1992

Handicap International physical therapy assistant training manual

Susan Eitel
Loyola University Chicago

LOYOLA UNIVERSITY CHICAGO

HANDICAP INTERNATIONAL PHYSICAL THERAPY ASSISTANT TRAINING MANUAL

VOLUME 2

CHAPTERS 24 - 39

A THESIS SUBMITTED TO

THE FACULTY OF THE DIVISION OF CURRICULUM AND INSTRUCTION

IN CANDIDACY FOR THE DEGREE OF

MASTER OF ARTS

DEPARTMENT OF CURRICULUM AND INSTRUCTION

by

SUSAN EITEL

CHICAGO, ILLINOIS

February 1992

TABLE OF CONTENTS

CHAPTER

CHAPTER 24

FRACTURES

A FRACTURE is a broken bone.

OBJECTIVES

At the time of the exam and with 80% proficiecy, the student will be able to correctly:

1. describe how a fracture heals.
2. identify the bone, and location of a fracture on x-ray.
3. compare simple and compound fractures
4. describe functional positions for the upper and lower limbs and state why they are important.
5. compare positive and negative effects of immobilization.
6. demonstrate appropriate P.T. evaluation and treatment for:
   - patients with different immobilization devices
   - patients that have had immobilization removed

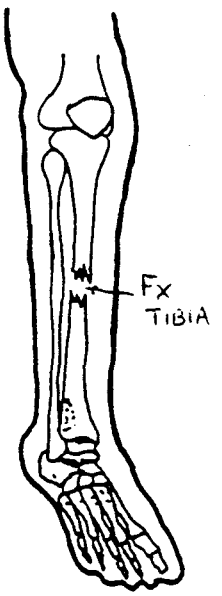
CHAPTER CONTENTS

A. WHAT IS A FRACTURE?

A fracture is a broken bone.

(Example: A "fractured tibia" means the tibia is broken.)

Fx or = fracture
Fx tibia = fractured tibia
tibia = fractured tibia



B. CAUSE OF A FRACTURE

Causes of broken bones are:

disease

trauma

C. SPECIFIC INFORMATION ABOUT A FRACTURE

Fractures are very common. The following information is given to help the PTA better understanding broken bones.

1. Names and Types of Fractures
2. Symptoms and Signs of Fractures
3. Problems a Fracture Can Cause
4. Fracture Healing (How and When)
5. Pseudarthrosis

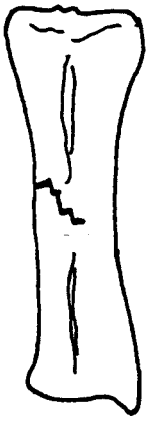
1. Names and Types of Fractures

NAMES OF FRACTURES

Fractures are named by describing the break in the bone.

The PTA will NOT have to remember the names of different fractures. These names are given as a reference only.

GREENSTICK (partial break of the bone)

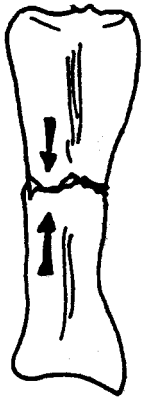


TRANSVERSE

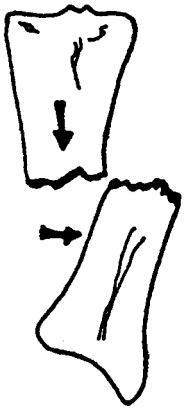
OBLIQUE

COMMINUTED (bone is broken into more than two pieces)

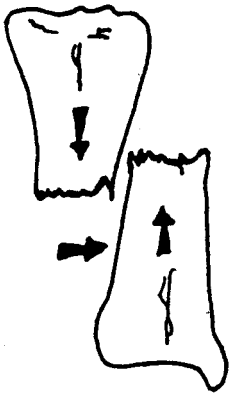
COMPRESSION



DISPLACED



DISPLACED WITH OVERLAPPING



Fractures can be identified by how they look on x-ray.

An x-ray is a type of picture of the inside of your body.

The more dense (hard) parts are white on an x-ray.

If there is a fracture, the white part may look broken, separated, or abnormal.

Activity:

Below are pictures of x-rays. Please put a circle around the area when the bone has been fractured.

TYPES OF FRACTURES

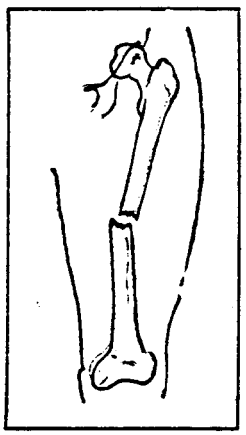
There are two main types of fractures. These are:

a) Closed fracture (Simple fracture)

b) Open fracture (Compound fracture)

a) <u>Closed fracture (Simple fracture)</u>

A closure fracture means that broken bone <u>remains inside</u> the skin.



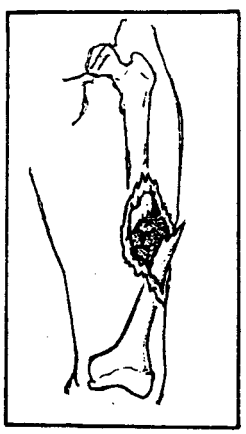
b) <u>Open fracture (Compound fracture)</u>

An open fracture means the skin has been opened in such a way that the <u>broken bone</u> and <u>outside air</u> can meet.

This can happen in two ways:

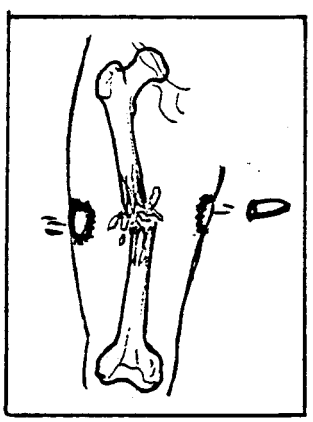
i) Skin is broken from the inside.

(Example: The fractured bone has pushed through the skin.)



ii) Skin is broken from the outside.

(Example: A bullet passes through the skin. This causes a wound and a bone fracture.)



Compound fractures are open doorways for bacteria. They must be kept very clean because they can easily get infected.

Questions:

1. A bone was broken in many places. The skin was not broken. What type of fracture is this (simple or compound)?

   _____

2. Are infections more common in open or closed fractures?

   _____

   Why? _____

   _____

3. You hear a PTA describe a simple fracture as a fracture with a small break in the bone, and a compound fracture as a fracture with many breaks in the bone.
   Do you agree with the description?
   Yes _____ No _____

   Why or why not?

_____

_____

_____

2. Symptoms and Signs of Fractures

After a bone has been broken, the patient may have:

* hear the bone break
* PAIN at the fracture site
* swelling
* limb deformity or unnatural movement

3. Problems a Fracture Can Cause

The two main problems a fracture can cause are:

a) damage to other body parts

b) infection

a) damage to other body parts

When a bone breaks, it may damage body parts that are close to it.

Body parts that can be easily damaged by a broken bone are:

* arteries and veins
* peripheral nerves
* special protected areas

Questions:

1. Many of your ribs are broken. What body part(s) could be damaged by these broken ribs?

_____

_____

2. A man has a fractured humerus. The broken bone cut the motor nerve that controls the wrist extensors. Describe the patient's problem because of this nerve damage.

_____

_____

3. You have a fracture of three vertebrae. What body part could be damaged because of these broken vertebae?

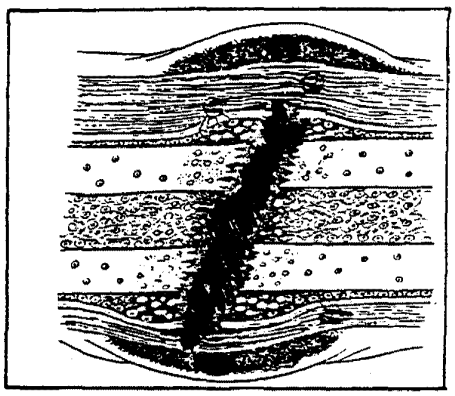
_____

b) infection

Compound fractures can easily become infected if the wound is dirty. Infection causes slower consolidation.

It is very important to keep wounds clean.

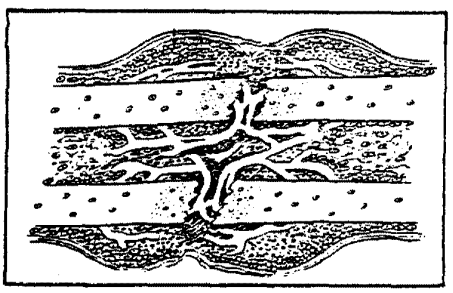
4. Fracture Healing (How and When)



a) HOW does a fracture heal?

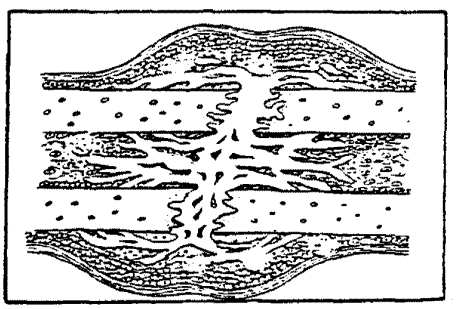
i) When a bone is broken it bleeds.

This bleeding is one reason for the swelling that occurs in a simple fracture.



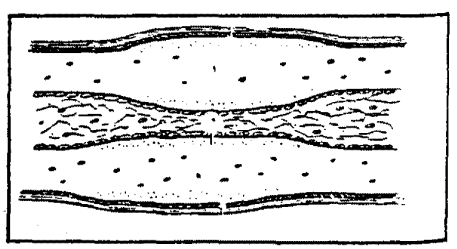
ii) After about two weeks, the inner periosteum will begin to produce new bone. (See OSTEOLOGY chapter, Volume 1.)

This new bone grows and works to join the broken bones together.



iii) In the beginning, this new bone is not very strong and is often called a "callus".

A callus can be seen on x-ray after about 3-5 weeks.



iv) Little by little, bone that is more hard replaces the callus.

When the bone is completely healed, it is called consolidation.

A doctor will decide if the bone has consolidated.

To identify how strong a bone is, the doctor can do two things:

* look at the x-ray

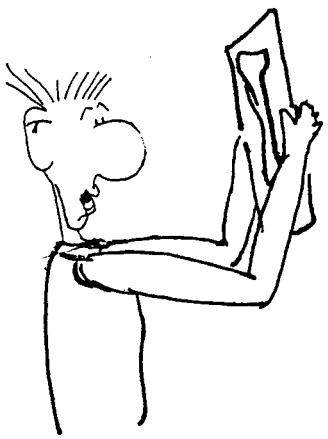
* manually check the patient

* look at the x-ray

The doctor will look at x-rays that were taken at different times to compare them.

He will look to see if the fractured area becomes whiter (harder) with time.

When the doctor thinks that the bone is consolidated, he will manually check the patient.



* manually check the patient

When the x-ray shows that the fractured bone is hard, the doctor will try to move the fractured area with his hands.

Example:

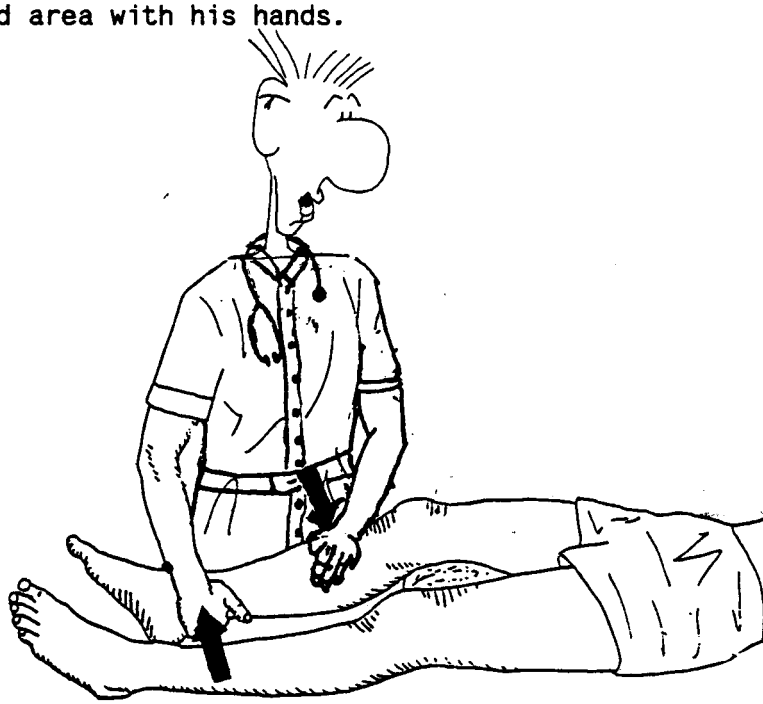
A patient had a fracture of the tibia.

The doctor thinks that the tibia has consolidated.

He will test the tibia to see if it moves when he pushes on the bone.

If the bone moves when he pushes on it, it is not yet consolidated.

If the bone does not move when he pushes on it, the fracture has consolidated.



b) <u>WHEN does a fracture heal</u>?

The amount of time it takes for a fracture to heal (consolidate) depends on the following things:

i) patient age - young people heal faster than older people.

ii) nutrition - good food (milk, rice, vegetables, meat) helps bones consolidate faster.

iii) wound care - if there is infection, the bone will consolidate more slowly.

iv) immobilization - if there is movement at the place where the bones are broken, the bones will not consolidate.

v) blood circulation - bones that have a better blood supply will consolidated faster. (Exercise can increase blood supply to a bone.)

vi) type of fracture - simple Fx heals faster than compound; transverse Fx heals faster than comminuted.

vii) type of bone - see chart (on next page) for details.

<u>Question:</u>

A patient has a fracture. Look at the information above. What four things can a patient do to help a bone heal faster?

_____

_____

_____

_____

GENERAL CONSOLIDATION TIME

Consolidation time depends on the individual patient, but general healing times for different bones can be seen on the chart below.

BODY AREA	GENERAL CONSOLIDATION TIME
upper limb: (humerus, radius, ulna)	ADULT = 1.5 months CHILD = 3 weeks
lower limb: (femur, tibia, fibula)	ADULT = 3 months CHILD = 1.5 months
ribs, scapula, clavicle	1 month
vertebrae: carpals, tarsals	3 months
distal hand (phalanges) distal foot (phalanges)	1.5 months

Question:

A patient has a fractured tibia and a fractured ulna. The tibia healed faster than the ulna. Is this what you would expect?

_____ yes _____ no

Please list three reasons why the tibia had healed faster than the ulna.

_____

_____

_____

5. Pseudarthrosis

Pseudarthrosis are bones that do not consolidate completely even after a long time.

Questions:

1. Please write two reasons why a bone may not grow together.

_____

_____

_____

2. A patient had a fracture of the left femur. After five months the doctor says he has a pseudarthrosis. What does this mean?

_____

_____

Is this a problem for the patient? _____ yes _____ no

Explain your answer. _____

_____

_____

_____

D. MEDICAL TREATMENT OF A FRACTURE

Medical treatment for fractures includes:

1. REDUCTION (put the broken bone in a good position).
2. IMMOBILIZATION (keep the bone in a good position).
3. Decide WEIGHT BEARING status (for lower limb fractures).

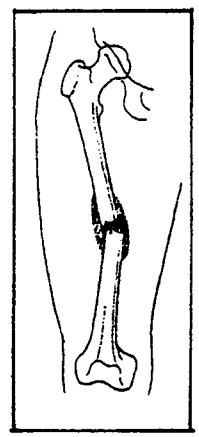
In addition, medicine may be given to:

a) decrease pain

b) prevent infection in open fractures

1. REDUCTION

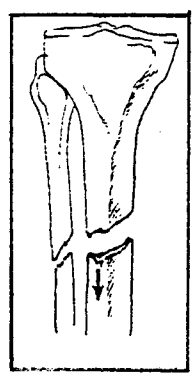
After a fracture, the broken bone may be in a bad position.



A bad position means that the broken ends of the bone are not in a good line with each other.

If the bone grows together in a bad position, the limb shape may be abnormal.

REDUCTION is the way to put the broken bone in a good position.



A good position means that the broken ends of the bone are in a straight line with each other.

If the bone grows together in a good position, the limb shape will be normal.

Question:

Reduction is the way to put a broken bone in a good position. All fractures should be in a good position so that the bones can grow together with a normal shape.

Do all fractures need reduction? _____ yes _____ no

Explain your answer. _____

_____

_____

_____

Reduction for fractures can be made in three ways:

a) manual reduction (closed reduction)

b) surgical reduction (open reduction)

c) bone traction

a) manual reduction (closed reduction)

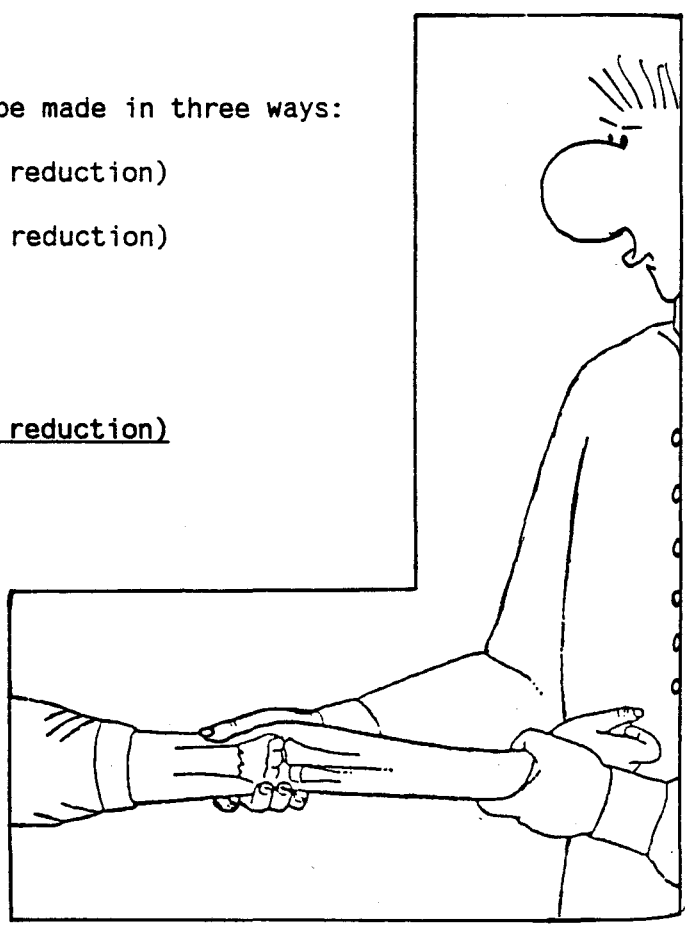
Manual reduction is made by the doctor.

The doctor uses his hands to put the broken bone in a good position.

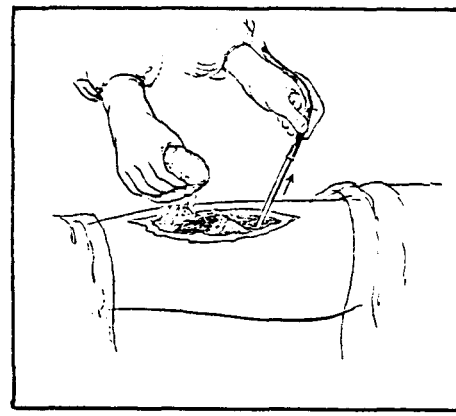
The skin remains closed.

The doctor positions the broken bone without opening the skin.

This technique is used for simple fractures that can easily be put in a good position.



b) surgical reduction (open reduction)

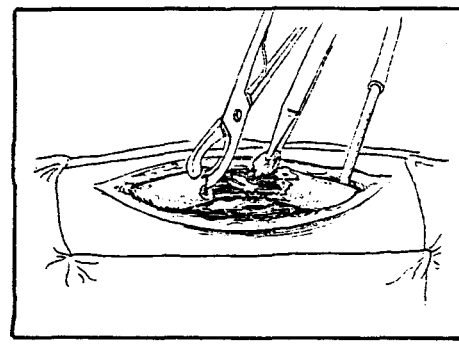


Surgical reduction is made by the doctor.

The doctor uses his hands to put the broken bone in a good position.

The skin covering the fractured bone is open.

The skin may have been opened because of a compound fracture.

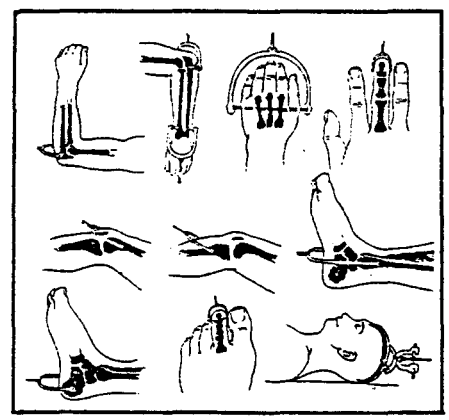


The doctor will clean the fracture area (remove metal or dirt), and then position the bone as well as possible.

c) bone traction

Bone traction is a system (different parts that work together) to to pull overlapping bones into a good position.

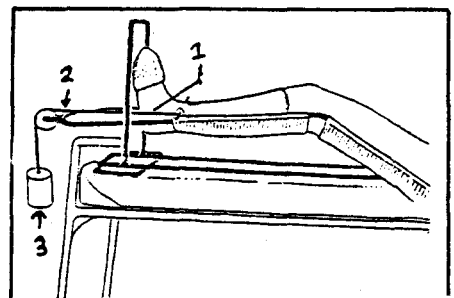
The traction system has three parts:



1) metal attachment to the bone

2) rope attached to the metal and a board that guides the rope to pull the bone in the right direction

3) weight attached to the rope will slowly pull on the bone moving it into a good position.



2. IMMOBILIZATION

Immobilization prevents movements.

With immobilization, the fractured bone stays in a good position.

The different ways to prevent a fractured bone from moving are:

IMMOBILIZE THE JOINTS ABOVE AND BELOW THE FRACTURE.	splint plaster (POP, cast)
IMMOBILIZE THE FRACTURED BONE ONLY	external fixator internal fixator
TRACTION	traction

The type of immobilization used will depend on the type of fracture, the location of the fracture, and the doctor's decision.

The different types of immobilization will be discussed in the following order.

a) splint

b) plaster (POP, cast)

c) external fixator

d) internal fixator

e) traction

a) splint

Immediately after a fracture there is a lot of swelling.

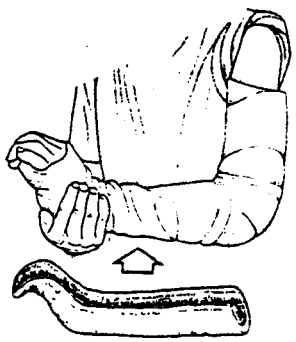
Question:

Please give one reason why there is swelling after a fracture.

_____

_____

A splint is used to immobilize the fracture during the time that there is a lot of swelling.

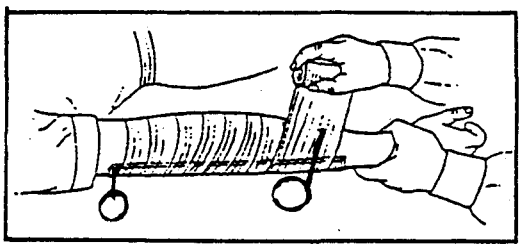


Most often a splint is used for patients that have closed fractures.

A splint is made of two parts:

i) a hard part that fits on the fractured limb.

ii) an elastic bandage that holds the hard part on the limb.



This elastic bandage also helps to decrease swelling by keeping a slight pressure on the area.

After the swelling has decreased, the doctor will use a different type of immobilization that is better at preventing movement for a long time.

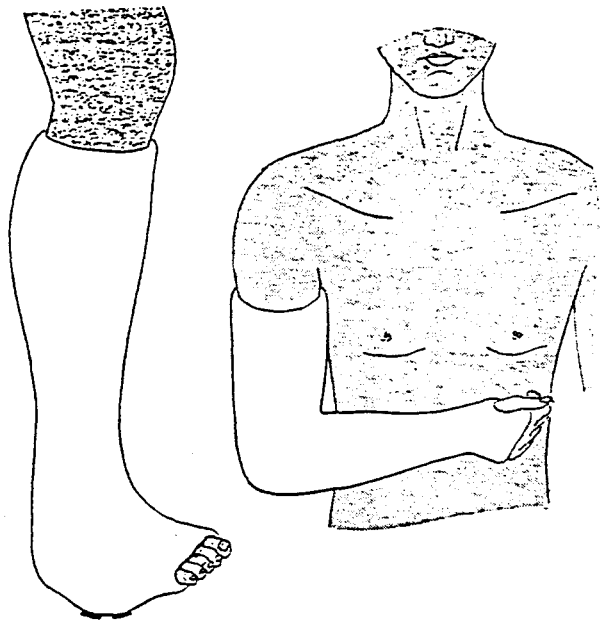
b) <u>plaster (POP, casting)</u> (See PLASTER chapter, Volume 2)

** POP = Plaster Of Paris

Plaster is a material that is very hard when it dries.

After swelling has decreased, plaster is used to immobilize the fracture.

The doctor puts the joints in a <u>functional position</u>; then he wraps the limb with a hard and fast drying material (plaster).



The joints <u>above the fracture</u> and <u>below the fracture</u> must be immobilized with the POP to prevent any movement of the broken bone.

FUNCTIONAL POSITIONS

When the joints are immobilized, they should be immobilized in a functional position.

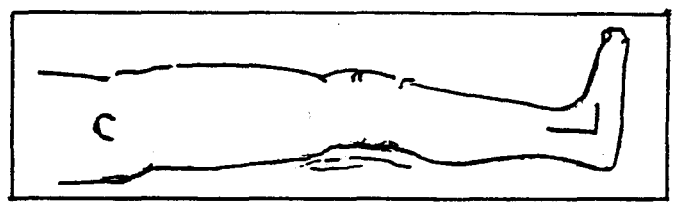
Functional positions are important because the joint is useful even if there is tightness/stiffness.

<u>Functional positions</u> for the joints of the UPPER LIMB are:

SHOULDER	a little flexion, abduction, internal rotation
ELBOW	flexion 90°
FOREARM	neutral
WRIST	a little extension
FINGERS	a little flexion
THUMB	opposition

Functional positions for the joints of the LOWER LIMB are

HIP	neutral
KNEE	a little flexion
ANKLE	neutral
FOOT	neutral
TOES	neutral



Questions:

1. The tibia is fractured. What joints should be immobilized by the POP?

_____

2. The right ulna is fractured.

(A) Draw a picture of where to put the POP on the upper limb.

(B) Describe the functional position of the upper limb in the POP.

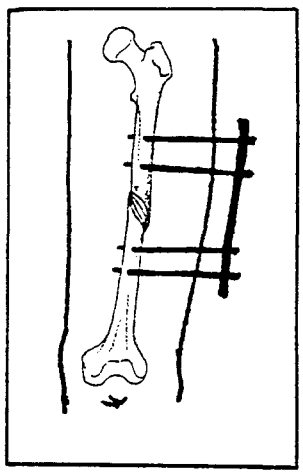
_____

_____

_____

c) external fixator

An external fixator is a type of immobilization that attaches to the bone.



4-6 pins are put into the broken ends of the bone and attach to a metal bar on the outside of the skin.

This type of immobilization is very strong and safe.

The places where the pins enter the skin should be kept very clean to prevent infection.

Question:

A patient has an open fracture and the bone is broken in many places. The doctor uses an external fixator to immobilize the broken bone.
List two reasons why an external fixator may be better than plaster to immobilize this bone.

_____

_____

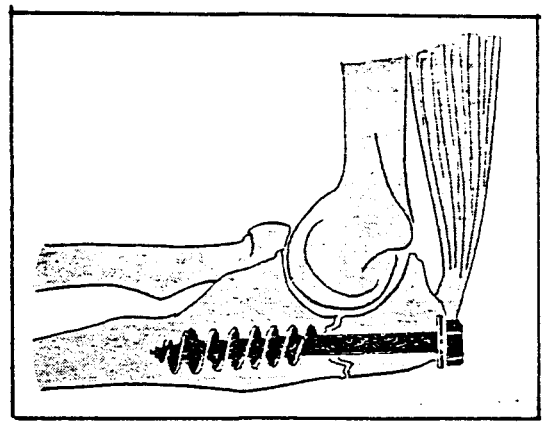
_____

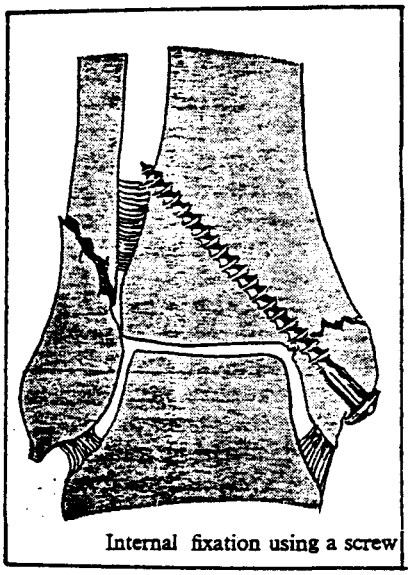
d) internal fixator

An internal fixator is a type of immobilization that attaches directly to the bone.

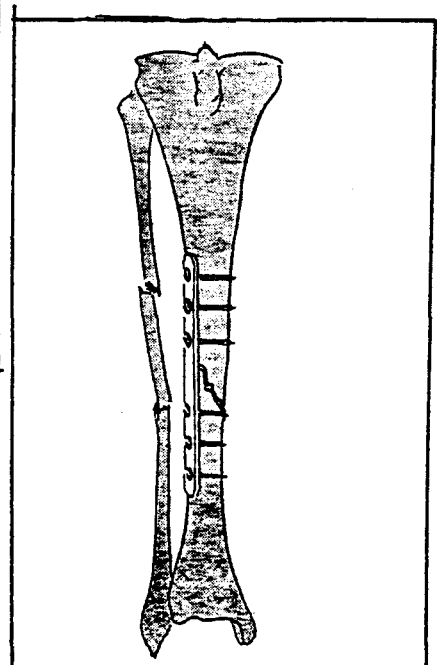
All of the pins and metal are on the inside of the skin.

An internal fixtor can be inside of the bone, or be directly on top of the bone.

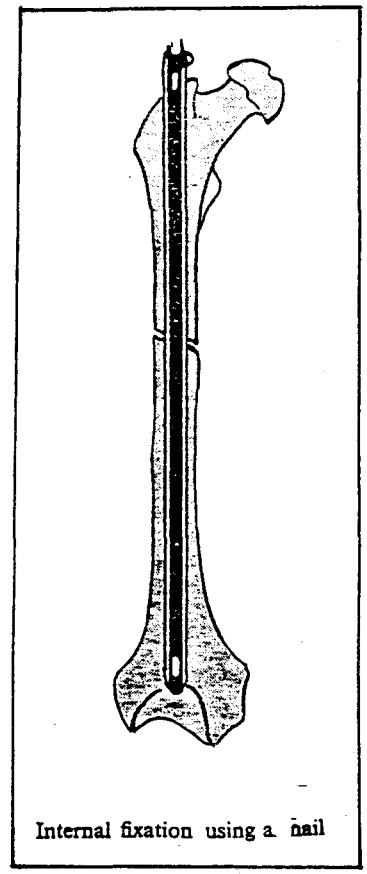




Internal fixation using a screw



Internal fixation using a plate and screws



Internal fixation using a nail

Internal fixators have a HIGH RISK OF INFECTION.

Questions:

1. What is the difference beween an internal fixator and an external fixator?

_____

_____

2. Why are internal fixators not often used in developing countries?

_____

_____

e) traction

Traction was described as a way to make reduction of a fracture.

Traction can also be used as a way to immobilize a fracture until a callus is made (the fractured bone is stable).

After there is a callus, a different type of immobilization may be used.

Questions:

1. What does "make reduction" mean?

_____

_____

_____

Questions: (continued)

2. Please list the three parts of a traction system and describe how they work.

_____

_____

_____

_____

3. WEIGHT BEARING

WEIGHT BEARING is putting some amount of weight through a bone.

Activity:

For each picture given, please write the weight bearing parts.

A. _____

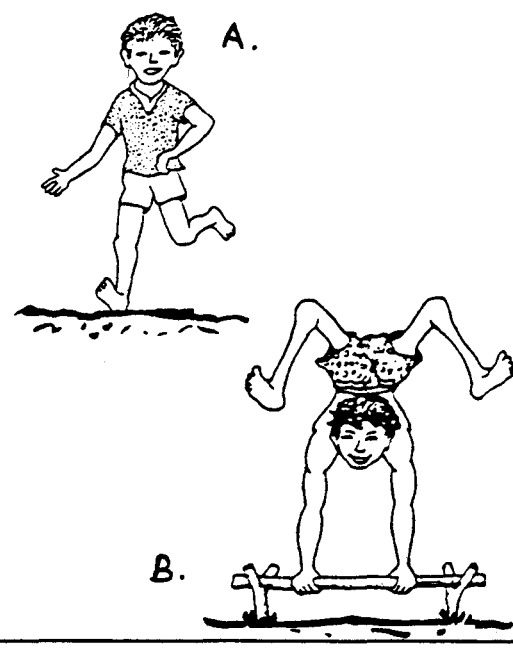
_____

_____

B. _____

_____

_____



A doctor will decide the amount of weight bearing.

A correct amount of weight bearing may help a bone grow.

An incorrect amount of weight bearing (too much) may damage the fracture or cause the bone to break again.

The amount of weight bearing is decided by knowing how strong the bone is (how much the bone has consolidated).

Question:

What are two ways that a doctor can identify how strong a bone is?

_____

_____

Common words about how much weight a limb can hold are:

a) NO WEIGHT BEARING (NWB)

b) PARTIAL WEIGHT BEARING (PWB)

c) HALF WEIGHT BEARING (HWB)

d) FULL WEIGHT BEARING (FWB) or TOTAL WEIGHT BEARING (TWB)

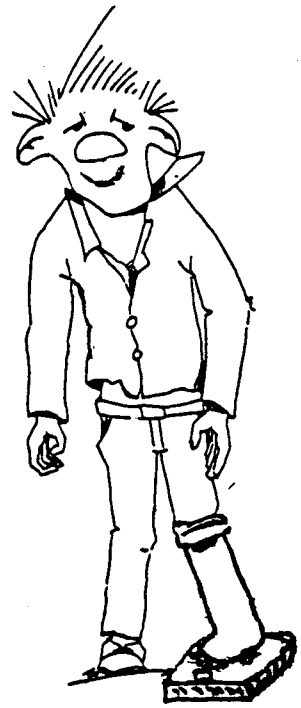
a) NO WEIGHT BEARING (NWB)

The patient must put no weight on the fractured limb.

Left leg no weight bearing

b) PARTIAL WEIGHT BEARING (PWB)

The patient may put some weight on the fractured limb.



The amount of weight will be:

* a number of kilograms
  (Example: 2kg WB on the limb)

A scale is useful to have the patient practice putting a specific amount of weight on the limb.

* a percent of the patient's body weight
  (Example: 20% of patient's body weight).

c) HALF WEIGHT BEARING (HWB)

The fractured limb can hold half the patient's body weight.

d) FULL WEIGHT BEARING (FWB) or TOTAL WEIGHT BEARING (TWB)

The patient can put all of the body weight on the limb.

IN SUMMARY

Reduction is made to put the bones in a good position.

Immobilization is made to keep the bones in a good position.

Fractures are immobilized so the bones can grow together well. If there was movement, the bones could rebreak very often.

Weight bearing may help a bone to become strong, but too much weight bearing could rebreak a bone.

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH A FRACTURE

The PTA should carefully evaluate the following:

* location of the fracture (what bone, what side of the body)

* immobilization used (type, specific location)

  . splint:
  - fits well on the limb
  - bandaging not too tight

  . plaster (POP)
  - limb in good functional position
  - plaster equally hard in all places
  - not too loose
  - not too TIGHT
  - any pain from plaster

  (If the plaster is too tight, the distal part of the limb may have decreased movement and feeling, feel cold, look blue.)

  If the patient has any of these symptoms, the doctor should replace the plaster as soon as possible.

  . external fixator
  - pin area clean

  . traction
  - is the system pulling the bone in the right direction (same line as proximal part of the bone)
  - pin area clean

* pain (when, where, how much)

* swelling (where, how much)

* range of motion (does pain or immobilization limit ROM, where)

* function of the patient

* weight bearing status (for lower limb fractures)

* does the patient need devices (sling or walking aid)

* other problems (infection)

* <u>general</u> strength of patient (no muscle testing of muscles near the fracture)

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH A FRACTURE

The three general groups of patients that need treatment are:

1. PATIENTS WITH A FRACTURE NOT YET CONSOLIDATED

2. PATIENTS WITH A FRACTURE THAT HAS CONSOLIDATED

3. PATIENTS WITH SPECIAL CASES OF FRACTURES

1. PATIENTS WITH A FRACTURE THAT HAS NOT YET CONSOLIDATED

If the fracture has not yet consolidated, the patient should continue to have some type of immobilization.

Before the fracture consolidates (heals completely), the PTA must remember the following rules:

** NO DEEP MASSAGE OVER THE FRACTURE **

** NO ROTATION OF THE FRACTURED BONE **

** NO PUSHING OR RESISTANCE DISTAL TO THE FRACTURE **

** NO MUSCLE TESTING NEAR THE FRACTURE **

Questions:

1. Why do you not give deep massage over a bone that has not yet healed?

2. Why can you give a little resistance proximal to the fracture and no resistance distal to the fracture?

The common types of immobilization for fractures are:

i) splint

ii) plaster (POP)

iii) external fixator

iv) traction

PT treatment guidelines for each immobilization are given in the following pages.

i) splint

General PT treatment for patients with a splint are:

a. follow the doctor's instructions

b. tell the patient why he has a splint and that he must always wear the splint

c. keep the fractured area elevated to decrease swelling

d. remind the patient not to move the fractured area

e. active movement to decrease swelling

Question:

A patient would like to remove his spling when he takes a shower. Is this a good idea?

Yes _____ No _____

Explain your answer.

_____

_____

_____

ii) plaster (POP)

General PT treatments for patients with plaster are:

a. follow the doctor's instructions

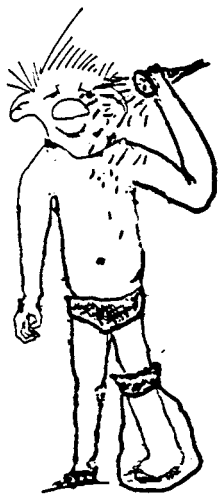
b. active movement for all joints of the body

c. isometric contractions for the muscle under the plaster.

d. active movements of the parts distal to the fracture

e. patient/family teaching about plaster - do not put it in water, it will become soft.

When bathing, the patient should put a plastic bag around the plaster.



Question:

A patient has a fracture of the left ulna. She is immobilized by a POP. She complains of pain in her wrist and decreased feeling in her fingers.

What must you do for this patient?

_____

_____

Explain your answer.

_____

_____

_____

iii) external fixator

General PT treatments for patients with an external fixator are:

a. follow the doctor's instructions

b. make sure the pin area is clean

c. active/resistive exercise for muscles except the muscles with the external fixator

d. active/active assistive exercise for the joint near the external fixator

   This is according to patient's pain!

   If the patient feels a lot of pain, stop the activity or decrease the level of activity.

e. gentle stretching of joints near external fixator to help increase ROM.

Question:

A patient has a fractured right femur with an external fixator. He has a very stiff knee and very weak knee extensor muscles.

Explain how Physical Therapy can help this patient.

_____

_____

_____

_____

iv) traction

General PT treatments for patients with traction are:

a. follow the doctor's instructions

b. breathing exercises to prevent respiratory problems.

c. prevent bedsores (patients can make small lifts to decrease pressure on posterior body parts.

d. these exercises do not move the part in traction

3. isometric co-contraction for the part in traction

(Co-contraction means to contract muscles on all sides of the joint at the same time.)

Questions:

A patient is in traction for a fracture of the right femur.

1. What muscles will you exercise isometrically?

_____

_____

2. What parts(s) of the body should not move?

_____

_____

3. Describe how the patient can prevent pressure sores on the back and butt.

_____

_____

_____

2. PATIENTS WITH A FRACTURE THAT HAS CONSOLIDATED

After the fracture has consolidated, the immobilization is removed.

General PT treatments for patients with immobilization removed are:

a. follow the doctor's instructions

b. in the beginning, active movements are used to increase ROM.

   Active movements help the patient to feel less afraid because the patient controls the movement.

   After 1-2 weeks, passive movements can be used to increase ROM. Most often, STRETCHING techniques will be needed to regain normal ROM after immobilization.

c. active assistive/active exercise of the part where immobilization has been removed.

Questions:

A man has fractured his tibia. He was immobilized in a POP for three months. The POP was from above the knee to below the ankle. His POP was removed two days ago.

1. List the movements that may be limited.

_____

_____

_____

2. Please decribe how you will begin to increase ROM at these joints.

_____

_____

_____

3. PATIENTS WITH SPECIAL CASES OF FRACTURES

Some bones of the trunk may receive treatment that is a little different than the bones of the limbs.

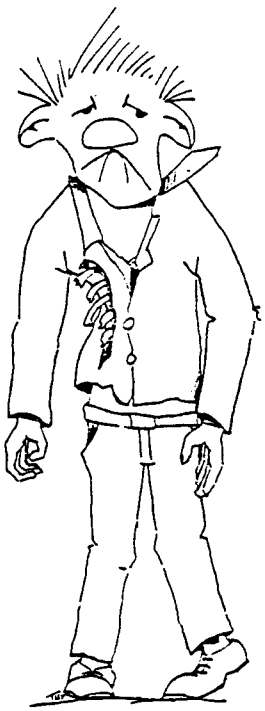
Bones that are special cases are the:

a) ribs

b) clavicle

c) fibula

d) vertebral column

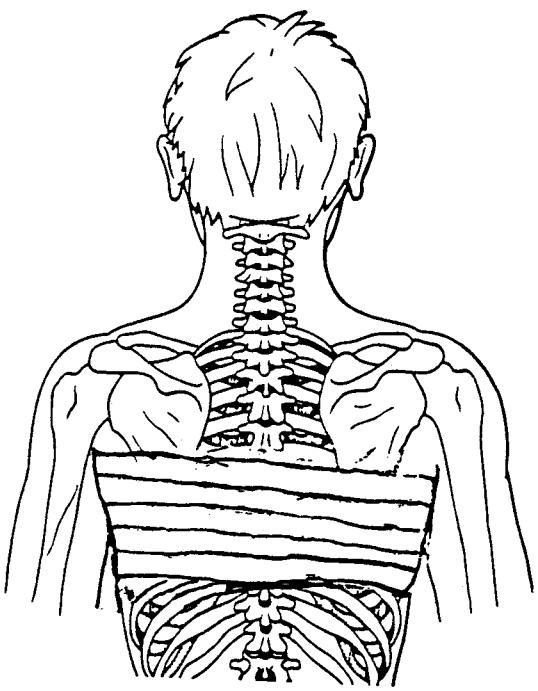


a) ribs

Generally, treatment for a rib fracture may be to <u>bandage the chest to decrease pain</u>.

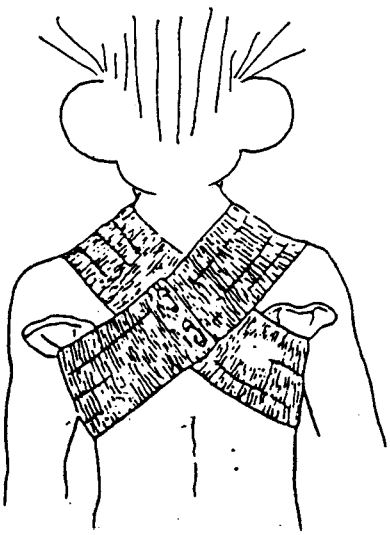
The patient should do <u>deep breathing</u> every day to prevent respiratory problems and keep the ribs mobile.

If a fractured rib has injured a lung then medical treatment is needed.



b) clavicle

If the clavicle is fractured, the arm of the same side should be put in an arm sling and rest for one month. (See BANDAGING chapter, Volume 2)



The PTA may need to slowly increase strength and ROM of the shoulder after one month.

c) fibula

If the fibula has been fractured the patient may have a POP or the patient may have no treatment and full weight bearing.

Question:

Why can the patient have total weight bearing after a fractured fibula?

_____

_____

_____

_____

d) vertebral column

If the vertebral column has been fractured, the patient should not be in sitting or standing positions without immobilization.

Sitting and standing positions will increase the weight on the vertebral body and may make the fracture worse.

The patient may have plaster or a special brace around the trunk to help hold some body weight and keep the vertebrae in a good position.

Generally, positions of trunk extension are best for patients with verebral body fractures.

Physical Therapy treatments for vertebral body fractures are:

a. follow the doctor's instructions

b. strengthening exercises of the limbs if appropriate

c. breathing exercises to prevent respiratory problems.

Questions:

1. Why are trunk flexion exercises NOT recommended for patients with fractures of the vertebral body?

2. A patient has a compression fracture of the vertebral bodies L3, L4 and L5. Describe in your own words the location and type of fracture.

3. A fractured vertebrae may put pressure on the spinal cord. Is this a problem?

Yes _____ No _____

Why or why not?

G. CHAPTER SUMMARY

A fracture is a broken bone.

A simple (closed) fracture means the bone remains inside the skin.

A compound (open) fracture means the skin has been broken in such a way that the broken bone and the outside air can meet.

A fracture heals by the inner periosteum making new bone that forms a callus. Little by little this callus becomes more hard. Consolidation is when the bone has completely healed.

General consolidation times are given for different body areas.

Complications that can happen with fractures are damage to other body parts and infection.

Pseudarthrosis is a bone that doesn't heal.

Reduction means to put the fractured bone in a good position.

Immobilization is the way to keep the broken bone in a good position. Immobilization prevents movement.

If joints are immobilized they should be in functional positions.

Functional positions are important because the limb is useful even if there is stiffness in the joints. Specific functional positions are given in the chapter.

Immobilization helps the bones grow together because it prevents movement around the fractured bone. Immobilization can also cause joint stiffeness and muscle weakness.

Physical Therapy evaluation and treatment guidelines were given for patients with different immobilization devices and for patients with immobilization removed.

Before a fracture consolidates the PTA must follow these rules:

- NO DEEP massage over the fracture
- No rotation of the fractured bone
- No pushing or resistance distal to the fracture
  (no muscle testing near the fracture)

Treatment guidelines were given for special fractured areas:

- clavicle
- ribs
- vertebral bodies

CHAPTER 25

AMPUTATIONS

An AMPUTATION is a loss of one part of the body.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. identify good patient positioning to decrease joint stiffness in AK and BK amputees.
2. describe appropriate Physical Therapy treatments for different stages of recovery for an amputee.
3. demonstrate appropriate bandaging techniques for AK and BK amputees.
4. demonstrate appropriate massage techniques for AK and BK amputees.
5. demonstrate the process of gait training for AK and BK amputees.
6. identify gait problems and describe solutions to decrease these problems.

CHAPTER CONTENTS

A. WHAT IS AN AMPUTATION?

An amputation is a loss of one part of the body.

The person who has lost a part of the body is often described as an amputee.

B. CAUSE OF AMPUTATIONS

Causes of amputations can be from:

1. trauma (mine injury, shelling, car accident)

2. disease (cancer, infection, diabetes)

3. congenital (a child born with limbs missing)

C. SPECIFIC INFORMATION ABOUT AMPUTATIONS

Because amputations are common, the PTA will be given much information to better understand this type of patient.

Information given in this section includes:

1. LOCATIONS (TYPES) OF AMPUTATIONS
2. HANDICAP INTERNATIONAL PROSTHESES, SOCKET SHAPE AND WEIGHT BEARING
3. TEMPORARY PROSTHESIS
4. SURGICAL PROCEDURES AND HANDICAP INTERNATIONAL GUIDELINES
5. COMPLICATIONS OF AMPUTATIONS.
6. PHANTOM PAIN
7. PERIODS OF RECOVERY FOR AMPUTEES

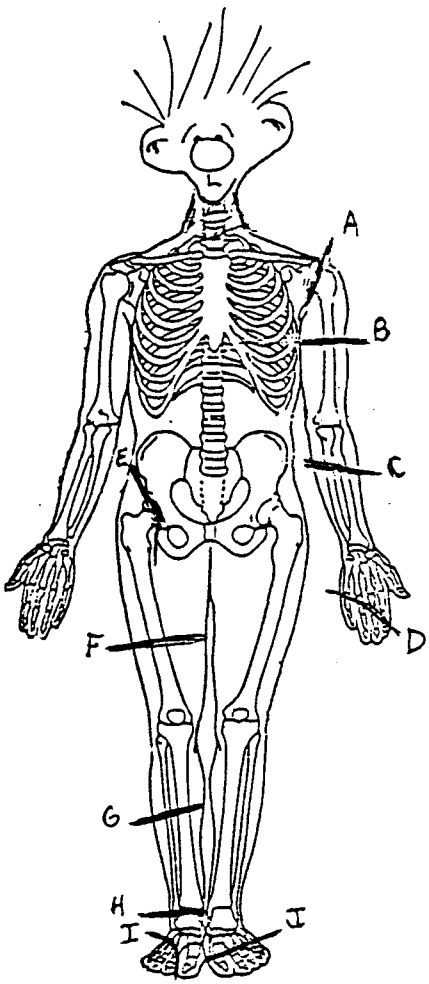
1. LOCATIONS (TYPES) OF AMPUTATIONS

Any part of the upper or lower limbs may be lost from the body.

Types of amputations = naming where the limb was cut and removed.

Activity:

Look at the picture and name the types of amputations that are given. Some answers have been provided



___ Above Knee Amputation (AKA)

___ Shoulder Disarticulation

___ Below Elbow Amputation

I Partial Foot Amputation

___ Above Elbow Amputation

___ Below Knee Amputation (BKA)

___ Partial Hand Amputation

___ Ankle Disarticulation

___ Forefoot Amputation

E Hip Disarticulation

Questions:

1. Will there be a problem with the patella in a BK amputation?

   Yes _____ No _____

   Why or why not? _____

2. A person has an amputation of part of the upper limb. The arm and the proximal forearm remain. What bones have been cut in this amputation?

3. The femur has been cut. Only the proximal part of the femur remains. All other parts of the lower limb have been lost. What type of amputation is this?

AK and BK amputations are the most common and the most important for the PTA to remember.

Activity:	
A. Please draw a picture of a left AK amputee.	B. Please draw a picture of a right BK amputee.

B. HANDICAP INTERNATIONAL PROSTHESES, SOCKET SHAPE AND WEIGHT BEARING

A prosthesis is a device that replaces the missing body part.

Questions:

1. In an AK amputee, what two main joints are missing?

_____

_____

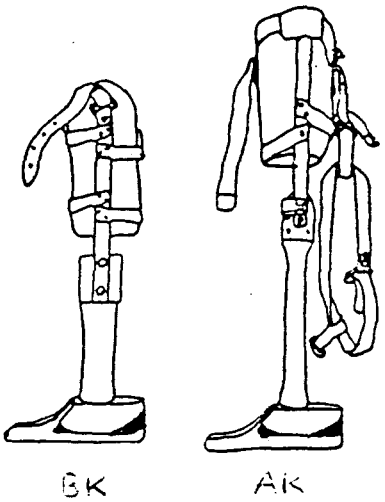
2. A BK amputee has a prosthesis. What two main body parts does this prosthesis replace?

_____

HANDICAP INTERNATIONAL is an organization that specializes in making AK and BK prostheses.

They make these protheses out of local materials.

The final prosthesis is made made out of leather, metal, wood, and rubber.



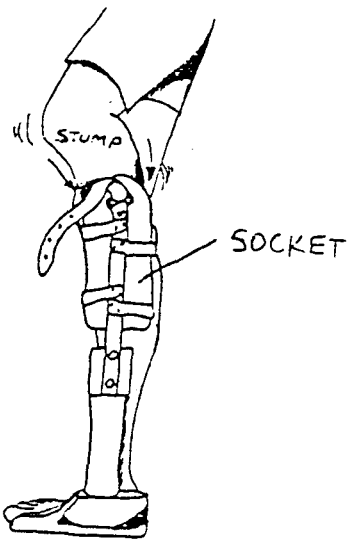
The PTA needs to understand basic vocabulary used in working with prostheses and amputees. These basic vocabulary words are:

The remaining part of the limb is called the STUMP.

Normally, the stump fits inside the prosthesis.

This is how the prosthesis is attached to the body.

The part of the prosthesis that holds the stump is called the SOCKET.



IN SUMMARY

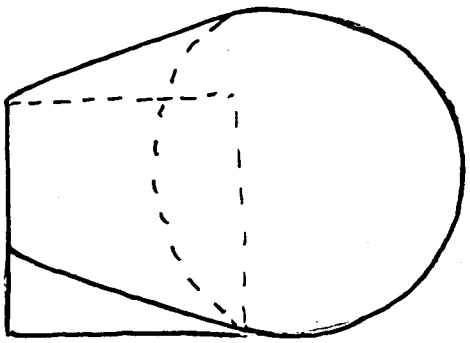
A stump is the part that remains after an amputation.

A prosthesis replaces the lost part of the limb.

A socket is the part of the prosthesis that fits over the stump.

In this section, we will present the general SHAPE and WEIGHT BEARING AREAS (in Handicap International prostheses) for AK and BK SOCKETS.

AK SOCKET



The superior view of an AK socket is shaped like a square and circle joined together.

The shape is like this to prevent the socket from turning on the stump.

Question:

Describe why the shape of the socket (above) is better than a round socket.

_____

_____

_____

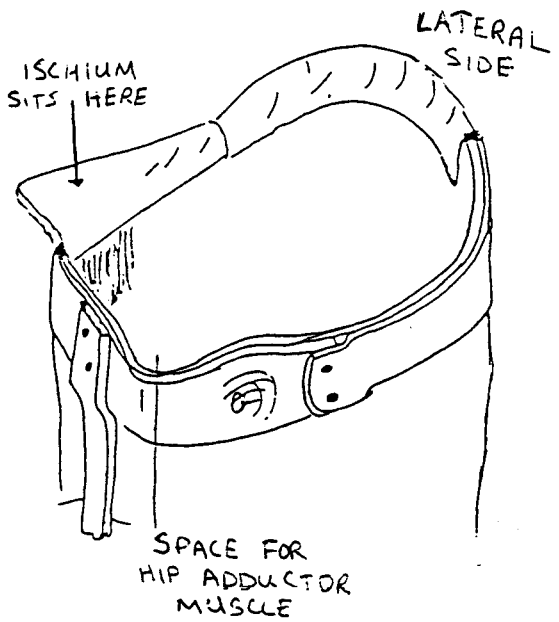
On the anterior/internal cornder there is a space for the tendon of the hip adductor muscle.

When the muscle contracts, the tendon has space to move.

On the posterior side of the AK socket, there is a "table".

The patient's ischium will sit on this table.

When the amputee stands, his weight is on the ischium. (On the posterior table of the socket).



(LEFT AK SOCKET ANTERIOR VIEW)

WEIGHT BEARING IS NOT ON THE DISTAL END OF THE STUMP !

Questions:

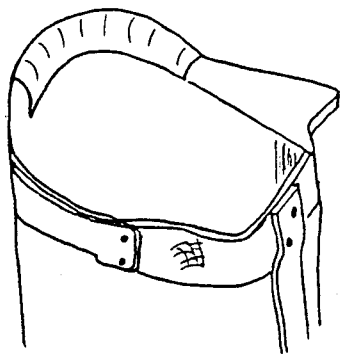
1. The patient has an AK prosthesis without a foot. The patient does not know what part of the socket is anterior and what part is posterior. Describe how you know the difference.

_____

_____

_____

2. What type of AK amputee can wear the socket in the picture, right or left?



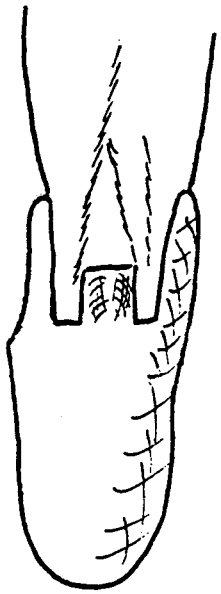
_____

Give two reasons for your answer.

_____

_____

BK SOCKET



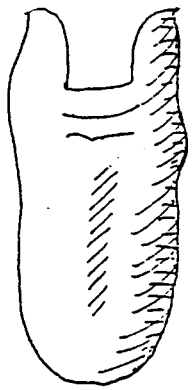
The BK socket is shaped like a triangle.

On the posterior side, there is a space for the tendons of the knee flexor muscle (hamstrings).

When the knee flexor muscle contracts, the tendons have space to move.

On the anterior/external side there is a space for the proximal part of the fibula.

This space decreases pressure on nerves that pass this area.



The anterior part of the socket fits closely to the tibia and pushes inward on the patellar tendon.

Weight bearing in a BK prosthesis is on the internal side of the tibia.

WEIGHT BEARING IS <u>NOT</u> ON THE DISTAL END OF THE STUMP !

Questions:

1. Why do you NOT want the distal part of the stump to hold the patient's weight?

_____

_____

_____

2. In anatomical position, what bone is on the external side of the leg, the tibia or the fibula?

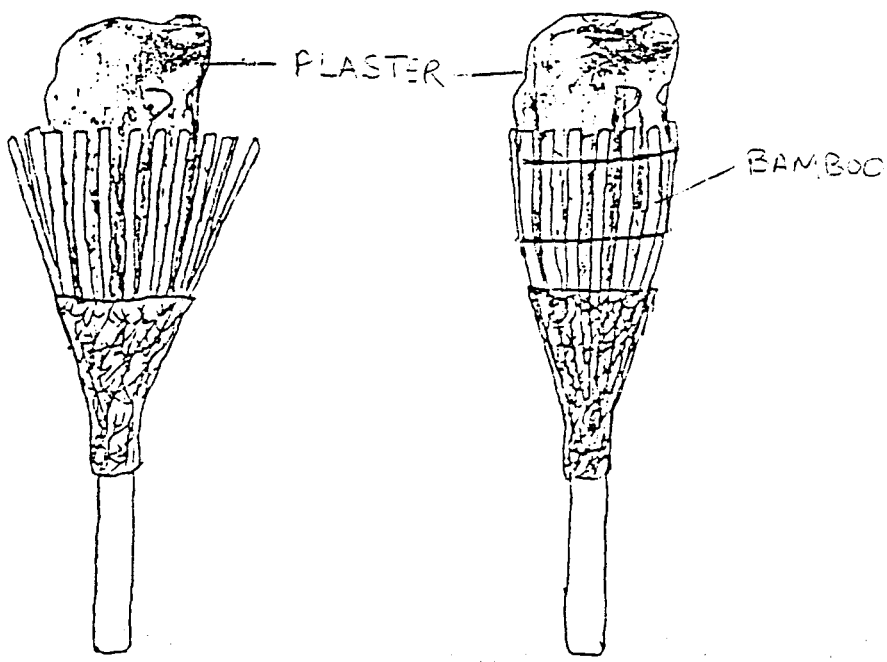
_____

3. TEMPORARY PROSTHESIS

In some countries, Handicap International makes temporary prosthesis.

A temporary prosthesis has a socket made out of plaster.

This socket is attached to the pylon by a bamboo bakest.



The socket will have the same shape as a normal AK or BK socket.

There are five main reasons for giving a patient a temporary prosthesis.

1. It is very fast and easy to make so that when the patient has good stump condition, he can begin gait training as soon as possible.

2. The size of the socket can be exchanged easily so that when swelling decreases or the stump shape changes, the socket can be changed quickly so training can continue.

3. The patient can begin gait training early which will help make walking easier when the patient receives the definitive prosthesis.

4. The patient psychologically feels better to begin walking when the stump is in good condition instead of having to wait a longer time for the definitive prosthesis.

5. Using the stump in a functional way will help to form a more normal shape more quickly.

4. SURGICAL PROCEDURES AND HANDICAP INTERNATIONAL GUIDELINES

The quality of the stump is very important to help keep the prosthesis attached to the body.

From experience, HANDICAP INTERNATIONAL has developed general guidelines for surgeons so that the stump can be as useful as possible.

These guidelines include suggestions for:

a. length of stump

b. coverage of the remaining bone

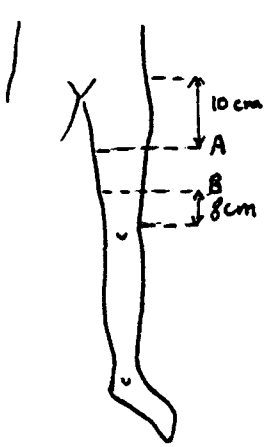
c. specific BKA information

a. <u>length of stump</u>

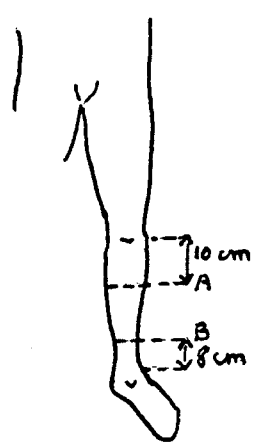
A = The shortest functional stump is 10 cm. (If the stump is too short, the patient cannot control the prosthesis well)

B = The longest functional stump is 8cm above the missing joint. (If the stump is too long, there is no space to attach the socket to the other part of the prosthesis)

C = Between "A" and "B" all amputations are possible; a longer stump is better for increased strength and control.



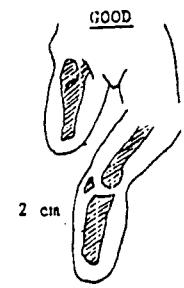
ABOVE KNEE AMPUTATION



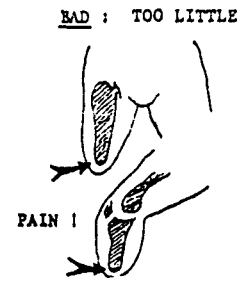
BELOW KNEE AMPUTATION

b. <u>coverage of the remaining bone</u>

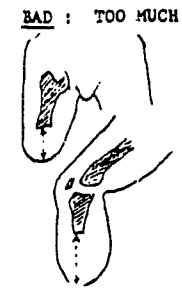
About 2 cm of muscle between the skin and the end of the bone is the best.



If there is not enough muscle covering the end of the bone, the patient will feel pain when any pressure is put on this area.



Too much muscle covering the end of the bone is useless and causes a problem in the prosthesis.

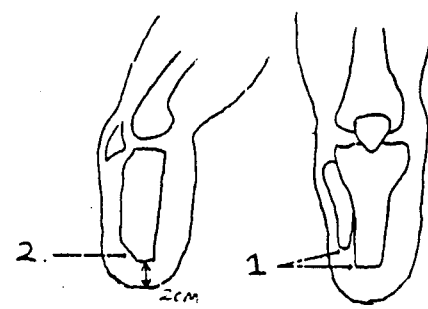


c. <u>specific BKA information</u>

There are two very important rules in cutting the bones of the leg:

1. The FIBULA must be shorter (2 cm) than the tibia.

2. The anterior part of the TIBIA should be removed and the remaining part rounded.



Both of these procedures will help to decrease the pain and complications of the BK amputee.

5. COMPLICATIONS OF AMPUTATIONS

There are many problems that could happen after an amputation.

The most common problems are:

a. infection

b. exostosis

c. neuroma

d. contracture

a. infection

Like any wound, the place of a new amputation is an open door for bacteria.

* An infection may cause skin death in that area.

  The amputee may need to have more surgery to remove the dead and infected areas.

* An infection means more time for the wound to heal.

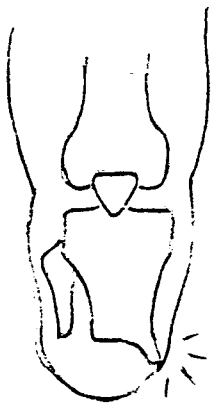
* An infection is painful.

The amputee must try very hard to keep the stump clean.

AN INFECTION IS A BIG PROBLEM FOR AMPUTEES AND SHOULD BE PREVENTED!

b. exostosis

Exotosis is the continued growth of bone after it is cut.



You can see this bone growth on an x-ray.

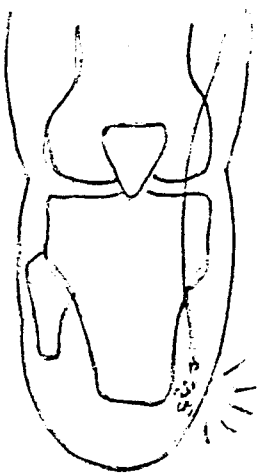
If it grows very much, it will be painful for the amputee.

The amputee will feel pain at the end of the bone.

The only treatment for exostosis is surgery to remove the unwanted bone.

c. neuroma

A neuoma is a circular growth of a nerve after it is cut.



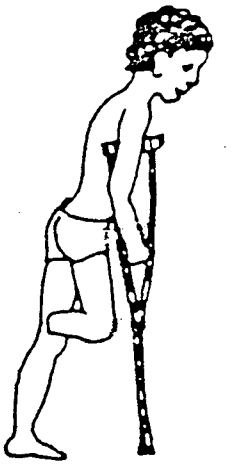
If this circular nerve is near the surface of the skin, this area will be painful when it is touched.

The patient may describe this pain as an "electric" pain going up the limb.

Again, surgery would be needed to remove a neuroma.

d. <u>contracture</u>

A contracture is tightness of a muscle that decreases joint movement.



A patient holds a joint in the same position for a long time .....

The muscle becomes tight.
The joint becomes stiff.
ROM is decreased.

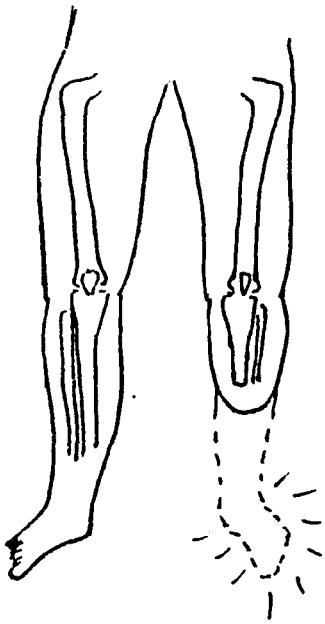
Contractures can be prevented by daily ROM and good patient positioning.

6. PHANTOM PAIN

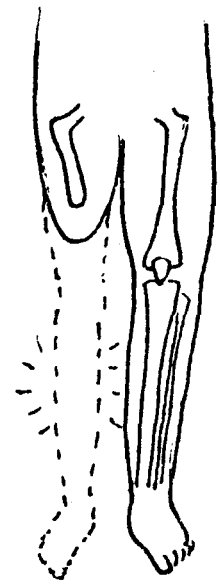
Phantom pain is pain in the part of the body that has been removed.

Examples:

A left BK amputee complains of pain in his left foot!



A right AK amputee complains of pain in his right calf!



Many patients may feel phantom pain after an amputation.

This pain may continue for 1-2 months (or longer).

To decrease phantom pain, a patient can apply pressure on the distal end of the stump.

7. PERIODS OF RECOVERY FOR AMPUTEES

There are four periods of recovery for patients with amputations:

a. nursing period

b. wound healing/strengthening period

c. early prosthetic period

d. advanced prosthetic period.

a. nursing period

The first 2-3 days after surgery, the patient may be very weak, painful and want to sleep.

b. wound healing/strengthening period

After 2-3 days, the patient should be more and more active in taking care of the wound and making the stump stronger.

c. early prosthetic period

After the wound has completely healed (3-4 weeks), the patient receives a prosthesis and is trained about how to put it on and use it in simple walking activities.

d. advanced prosthetic period

The patient demonstrates good and safe walking without assistance. He is able to go over obstacles,to and from the floor, up and down stairs, and other functional activities.

D. MEDICAL TREATMENT FOR AMPUTATIONS

Amputation surgery cuts the skin, muscles, nerves, and bones.

All of these parts must be attached together so that the stump is a good shape and size.

Medicine is given to help fight infection and decrease pain.

If a second surgery is needed to remove dead of infected skin, exostosis, or neuroma, it is called a stump revision.

GENERALLY

Medical treatment of amputees is very short.

Physical rehabilitation of amputees is very long.

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH AMPUTATIONS

The PTA must carefully evaluate the amputee for the following:

NURSING PERIOD

* location of amputation
* other injuries or medical problems
* general condition of the patient

WOUND HEALING/STRENGTHENING PERIOD

* stump condition (swelling, infection,. scar, healing)
* pain (where, when, what kind, possible cause)
* range of motion
* strength
* balance (standing, on knees)
* functional ability (dressing, walking with crutches)
* stummp bandaging technique (pages 27 - 29)
  - figure of 8 (not circular)
  - good pressure (distal more than proximal)
  - bandage flat

EARLY PROSTHETIC PERIOD

* check patient as in wound healing period

* technique of putting on a prosthesis (page 36-37)
  - remove bandage and apply cloth
  - cloth helps pull stump into socket
  - stump pulled completely into socket

* fit of prosthesis (pages 38 - 40)

  (patient in parallel bars, standing with equal weight on both legs)
  - weight bearing (AK - ischium, BK - below patella) weight bearing is never on distal end of stump)
  - pain (where, how much, a little at ischium/patella is okay)
  - length of prosthesis (ASIS and knees same level)
  - foot flat

* walking with prosthesis (pages 41-47)
  - equal step length
  - equal time on each leg
  - good step width
  - good heel strike (both sides)
  - equal weight shifting
  - trunk straight (no lateral bending)
  - head looking forward
  - arm swing with opposite leg
  - any pain when walking? (when, where)

* any skin problem after patient has worn the prosthesis

ADVANCED PROSTHETIC PERIOD

* continue as in early prosthetic period

* check advanced activities for safety and independence

F. PHYSICAL THERAPY TREATMENTS FOR PATIENTS WITH AMPUTATIONS

Physical therapy treatment will be given for each of the following periods.

1. Nursing period
2. Wound healing/strengthening period
3. Early prosthetic period
4. Advanced prosthetic period

1. NURSING PERIOD

During the nursing period the PTA can begin the following activities.

a. breathing exercises

b. psychological support

c. good bed positioning

d. active exercises for the upper limbs and the normal lower limb

e. sitting in bed and standing as soon as possible

f. active assisted/active exercise for the stump

a. breathing exercises

After surgery it is good for a patient to do deep breathing exercises.

This helps to fill all of the alveoli and prevent secretions from collecting in the lungs.

Specific exercises and more detailed explanation can be found in RESPIRATORY chapter, Volume 2.

b. psychological support

In this early period it is good for the PTA to take time to SPEAK with the patient and family.

The PTA should explain how he and the patient will work together to heal the wound, make the stump strong, and learn to use a prosthesis to walk as normally as possible.

c. good bed positioning

Good positioning will help prevent joint stiffness and contractures.

If the patient has a contracture, a normal prosthesis cannot be used to replace the lost limb.

Activity:

A. Draw a right AK amputee with a very severe hip flexion contracture.

B. Draw a normal AK prosthesis attached to this limb.

What do you see?

_____

_____

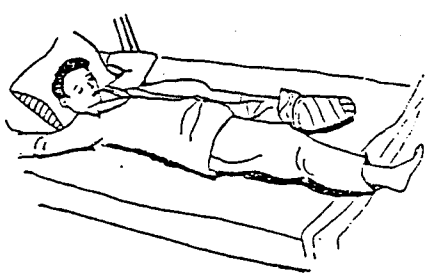
AK amputees like to rest with the hip in flexion.
BK amputees like to rest with the hip and knee in flexion.

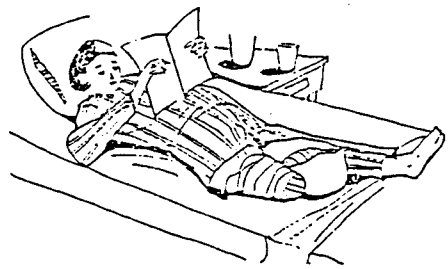
If AK and BK amputees are always in the position of hip flexion and knee flexion, they will develop tightness in these positions.

To prevent flexor tightness in the hip and knee, the patient should be encouraged to put these joints in extension as much as possible.

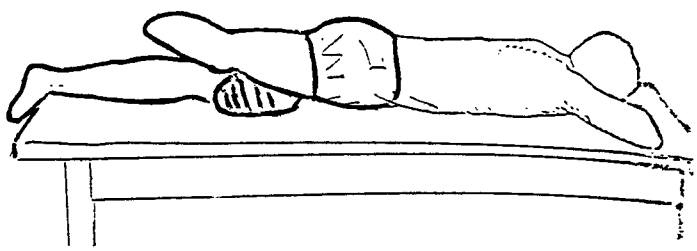
The following pictures are examples of "good positions" (extension) and "bad positions" (flexion) for patients with amputations.

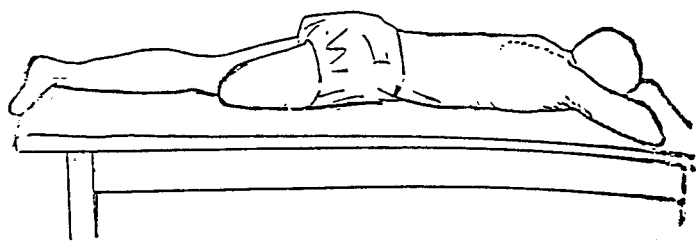
SUPINE





PRONE

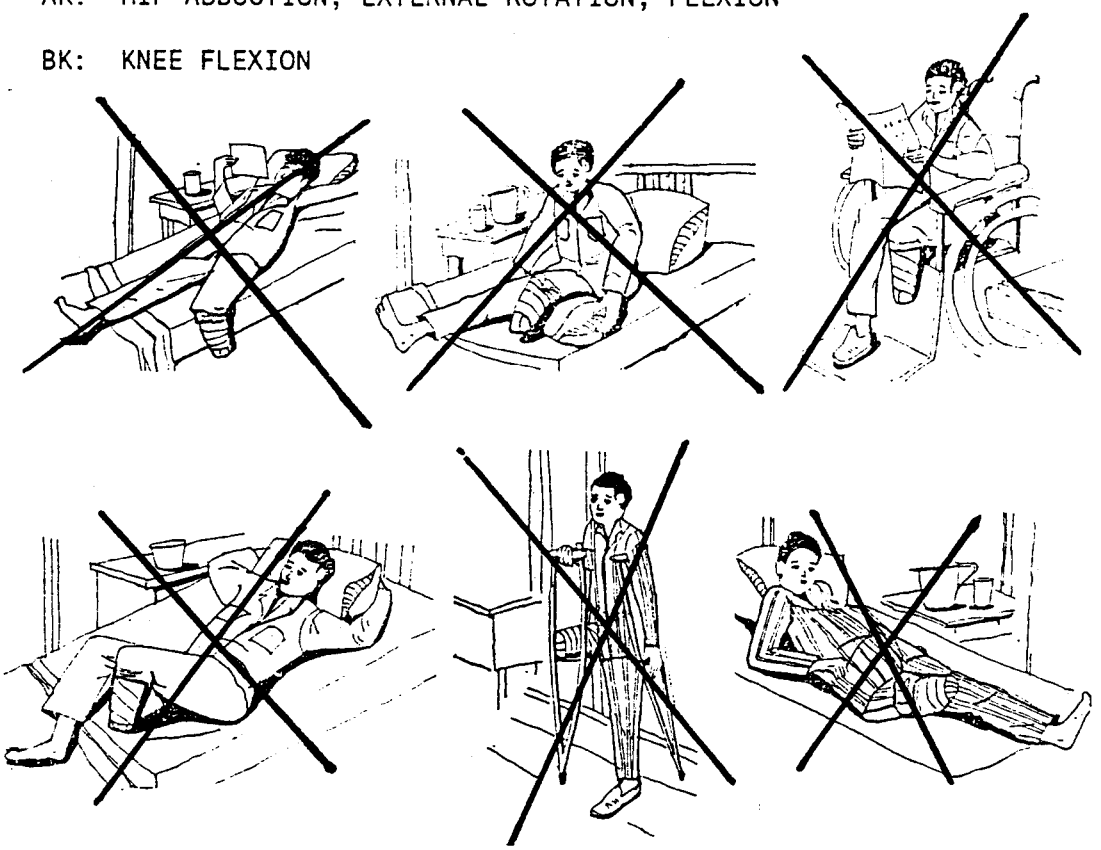




The patient must also learn to AVOID "RELAXED" POSITIONS.

AK: HIP ABDUCTION, EXTERNAL ROTATION, FLEXION

BK: KNEE FLEXION



d. <u>active exercises for the upper limbs and normal lower limb</u>

These exercises ccan help prepare the patient for standing and for general body conditioning.

e. <u>sitting in bed and standing as soon as possible</u>

As soon as the patient is able, he should be encouraged to sit in bed.

This will help prevent his body from becoming weak.

When he is ready, the patient should also begin to do some standing.

f. active assistive/active exercise for the stump

It is good for the patient to begin to move the stump early in the recovery period.

This early movement helps to increase blood to the stump and begin moving the joints to prevent stiffness.

2. WOUND HEALING/STRENGTHENING PERIOD

During the wound healing/strengthening period, the PTA can work on the following activities.

a. continue good positioning

b. teach stump bandaging techniques

c. massaging the stump

d. active exercies for the stump

e. functional activities for the patient

a. continued good positioning

Remember, to be able to move well and walk well, the amputee must have normal movement in all remaining joints.

Questions:

1. Why is prone a good lying position for an AK amputee?

_____

_____

Questions: (continued)

2. An AK amputee is laying in prone position. Will you put a pillow under the patient's hips to make him more comfortable?

Yes _____ No _____

Explain your answer.

_____

_____

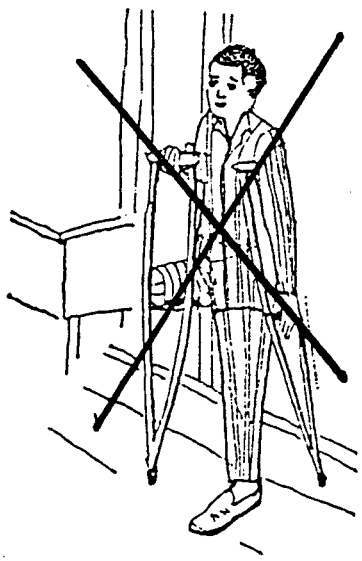
_____

We have shown that the patient should be in hip extension and knee extension positions as much as possible.

To help prevent contractures the patient should avoid "relaxed" positions.

One last rule to remember is that the patient should not rest the stump on the crutch.

This will increase the chance of hip and knee flexion contractures.



b. teach stump bandaging technique

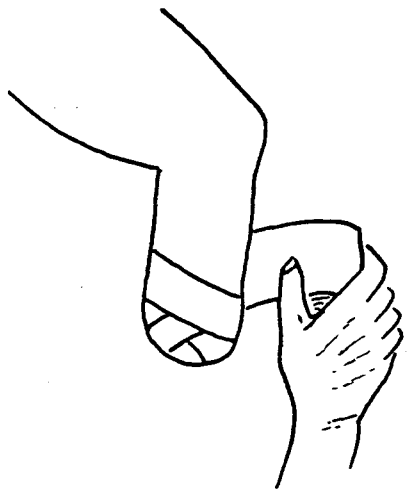
Bandaging was discussed in BANDAGING chapter, Volume 2.

Bandaging the stump happens directly after the surgeon closes the stump.

An elastic bandage is used to bandage the stump.

The width of the bandage used depends on the size of the stump.

The elastic gives a gentle squeezing pressure all around the stump.



There are two main reasons for bandaging the stump:

a) control/decrease swelling

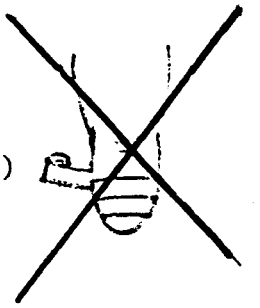
b) give the stump a good shape
(so that it can easily fit into a prosthetic socket in the future)

After 2-3 days, the PTA should teach the patient how to correctly bandage the stump by himself.

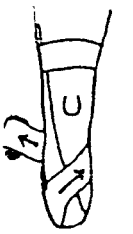
Five rules to remember when bandaging a stump.

1. Always bandage in figure of 8.
(the bandage will make an X
where it crosses on the stump.)

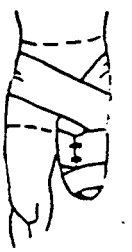
2. Never bandage in
a circular direction.
(this may stop the blood
from going to the stump.)



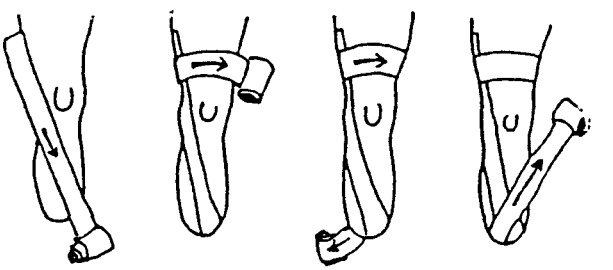
3. Distal pressure more
than proximal pressure.



4. Bandage is flat.



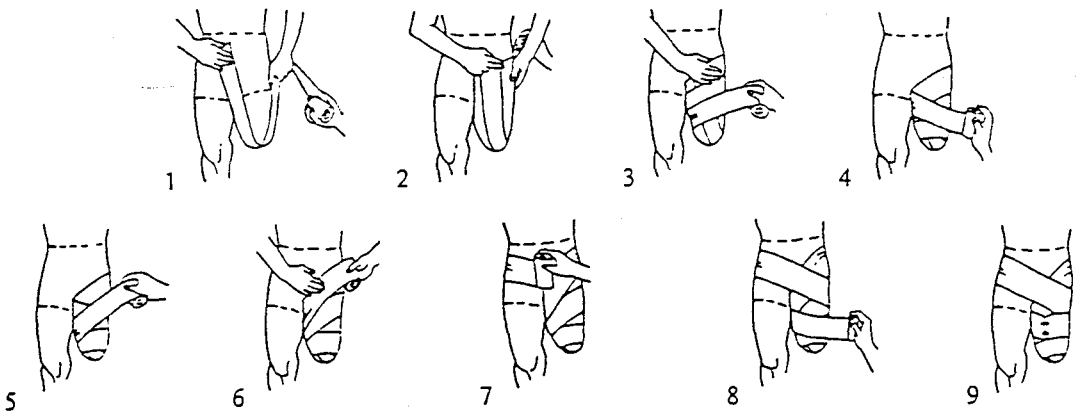
5. The distal part of
the stump should
be covered.



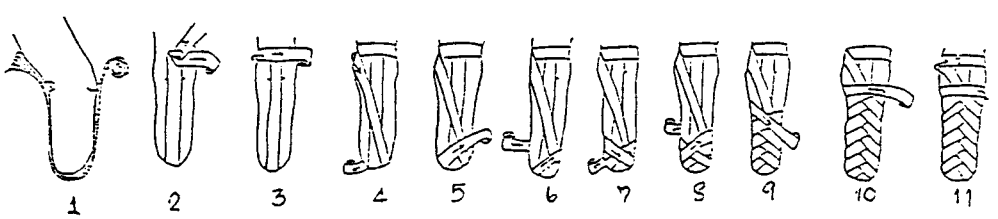
65. Good pressure / not painful.
(The bandaging should be tight
enough to keep good pressure
on the stump.)

BANDAGING PRESSURE SHOULD NOT CAUSE PAIN!

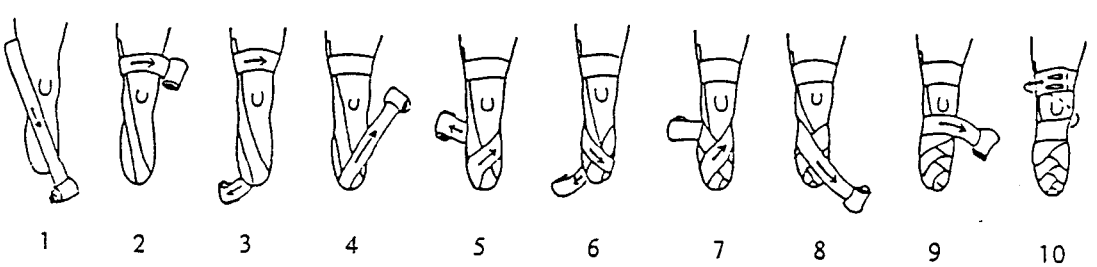
BANDAGING TECHNIQUE AK AMPUTEE



BANDAGING TECHNIQUES BK AMPUTEE



OR



Activity:

An AK amputee arrives with a stump that has the same shape as the stump in the picture.

1. Is this a normal shape for a stump?

   Yes _____ No _____

2. Describe the type of bandaging that could have caused this stump shape.

_____

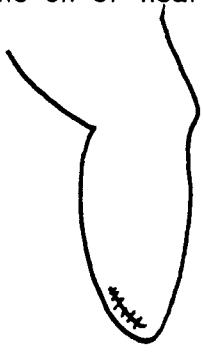
_____

_____

_____

c. massaging the stump

Most often, massage for amputees is done on or near the scar.



The scar is the place where the two pieces of skin are attached together.

A special type of string ties the two pieces together.

These ties are called sutures.

Massage for the scar area has three main functions:

1. to increase wound healing (by increasing blood circulation).
2. to prevent the scar and stump from becoming hard and immovable.
3. to decrease pain by applying a "global pressure" on the stump.

The three periods for <u>scar healing</u> are:

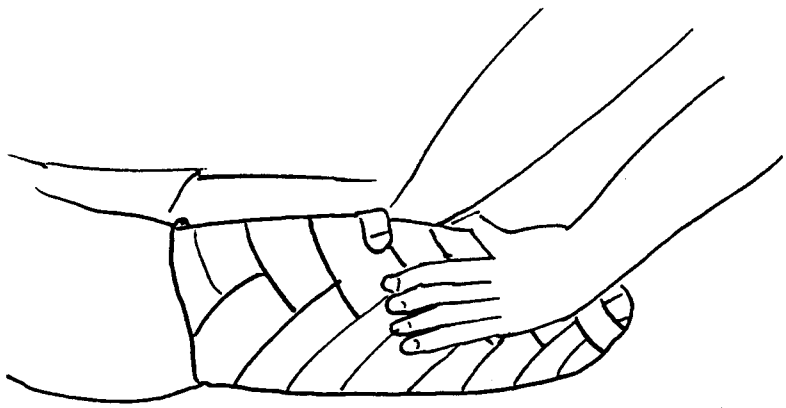
1. sutures present; scar not healed
2. sutures removed; scar not completely healed.
3. scar completely healed and closed.

1. **sutures present; scar not healed / (ten days after surgery)**

NO MASSAGE AT THIS TIME.

We recommend "no massage" because the stump could become infected from unclean hands, or the sutures damaged from a hard massage.

The PTA can apply "global pressure" <u>over</u> dressing to decrease pain. The PTA should NOT remove dressing.



2. **sutures removed; scar not completely healed**

Gentle massage is given to <u>increase wound healing</u>.

Massage is given in the direction of pushing the two pieces of skin toward each other.

IMPORTANT!

If the scar has <u>not healed</u>, massage is given near the scar NOT ON THE SCAR.

If there is infection, do not give massage.

3. scar completely healed and closed (one month after surgery)

Massage is given to prevent the scar from becoming short, tight, or stiff.

Massage can be given on top of the scar and in many directions.

If there is infection, do not give massage.

Massage can stop when the stump and scar are soft.

Massage is very important to do the following things:

- help the scar heal
- prevent the scar from being stiff or tight
- prepare the stump to wear a prosthesis

d. active exercise for the stump

Active exercises can progress to resistive exercises as the patient becomes stronger.

Strengthening exercises help for general condition of the stump and help prepare the patient for WALKING.

Important muscles to strengthen for walking are:

For AK amputees: HIP EXTENSORS

HIP ABDUCTORS

For BK amputees: KNEE Extensors

Question:

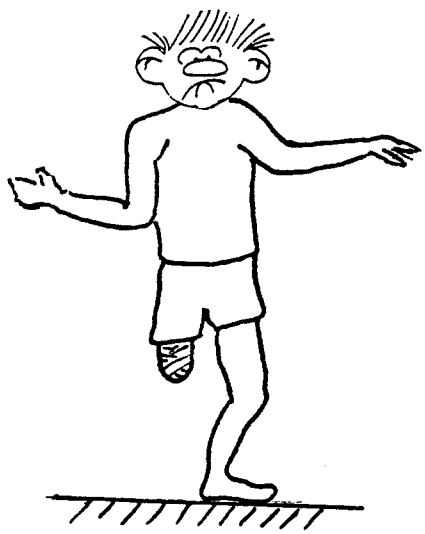
To prepare for walking, it is best to strengthen the hip ABDuctors isometrically in an ADDucted position. Why?

e. functional activities for the patient

Very early in wound healing/strengthing period, the patient should practice functional activities.

These include:

* balance exercises



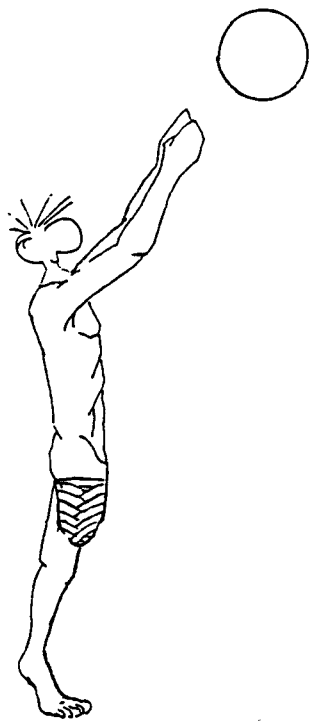
* walking with crutches

  The PTA must make sure of:

  - correct fit of crutches (see WALKING AIDS chapter, Volume 2)

  - correct gait with crutches (see WALKING AIDS chapter, Volume 2)

* Sports to improve psychology and general body condition.



3. EARLY PROSTHETIC PERIOD

Before receiving any type of prosthesis, the patient must have:

* GOOD STUMP CONDITION
  - no stump pain
  - no open wound on the stump
  - no hard areas on the stump
* COMPLETE RANGE OF MOTION
* GOOD MUSCLE STRENGTH
* GOOD BALANCE ON THE NORMAL LEG

The PTA must evaluate the patient carefully. Prosthetic period begins AFTER the above goals are achieved.

Question:

Please list five different ways the PTA and the patient have worked together to prepare for receiving a prosthesis.

_____

_____

_____

_____

_____

During the early prosthetic period, the PTA should work on the following activities.

a. continue activities as in wound healing/strenghening period

b. teach the patient how to put on prosthesis

c. make sure prosthesis has good fit

d. begin basic gait training

e. identify gait problems, possible causes and how to correct them.

a. <u>continue actitivies as in wound healing/strengthening period</u>

Active exercise for the stump, functional activities, make sure bandaging technique is good, make sure stump condition remains good.

b. <u>teach patient how to put on prosthesis</u>

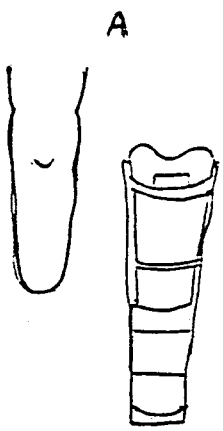
Techniques for putting on prostheses are the same for all Handicap International prostheses - temporary or definitive.

<u>PUTTING ON A PROSTHESIS</u>

A. The patient should remove the bandage before putting on the prosthesis!!

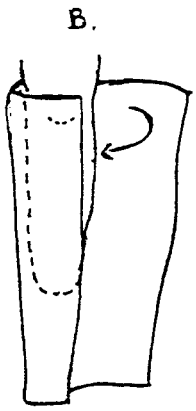
The prosthesis was measured to fit a stump without a bandage.

A bandage will change the fit of the prosthesis.



B. A cloth is put around the stump.

This cloth will help to pull the stump into the socket.

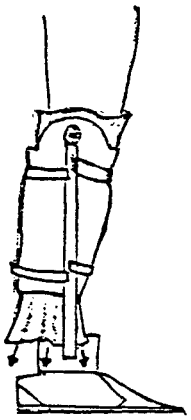


C. The cloth is twisted and pulled through the hole in the socket.

This pulls the stump into the socket.

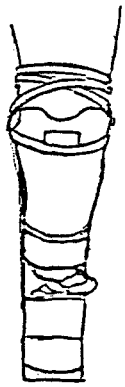
D. The cloth is <u>untwisted</u> and all parts are pulled downward equally.

This pulls the stump into a good position in the socket.



E. The cloth stays on the stump when the prosthesis is on.

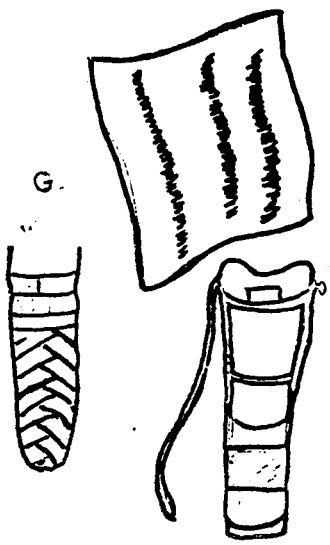
The end of the cloth can be tied around the prosthesis.



F. A belt is also used to hold the prosthesis on the stump.

G. Step out of the prosthesis when you want to remove it.

Remove the cloth and rebandage the stump.



c. <u>make sure prosthesis has a good fit</u>

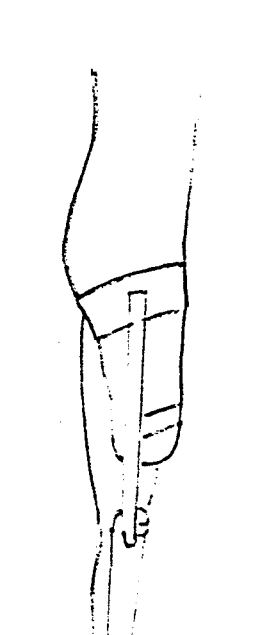
To check the fit of the prosthesis, the patient should be standing in the <u>parallel bars</u> with legs straight, feet equal, trunk straight, and equal weight bearing on both legs.

Ways to check for equal weight bearing are to:

1. PTA tries to move the prosthetic foot with his hand.

2. The PTA tries to put a piece of paper under the prosthetic foot.

* If there is good weight bearing, neither of these activities should be possible.



What to check

1. weight bearing
2. pain
3. belt tightness
4. length and alignment

1. **Weight bearing**

<u>AK prosthesis:</u>

- PTA should feel if the ischium is on the socket "table".

- Patient should feel pressure on the ischium.

BK prosthesis:

Patient should feel pressure
just below the patella.

2. Pain

- An AK amputee may normally feel a little pain on the ischium when first wearing the prosthesis.

- A BK amputee may normally feel a little pain just below the patella when wearing a BK prosthesis.

If the patient feels severe pain in these areas or feels pain in any other areas, the PTA must know:

. how much pain

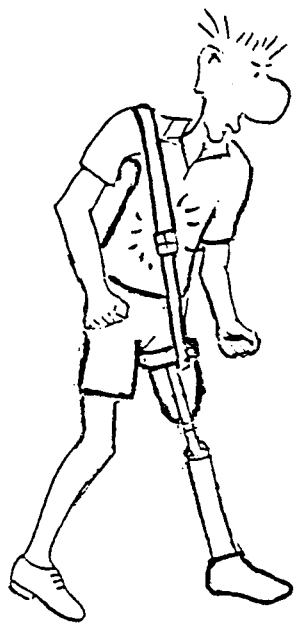
. where is this pain

. when does the patient feel the pain

The PTA must work together with the technician to identify the cause of the pain and try to decrease it.

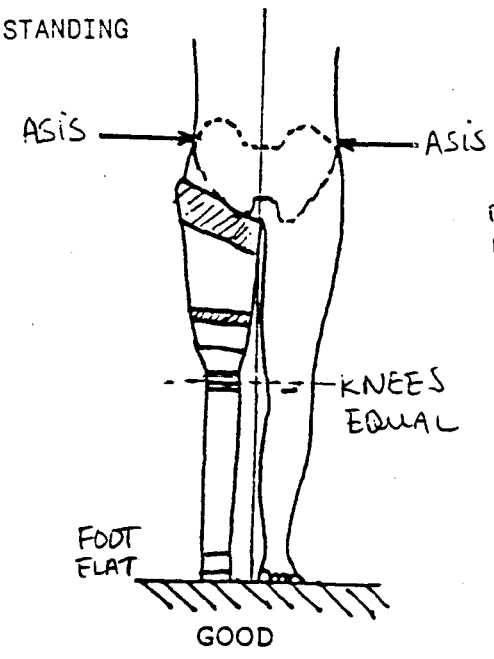
3. **Belt tightness**

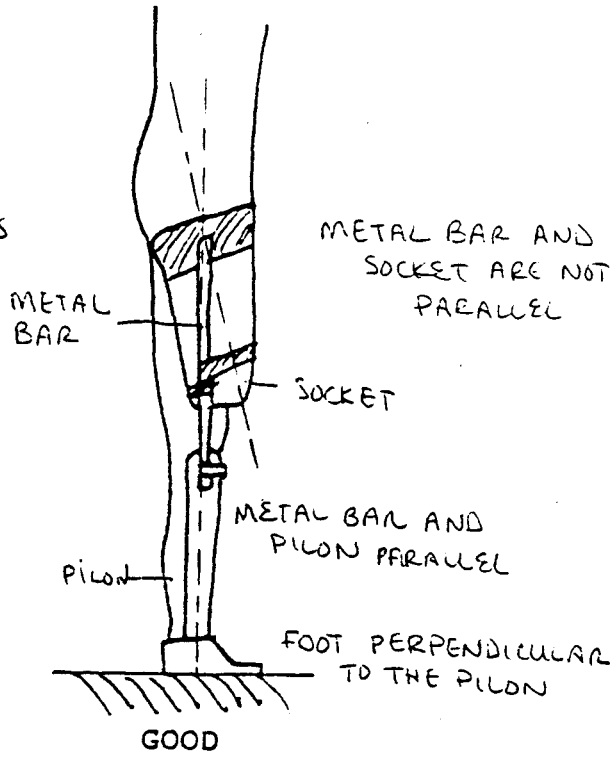
The belt in an AK prosthesis
is anterior to the hip.
If the belt is too tight,
it will limit hip extension.



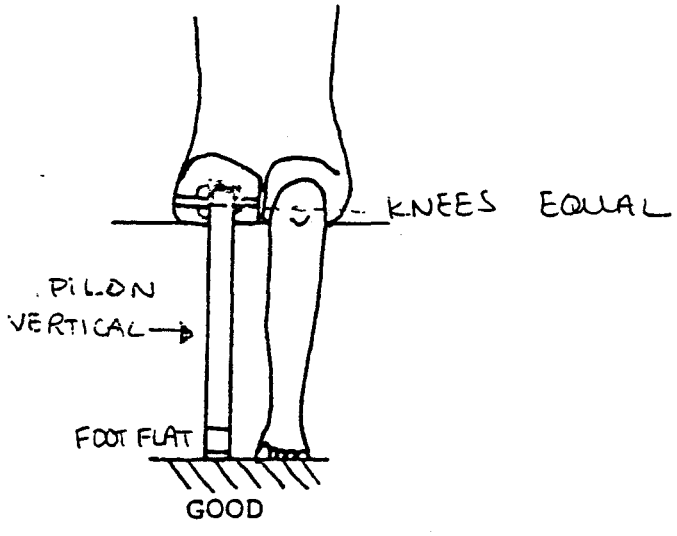
4. Length and alignment

STANDING





SITTING



d. Begin basic gait training

Before gait training the PTA must remember that wearing and using the prosthesis must begin step by step.

In the beginning, the patient should use the prosthesis for a short time only (about ten minutes, 2-4 times each day).

This time can increase as the scar and the stump become more strong.

REMEMBER !

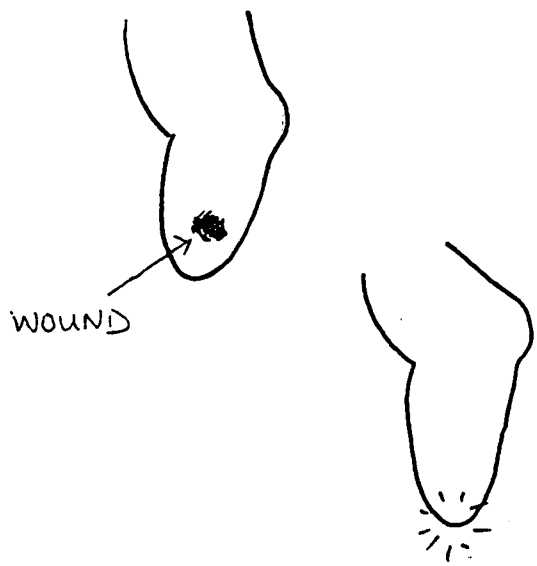
WEARING A PROSTHESIS TOO MUCH TOO SOON WILL CAUSE STUMP DAMAGE.

IF THERE IS STUMP DAMAGE, THE TRAINING MUST STOP.

After each use of the prosthesis, the PTA should carefully check the stump of the patient.

The PTA must look for red areas, painful areas, or open wounds.

If there is an open wound, the patient must stop training with the prosthesis.



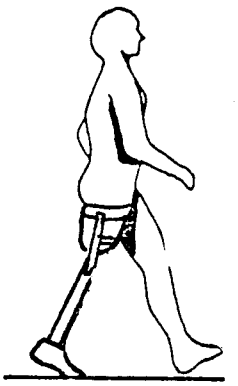
Red or painful areas should be reported to the technician so adjustments can be made.

Basic steps of beginning gait training are given in GAIT TRAINING chapter, Volume 2.

The PTA and patient must begin with the simple parts of gait training first.

Gait training activities specific for amputees are:

AK AMPUTEES



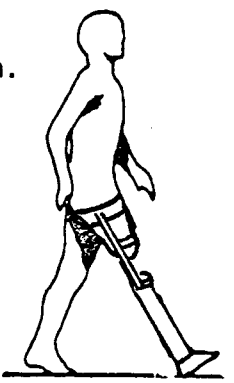
* practice hip extension in stance phase

(PTA must put one hand on patient's chest and one hand on patient's butt to keep the trunk straight and the hip in extension)

* practice no movement of the pelvis

(The hip flexes to bring the leg forward)

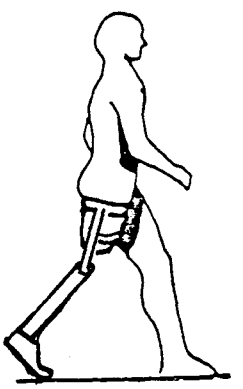
* practice good knee extension.



AK AND BK AMPUTEES

* practice good heel strike (prosthetic side)

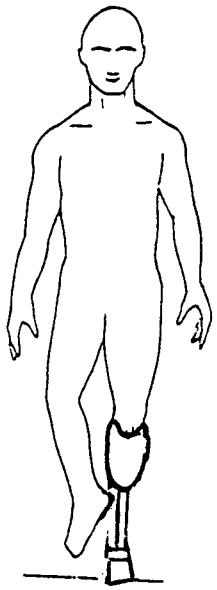
* practice good toe off (prosthetic side)



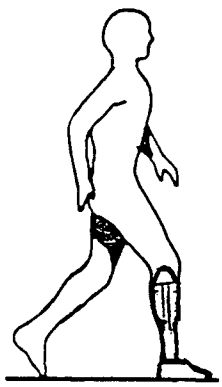
e. Gait problems, possible causes and how to correct them.

The PTA must be able to identify if a patient is walking normally.

The PTA can observe the patient walk from three views:



ANTERIOR VIEW



LATERAL VIEW

POSTERIOR VIEW

If a patient does not walk normally, it can be for three reasons:

A. physical problem (muscle weakness, pain, contracture).

B. mental problem (fear).

C. structural problem of the prosthesis

The PTA can try to help physical or mental causes of gait problems.

If the problem is in the prosthesis, a technician should be consulted to help solve this gait problem.

On the following pages are common gait problems, causes, and suggestions to help solve these problems.

GAIT PROBLEM	CAUSE	SOLUTION
unequal steps and unequal timing	<u>prosthetic cause:</u> * poor knee joint (AK) * poor socket position <u>patient cause:</u> * pain * fear * poor gait training	see technician - identify cause of pain and treat - gait training in parallel bars - instruct patient
lateral bending (to prosthetic side during stance)	<u>prosthetic cause:</u> * poor alignment * prosthesis too short <u>patient cause:</u> * pain * weak hip abductors	see technician - identify cause of pain and treat - strengthen weak hip abductors
walking with the pelvis (not the hip) (AK amputees)	<u>prosthetic cause:</u> * poor socket position <u>patient cause:</u> * poor gait training * weak hip flexors	see technician - retrain patient for good walking habits
foot rotation (at heel strike)	<u>prosthetic cause:</u> * poor alignment <u>patient cause:</u> * weak stump, no control of prosthesis	see technician - general strengthening for the stump

GAIT PROBLEM	CAUSE	SOLUTION
head down during gait cycle	<u>prosthetic cause:</u> 0 <u>patient cause:</u> *fear * poor gait training	0 - practice walking with head looking forward - feedback
instability of knee	<u>prosthetic cause:</u> * poor alignment <u>patient cause:</u> * weak knee extensors	see technician - strengthen knee muscles
abducted gait	<u>prosthetic cause:</u> * prosthesis too long * poor knee joint <u>patient cause:</u> * pain * fear * poor gait training	see technician - identify cause of pain and treat - patient instruction and practice of gait
decreased weight shifting	* poor gait training	- retrain patient for good walking habits
decreased (or incorrect) arm swing	* poor gait training	- retrain patient for good walking habits
decreased heel strike on mormal leg	* poor gait training	- retrain patient for good walking habits

4. ADVANCED PROSTHETIC PERIOD

Physical Therapy treatments in advanced prosthetic period include:

a. continuing activities from early prosthetic period

b. practising more difficult walking activities

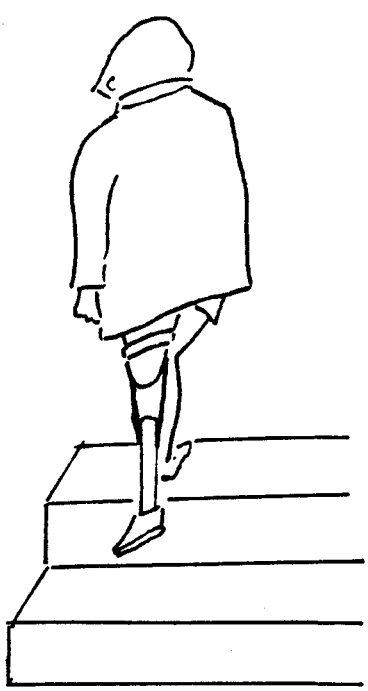
a. continuing activities from early prosthetic period

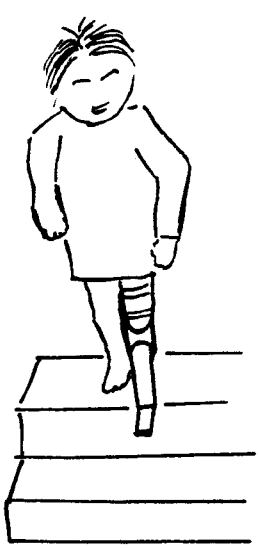
As much as possible the patient should continue activities from early prosthetic period until he has a near normal gait and is safe and independent in all activities of early prosthetic period.

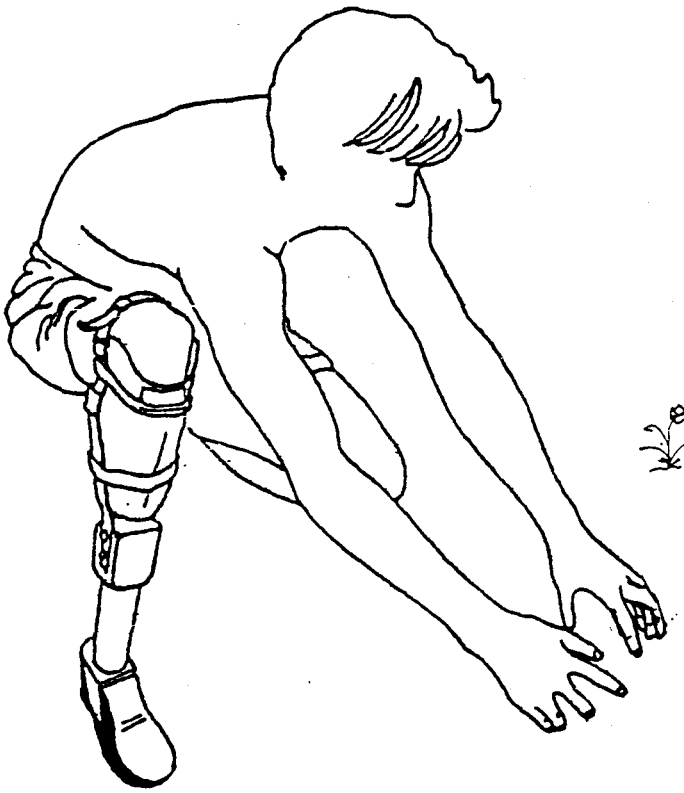
b. practising more difficult walking activities

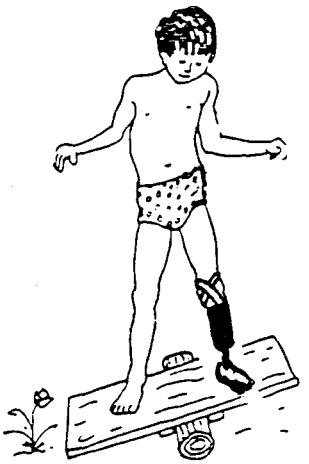
The PTA must encourage the patient to practice the following activities while wearing the prosthesis.

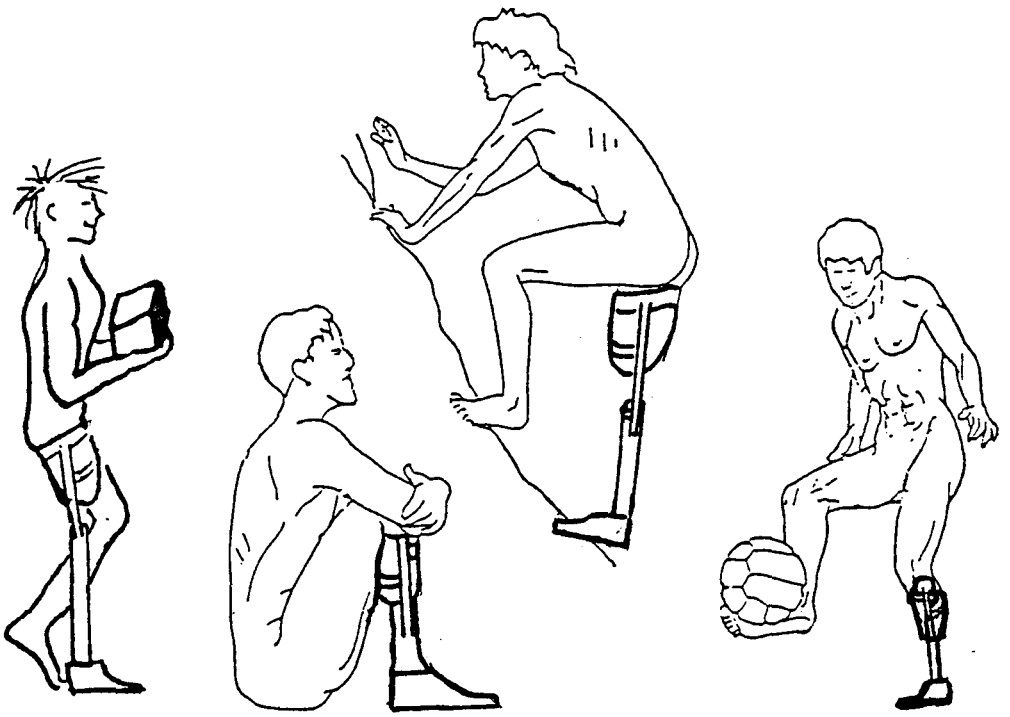
* floor <----> standing
* stairs
* stepping over and under objects
* carrying heavy objects











See GAIT TRAINING chapter, Volume 2, for more advanced gait activities.

G. CHAPTER SUMMARY

An amputation is a loss of one part of the body. The remaining part of the limb is called the stump.

A prosthesis is a device that replaces the missing body part.

Surgical guidelines are given to help inform doctors about the stumps that are best suited for Handicap International prostheses.

Complications of amputations include:

- infection
- exotosis (continued bone growth after it is cut)
- neuroma (circular nerve growth after it is cut)
- contracture

Phantom Pain is pain in the part of the body that has been removed.

Periods of recovery for amputees are:

- nursing period
- wound healing/strengthening period
- early prosthetic period
- advanced prosthetic period

Physical Therapy evaluation and treatment suggetions are given for each period.

General rules for treatments:

- positioning

AVOID	Hip Flexion
	Hip Abduction
	Hip Internal Rotation
	Knee Flexion

- bandaging

  . always in figure of 8's
  . never circular
  . distal pressure more than proximal
  . bandage is flat
  . good pressure/not painful
  . end of stump is covered

massage - techniques vary according to wound

- sutures present/ scar not healed	no massage, global pressure only
- sutures removed, scar not completely healed	push skin together no massage on top of scar
- scar completely healed and closed	massage on top of scar in any direction

exercise

For walking it is important to strengthen

Hip Extensors
Hip ABDuctors
Knee Extensors

Before receiving prosthesis, the patient must have

. good stump condition (no pain, wound, hard areas)

. complete ROM

. good muscle strength

. good balance on normal leg

Prosthetic training includes:

. putting on prothesis correctly

. correct fit (weight bearing, no pain, alignment)

. balance exercises

. basic gait training

. evaluation of gait problems and corrections

. advanced gait activities

CHAPTER 26

CLUB FOOT

CLUB FOOT is a congenital deformity of one or both feet.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. describe the three main positions of a club foot deformity.
2. compare the three different types of club foot.
3. describe the four main Physical Therapy treatments that can be used to help club foot.
4. compare three types of immobilization that can be used to treat club foot.
5. demonstrate two of the four main treatments used to help club foot.
6. explain why family teaching is important for all club foot patients.

CHAPTER CONTENTS

A. WHAT IS CLUB FOOT?

Club foot is a congenital deformity of one or both feet.

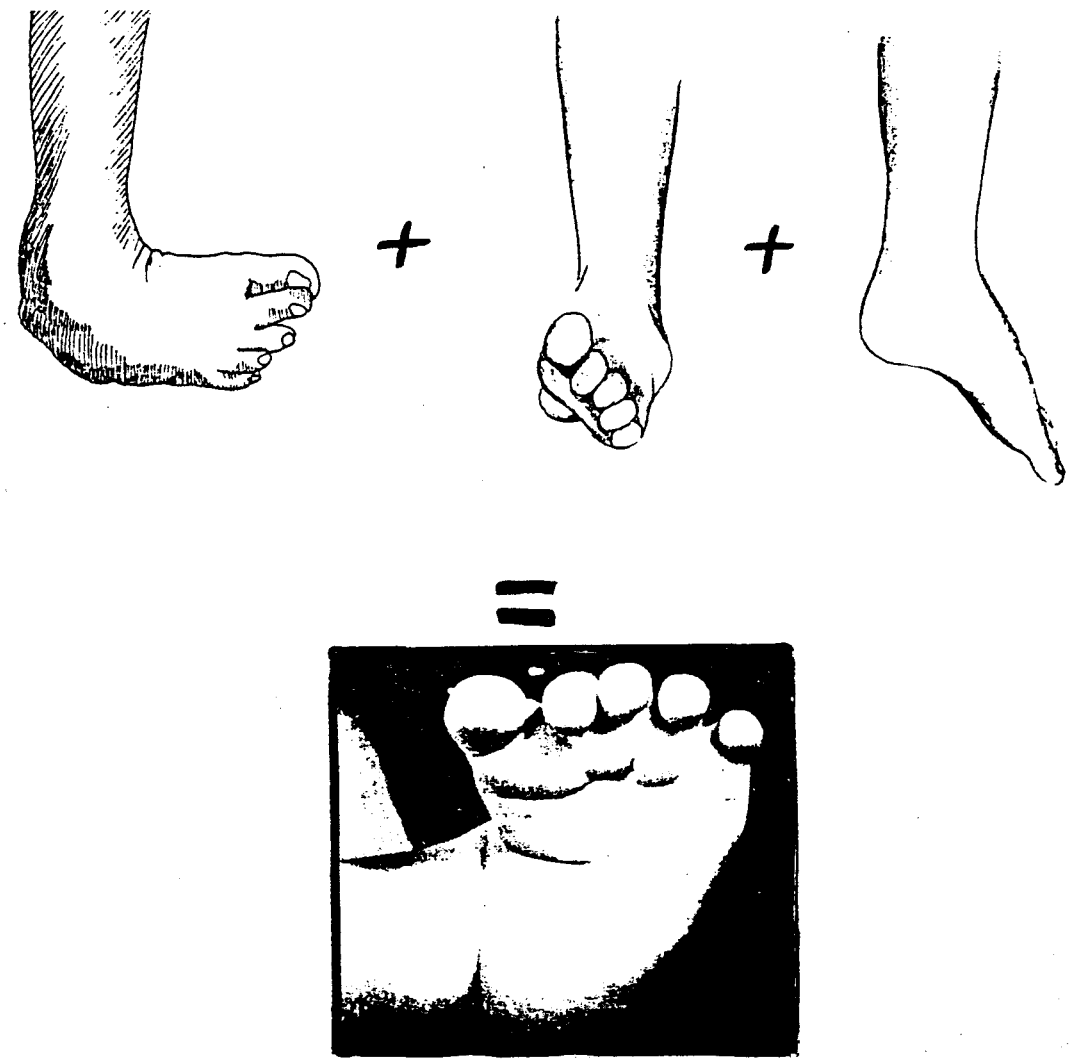
congenital = happens before birth

The deformity of the foot is a combination of:

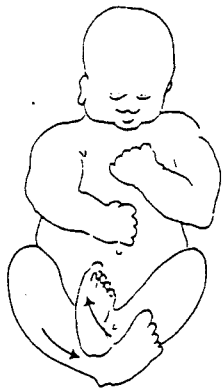
a. adduction of the forefoot

b. inversion of the heel and forefoot

c. plantar flexion of thd ankle (equinus)



B. CAUSES OF CLUB FOOT



FETAL POSITION

The cause of club foot is generally unknown.

Club foot may be from how the baby is positioned inside of the mother.

Club foot may be hereditary.

C. SPECIFIC INFORMATION ABOUT CLUB FOOT

The PTA must understand club foot to treat it.

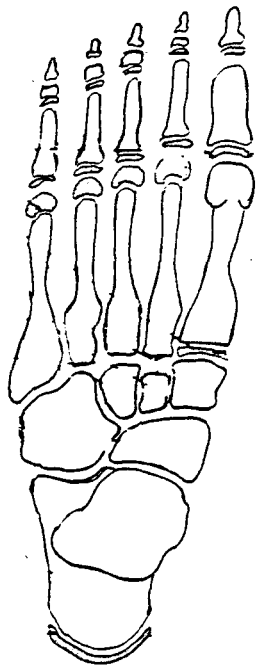
The following information will be given in this section:

1. normal bone growth in children
2. deformities of the bones in club foot
3. muscular problems found in club foot
4. types of club foot.

1. Normal bone growth in children

The bones of a baby are different than the bones of an adult.

Below are pictures comparing an adult's foot with a baby's foot.



NORMAL ADULT FOOT

NORMAL BABY FOOT

A baby's bones are softer, smaller, and have not finished growing.

Because the bones are very small and movable, CLUB FOOT CAN BE EASILY TREATED IN YOUNG INFANTS.

As the child becomes older, the bones become bigger, harder, and very difficult to move.

WARNING !

Too much pressure on a baby's bones can DAMAGE or DESTROY them.

The PTA must remember to be GENTLE when working with children.

Questions:

1. Why should club foot treatment begin as soon as possible after the baby is born?

2. A PTA believes the harder that he pushes on the baby's foot, the faster the baby will have a normal foot shape. Explain why this PTA is WRONG.

2. Deformities of the bones in club foot

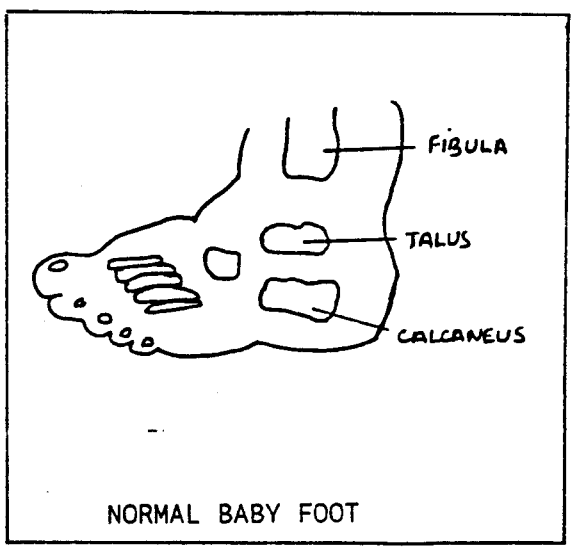
In the normal foot, the talus is inferior to the tibia and fibula and directly above the calcaneus.

In club foot, the following changes are seen

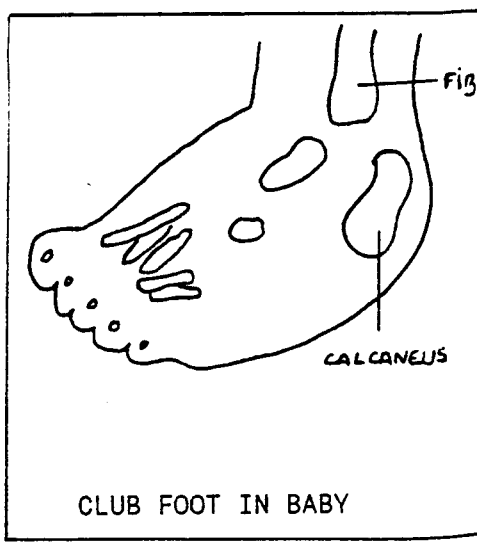
a) CALCANEUS is in plantar flexion, adduction and inversion;

b) TALUS is in plantar flexion; the talus moves anteriorly out of the space between the two malleoli.

Below are pictures comparing a normal baby's foot with a club foot.



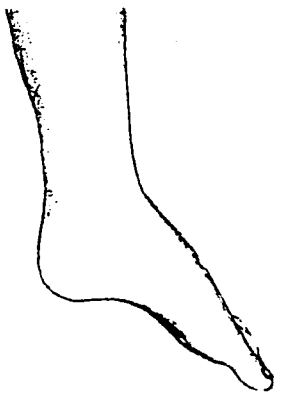
NORMAL BABY FOOT



CLUB FOOT IN BABY

3. Muscular problems found in club foot

Questions:



1. With the foot fixed in plantar flexion, what muscle(s) will be shorter?

_____

_____

_____

_____

_____

2. The club foot is also in inversion.

   Will the foot evertors be strong or weak?

   _____

   Will the foot evertors be short or long?

   _____

The muscle problems in club foot are tightness of the ankle plantar flexors and invertors, and increased length of the evertors.

These muscle problems are from continued bad positioning of the baby's foot.

4. Types of Club Foot

The severity of the deformation determines the type of club foot.

The types of club foot can be detetermined at the time the baby is born.

The three types of club foot are:

TYPE I	EASY TO CORRECT (put foot in a normal position)
TYPE II	POSSIBLE TO CORRECT WITH DIFFICULTY or POSSIBLE TO CORRECT INCOMPLETELY
TYPE III	IMPOSSIBLE TO CORRECT (fixed)

D. MEDICAL TREATMENT OF CLUB FOOT

Generally, no medical treatment for club foot is given.

If Physical Therapy is not successful in correcting club foot, SURGERY would be needed to correct a club foot deformity.

Surgery is the LAST option. Club foot is a problem that can be treated effectively with good cooperation of the family.

Surgery does not always make a perfect foot. After surgery the patient must have continued Physical Therapy to make sure that the foot will be in a good position.

Question:

Generally, why do you not give medical treatment for club foot?

_____

_____

_____

_____

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH CLUB FOOT

When evaluating a child for club foot, the PTA must:

* check passive ROM of the feet to determine the type of club foot (remember these are gentle movements!)

* identify what movements the child can do actively

* check if the child has any other deformities or abnormalities

* consider the age of the child and type of club foot in deciding treatment

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH CLUB FOOT

Physical Therapy treatments are very effective in helping to correct club foot deformities.

Information presented in this section includes:

1. Basic rules for club foot treatment
2. Family teaching
3. P.T. treatment used to help correct club foot
4. Follow-up care for club foot patients

1. Basic rules for club foot treatment

REMEMBER !

* club foot treatment must be started very early
* the family must be taught how to do the treatments
* club foot treatments must be given regularly
* be gentle -- a baby's foot can be damaged easily
* the child will need P.T. treatments for a long time

2. Family teaching

In this section and in the whole chapter, we use the word "family" to mean the person that will be responsible for the care of the child.

Most often, the "family" will mean the mother of the child. We encourage the involvement of the father and older brothers and sisters to be involved in treatments so that the baby can receive support from the whole family.

Family participation in club foot treatments is very important.

The family must understand club foot and know that they can help the baby to recover.

If the family does not understand the reasons for treatment, they will not follow the PTA's suggestions, and the baby may have poor recovery.

The PTA must encourage the family to participate in the treatments and make sure that the family can make simple treatments independently.

In this way, the family can be responsible for the treatments given many times each day.

IN SUMMARY

The PTA must take time to:

* demonstrate each treatment so that the family can observe

* clearly explain why this treatment is needed (how it will help, what happens if it is not made)

* explain how often the treatment should be made

* have the family member <u>demonstrate</u> the treatment for the PTA to see that the family member understands how to do it.

<u>Questions</u>

1. The mother of a baby with club foot does not understand why you ask her to help with treating the baby. What will you say to this woman?

_____

_____

_____

_____

2. You travel to see the club foot baby in her home. When you arrive, the family leaves. The family would like to do other things at the same time you work with the baby. Is this a good idea?

Yes _____ No _____

Explain your answer.

_____

_____

_____

_____

3. P.T. treatments used to help correct all types of club foot

a. massage and family teaching

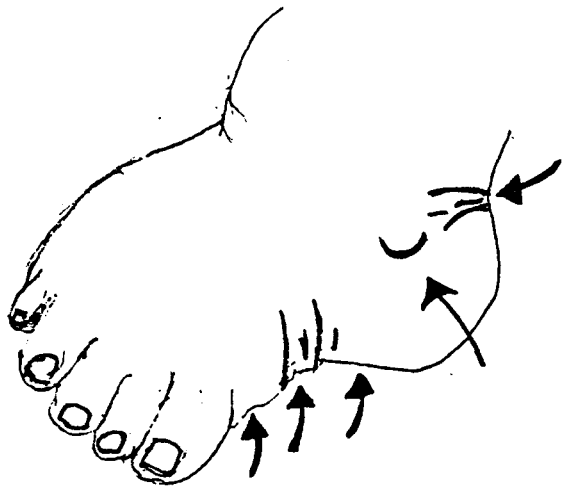
b. passively moving the foot into a good position and family teaching

c. stimulation and family teaching

d. immobilization and family teaching

a. massage and family teaching

Massage is given to the toes, foot, and lower leg. More specifically, the areas posterior and superior to the heel, internal ankle and medial side of the foot. These are areas where the skin may be tight.



Massage is given for three main reasons:

* increase trust of the baby

* apply small stretch to the muscles

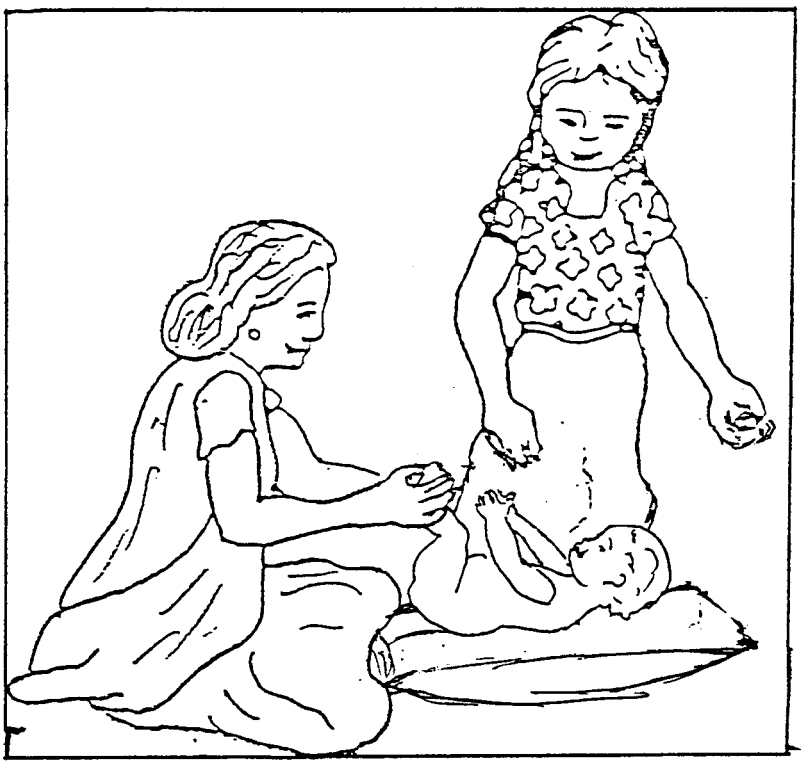
* prevent skin tightness or loosen tight skin.

Massage should be given for 10-20 minutes 2-3 times each day.

The PTA must demonstrate the technique and location of massage for the family.

The PTA must explain why massage is given to the child and how often it must be made.

The family must demonstrate the massage technique and the PTA can give positive feedback or suggestions for improvement.



b. <u>passively moving the foot into a good position and family teaching</u>

The main rule to remember is the movements of the baby's foot should be <u>gentle</u>.

A baby's bones are not strong and can be damaged easily.

WARNING!

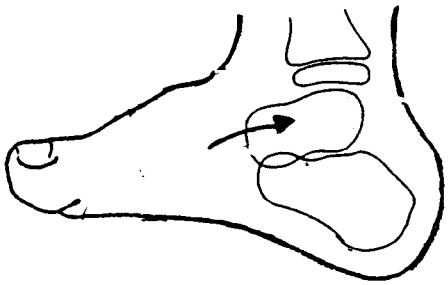
NEVER FORCE MOVEMENTS IN A BABY'S FOOT

Damage can be caused by:

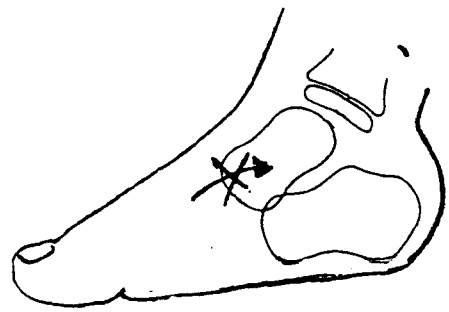
pushing too hard on the bones

two bones being forced together

NORMAL DORSIFLEXION



FORCED DORSIFLEXION



Steps to follow in moving the foot into a good position.

REMEMBER: HINDFOOT ---> FOREFOOT ---> ANKLE

Gentle DISTRACTION should be used before all movements. Distraction is a pulling movement to make space between the bones before moving them.

STEP 1: Distract calcaneus (gently pull calcaneus downward)

STEP 2: Correct inversion of the heel (gently pull the heel outward)

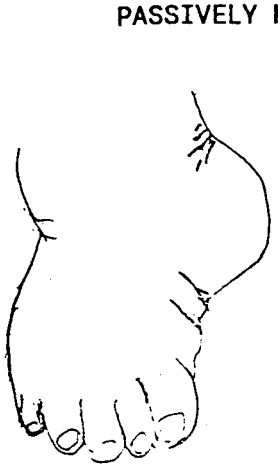
STEP 3: Distract forefoot (gently pull forefoot forward)

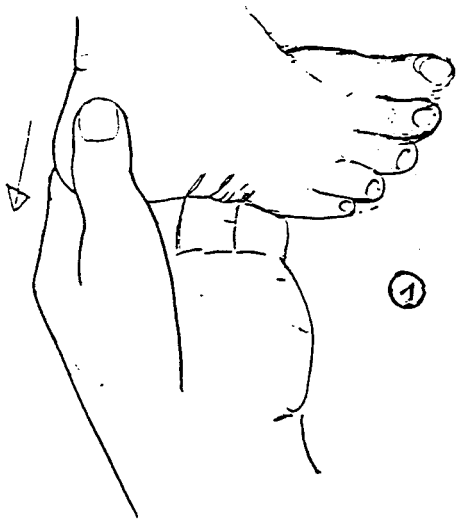
STEP 4: Gently push the talus posteriorly and correct forefoot adduction and inversion (gently move the forefoot outward)

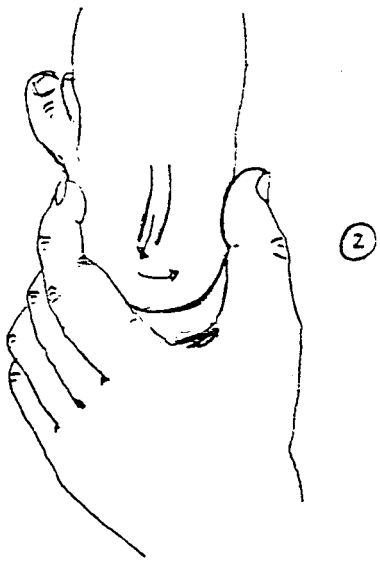
STEP 5: Correct plantar flexion (gently pull calcaneus downward and push forefoot upward.

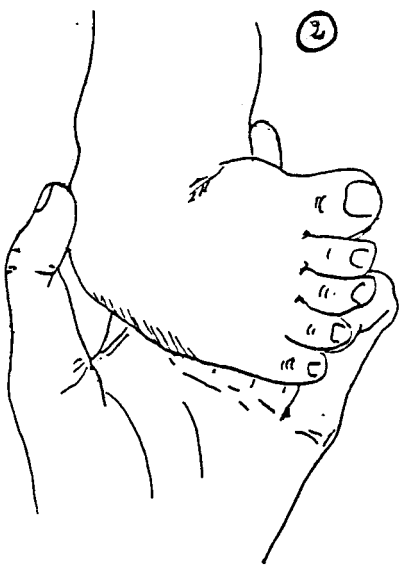
PICTURES OF EACH STEP ARE GIVEN ON THE FOLLOWING PAGE

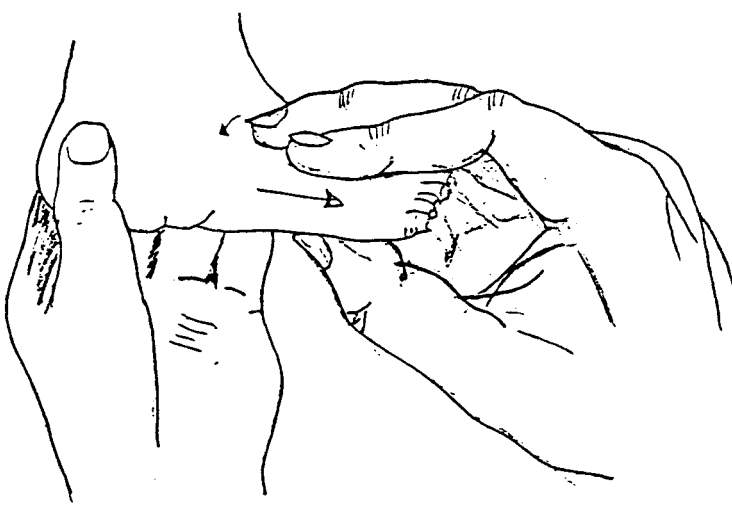
PASSIVELY MOVING A CLUB FOOT INTO A GOOD POSITION

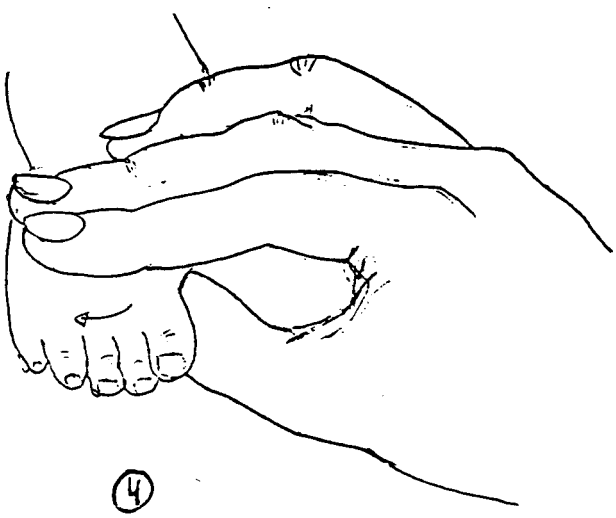


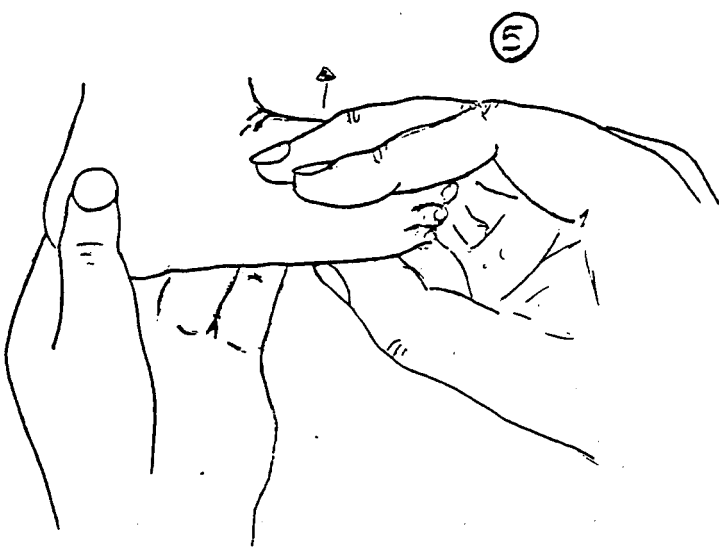












The PTA must demonstrate the correct passive positioning of the foot many times so the family can see.

The PTA must clearly explain each step and give good reason why each step is made in the way that it is.

The PTA must tell the family how many times this positioning should be made (10 times each treatment, 2-3 treatments each day).

The family must demonstrate foot positioning technique and the PTA can give positive feedback and suggestions for improvement.

Questions:

1. A mother does not understand why she must pull down on the heel bone before moving the heel to the outside. What will you say to this woman?

_____

_____

_____

2. A woman is afraid of the talus being in a bad position when moving the foot. With her finger she pushes very hard on the talus to keep it in a good position. Do you agree with this idea?

Yes _____ No _____

Explain your answer.

_____

_____

_____

General guidelines for moving the baby's foot

* The baby should be calm and relaxed. (Example: after feeding)

* The baby's knee should be flexed.

* Gentle movements and distraction are to prevent bone damage.

* Dorsiflexion is made after the heel and forefoot are corrected.

* Parents/family should be able to make these treatments.

* The foot should be put in a good position 10 times each treatment and the baby should have at least 2-3 treatments each day.

* At the end of the last movement, the foot should be held in this position to give a small stretch and prepare the foot for strapping.

Activity:

We have recommended to correct the club foot in the following sequence:

HINDFOOT ---> FOREFOOT ---> ANKLE

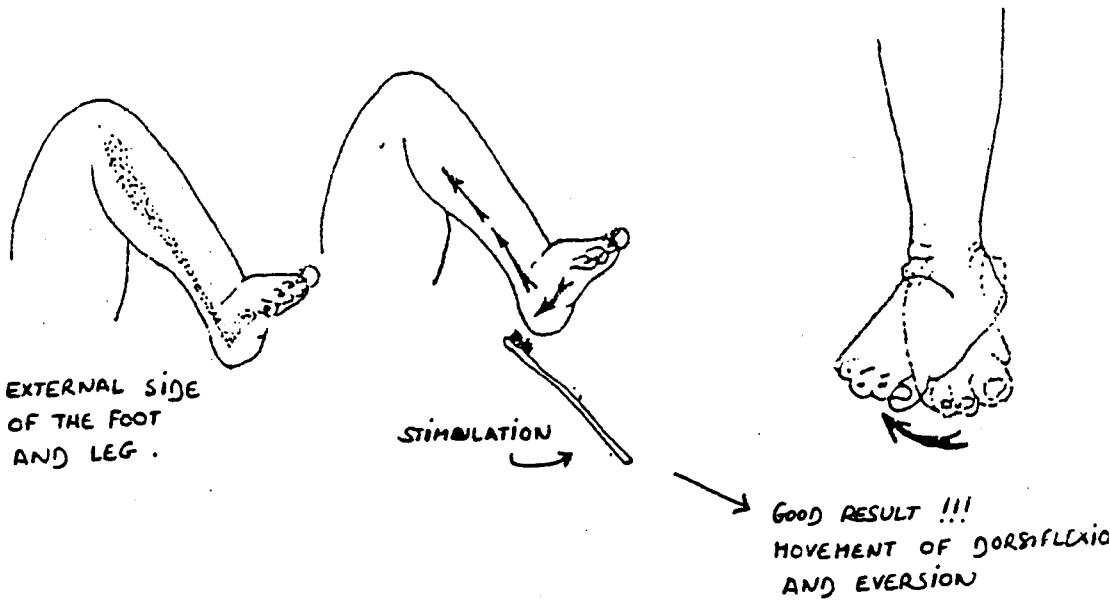
Together with your class discuss why not another sequence (Example: why not Forefoot ---> Hindfoot ---> Ankle, or Hindfoot ---> Ankle ---> Forefoot?

c. stimulation and family teaching

In club foot, the foot dorsiflexors and evertors are longer and weaker because of poor foot positioning and decreased use by the baby.

These muscles need STIMULATION (something to excite the muscles) to make them contract and become stronger.

As a result of stimulation, the foot should move in the direction of dorsiflexion and eversion.



Common areas to stimulate to increase dorsiflextion and eversion of the foot are:

- the external side of the foot
- the external side of the leg

Note: Any area can be stimulated; the PTA and family can test different areas to see what area will help increase active dorsiflexion and eversion.

The rhythm of stimulation should be varied. This variety will help to keep the muscles active.

Question:

You are stimulating the external side of the foot.
As a result the foot makes inversion (turns to the inside).
Is this the result you want?

Yes _____ No _____

What will you do to modify your treatment?

_____

_____

Remember:

* The PTA must demonstrate stimulation techniques and identify what movement should be the result.

* The PTA must clearly explain why stimulation helps the baby and how often it should be made (¨ 10 minutes, 2-3 times each day).

* The family must demonstrate stimulation technique and the PTA can give positive feedback and suggestions for improvement.

Questions:

1. A woman stimulates the thigh of the baby. The result is active dorsiflexion and eversion of the club foot. Do you agree with her treatment?

   Yes _____ No _____

   Explain your answer.

_____

_____

2. A man does not understand why it is important to have active dorsiflexion and eversion. He thinks positioning the foot is enough. What will you explain to this man?

_____

_____

_____

d) immobilisation and family teaching

Immobilization is used to prevent movement. (See FRACTURES chapter, Volume 3).

In club foot, immobilization is used to maintain the foot movement that you have made with other techniques.

All immobilization techniques are made AFTER passive movement and stimulation.

There are different ways to hold the foot in a good position without allowing movement. The type of immobilization used will depend on the type of club foot and the materials available.

The types of immobilization used to treat club foot are:

- Strapping
- St. Germain splint
- Plaster of Paris (POP)

Strapping

Strapping can be used for patients with Type I and Type II club foot.

Strapping for club foot is a technique that uses adhesive bandage (tape) and a hard sole.

The sole can be made of wood or rigid leather, or plaster.

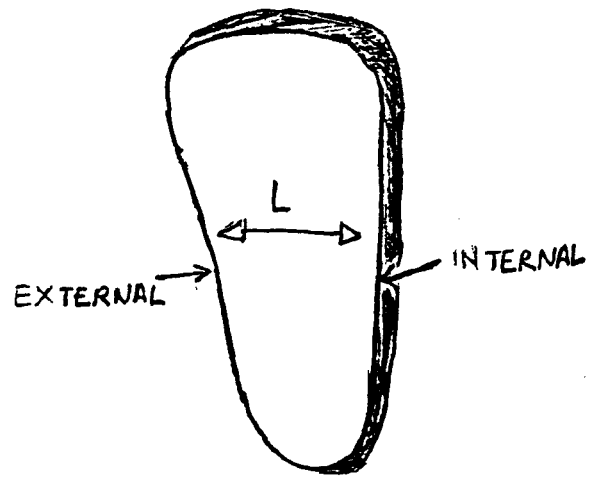
The sole should be the same size as the baby's foot.

The sole should be straight on the internal side.

This will help keep the baby's foot in a good position.

Strapping should be changed every day.

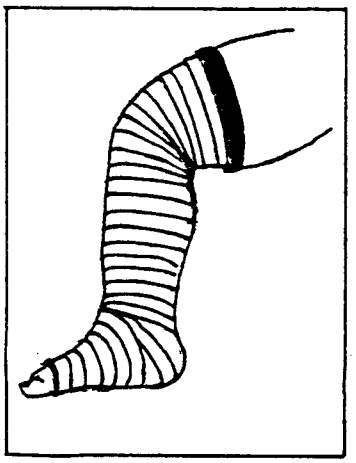
Strapping can be stopped when the foot is resting in a good position when the baby is relaxed.



Procedure to apply strapping

The PTA must follow the specific order given below.

1. protect the baby's skin with



* gauze bandage

The bandage should be wrapped around the areas that tape will be applied.

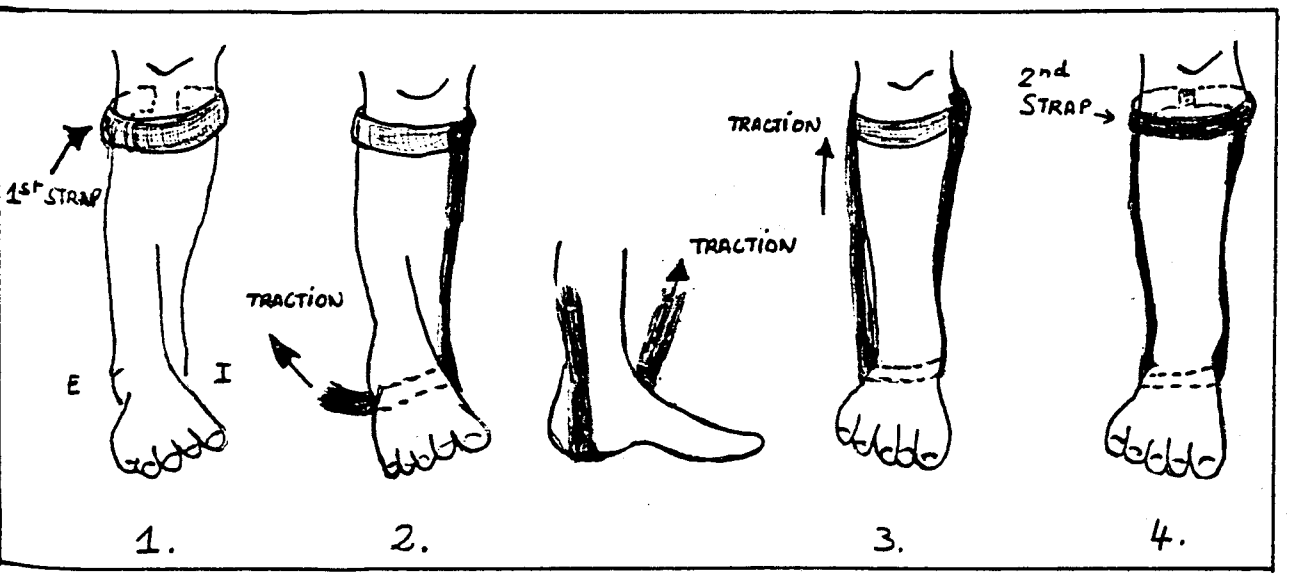
The ends of the gauze bandage are secured with tape (do not cover the baby's toes)

OR

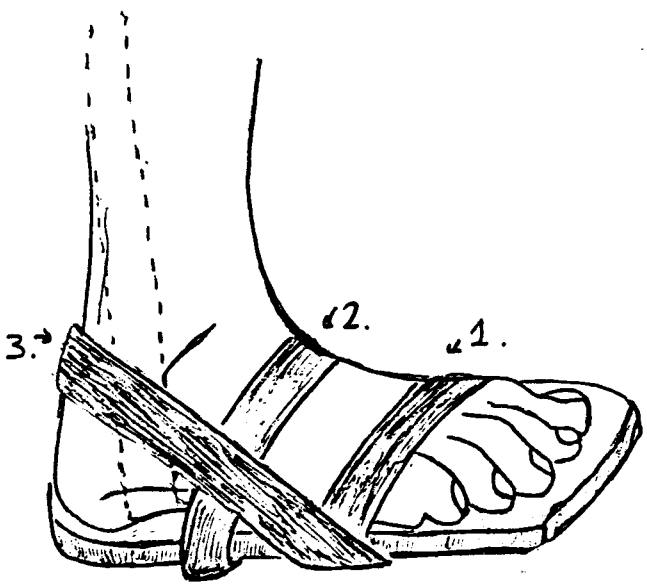
Tincture of Benzoin is a liquid that can be applied to areas where tape is used. This liquid helps to prevent skin damage.

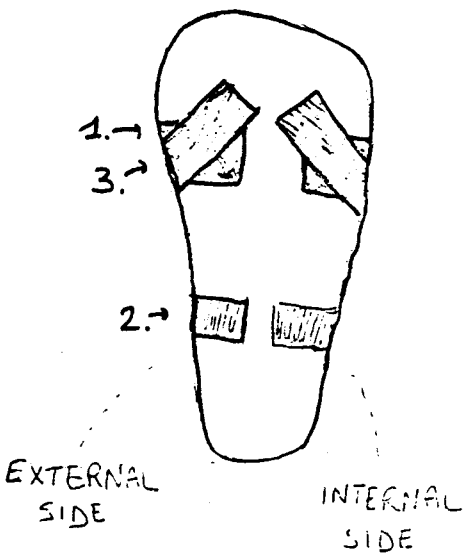
2. put the heel and foot in a good position

* make sure the talus is in a good position before strapping.



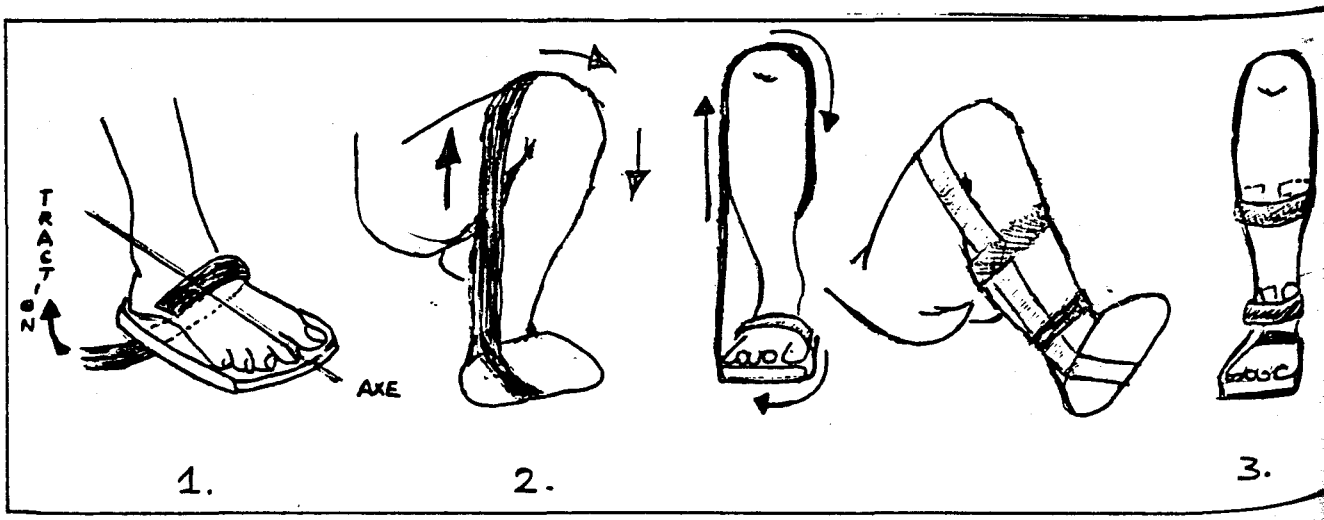
3. then attach the sole to the bottom of the foot.



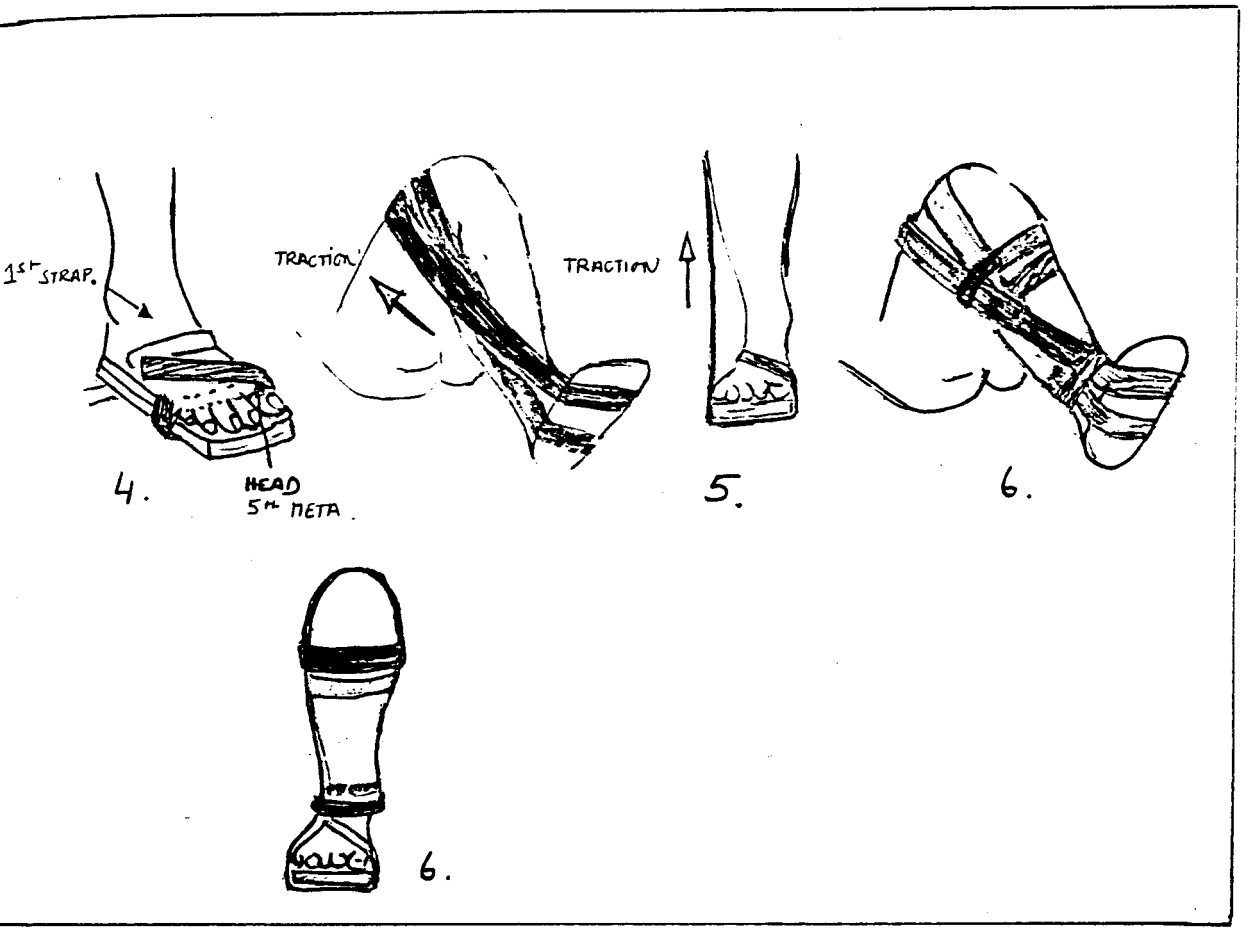


4. then immobilize the foot in a good position with knee flexion

<u>first bandage</u>



second bandage



Family teaching

The PTA must carefully explain why strapping is needed for the baby.

Strapping is a difficult technique. For this reason, the PTA will be responsible for applying and removing strapping.

If the PTA feels that the family can correctly and reliably apply strapping, he must take a lot of time to correctly teach this technique and observe the family apply strapping.

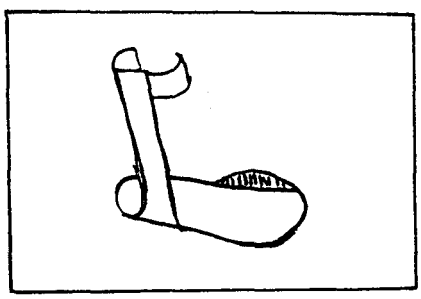
St. Germain Splint

St. Germain splint can be used for patients with Type I or Type II club foot.

The St. Germain splint is made out of one continuous piece of sheet metal or PVC tubing. If sheet metal is used, it must be padded well.

The St. Germain splint is attached to the baby's foot and leg with an adhesive bandage.

The splint has three different parts:



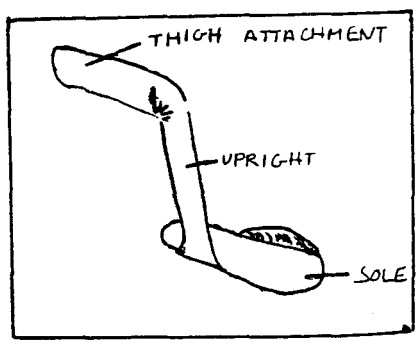
* A sole with a straight internal side.

  It may have a raised edge on the internal side to help keep the foot in a good position.

* An upright that attaches to the external side of the leg.

* Another part that attaches to the external side of the baby's thigh

  This part may be removed as the child progresses.



The splint is made to fit the child.

The sole of the splint should be the same size as the child's foot.

The upright should continue to the level of the knee joint. A relief is made to decrease pressure on the malleolus.

The thigh attachment should continue to just below the greater trochanter. The upright and thigh attachment should meet at a 90 degree angle.

The position of the sole in relation to the upright is adjusted to follow the progress of the child.

The use of the splint can be stopped when the foot is resting in a good position when the baby is relaxed.

Applying the splint

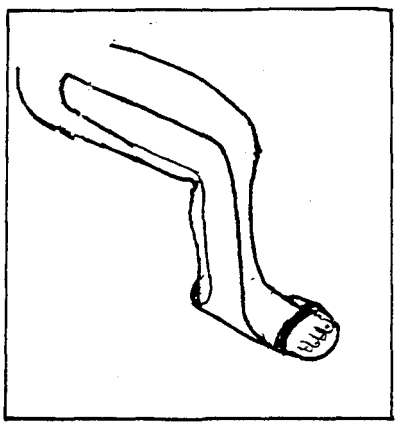
a) apply ticture of Benzoin or gauze bandages over areas where adhesive bandages will be applied

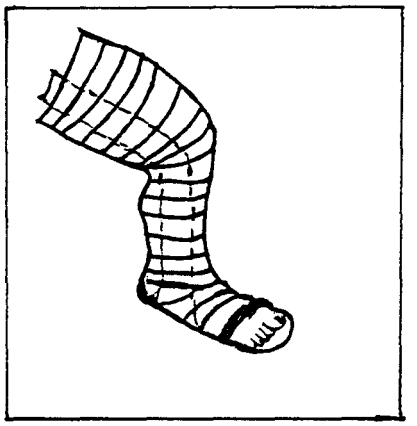
b) correct placement of the anterior part of the foot in the splint

c) apply adhesive bandage around this area

d) correct placement of the posterior part of the foot in the splint and apply the adhesive bandage

e) align the upright with the baby's leg and thigh and continue to apply the bandage until it is finished.





Removing the splint

The PTA and family must carefully check the skin after removing the splint. If there are red or dark areas, the shape of the splint must be modified to decrease pressure over these areas.

The St. Germain splint is very easy to make and to use.

It is highly recommended as an effective and very practical method of immobilization for children with club feet.

Family teaching

The PTA must demonstrate correct application of the St. Germain splint and explain why he makes each step.

The St. Germain splint is very easy to apply and the family should learn how to do this.

The family must demonstrate application of the splint and the PTA can give positive feedback and suggestions for improvement.

The splint can be removed when the child is receiving treatment (¨ 2 times each day) and must be re-applied at the end of each treatment.

Question:

The family makes a very good treatment for the child. They decide to let the child's foot be "free" for 2-3 hours before applying this splint.

Is this a good idea?

Yes _____ No _____

Explain your answer.

_____

_____

_____

_____

Plaster

Plaster is a type of immobilization that is used for very stiff feet (Type II) or when other immobilization techniques are not strong enough to hold the foot in a fixed position.

Special care must be used in applying and checking plaster immobilization. If incorrectly applied, plaster can cause severe damage.

Never make a plaster cast if the child lives more than two hours away from where you are working. This child will be difficult to check. If there is a problem with the plaster, it cannot be changed quickly and the child will have severe problems.

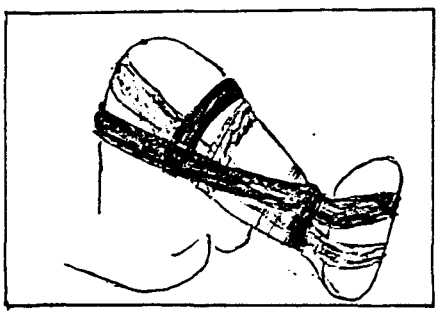
Method to apply plaster

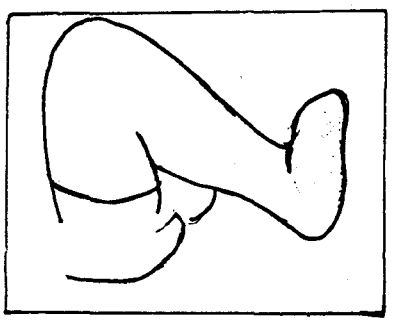
Review plaster application techniques, PLASTER chapter, Volume 2.

a) apply strapping as seen on page 20.

b) protect all bony areas with cotton padding.

c) apply plaster over the strapping; the plaster should not cover the toes and should continue above the knee.





d) do not push on the plaster or try to correct the foot position after you have applied plaster; this will cause pressure on the skin which may create wounds

Plaster of Paris should be changed at least 2 times each week.

Plaster can be stopped when the baby's foot can be controlled by strapping/splint or when the foot is relaxed in a good position.

Family teaching

The PTA will not teach the family how to apply plaster, but must teach the family how to:

* identify problems with plaster

  If the child's toes become swollen, cold, or blue, THE PLASTER IS TOO TIGHT.

  The family must remove the plaster immediately. (One method is to soak the plaster in water and then unwrap the bandage.)

* how to take care of plaster

  If the plaster becomes wet (from baby's pee or from bathing), it will become soft and begin to smell.

  To prevent this, a plastic bag can be put over the plaster to help keep it dry.

Disadvantages of plaster

* cannot move and stimulate the feet every day

* incorrect application will cause pressure sores (wounds)

* need a well trained team to apply plaster correctly

Questions:

1. What are the main problems with using plaster for immobilization?

2. Describe four differences between the St. Germain splint and strapping.

3. What type of immobilization is easiest for the family to use?

Questions:

1. Why do you not give plaster immobilization for babies with TYPE I club foot deformity?

_____

_____

_____

2. Why do you make immobilization for babies with club feet?

_____

_____

_____

4. Follow-up care for club foot patients

After the child's foot in the normal position, Physical Therapy does not stop.

The child must continue to do stretching and strengthening exercises to maintain good position and movements of the foot.

If the family and child stop making these exercises, most club feet will return to a bad position!

When the child begins to walk, he may need special shoes to help keep in the foot in a good position in standing.

Questions

A child received treatment for club foot when he was a baby. He is now 2 years old and continues to receive treatment.

1. What muscles need to be strengthened in the feet?

_____

_____

This boy received special shoes.

2. Will special shoes help to keep the foot in a position of inversion or eversion?

_____

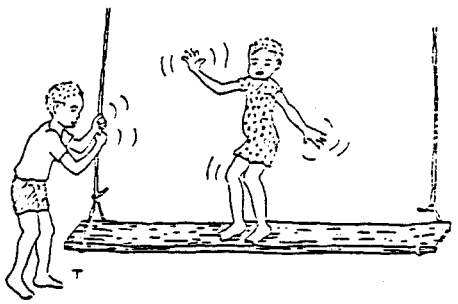
Explain your answer.

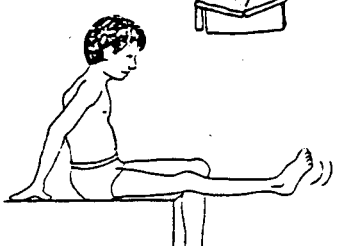
_____

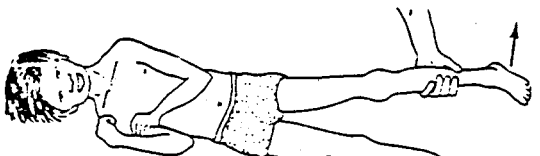
_____

_____

Below are pictures of different exercises that will help maintain good strength and position in the child's foot after treatment for club foot.







G. CHAPTER SUMMARY

Club foot is a congential deformity of one or both feet.

The deformity of the foot is a combination of:

- adduction of the forefoot
- inversion of the heel and forefoot
- plantar flexion of the ankle (equinus)

There are three different types of club foot. The types are named depending on the severity of the deformity.

- TYPE I = easy to correct (easy to put the foot in a normal position)
- TYPE II = possible to correct with difficulty; possible to correct incompletely
- TYPE III = impossible to correct (fixed)

The family must be involved in treatment of the child. They can help to give the treatments and help the child develop good habits.

The four main P.T. treatments used to treat club foot are:

- **massage** - helps relax the child and build trust
- **passively moving the foot into a good position** (distraction, then correct HINDFOOT --> FOREFOOT --> ANKLE) - helps to stretch tissues and increase ROM.
- **stimulations** - used to help excite dorsiflexor and evertor muscles and make them work.
- **immobilization** (strapping, St. Germain splint, plaster) - are used to <u>maintain</u> ROM that has been increased by other techniques.

The PTA should remember to be gentle with the baby's foot because it can be easily damaged.

Follow-up care is needed for these patients for exercises and shoes.

CHAPTER 27

HEMIPLEGIA

HEMIPLEGIA is loss of controlled movement and decreased feeling in one side of the body.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. describe hemiplegia (causes and symptoms).

2. identify the 3 different stages of hemiplegia and what happens in each stage.

3. describe flaccidity and spasticity.

4. evaluate a hemiplegic patient and identify problems that Physical Therapy can help.

5. demonstrate the appropriate Physical Therapy treatment for hemiplegic patients in different stages of recovery.

CHAPTER CONTENTS

A. INTRODUCTION

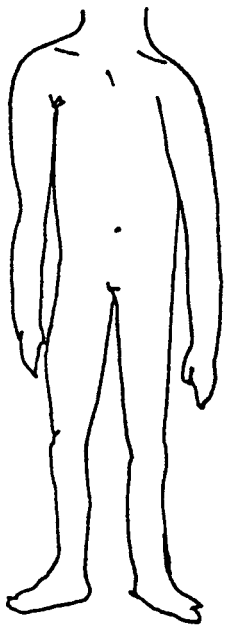
Hemiplegia is a problem of the central nervous system. The PTA should study the nervous system (see NEUROLOGY chapter, Volume 1) before beginning this chapter.

B. WHAT IS HEMIPLEGIA

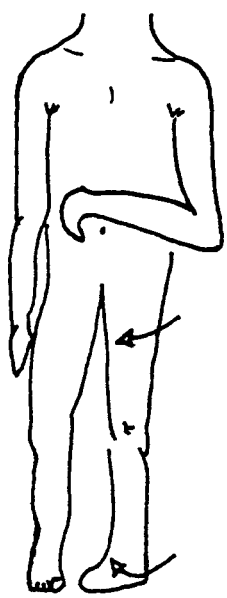
Hemiplegia is loss of controlled movement and decreased feeling in ONE SIDE of the body. Hemi = half

Loss of movement can mean:

NO MOVEMENT
(flaccid paralysis)
Flaccidity



UNWANTED/EXTRA MOVEMENT
(spastic paralysis)
Spasticity



Questions:

1. A patient has no movement in the right arm. All other body parts are normal. Does this patient have complete hemiplegia?

   Yes _____ No _____

2. A patient has spasticity in both legs. What does spasticity mean?

_____

_____

3. A patient has a flaccid left arm and a flaccid left leg. What does flaccid mean?

_____

_____

Could this patient have hemiplegia?

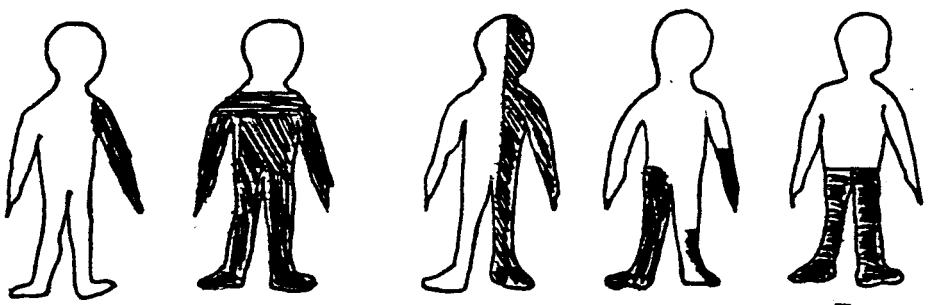
Yes _____ No _____

4. A patient has paralysis in the right side of the body. Describe 3 general problems this patient will have in a normal day.

_____

_____

5. Below are pictures of different patients. The dark areas are the areas that have uncontrolled movement. Please identify what pictures could be patients with hemiplegia.



C. CAUSE OF HEMIPLEGIA

The cause of hemiplegia is <u>damage to one side of the brain</u>.

Brain damage can be caused by:

TRAUMA

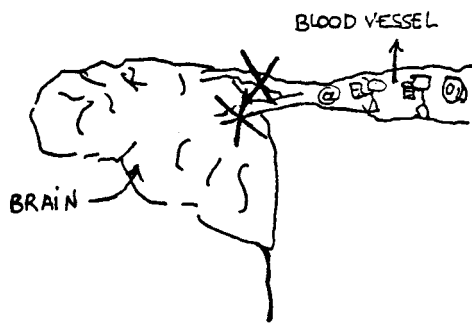
* direct hit to the head.

DECREASED CIRCULATION

* Blood travel is blocked. Food and oxygen cannot arrive at a part of the brain and it becomes weak and dies.

DISEASE

* Disease may attack one area of the brain more than another area.



<u>Questions</u>:

1. If there is damage on the right side of the brain, what side of the body will have a problem?

   _____

2. A patient has <u>right</u> hemiplegia. What side of the body has abnormal movement and feeling?

   _____

   What side of the brain has been damaged?

   _____

D. SPECIFIC INFORMATION ABOUT HEMIPLEGIA

Information provided in this section includes:

1. The stages of hemiplegia (descriptions and explanations are given for each stage).
2. Different problems of hemiplegic patients.

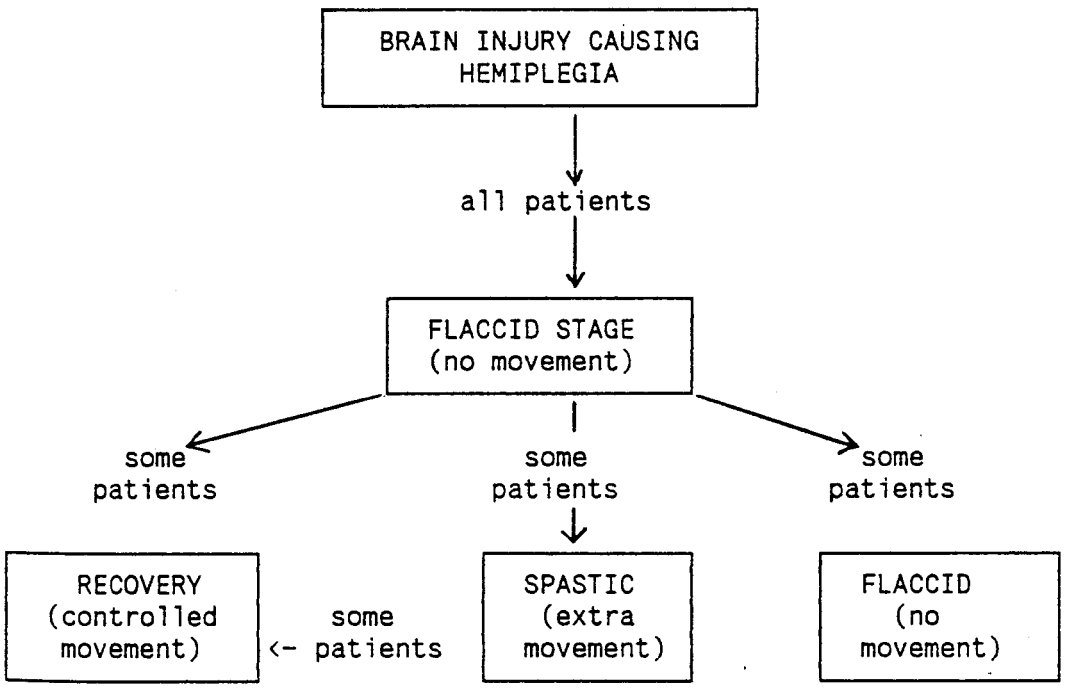
1. THE STAGES OF HEMIPLEGIA

There are 3 stages of hemiplegia:

a. FLACCID STAGE (NO MOVEMENT)

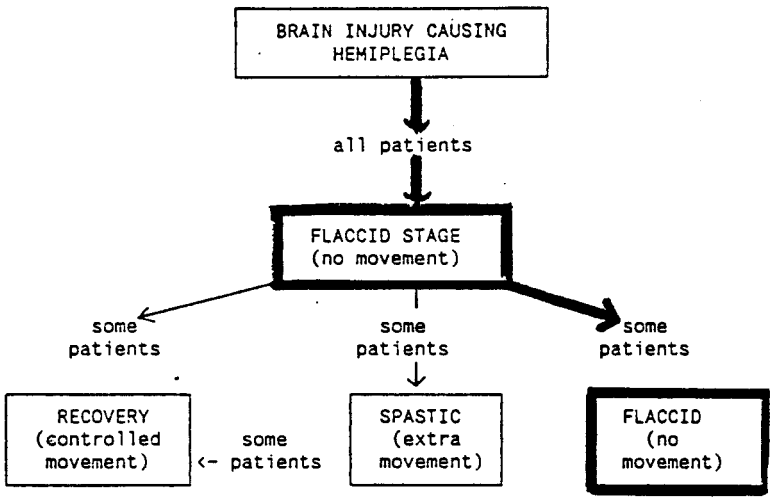
b. SPASTIC STAGE (UNCONTROLLED, EXTRA MOVEMENTS)

c. RECOVERY STAGE (REGAIN CONTROLLED MOVEMENT)



For each stage we will give a description of what you may see and an explanation of why this may happen.

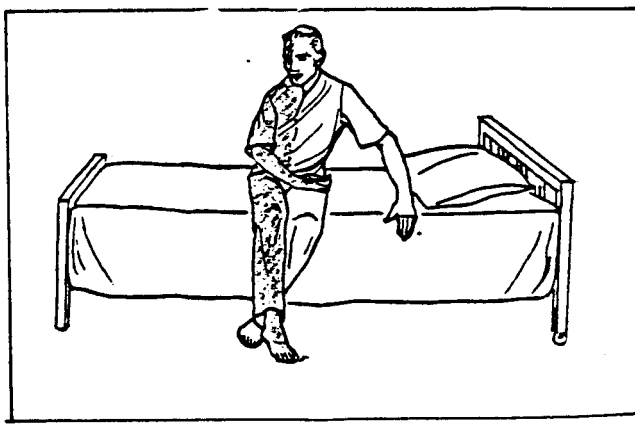
a. FLACCID STAGE (NO MOVEMENT)



Description of Flaccid Stage

Just after damage to the brain, muscles on one side of the body will make no movement.

This can include muscles of the face, tongue, trunk, upper limb and lower limb.



Another word used to describe flaccid is "floppy".

A part that is flaccid (floppy) feels very heavy and loose.

Some patients will describe a flaccid limb as a "dead" limb. The limb is <u>not</u> dead, but it has no muscle movement to show that it is alive.

Flaccid stage can continue for some days, weeks or months. In some patients (not often), a part may remain flaccid forever.

<u>Explanation of why flaccid stage happens</u>

Normally the brain is very active.

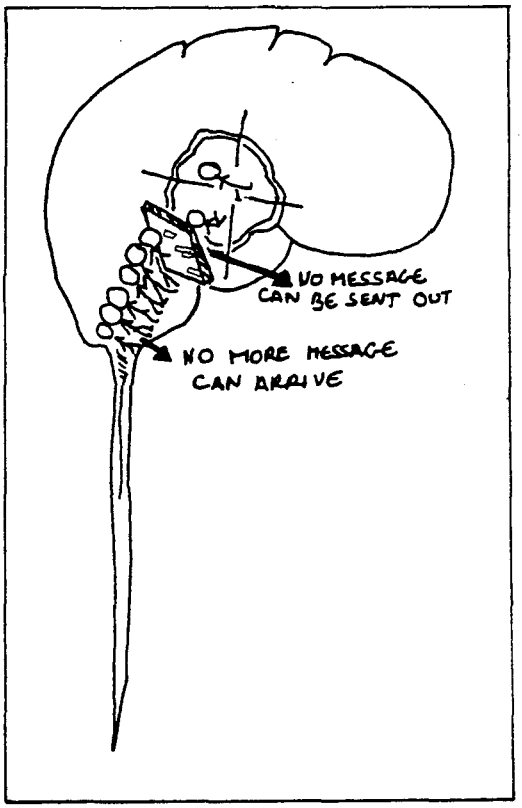
The brain makes messages, sends messages and receives messages.

If there is damage to a part of the bain, this area will stop working.

This damaged area <u>cannot make messages</u> for a part of the body.

This damaged area <u>cannot send messages</u> to a part of the body.

This damaged area <u>cannot receive messages</u> from a part of the body.



THIS IS THE FLACCID STAGE.

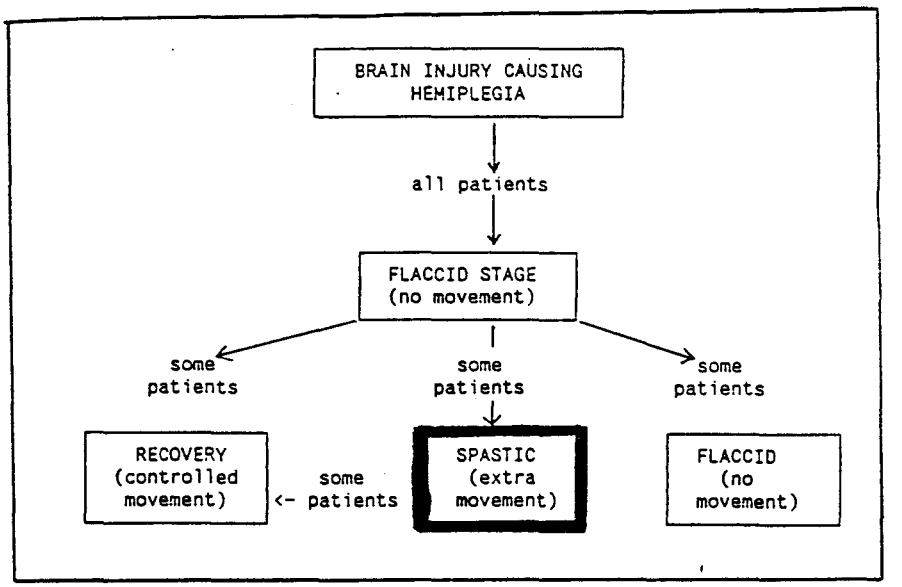
Questions:

1. After brain injury, the part of the brain that is damaged cannot make or send messages to a part of the body. What will this part have problems with, movement or feeling?

   Explain your answer.

2. In your own words, describe why hemiplegic patients in flaccid stage may also have problems with sensation (feeling) in the flaccid limb.

b. SPASTIC STAGE (UNCONTROLLED, EXTRA MOVEMENT)



Description of Spastic Stage

After flaccid stage, some patients may begin to have uncontrolled movement in the arm and leg. Uncontrolled, extra movement is called Spasticity.

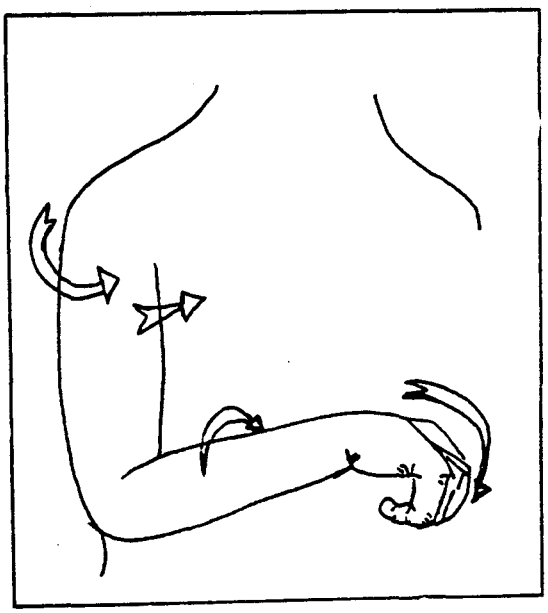
Spasticity in hemiplegia is seen in many muscles at the same time. This is called "group spasticity".

Group spasticity means that the uncontrolled movement of the upper limb or lower limb do not happen to only one muscle; spasticity is seen in many muscles at the same time.

In hemiplegic patients, "group spasticity" generally appears in the stronger muscles of the upper and lower limb.

Common "group spasticity" in the upper limb is:

shoulder:	adduction, internal rotation
elbow:	flexion
forearm:	pronation
wrist:	flexion
fingers:	flexion, adduction
thumb:	flexion, adduction

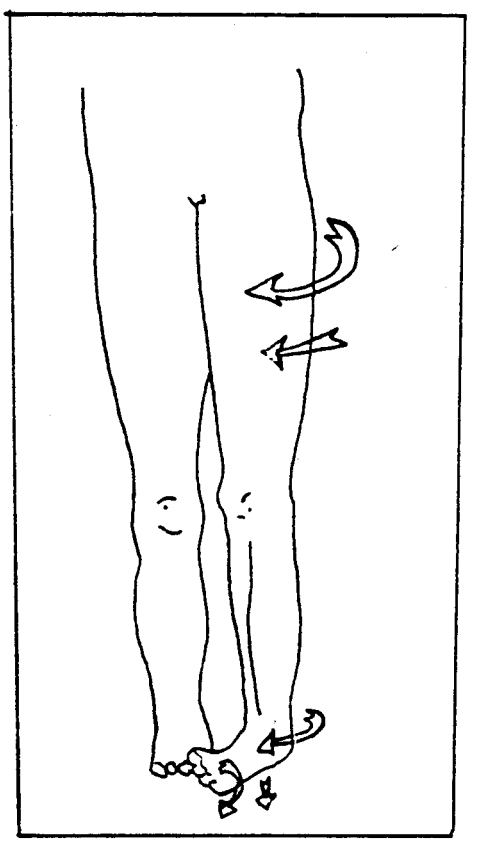


NOTE:

Not all patients will look this.
Some patients may have diferrent muscles
included in "group spasticity".

Common "group spasticity" in the lower limb is:

hip:	extension, internal rotation, adduction
knee:	extension
ankle:	plantarflexion
foot:	inversion
toes	flexion, adduction

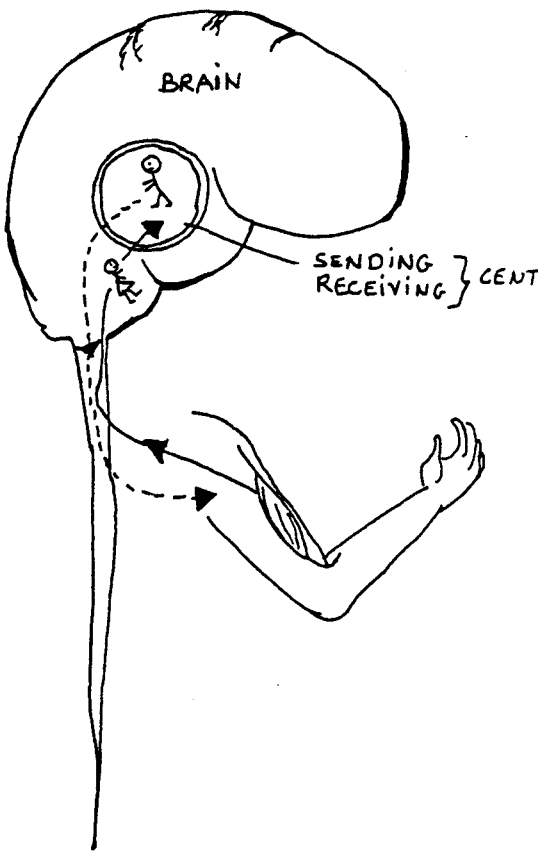


NOTE:

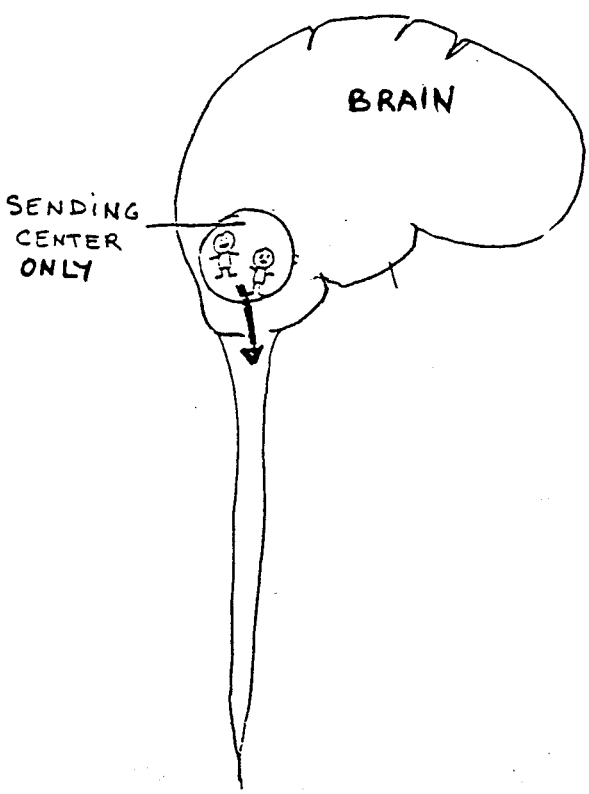
Not all patients will look this.
Some patients may have diferrent muscles
included in "group spasticity".

Explanation of why flaccid stage happens

We have said that the brain can make, send, and receive messages to and from all parts of the body.



There is a special part of the brain (special sending area) that would like only to send messages to the muscles all of the time to tell them to work.



Question:

If this special part of the brain was free to send messages all of the time, would ALL MUSCLE ACTIVITY be increased or decreased?

_____

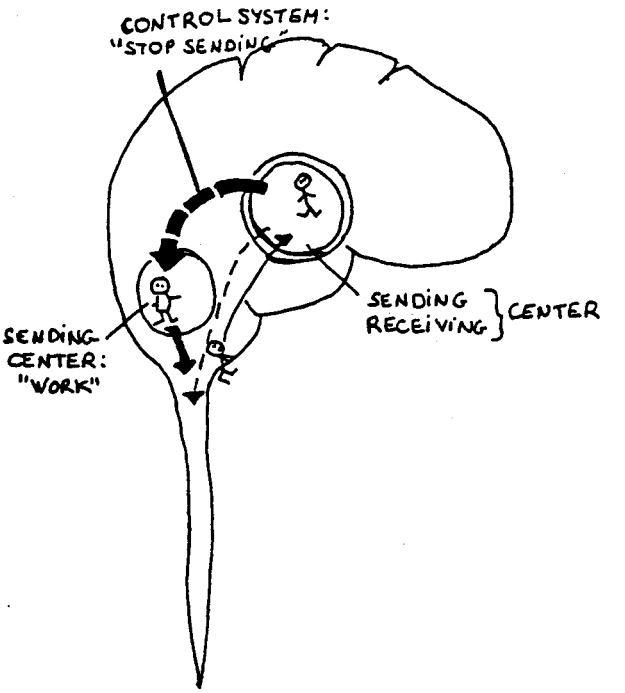
Explain your answer.

_____

_____

_____

To help CONTROL muscle activity, a part of the brain must INHIBIT (stop) many of these messages.



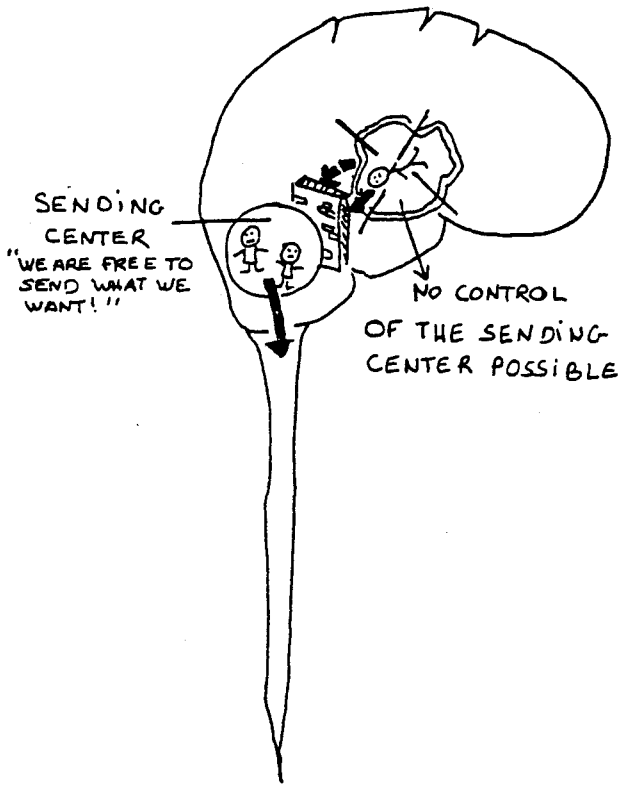
Question:

If a part of the brain inhibits these messages there is more controlled muscle movement. Explain why.

_____

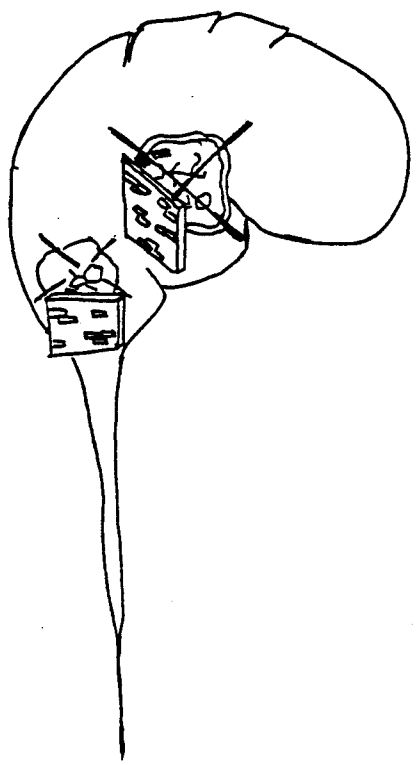
_____

_____



When the damaged part of the brain is the "inhibiting part", the inhibiting part stops working.

The "special sending area" is free to send many messages and the result is uncontrolled movement (spasticity) in specific muscles.



If brain damage is so severe that the "inhibiting part" and the "special sending area: are both damaged, then the patient will remain FLACCID.

Questions:

1. A patient has right hemiplegia.

   * What side of the body has a problem with feeling?

   _____

   * What side of the brain has been damaged?

   _____

2. After 2 weeks, the patient in Question 1 begins to have spasticity (uncontrolled movement) in the right arm. Explain why this happens.

_____

_____

_____

_____

3. Do you expect the patient in Question 1 to develop spasticity in the left arm?

   Yes _____ No _____

   Why or why not?

_____

_____

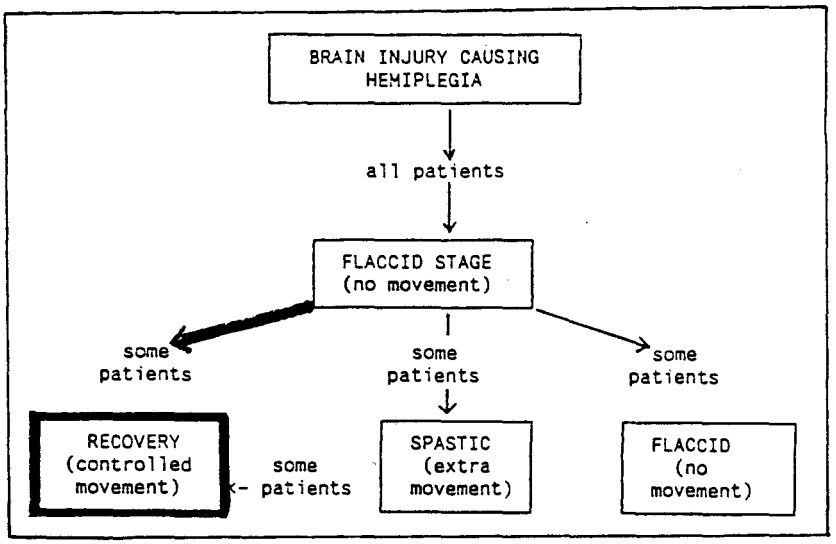
_____

_____

4. The patient in Question 1 also has a FLACCID lower limb. Is this flaccidity on the left side or the right side?

   _____

c. RECOVERY STAGE (REGAIN CONTROLLED MOVEMENT)



Description of Recovery Stage

The patient has relearned how to make individual movements, and the brain has been retrained on how to control different movements.

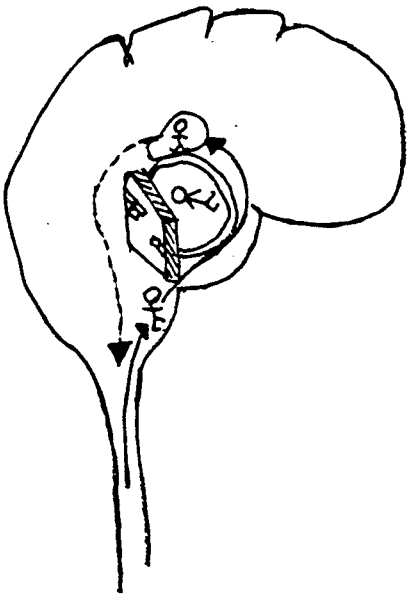
In some patients where brain damage is severe, individual movements of some body parts may never be possible (flaccidity or spasticity may remain forever).

Most recovery happens in the first six months after brain injury. Some recovery may continue even after many years, but this is not common.

Explanation of why Recovery Stage happens

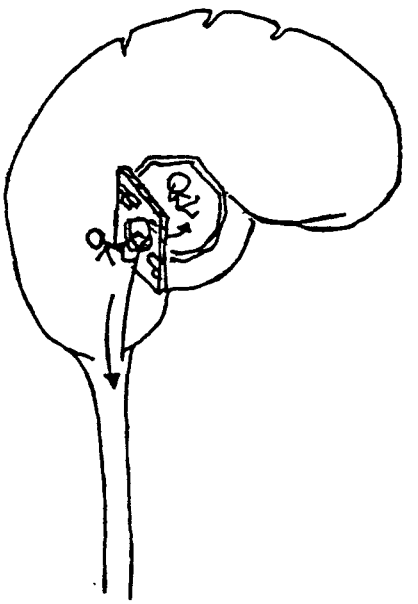
Areas of the brain that have died (been completely destroyed) will not recover.

There are three ideas that help explain how a patient may be able to recover individual movements after an injury to the brain.



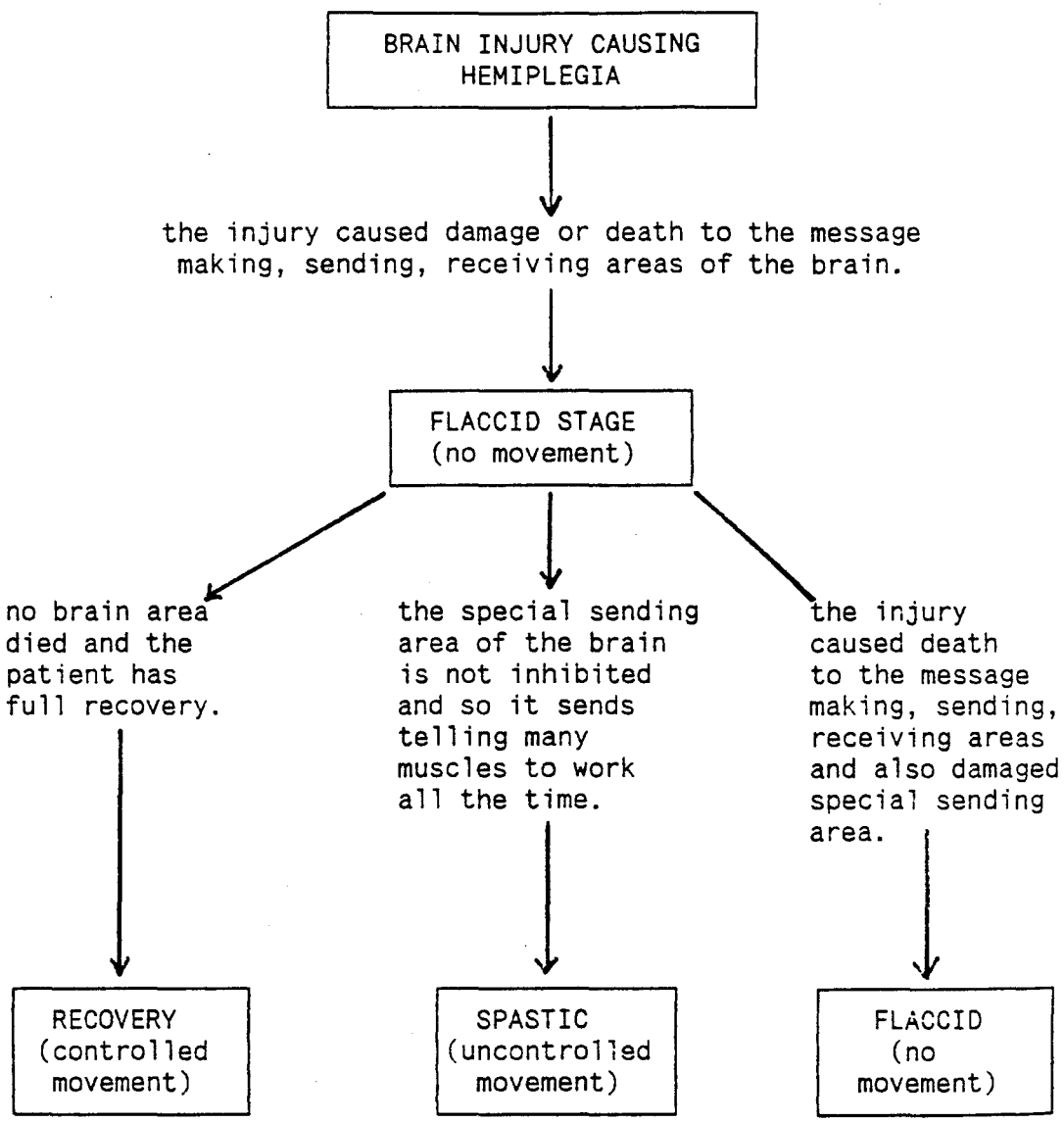
i) areas that are <u>close</u> to the brain-dead area may try to help and do some of the work that this area would normally do.

ii) Some areas that had only small injury (or pressure from swelling) and did not die may recover to normal function.



iii) Through <u>practice</u> and <u>retraining</u> the patient may be able to <u>control</u> some of the "group spasticity" muscles.

SUMMARY OF THE 3 STAGES OF HEMIPLEGIA



an injured part recovers, or areas close to the brain-dead areas help with the work, or the patient relearns how to make individual movement through lots of practice.

Notes:

- The length of time for each stage is different in all patients
  Example: flaccid stage may be 1 week in one patient and may be 3 weeks in another patient

- A clear beginning and end of the stages cannot be seen; often many of the stages can be seen at the same time
  Example: a man may have controlled movement in the right hip, spasticity in the right foot, and flaccidity in the right arm.

- Not all patients will have controlled movements. Many hemiplegic patients may continue to have some spasticity for the rest of their lives.

2. DIFFERENT PROBLEMS OF HEMIPLEGIC PATIENTS

As we have said before, hemiplegic patients will have problems with movement and feeling on one side of the body.

This may include movement and feeling in the face, mouth, tongue, trunk and limbs on that side.

Activity:

You have just met a patient with left hemiplegia. There is no movement in the muscles of the left face, mouth, tongue, trunk, arm and leg.
Describe five problems that this patient will have in a normal day.

_____

_____

_____

_____

_____

In addition to problems with movement and feeling, the hemiplegic patient may also have problems with

* speaking
* "knowing" one side of the body
* following directions
* controlling emotions

* SPEAKING

The language area (the area that gives you the ability to speak) is on the LEFT side of the brain only.

If the language area is damaged, the patient will be able to understand what you say, but is <u>not able to speak</u>.

<u>Questions</u>:

1. What type of hemiplegic patient will have a problem with speaking (right hemiplegic or left hemiplegic)?

_____

Questions: (continued)

2. A patient with hemiplegia cannot speak. The PTA stops speaking to the patient and uses hand movements to communicate with the patient.
   Is this a good idea? Yes _____ No _____

   Explain your answer.

   _____

   _____

   _____

* "KNOWING" ONE SIDE OF THE BODY

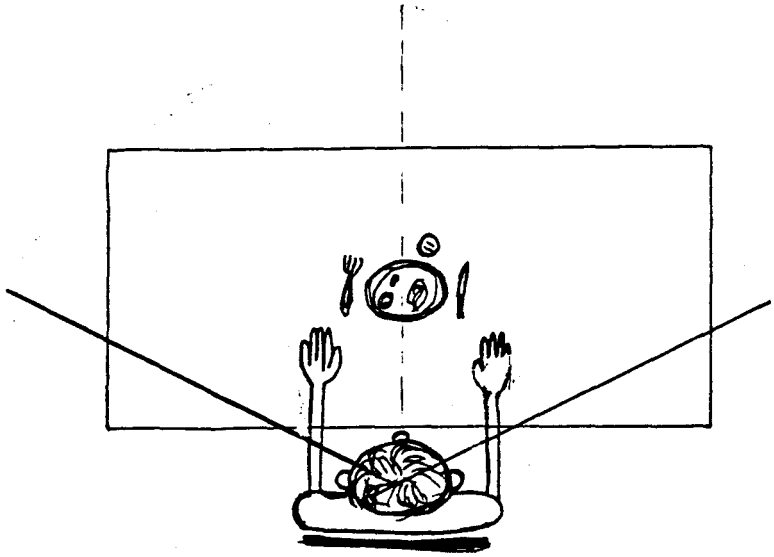
The patient with hemiplegia may not remember, recognize, know or see the hemiplegic side of their body.

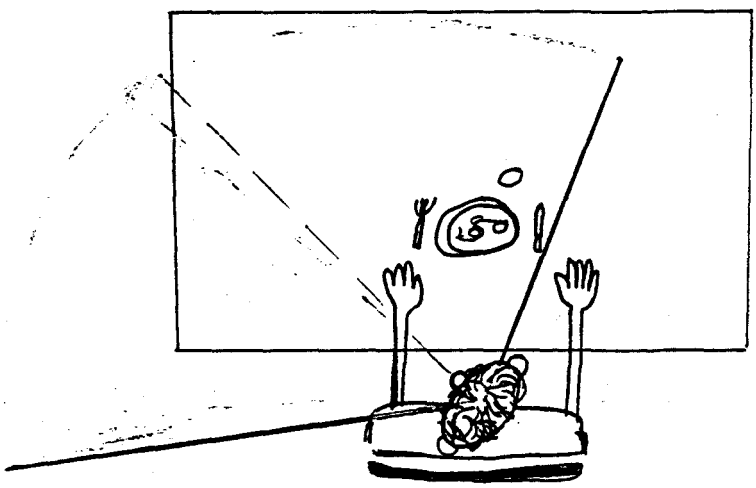
The brain is not making or sending messages to this area and is not able to receive messages from this area.

With no messages arriving to and from the hemiplegic side, the patient can easily "forget" that this side continues to be a part of his body.

For some patients, the brain may be damaged in such a way that the patient does not "see" the area or objects on the hemiplegic side.

Example:





* FOLLOWING DIRECTIONS

In some patients, the brain has been damaged so that it may be difficult for the patient to follow directions or understand simple conversation.

* CONTROLLING EMOTIONS

After the brain has been damaged, the patient may become very sensitive and may easily be angry, cry, laugh or shout.

The PTA must remember that these behaviors may be difficult for the hemiplegic patient to control.

IN SUMMARY

The different problems of a hemiplegic patient are caused by damage to or death of a specific part of the brain.

Our body is one complete whole. When a part of it is damaged, the "normal" areas cannot remain the same. These areas may need to do more work, adapt their work, or help to retrain the damaged areas.

It is important to remember that a hemiplegic patient is not just a paralyzed arm and leg.

There may be many other problems caused from damage to the brain and we must always work with the whole patient.

E. MEDICAL TREATMENT OF HEMIPLEGIA

Medical treatment for hemiplegia is medicine given to:

* make the blood thinner: this will prevent the blood from being blocked in the arteries and veins

* try to decrease pain (if the patient complains of pain)

* try to decrease spasticity (this medicine will also make the patient very sleepy)

In general, MEDICINE WILL NOT HELP THE PATIENT RECOVER CONTROLLED MOVEMENT.

Controlled movement can happen only with practice and retraining muscles on the hemiplegic side of the body.

It is the responsibility of the PTA to work closely with the patient to help retrain muscles and practice controlled movements.

F. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH HEMIPLEGIA

The PTA must carefully evaluate the patient to identify changes in movement and function.

FLACCID PERIOD

* sensation (what areas have decreased feeling or no feeling?)
* what areas are completely flaccid (do some areas have a little muscle tone?)
* pain
* range of motion
* functional ability of patient (moving in bed, sitting, eating)
* mentation (can the patient follow directions or understand you?)
* awareness of the hemiplegic side of the body

SPASTIC PERIOD

* sensation
* pain
* range of motion
* group spasticity (where, how strong, when do you see it?)
* flaccid areas
* functional ability of the patient (moving in bed, sitting, transfers, standing)
* mentation, and awareness of hemiplegic side of the body

RECOVERY PERIOD

* sensation, pain, range of motion
* amount of controlled movement that the patient has (movements that are not in a group pattern)
* group spasticity areas
* functional ability of the patient (standing, walking, dressing)
* flaccid areas
* equipment needed to help patient be more functional and independent in every day activities

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH HEMIPLEGIA

RULES TO REMEMBER IN TREATING ALL HEMIPLEGIC PATIENTS

* Weakness is NOT the main problem, NO CONTROL of movement is the main problem.
* The PTA should NOT muscle test a patient with hemiplegia and NOT work to "strengthen" the hemiplegic side. The patient must learn to control individual movements.
* The whole person needs treatment to help both sides of the body to work together again.

Specific Physical Therapy treatments will be discussed for each stage of hemiplegia.

1. PHYSICAL THERAPY TREATMENT IN FLACCID STAGE
2. PHYSICAL THERAPY TREATMENT IN SPASTIC STAGE
3. PHYSICAL THERAPY TREATMET IN RECOVERY STAGE

1. PHYSICAL THERAPY TREATMENT IN FLACCID STAGE

Physical Therapy treatment should begin as soon as possible after a patient has hemiplegia.

Physical Therapy treatment during this stage includes:

a. good patient positioning

b. orient the patient to the hemiplegic side of the body

c. psychological support

d. maintain ROM

e. practice functional movements

f. balance exercises

g. stimulate movements not expected in group spasticity

h. provide wheelchair

a. good patient positioning

Good positioning for the hemiplegic patient in flaccid stage is important to help:

* keep the joints in a good position
* avoid spasticity
* support the joints that flaccid muscles cannot support
* encourage the patient to look on the hemiplegic side

In this section will will describe:

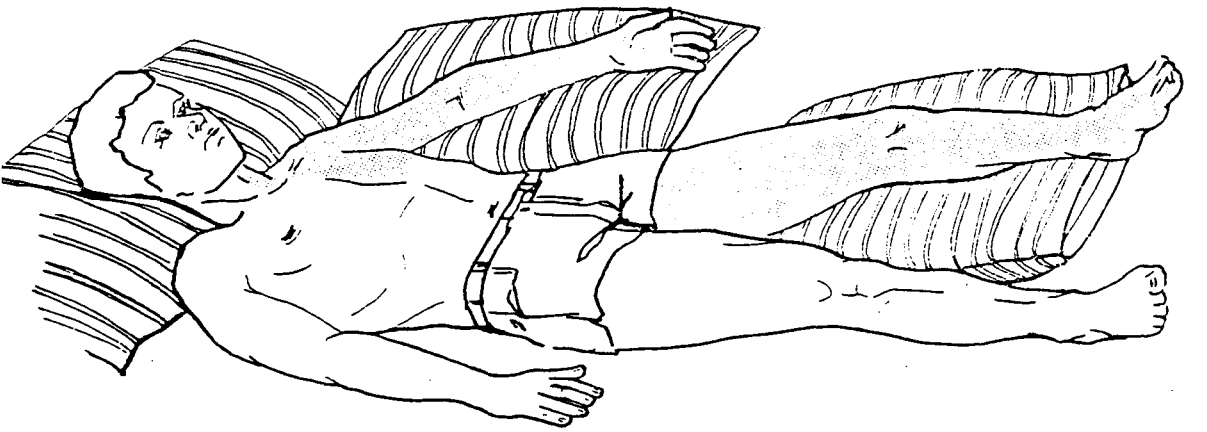
i) suggested bed positions

ii) suggested sitting positions (wheelchair, table, bed)

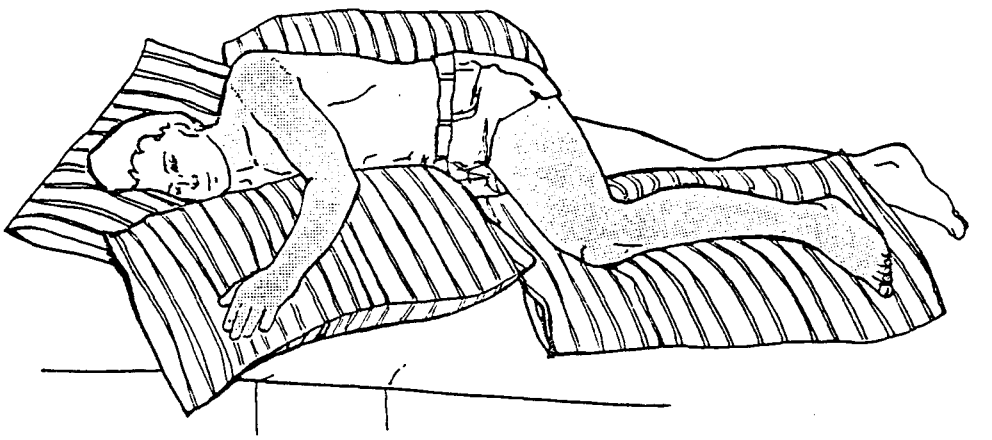
iii) equipment to help with positioning

i) **suggested bed positions**

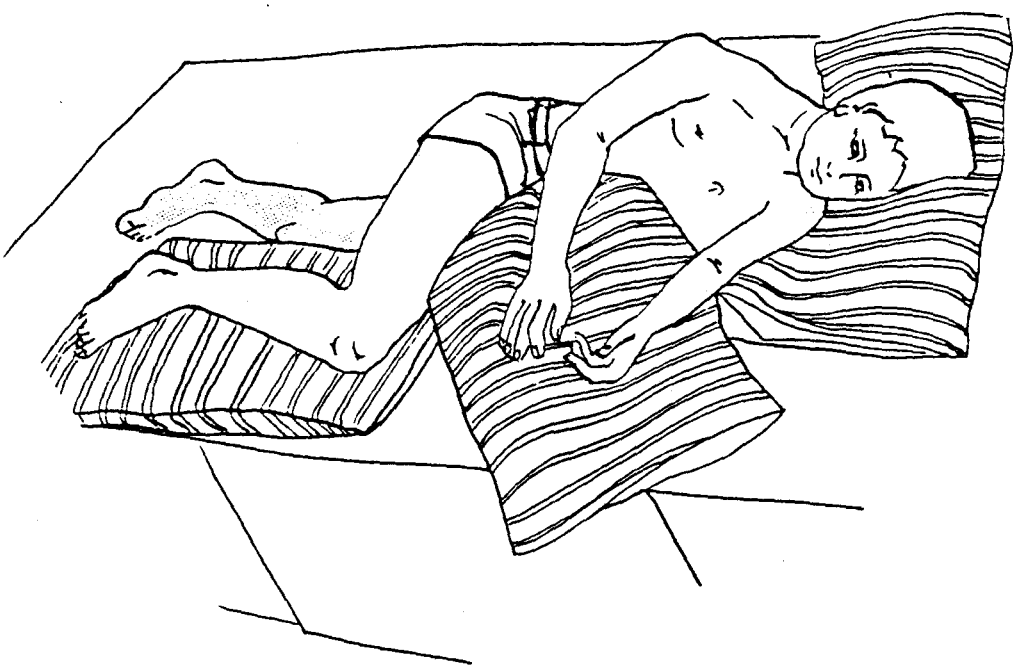
Below are pictures of recommended positions for patients in bed.



Supine position



Side lying on the unaffected side



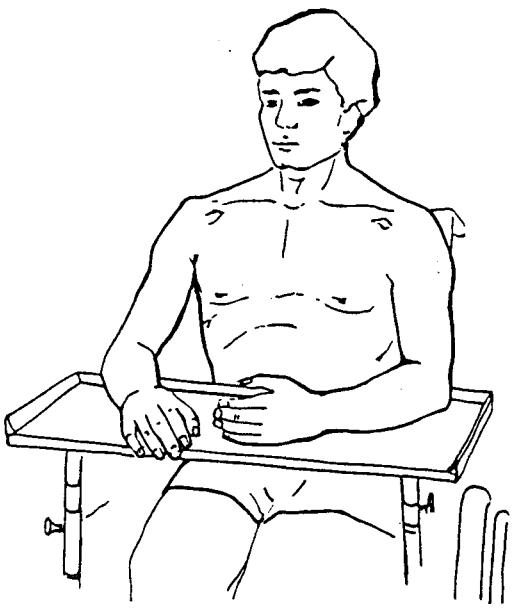
Side lying on the affected side with pillow support

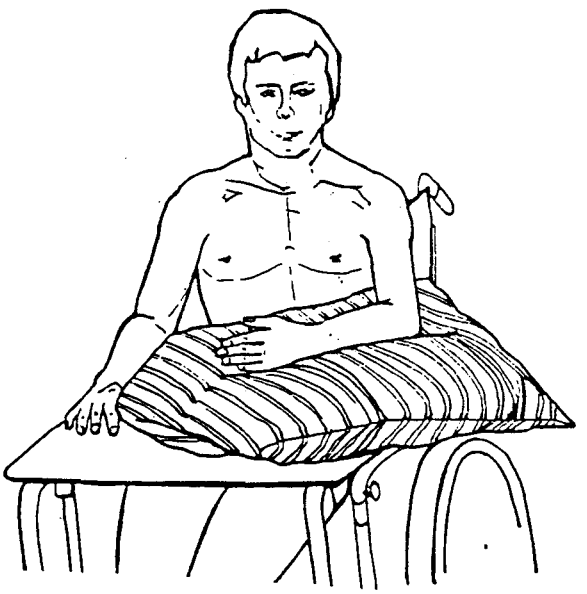
NOTE

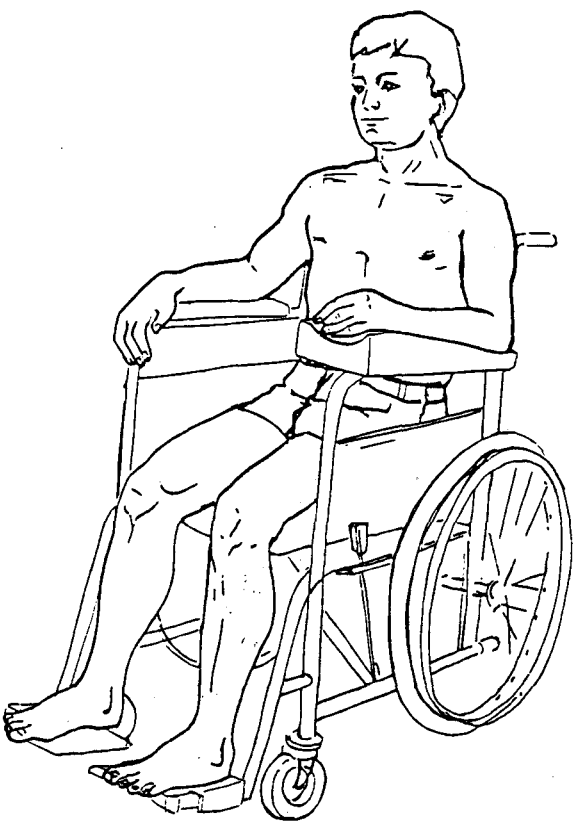
Sidelying positions are best to help avoid spasticity.

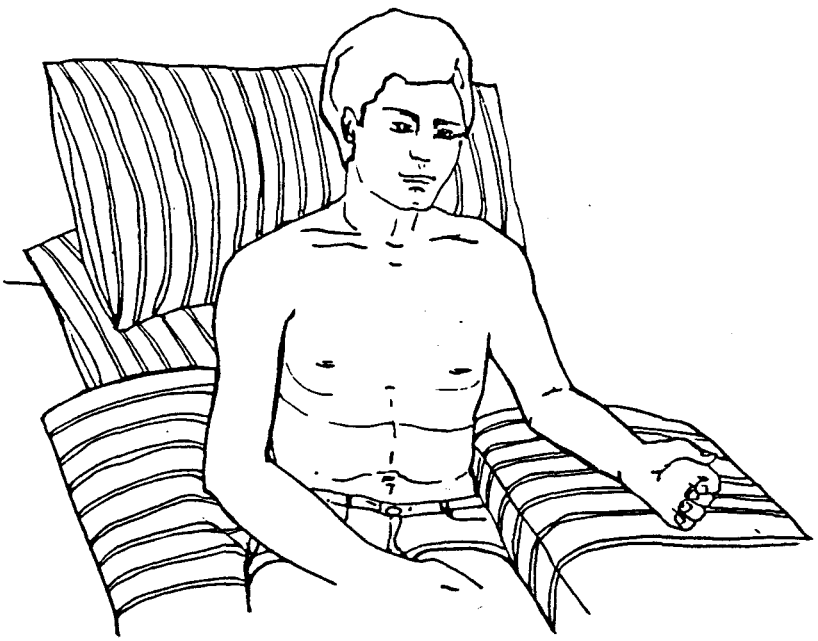
ii) **suggested sitting positions**

The main goal is to support the flaccid upper limb so that it does not pull on the shoulder joint and cause joint damage.









Question:

A person has left hemiplegia and has a flaccid upper limb. This limb is not supported and the patient develops problems in the left shoulder. In your own words, describe the cause of these shoulder problems.

_____

_____

_____

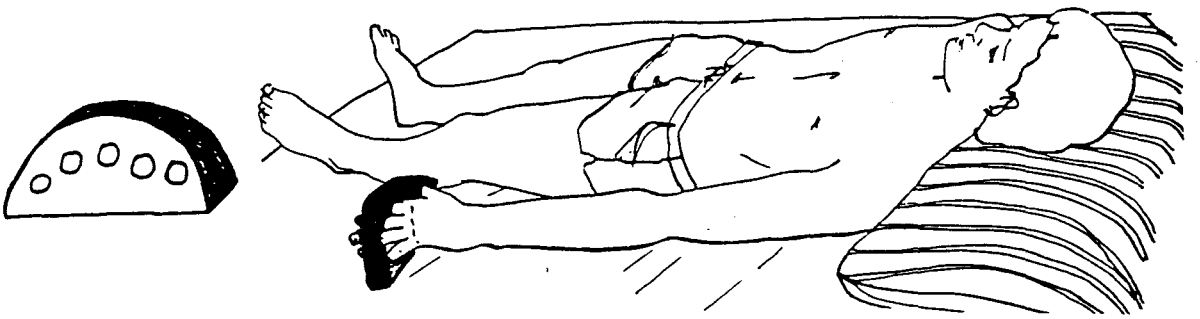
_____

iii) **equipment to help with positioning**

The different devices that can help support the joints during this period are:

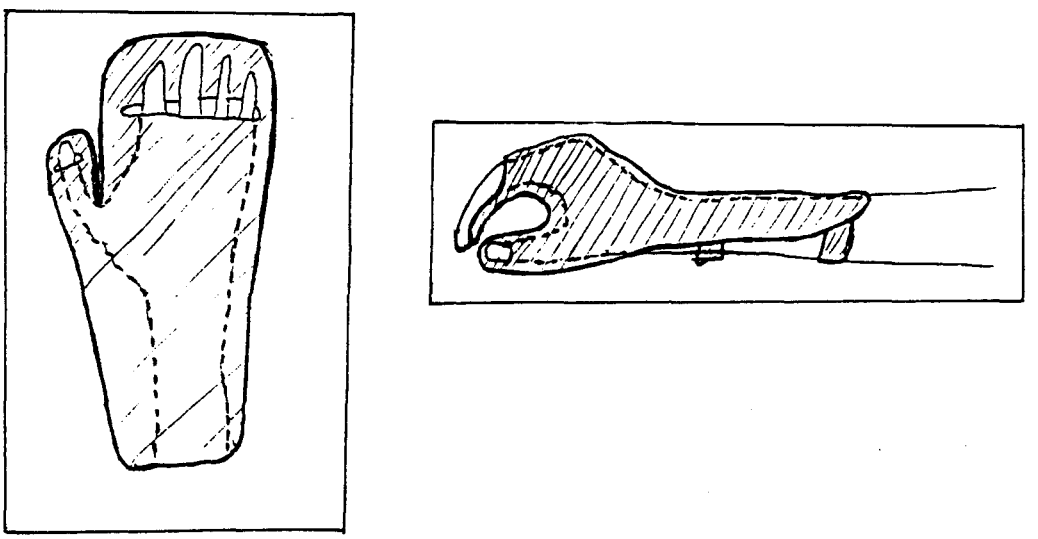
* soft finger divider
* hand splint
* shoulder supports

* soft finger divider



This divider is made of foam rubber. The patient can wear this at night to help keep the fingers apart (helps avoid spasticity).

* hand splint

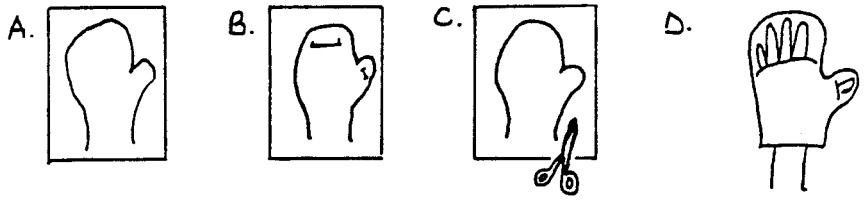


This is a special splint that covers the posterior side of the hand and anterior side of distal fingers and thumb.

The hand is in a functional position.

The splint does not push in the palm area because pressure on this one area may increase spasticity.

Activity:



A. Take a regular size piece of paper and draw a line around the outside of the hand.

B. Cut a straight line into the paper about 5 cm from the end of the paper where the fingers and thumb were.

C. Cut around the line that you drew in step A.

D. Put fingers and thumb through the holes that you cut.

The "paper device" you have on your hand is nearly the same form as the hand splint for patients with hemiplegia.

Question:

What is the functional position for the wrist, fingers and thumb?

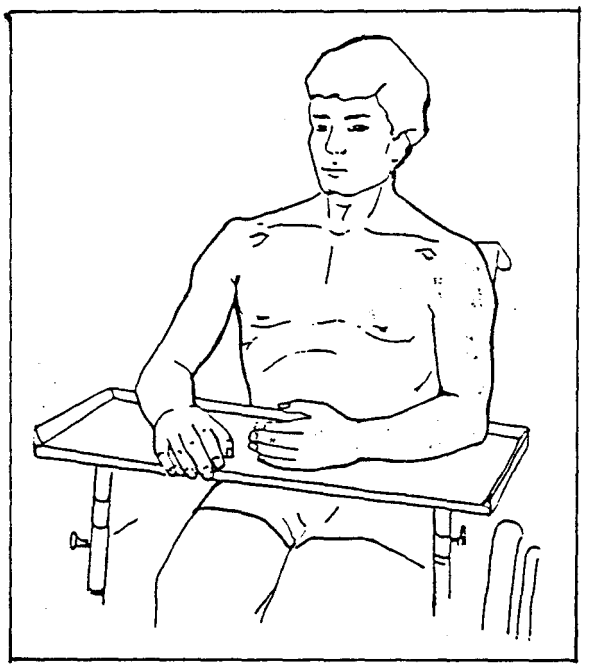
_____

_____

_____

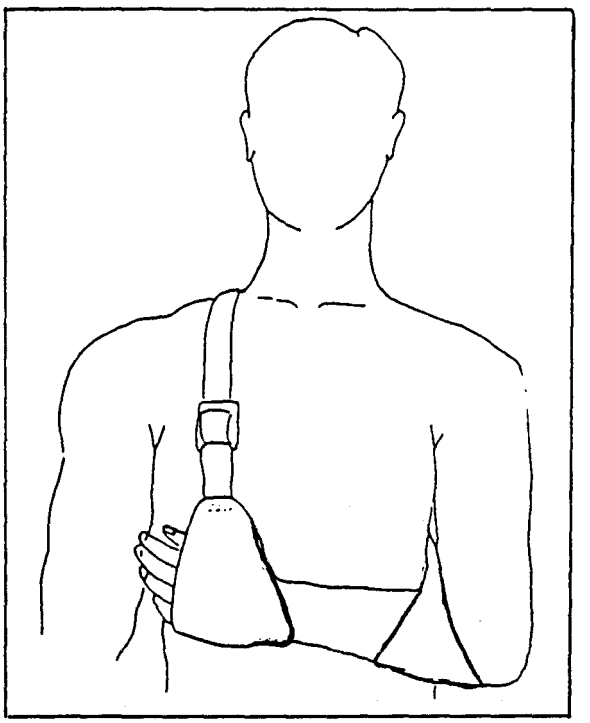
* **shoulder support techniques**

To help keep the humerus in a good position, the patient can rest the arm on a table in sitting position.

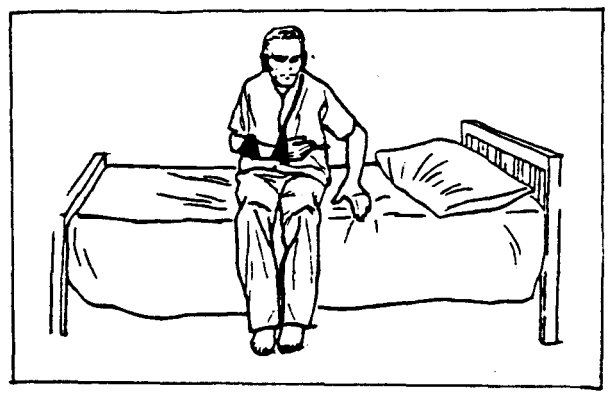


Another very good method to support the shoulder joint is an arm sling (see SLINGS chapter, Volume 2).

The recommended sling is shown below.

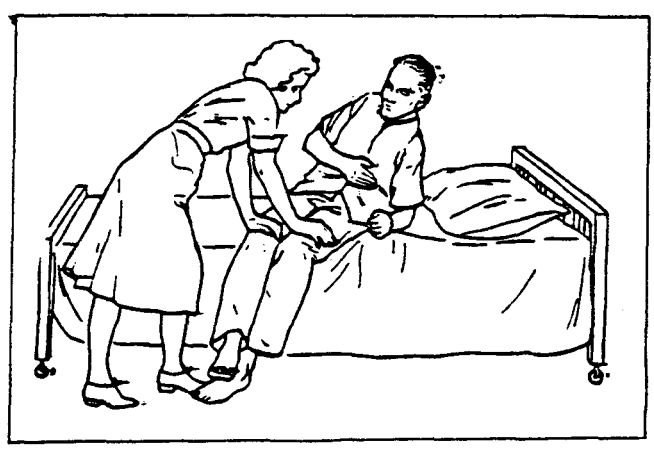


The patient should wear the sling when standing, walking, or sitting without arm support.



b. <u>orient the patient to the hemiplegic side of the body</u>

The PTA and the patients's family must help the patient "remember" the hemiplegic side of the body and look at materials and places that are on the hemiplegic side.



Because of brain damage, one side of the body and the opposite side of the brain have no communication with each other.

As the brain recovers, communication between the brain and the body can be increased by encouraging the patient to <u>LOOK</u> at the hemiplegic side, <u>TOUCH</u> the hemiplegic side of the body, and <u>USE</u> the hemiplegic side together with the "normal" side of the body.

If the patient does not look at, touch, or try to use the hemiplegic side, communication between the brain and this side will return more slowly or sometimes not at all.

The methods used to help orient the patient to the hemiplegic side are:

* verbal instruction

* mirror

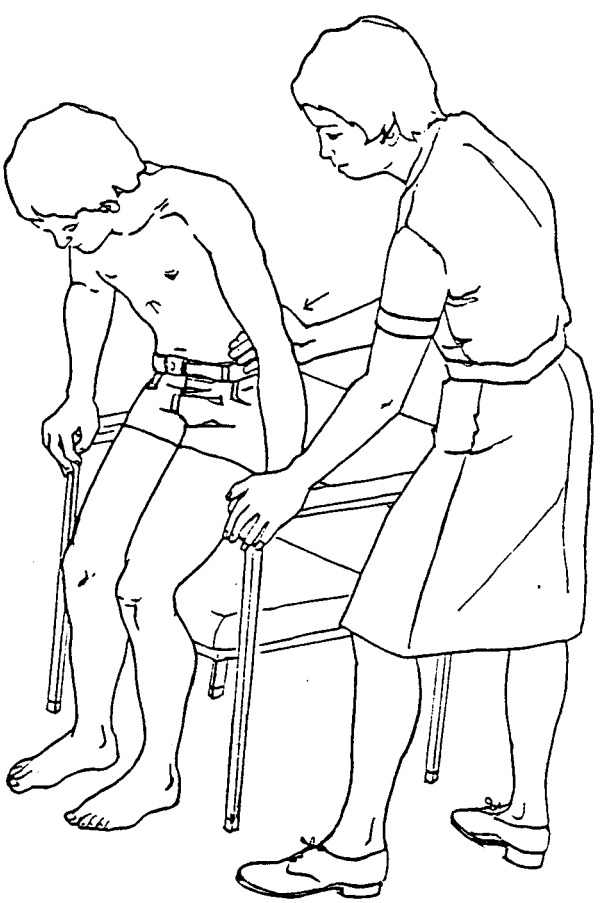
* location of materials and people

* practicing movements using the hemipelgic side

* exercises using both sides of the body

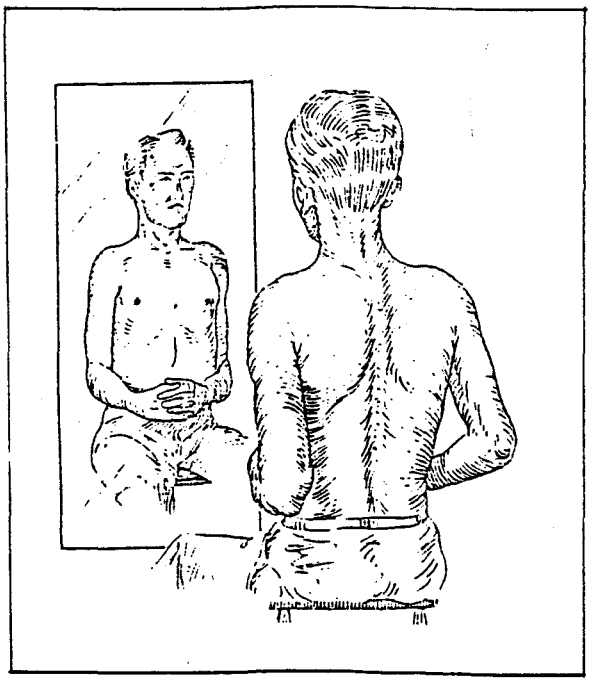
*** verbal instruction**

The PTA and patient's family must gently remind the patient to look at and take care of the hemiplegic side of the body.



* mirror

The PTA and family can have the patient use a mirror to help identify and correct differences between the hemiplegic and non hemiplegic side of the body.



CAUTION

Some patients can become emotional or cry when they see themselves in the mirror.

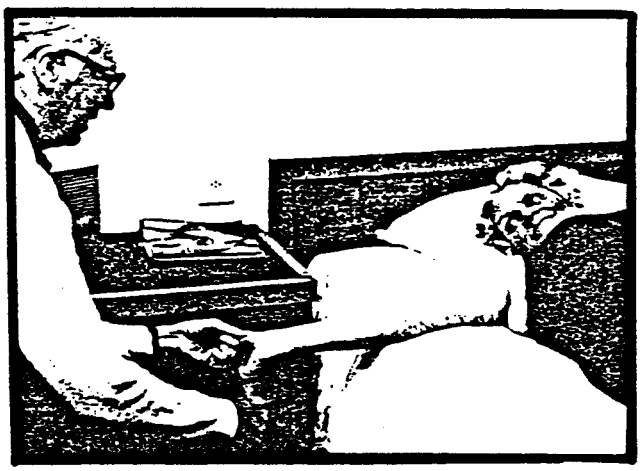
The PTA must respond to the patient's behavior by better explanation of how the mirror helps the patient correct himself, encouraging the patient by identifying positive areas, or sometimes removing the mirror.

* location of materials and people

As much as possible, materials and people should be in front of the patient and on the hemiplegic side.

If all objects were on the hemiplegic side, the patient may feel frustrated and alone.

Some objects may be in front of the patient while many should be on the hemiplegic side.



Question:

A patient has right hemiplegia. The family puts all of the objects he needs on the left side of his body. When they speak to him, they always stand on his left side.

You are a PTA that works with this patient. Would you recommend something different to the family?

Yes ____ No ___

Explain your answer.

_____

_____

_____

* **practicing movements using the hemiplegic side**

During the flaccid stage, the PTA or family can help "guide" the hemiplegic limbs in making functional movements.

The patient must experience different feelings and movements with the hemiplegic side of the body.

In this way, information from the hemiplegic side is available for the brain to "relearn".

The PTA's or family member's hand is on the outside of the patient's hand. In this way, the patient has direct contact with different objects.

Examples of guiding the hemiplegic limb are given below.

c. <u>psychological support</u>

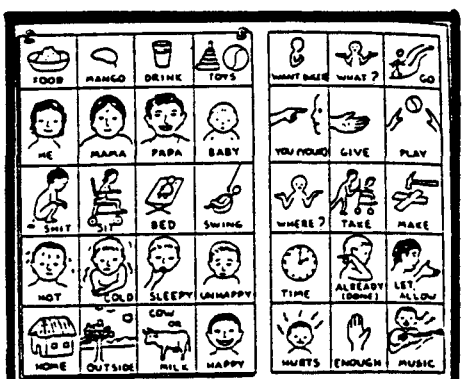
Patients with hemiplegia may have a difficult time to control their emotions.

They may laugh or cry without reason. They may be depressed or easily confused.

Psychological support is especially important for patients with right hemiplegia.

Most often, these patients know they have a problem with their body and are unable to say what they feel or need.

A simple communication board may help patients with right hemiplegia (no speech) tell others what they want.



communication board

d. maintain range of motion (ROM)

The PTA can passively move the paralyzed arm and leg. (See RANGE OF MOTION chapter, Volume 2).

Remember: Move the limb through normal range of motion only. Too much movement will increase joint problems.

Questions:

1. Why is passive ROM needed for the flaccid side of a patient with hemiplegia?

_____

_____

2. A patient has right hemiplegia. The PTA makes passive ROM for the left side and right side of the body. Do you agree with this treatment?

Yes ____ No ___

Explain your answer.

_____

_____

The patient must also learn to make self-ROM for the upper limb.

The patient will hold the hands together and then use the "good" arm to help move the flaccid arm.

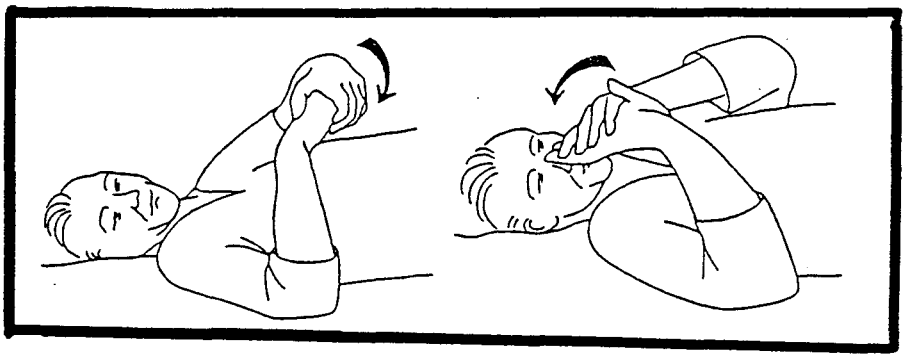
Methods to hold the hands together:

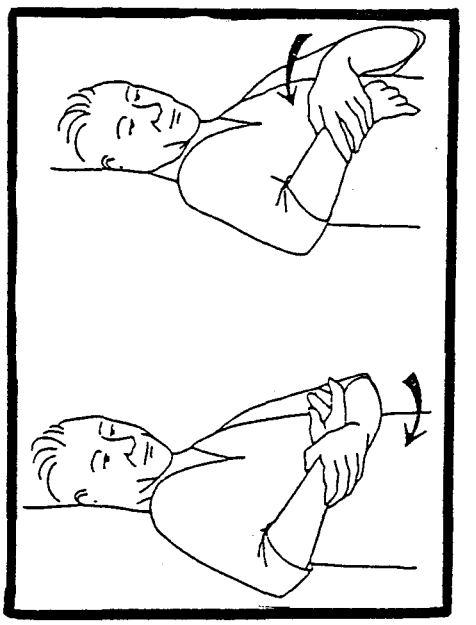
a. all fingers crossed over each other as much as possible. "Hemiplegic thumb" is on the outside.

(OR)

b. all fingers crossed over each other as much as possible. "Good thumb" is on the outside.

Techniques for the patient to make self-ROM for the upper limb.





e. practice functional movements

We have said that the patient with hemiplegia should use the hemiplegic side as much as possible. This is true.

The patient with hemiplegia should also be independent in functional activities as quickly as possible.

To be independent in activities often means using the "good" side of the body.

It will be the work of the PTA to help the patient be independent and help the patient practice using the hemiplegic side whenever possible.

Example:

- The PTA will teach the patient how to move from lying to sitting position most easily (normally this is using the "good" side).

- The PTA will also help the patient practise using the hemiplegic side.

Functional movements include:

i) rolling

ii) lying ----> sitting
sitting ----> lying

iii) sitting ----> standing
standing ----> sitting

iv) transfers (bed ----> chair
chair ----> bed)

i) **rolling**

The patient should practice rolling to both sides of the body.

<u>rolling towards the good side</u>

STEP 1 : Hold hemiplegic arm with the good hand and bring the arm across the body.

(DEMONSTRATION)

STEP 2 : Put the good foot under the hemiplegic foot and move both legs near the side of the bed.

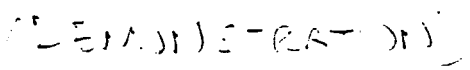
(DEMONSTRATION)

STEP 3 : Patient looks toward the good side and extends both arms toward the good side. This will help the body roll toward the good side.

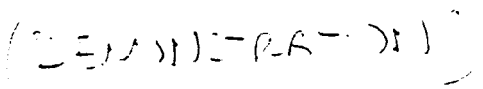
(DEMONSTRATION)

<u>rolling towards the hemiplegic side</u>

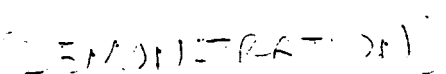
STEP 1 : Patient must move the hemiplegic arm so that is is in abduction.



STEP 2 : The patient bends the good knee so that the good foot is flat on the bed.



STEP 3 : The patient pushes into the bed with the good foot (this will bring the good hip forward) and reaches toward the hemiplegic side with the good arm. This will help the body roll toward the hemiplegic side.



ii) **lying ----> sitting and sitting ----> lying**

In the beginning, the patient may find it easiest to go from lying ----> sitting from the good side. The patient should practise lying to sitting from both sides to find the method that helps him to be the most independent.

<u>lying ----> sitting from the good side</u>

STEP 1 : Roll toward the good side (see previous section).

STEP 2 : Put the good foot under the hemiplegic foot and move both legs off the side of the bed.

(DEMONSTRATION)

STEP 3 : Bring the good arm above your head and push down with the elbow to help lift the trunk off the bed.

(DEMONSTRATION)

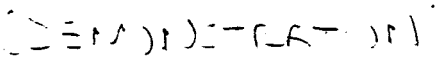
STEP 4 : Extend the elbow and slowly push yourself up to a sitting position.

(DEMONSTRATION)

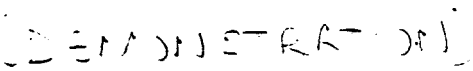
lying ----> sitting from the hemiplegic side

STEP 1 : Roll toward the hemiplegic side (see previous section).

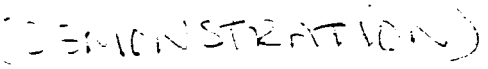
STEP 2 : Put the good foot under the hemiplegic foot and move both legs off the side of the bed.



STEP 3 : Put good hand on the bed in front of the body and lean body weight forward and push down on this arm. This will help lift the trunk off the bed.



STEP 4 : Reposition arm to continue to help push the body to a sitting position.



Sitting ----> lying is just the opposite movement.

iii) **sitting ----> standing and standing ----> sitting**

The main rules that the PTA must remember are:

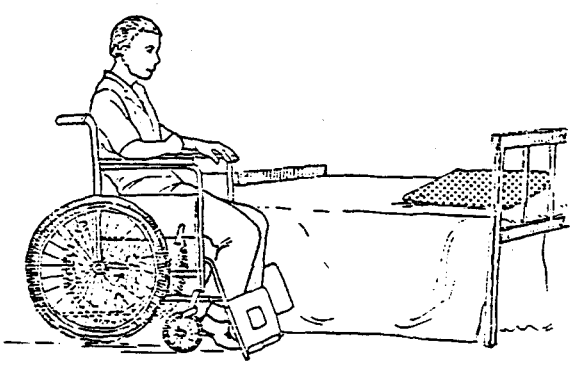
- do not pull on the hemiplegic arm

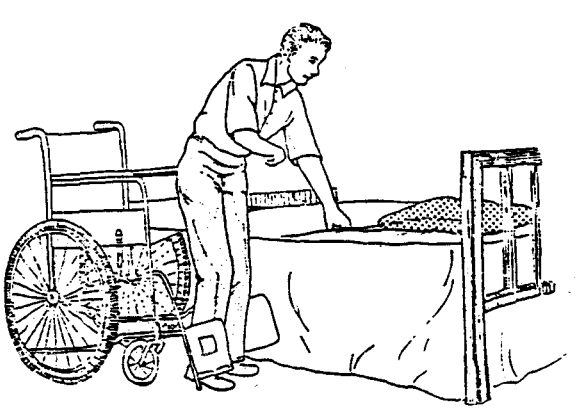
- support the hemiplegic knee to prevent flexion or hyper-extension.

For details on how to help a patient stand, see STANDING CHAPTER, Volume 2.

iv) **transfers (bed ---> chair and chair ---> bed**

For the most independence in the shortest time, the patient should TRANSFER TOWARD THE GOOD SIDE.



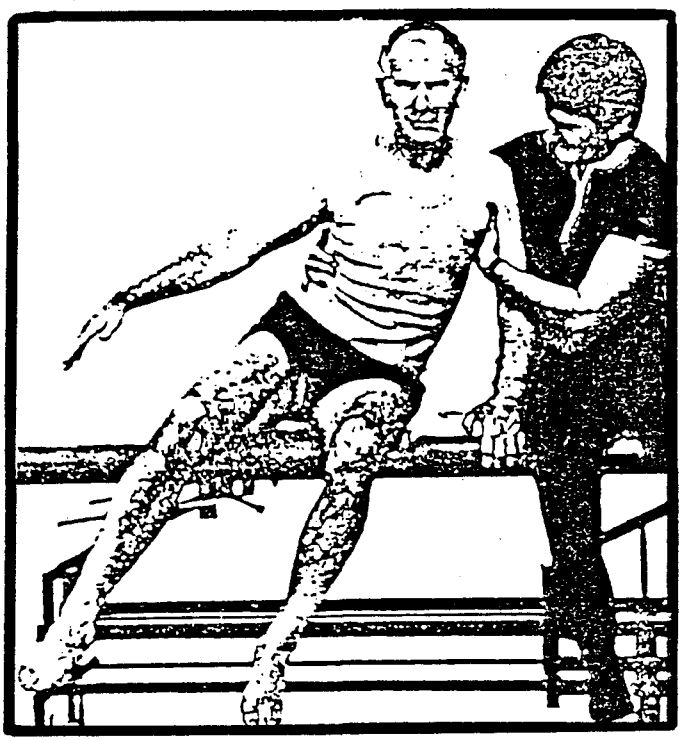


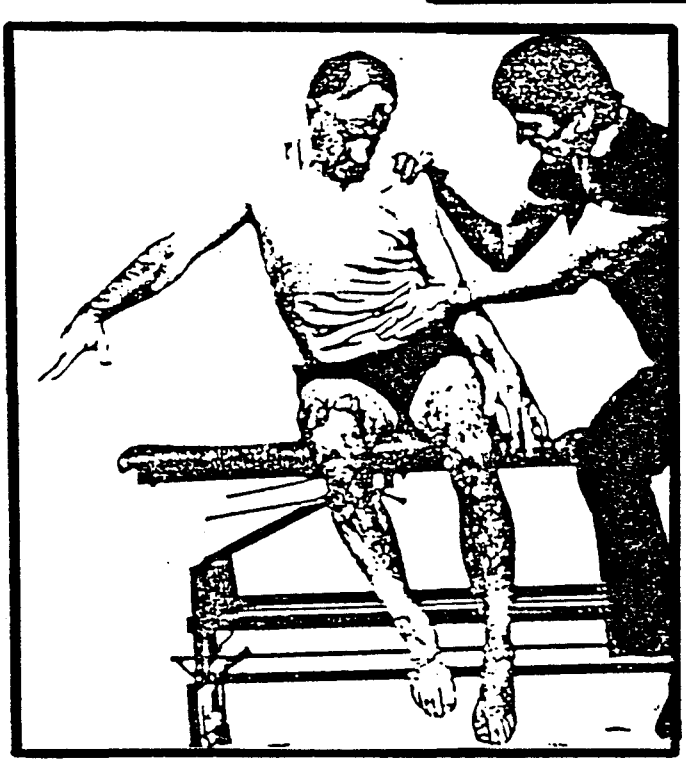
f. balance exercises

Balance exercises in sitting are very good to :

- help the patient increase trunk control on the hemiplegic side
- help the patient to again use both sides of the body together

Examples of different balance exercises are seen in the pictures below.

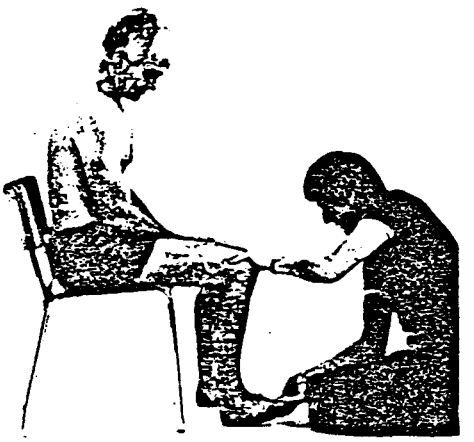




g) stimulate movements not expected in group spasticity

The PTA should encourage the patient to relearn how to move the following muscles

- elbow extensor
- wrist/finger extensors
- ankle dorsiflexor

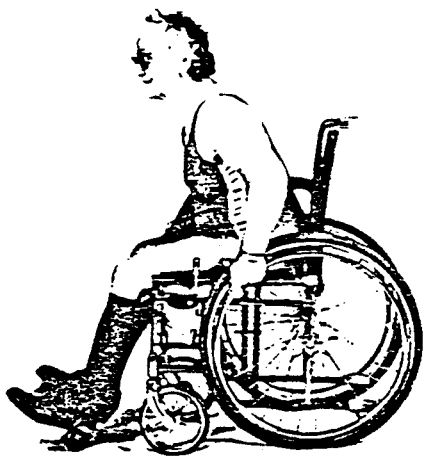


h) provide wheelchair

Patients in flaccid satage of hemiplegia have poor balance and are not able to control the trunk or lower limb.

For these reasons, it is best to have the hemiplegic patient use a wheelchair.

It is helpful if the patient is able to use his good foot to help move the wheelchair.



2. PHYSICAL THERAPY TREATMENT IN SPASTIC STAGE

Note: It is important to remember that not all body parts will be in the same stage at the same time.

(Example - a patient's upper limb may be spastic while the lower limb continues to be flaccid).

The PTA must select activities that are best suited for the individual patient.

Physical Therapy treatment for spastic stage includes:

a. good patient positioning

b. orient the patient to the hemiplegic side of the body

c. psychological support

d. maintain range of motion

e. practice functional movements

f. work on movements independent of "group" spasticity

g. decrease spasticity

h. weight bearing on hemiplegic side

i. preparation for walking

j. independence in eating and dressing

a. good patient positioning

Follow guidelines as given in flaccid stages. Two modifications may be needed:

- If hand splint appears to increase spasticity, the PTA can try to shape it so the fingers are more extended or the splint may be removed.

- If the shoulder muscles have strong spasticity, this may be enough to hold the humerus in a good position. In this case, the arm sling could be removed,

b) orient the patient to the hemiplegic side of the body

Follow guidelines as given in flaccid stage.

Question:

Why is it important to orient the patient to the hemiplegic side of the body as early and as much as possible?

_____

_____

_____

_____

c. psychological support

Follow guidelines as given in flaccid stage.

In addition, the PTA must explain the cause of this uncontrolled movement. The patient and family will be happy to see the movements return, and must be informed not to encourage these movements, but try to encourge movements that have not yet appeared.

d. maintain range of motion

Follow guideline as given in flaccid stage. The patient and patient's family should be responsible to make ROM.

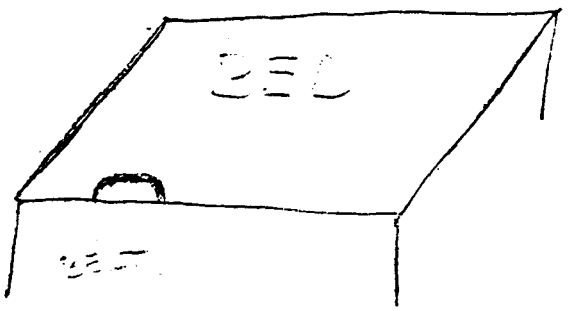
Modifications in this stage may include:

- active/assistive ROM for movements not in "group spasticity"

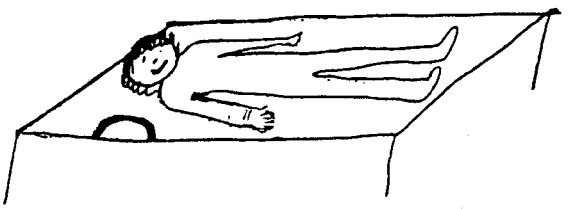
- passive ROM for movements included in "group spasticity"

- self-STRETCHING exercise for the hemiplegic upper limb.

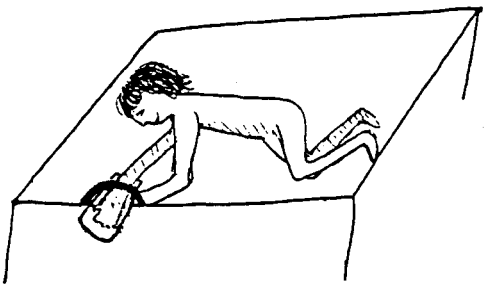
STEP 1 : A belt is attached on the hemiplegic side of the bed - near the head of the bed.



STEP 2 : Patient is wearing a hand splint (page 31-32) and lying supine on the bed.

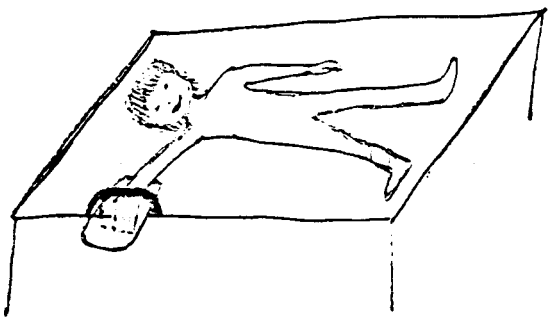


STEP 3 : Patient rolls to sidelying and puts the hemiplegic hand through the belt (forearm is supinated).



STEP 4 : With the arm inside the belt, the patient <u>slowly</u> rolls to a supine position. This movement will put the upper limb in a position of:

- should abduction, and external rotation
- elbow extension
- forearm supination
- hand functional position



The patient can remain in this position for 10-30 minutes, 2-3 times each day.

e. practice functional movements

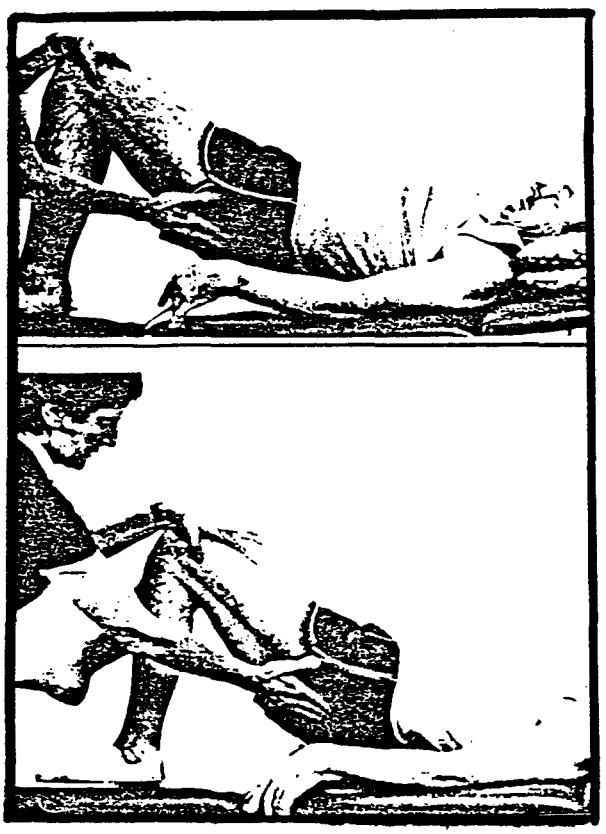
Follow guidelines as given in flaccid stage encouraging more use of the hemiplegic side, and encouraging as much independence in these activities as possible.

f. work on active movements independent of group spasticity

The patient must learn to control the movements on the hemiplegic side.

Examples are:

* hip extension with knee flexion



* elbow extension with shoulder flexion

g. decrease spasticity

Spasticity is the increased and uncontrolled movement of the hemiplegic side.

Most hemiplegic patients will have some spasticity.

The PTA should know that some activities may increase spasticity. These are:

- ROM or stretching that is much too fast
- stress, loud noises
- an activity that is very difficult for the good side

If the patient begins to show spasticity, the PTA can first try to modify the above activities.

Spasticity can also be decreased by breaking "group spasticity". Ways to do this are:

i) specific joint positions

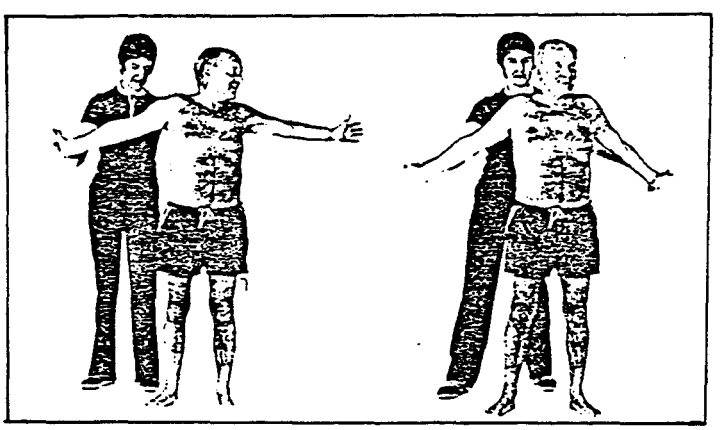
ii) trunk rotation

iii) SLOW muscle stretching

i) specific joint positions

Upper limb position that may help decrease spasticity:

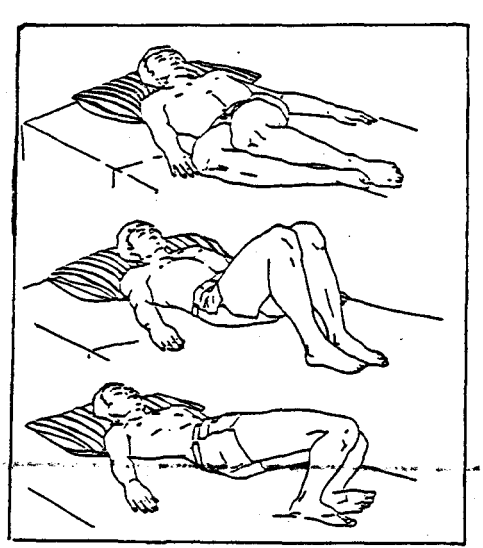
shoulder	- external rotation, ABDuction
elbow	- extension
forearm	- supination
wrist	- extension
fingers	- extension
thumb	- abduction and extension



Lower limb position will depend on the specific patient. The PTA must work with the patient to help identify what positions best decrease the patient's spasticity.

ii) trunk rotation

Moving the hips in one direction and the shoulders in another direction will help to decrease the spasticity in the body.



Trunk rotation exercises are very good for the patient and should be practiced every day.

Rotation helps the body work together, prevents stiffness in the trunk and helps decrease spasticity.

iii) SLOW muscle stretching

A muscle stretch must be slow and constant.

WARNING

A HARD AND FAST STRETCH WILL INCREASE SPASTICITY

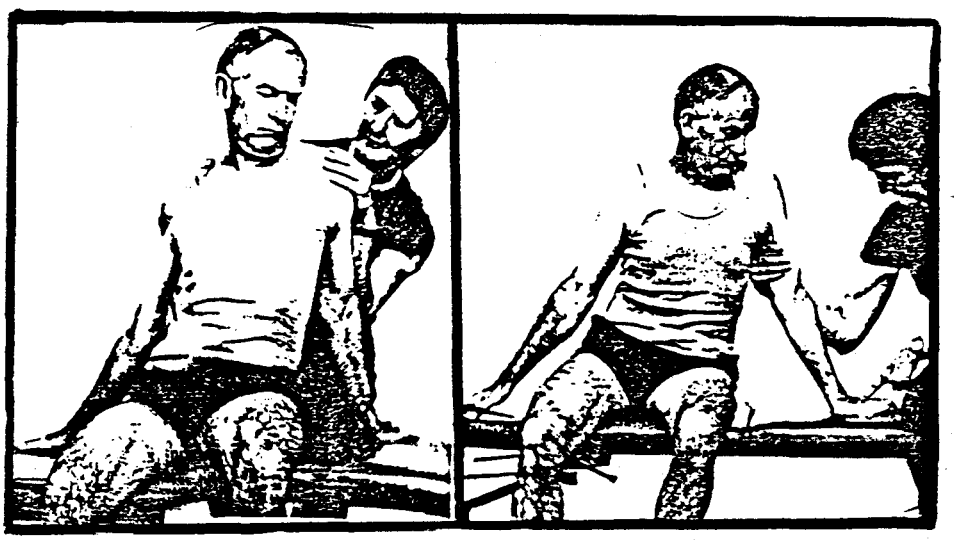
SLOW rotational movements at the proximal joints (shoulder/hip) may help decrease spasticity for the limb.

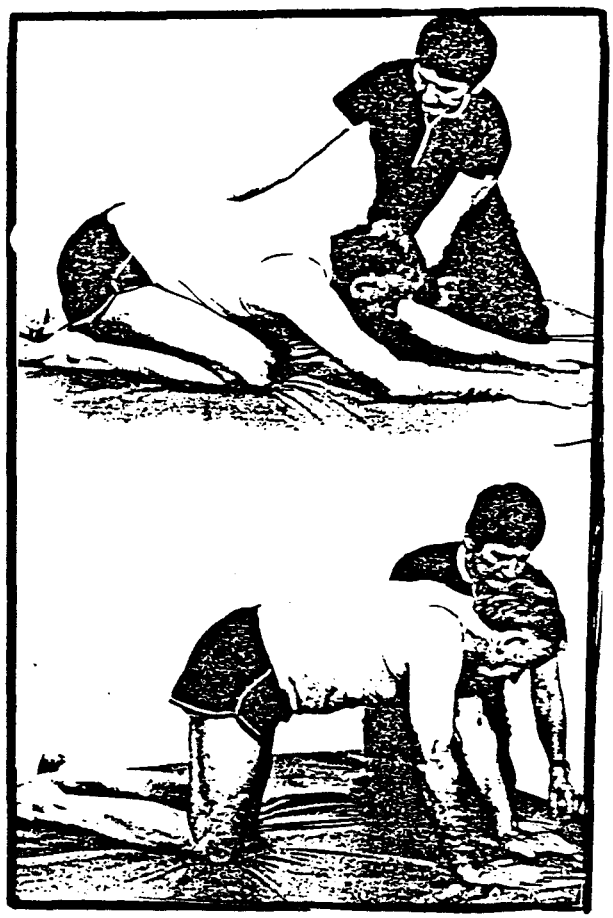
When working with the arm, try to place the leg in an anti-spastic position.

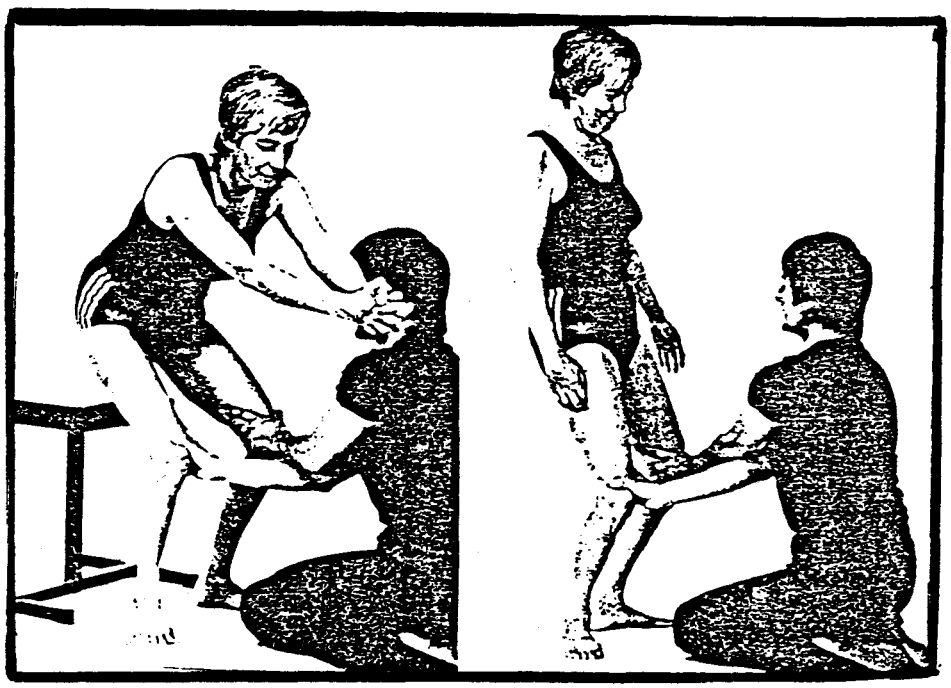
h. weight bearing on the hemiplegic side

Putting weight through a hemiplegic limb gives the joints more information to help them relearn these positions.

Examples of weight bearing on the hemiplegic side are seen in the pictures below.



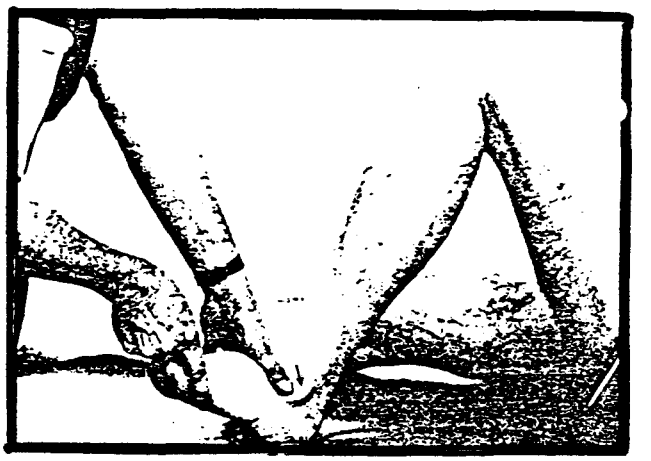


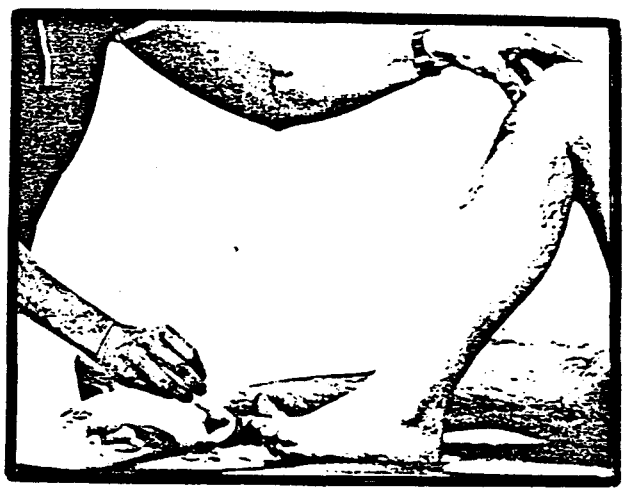


i) preparation for walking

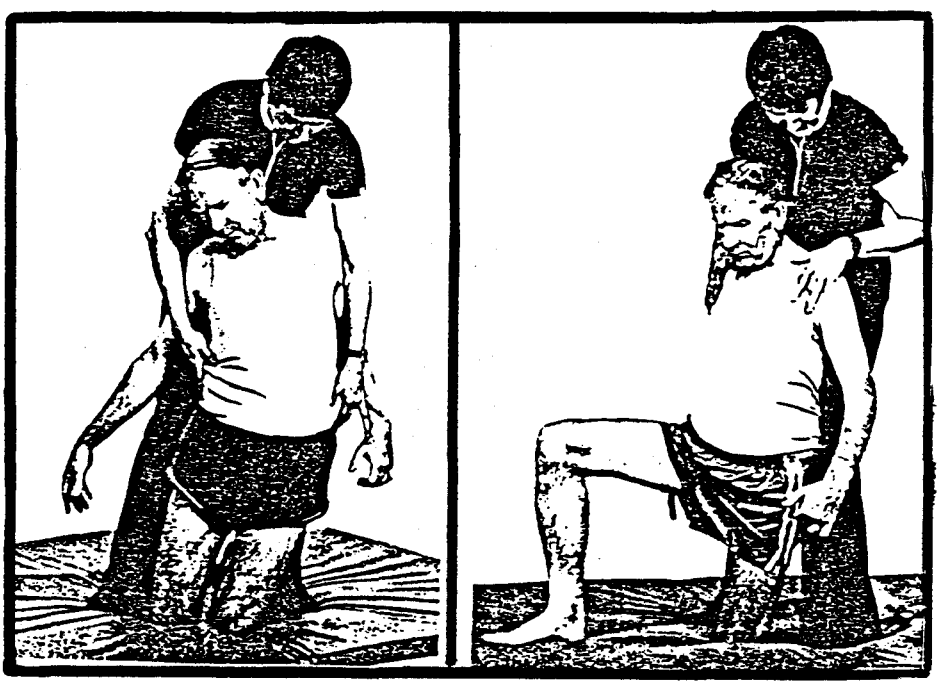
The PTA and patient can work together to help regain control of the lower limbs and trunk by doing the following activities.

IN LYING POSITION

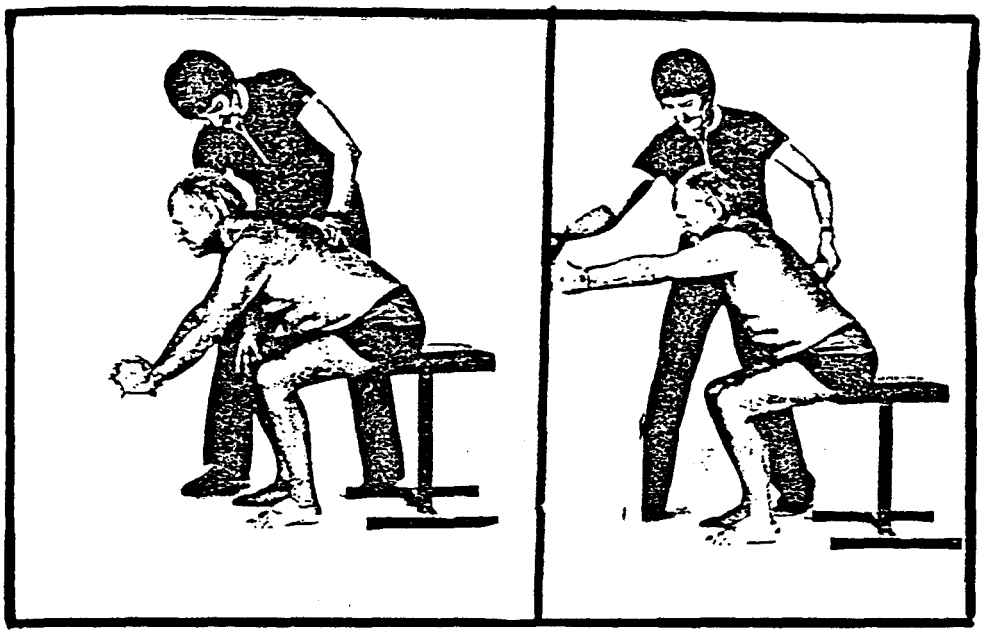


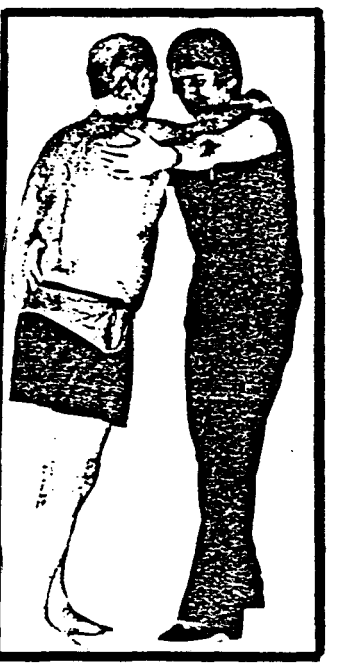


IN KNEELING POSITION

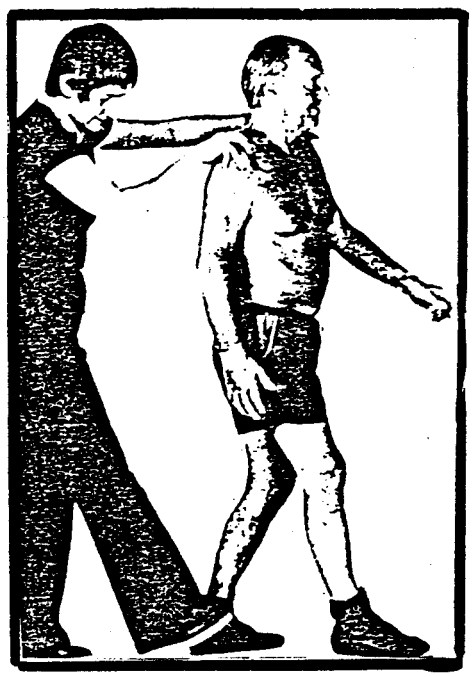


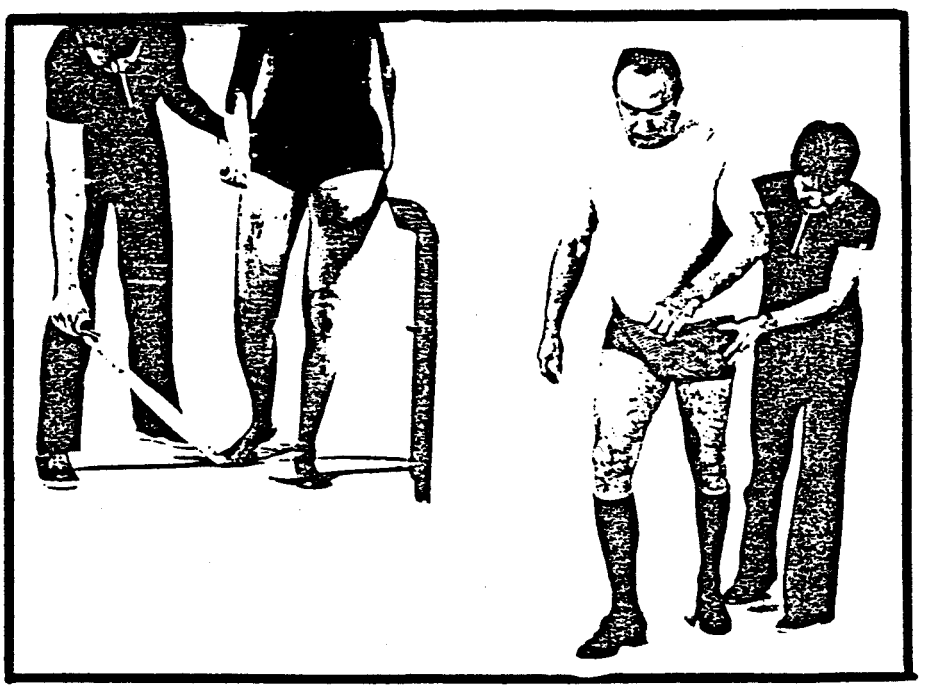
IN STANDING POSITION





IN STANDING POSITION

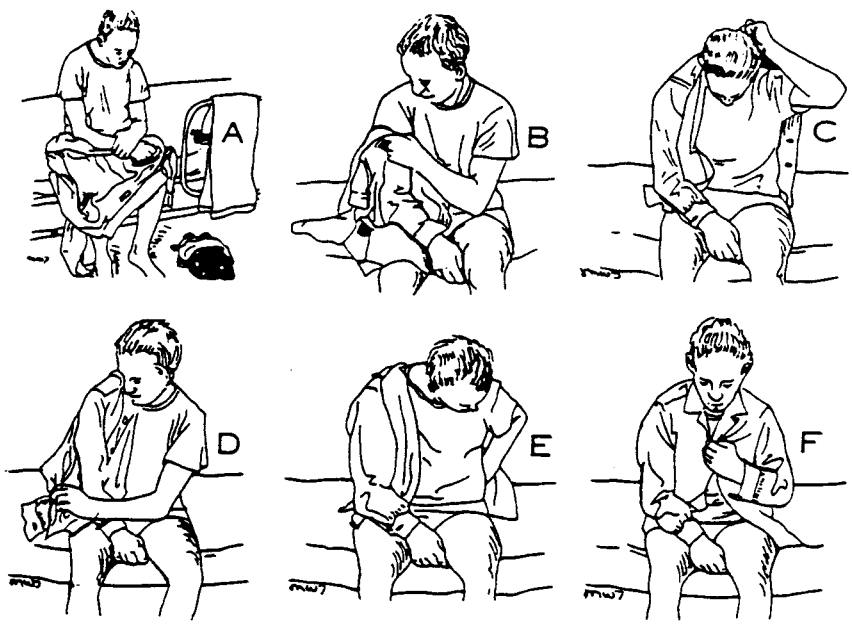




Please see GAIT TRAINING for other pre-gait activities.

j. independence in eating and dressing

When the patient puts clothes on, he should always dress the hemiplegic side first.



Many patients may eat with the "good" side. These patients can help to keep plates from moving by using the hemiplegic arm to hold them.

For more details see DEVICES FOR AUTONOMY chapter, Volume 2.

E. PHYSICAL THERAPY TREATMENT IN RECOVERY STAGE

Note: It is important to remember that not all body parts will be in the same stage at the same time.

(Example - a patient may begin to have some controlled movement in the hip, but his ankle continues to be spastic).

The PTA must select activities that are best suited for the individual patient.

Physical Therapy treatment for recovery stage includes:

a. continue all appropriate activities from flaccid and spastic stages

b. walking activities

c. equipment needs

d. house adaptations

e. community integration

a. continuing all appropriate activities from flaccid and spastic stages

The PTA must regularly evaluate the patient and select treatments that will help the patient improve in different areas.

b. walking activities

After the patient has good standing balance and some control of the hemiplegic lower limb, he can begin more complete walking activities.

In spastic stage the patient worked on many gait preparation activities.

The PTA should give special care to the following areas.

- heel contacts the ground first (hemiplegic side)
- good weight shifting to hemiplegic side
- hemiplegic knee does <u>not</u> hyperextend during stance phase
- the patient's trunk remains straight
- prevent too much group spasticity in the upper limb.

Below are picture that show how to help the patient in some of these areas.

c. equipment needs

The PTA must identify if any equipment is needed to help improve the function of the patient.

Some patients may need wheelchairs, others may need a walking aid (see WALKING AIDS chapter, Volume 2), others may need a leg brace (see BRACES chapter, Volume 2), and others may need NO EQUIPMENT.

d. house adaptations

When the patient returns home, the house may need some changes to help the patient move more independently.

Hand rails on the inside and outside of the house may be very useful for some patients with hemiplegia.

For more details, see HOUSE ADAPTATIONS chapter, Volume 2.

e. community integration

Questions:

1. Explain what community integration means.

_____

_____

_____

_____

2. How can the PTA work together with the patient and family to help integrate a hemiplegic patient into the community?

_____

_____

_____

H. CHAPTER SUMMARY

Hemiplegia is uncontrolled movement and decreased feeling in one side of the body.

Hemiplegia is caused from damage to one side of the brain. Damage on one side of the brain will cause problems on the opposite side of the body.

There are 3 stages of hemiplegia:

FLACCID STAGE	- no movement at all on the hemiplegic side
SPASTIC STAGE	- UNCONTROLLED, EXTRA movement of the hemiplegic side. These uncontrolled movements happen in groups (called "group spasticity").
RECOVERY STAGE	- CONTROLLED movement. The patient is able to make some movements independent of the "group spasticity".

Note: Every hemiplegic patient is different. When, if and where these "stages" occur will depend on the individual patient.

Other problems that hemiplegic patients may have:

* "forgetting" the hemiplegic side of the body (and all the objects located on the hemiplegic side)
* speaking - patients with right hemiplegia often lose their ability to speak (but they continue to understand)
* controlling emotions - the patient may laugh or cry for very little reason

It is important to remember that in hemiplegia, the patient's problem is NO CONTROL over movements on the hemiplegic side.

Strengthening and muscle testing are NOT appropriate for hemiplegic patients.

Relearning and controlling movements are the goals of Physical Therapy.

Specific Physical Therapy evaluation and treatment suggestions are given for each of the stages in Hemiplegia.

CHAPTER 28

SPINAL CORD INJURIES

A SPINAL CORD INJURY is damage to the spinal cord.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. compare paraplegia with tetraplegia; and complete with incomplete spinal cord injuries.
2. describe the cause of spasticity in patients with spinal cord injuries.
3. list complications that can happen with spinal cord injury patients and how Physical Therapy can help to prevent them.
4. describe Physical Therapy treatment for different levels of spinal cord injuries and different stages of recovery.

CHAPTER CONTENTS

A. INTRODUCTION

NOTE

Before beginning this chapter, this PTA should review the NEUROLOGY chapter, Volume 1, to have a better understanding of the content.

Questions:

1. What does the spinal cord do?

_____

_____

_____

2. Where is the spinal cord?

_____

_____

B. WHAT IS A SPINAL CORD INJURY?

A spinal cord injury is damage to the spinal cord.

The important things to know about a spinal cord injury are:

1. How Much the Spinal Cord is Injured.

2. Where the Spinal Cord is Injured.

1. HOW MUCH THE SPINAL CORD IS INJURED

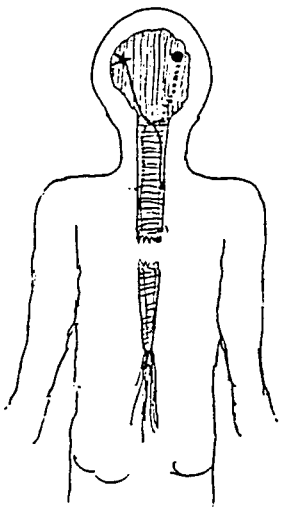
A spinal cord injury can be "complete" or "incomplete".

"complete" spinal cord injuries:

The spinal cord that has a complete injury cannot carry messages to and from the brain.

The road is completely broken.

When messages arrive at this broken area, they cannot pass at all.



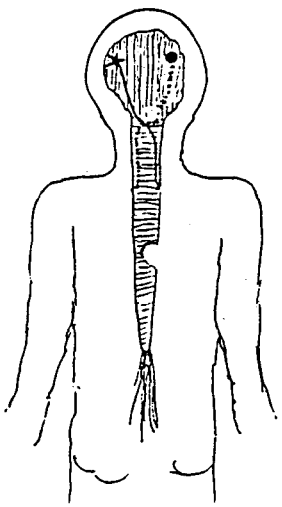
"incomplete" spinal cord injuries

The spinal cord that has an incomplete injury may still be able to carry some messages to and from the brain.

A part of the road is broken.

When messages arrive at this area, some messages are able to pass.

(How many messages and what kind of messages are carried depends on what part of the spinal cord is damaged.)



Question:

Below the complete spinal cord injury there will be no controlled muscle movement and no feeling in the skin or tissues. Please explain why.

_____

_____

_____

It is very important to remember that when the spinal cord is damaged, cut or broken it CANNOT REPAIR ITSELF.

2. WHERE THE SPINAL CORD IS INJURED

a) The spinal cord may be injured in the cervical area.

If the cervical area is injured: the arms, trunk, and legs will have a problem with movement and feeling.

The diagnosis is called **TETRAPLEGIA** or **QUADRIPLEGIA.**

b) The spinal cord may be injured in the thoracic area.

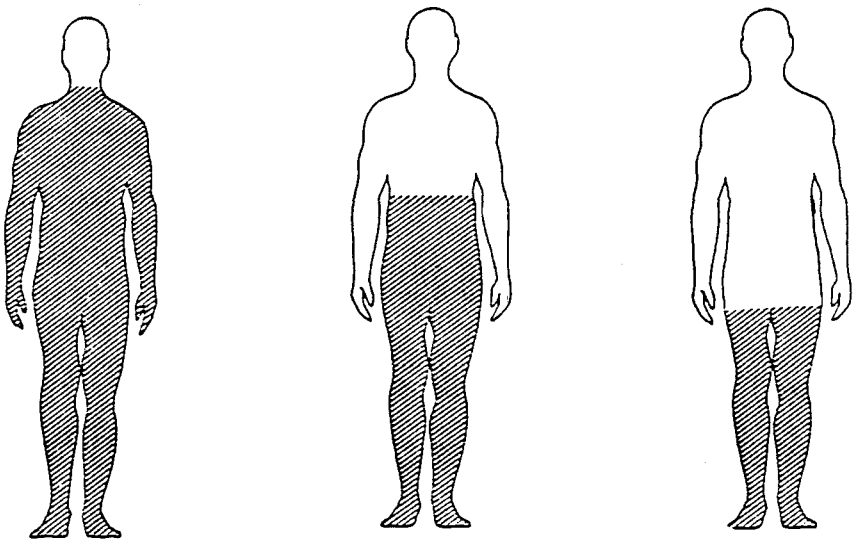
If the thoracic area is injured: the trunk and legs will have a problem with movement and feeling.

The diagnosis is called (high) **PARAPLEGIA.**

c) The spinal cord may be injured in the lumbar area.

If the lumbar area is injured: the legs will have a problem with movement and feeling.

The diagnosis is called (low) **PARAPLEGIA.**



(a) (b) (c)

Questions:

1. Describe (in your own words) the meaning of tetraplegia and paraplegia.

2. How are tetraplegia and paraplegia similar?

Questions: (continued)

3. How are tetraplegia and paraplegia different?

_____

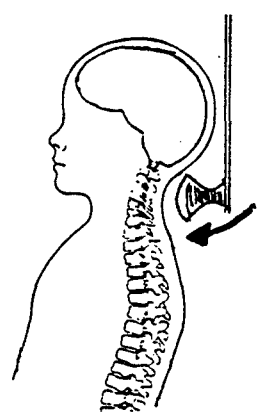
_____

_____

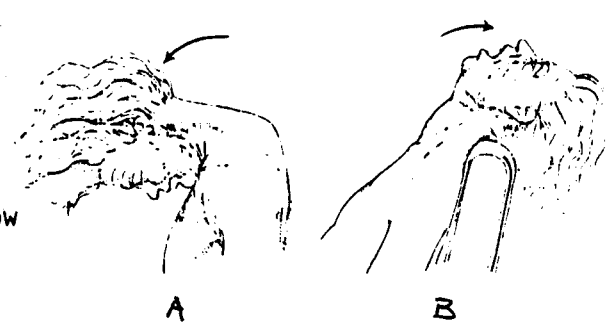
C. CAUSE OF A SPINAL CORD INJURY

The spinal cord can be injured from:

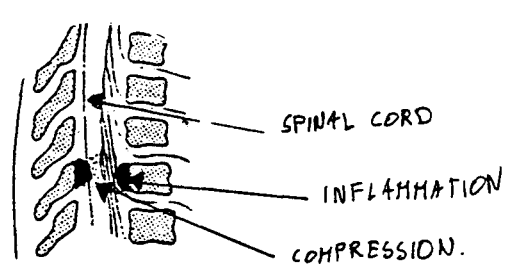
* bullet, knife, schrapnel that damage the cord directly



* abnormal movements or fractures of the vertebral bones that will damage the spinal cord (falling from a house, diving into shallow water, car accident)



* disease (TB - Pott's disease) causing inflammation and swelling which lead to compression and damage of the spinal cord



D. SPECIFIC INFORMATION ABOUT A SPINAL CORD INJURY

In this section, the following topics will be presented.

1. Identifying different levels of Spinal Cord Injuries (SCI)
2. Spasicity in patients with SCI
3. Complications of Spinal Cord Injuries
4. Stages of recovery for SCI patients

1. IDENTIFYING DIFFERENT LEVELS OF SPINAL CORD INJURIES

The level of a spinal cord injury can be identified by:

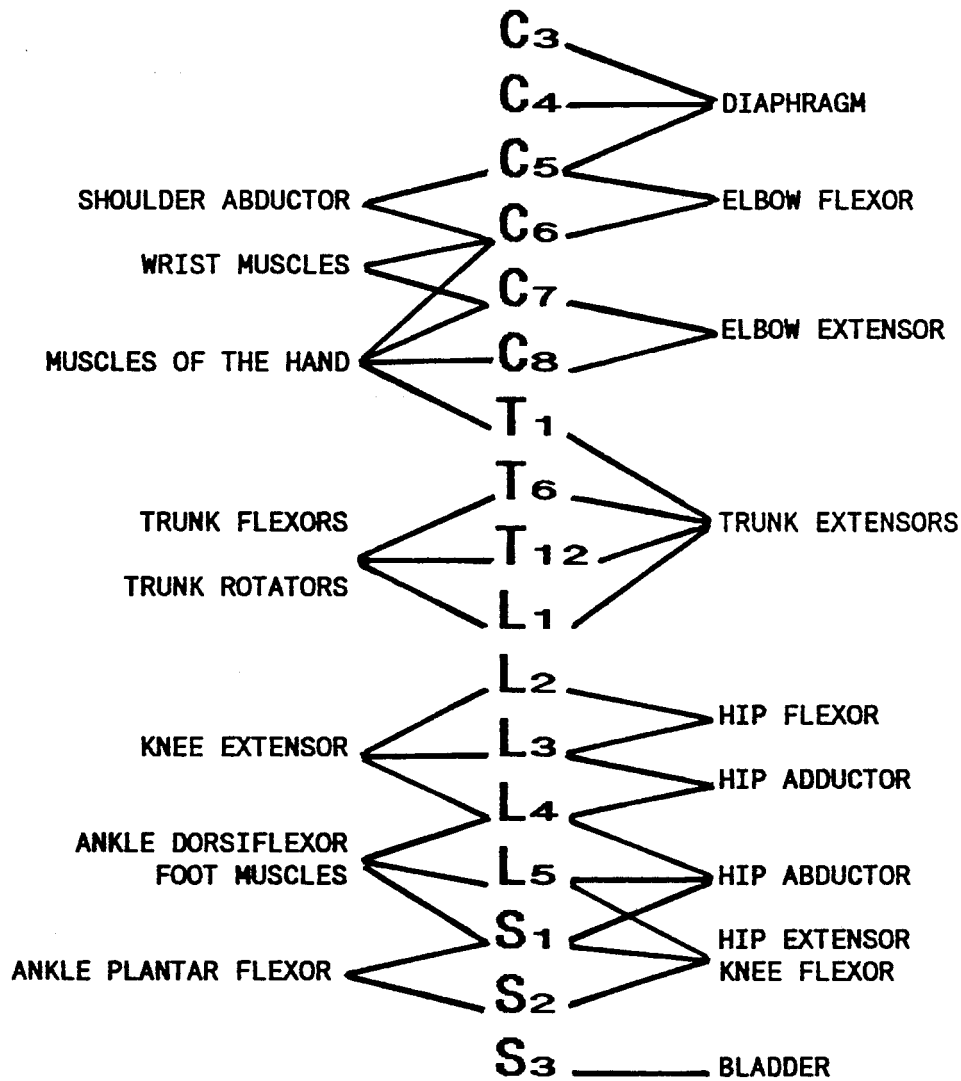
a. MUSCLE TESTING

b. SENSORY TESTING

a. MUSCLE TESTING

A motor nerve comes from the brain to tell a muscle to work (see NEUROLOGY and MYOLOGY chapters, Volume 1).

Below is a summary of different motor nerves and the muscles that they tell to work.



NOTE:

* One motor nerve can tell one or more muscles to work

* One muscle can receive messages from more than one motor nerve.

Questions:

Look at the chart on page 8 to answer the following questions.

1. L2 tells what muscles to work?

_____

2. What motor nerves tell the muscles of the hand to work?

_____

3. L5 helps to tell how many different muscles to work?

_____

4. What motor nerves tell the elbow extensor to work?

_____

5. How many different motor nerves tell the knee extensor to work?

_____

If the spinal cord is destroyed, the motor nerves below the injury cannot carry messages from the brain to the muscle.

If the muscle receives no order from a motor nerve, it will not work.

If the muscle receives only a few orders, it can work but it will be weak.

As we have said before, the level of a spinal cord injury can be identified by muscle testing (see MYOLOGY, Volume 1).

Questions:

1. What is muscle testing?

2. Explain how muscle testing can help identify the level of a spinal cord injury.

The level of the spinal cord injury is named by identifying the lowest nerve that continues to work.

Examples:

C6 complete quadriplegia = C1-C6 nerves work; C7-S3 do not work.

L3 complete paraplegia = C1-L3 nerves work; L4-S3 do not work.

L2 incomplete paraplegia = C1-L2 nerves work; L3-S3 may not work.

Questions:

To answer these questions, please see the chart on page 8.

1. A patient has C6 complete quadriplegia. One patient has C7 complete quadriplegia. Can these 2 patients move the same muscles of the elbow?

   Yes _____ No _____

   Explain your answer.

   _____

   _____

2. A patient has L2 incomplete paraplegia. Will the trunk have a problem?

   Yes _____ No _____

   Will all the muscles of the leg have a problem?

   Yes _____ No _____

   Explain your answer.

   _____

   _____

3. A patient has strong knee extensors, weak foot muscles, no hip extensors and no ankle muscles. He has a complete spinal cord injury. What level is this spinal cord injury?

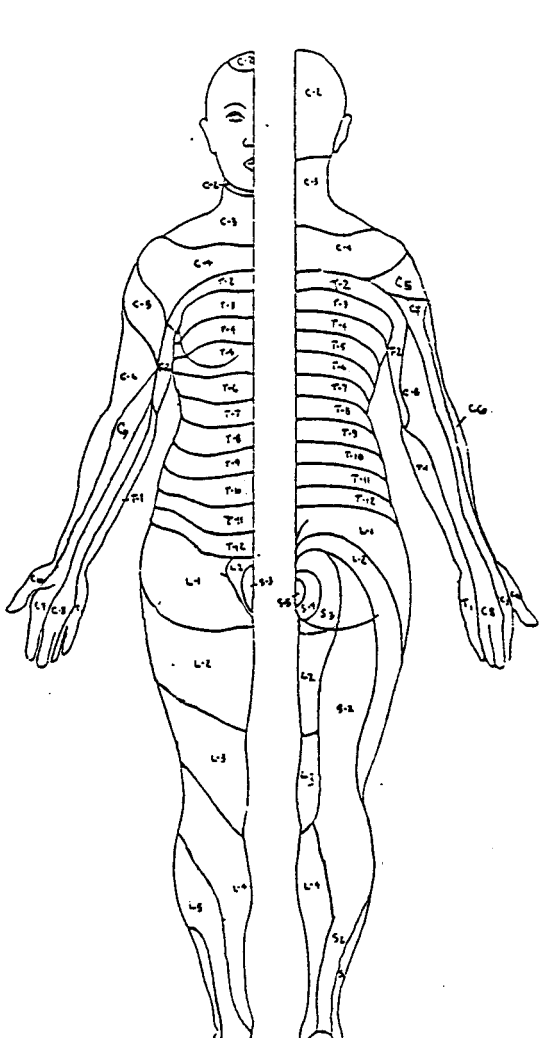
   _____

b. SENSORY TESTING

A sensory nerve comes from the skin and body to tell the brain what we feel (see NEUROLOGY chapter, Volume 1).

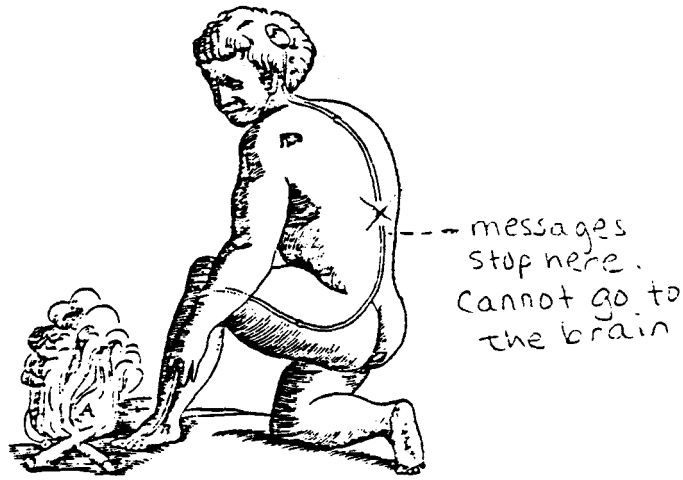
Different sensory nerves are responsible to tell the brain about different parts of the body.

The picture below gives a summary of the nerves that carry information from different skin areas.



ANTERIOR VIEW POSTERIOR VIEW

If the spinal cord is destroyed, the sensory nerves <u>below</u> the injury cannot carry messages from the skin to the brain.



If the brain receives <u>no message</u> from a sensory nerve, we will not feel that area of the body.

If the brain receives a few messages from a sensory nerve, we can have some feeling in that area, but the feeling will be decreased.

Sensory testing (see NEUROLOGY chapter, Volume 1) can help identify the level of the spinal cord injury.

More importantly, sensory testing is used to identify what body areas a patient cannot feel.

These area must be given special care so that <u>pressure sores</u> (see PRESSURE SORES chapter, Volume 3) can be prevented.

<u>Questions</u>:

To answer the following questions, please see the picture on page 12.

1. A patient has C6 complete quadriplegia. Describe the areas that this patient can feel.

_____

_____

_____

Questions: (continued)

2. A patient has C7 complete quadriplegia. Explain why this patient must check carefully for pressure sores on the lower limbs.

_____

_____

_____

3. A patient has L3 complete paraplegia. Will this patient feel pain if he has a wound on his foot?

Yes _____ No _____

Explain your answer.

_____

_____

_____

2. SPASTICITY IN PATIENTS WITH SPINAL CORD INJURIES

Question:

From the study of Neurology, please describe a REFLEX. Include how a reflex happens, where a reflex happens, and why a reflex happens.

_____

_____

_____

_____

_____

_____

_____

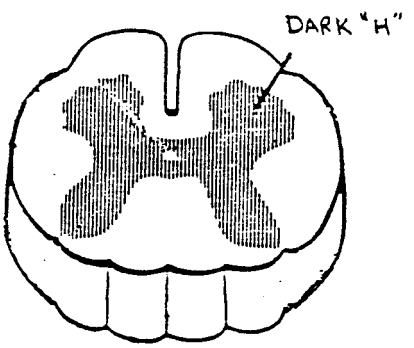
Spasticity is uncontrolled muscle contraction.

The spasticity seen in spinal cord injuries is caused by reflexes.

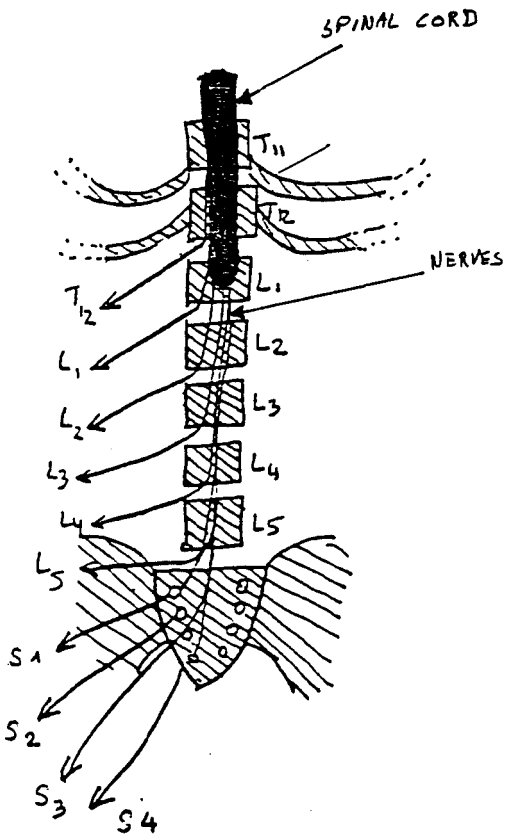
A reflex is a quick decision made in the spinal cord that always causes a muscle contraction.

After a reflex, the brain sends a message to stop this contraction or continue it.

If the spinal cord is damaged, the brain cannot control this "reflex" and the muscle contraction will continue. This is spasticity.



It is important to remember that reflexes (fast decisions) happen in the gray area of the spinal cord.



The spinal cord stops at about L1. Below this area, only anterior (motor) and posterior (sensory) nerves continue.

If there is injury at L2 or below, no reflex can happen because there is no connection to the gray area of the spinal cord.

This means there should be no spasticity in spinal cord injuries below L1.

Complete spinal cord injuries below L1 will result in flaccid muscles and no sensation below that level.

Question:

Explain why a quick joint movement (quick muscle stretch) will increase spasticity.

_____

_____

_____

A long constant stretch will decrease spasticity.

3. COMPLICATIONS THAT CAN HAPPEN AFTER A SPINAL CORD INJURY

Four main problems that can happen after a spinal cord injury are:

a. pressure sores (bed sores)

b. contractures/joint tightness

c. urinary infections/constipation

d. respiratory problems

a. Pressure sores (see PRESSURE SORES chapter, Volume 3)

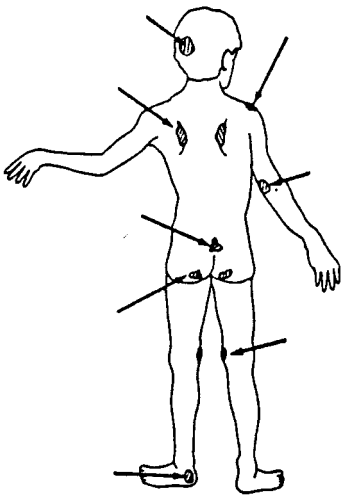
When there is pressure on a skin area for a long time, blood cannot arrive.

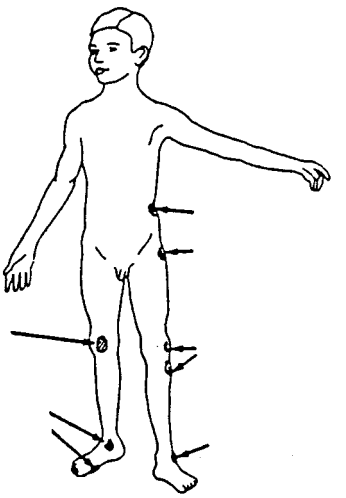
If blood cannot arrive, the skin will die. The areas where the skin is weak or dead can easily become infected.

Spinal cord injury (SCI) patients may be unable to move themselves, and they cannot feel when an area begins to have pain from too much pressure.

Spinal cord injury patients (and all patients that cannot move) are at high risk to get bed sores.

Areas that are likely to develop bed sores are shown in the pictures. (right)





b. <u>contractures/joint tightness</u>

If the patient is unable to move the limbs, and no one helps to make range of motion (ROM), joint movement will become limited.

Joint movement can be limited because of two reasons:

1. parts of the <u>joint</u> will become stiff and tight.

2. <u>muscles</u> are not moved and they will become tight in the position that they are in.

<u>Questions</u>:

1. Please name two parts of the joint that can become tight or stiff if there is no ROM given.

_____

_____

Questions: (continued)

2. A PTA gives massage for a patient who has limited ROM. The PTA gives no other treatment. Is this a good treatment plan?

   Yes _____ No _____

   Explain your answer.

_____

_____

_____

_____

3. A patient cannot move her legs. When she is in bed, her ankles are always in plantar flexion. What muscles may become shortened because of this position?

_____

   What movement may be limited?

_____

4. A patient is a C7 complete quadriplegic. He has been in bed for 10 months with no ROM. His position is always hip flexion and knee flexion. What muscles have become shortened?

_____

   What movements may be limited?

_____

_____

SPECIAL NOTE:

For some tetraplegic patients, tightness in the wrist and finger flexors can be useful! (See pages 34-36)

c. urinary infections/constipation

Normally, our body can remove wastes (urine and stool) with little or no problem.

A summary of how these wastes are removed is given below:

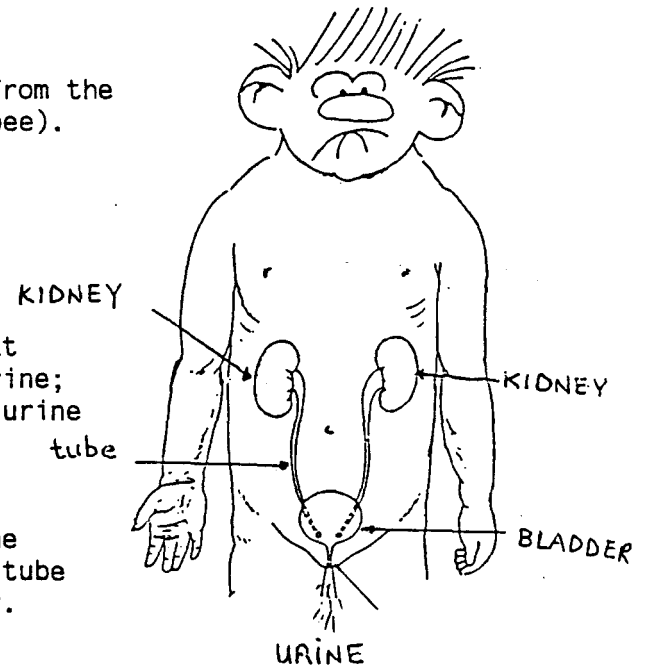
URINE REMOVAL

The kidneys take waste from the blood producing urine (pee).

Small tubes carry urine to the bladder.

The bladder is a bag that stretches to hold the urine; the bladder empties the urine when it is full.

The urine passes from the bladder through another tube and then leaves the body.

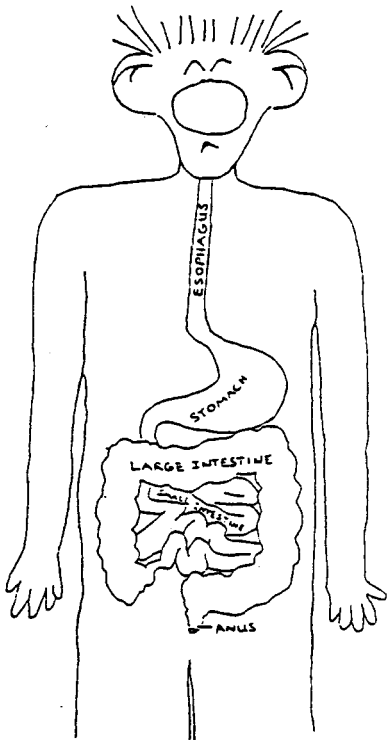


* The bladder muscles are very important in pushing the urine out of the body.

It is important that all urine is removed from the bladder when it is emptied.

Urine that remains in the bladder for a long time can cause a urinary infection.

STOOL REMOVAL



Food moves from the stomach to the small intestine and then through the large intestine.

The food that is not used by the body is pushed out through the anus. This waste is called stool (shit).

* The abdominal muscles are important in helping to push the stool out of the body.

Stool must be removed from the intestine regularly.

If stool remains in the intestine for a long time, it will prevent new food from passing and may cause severe illness.

Constipation is a word that means unable to pass stool.

For patient's with spinal cord injuries, the nerves that tell the bladder and abdominal muscles to work may be damaged.

If the muscles of the bladder and the abdominal muscles do not work, the patient must learn how to manually remove urine and stool. (See pages 43-44.)

d. respiratory problems

Questions:

1. Patients that stay in bed for a long time can have respiratory problems. Please describe two respiratory problems these patients could have.

_____

_____

_____

Questions:

2. Patient "A" has a C6 complete SCI. Patient "B" has a L1 complete SCI. Which patient will need more special care for breathing exercises. patient "A" or patient "B"?

_____

Why?

_____

_____

_____

_____

The spinal cord injury patient must be able to bring enough air into the lungs and keep the airways clear of secretions.

Diaphragmatic breathing, chest expansion, and coughing exercises can help the SCI patient with breathing. (See RESPIRATORY chapter, Volume 2).

4. STAGES OF RECOVERY FOR SPINAL CORD INJURED PATIENTS

The spinal cord injured patient may experience four different stages in their recovery.

Not all spinal cord injuries will follow all of these stages. The stages will depend on the type of injury and advice of the doctor.

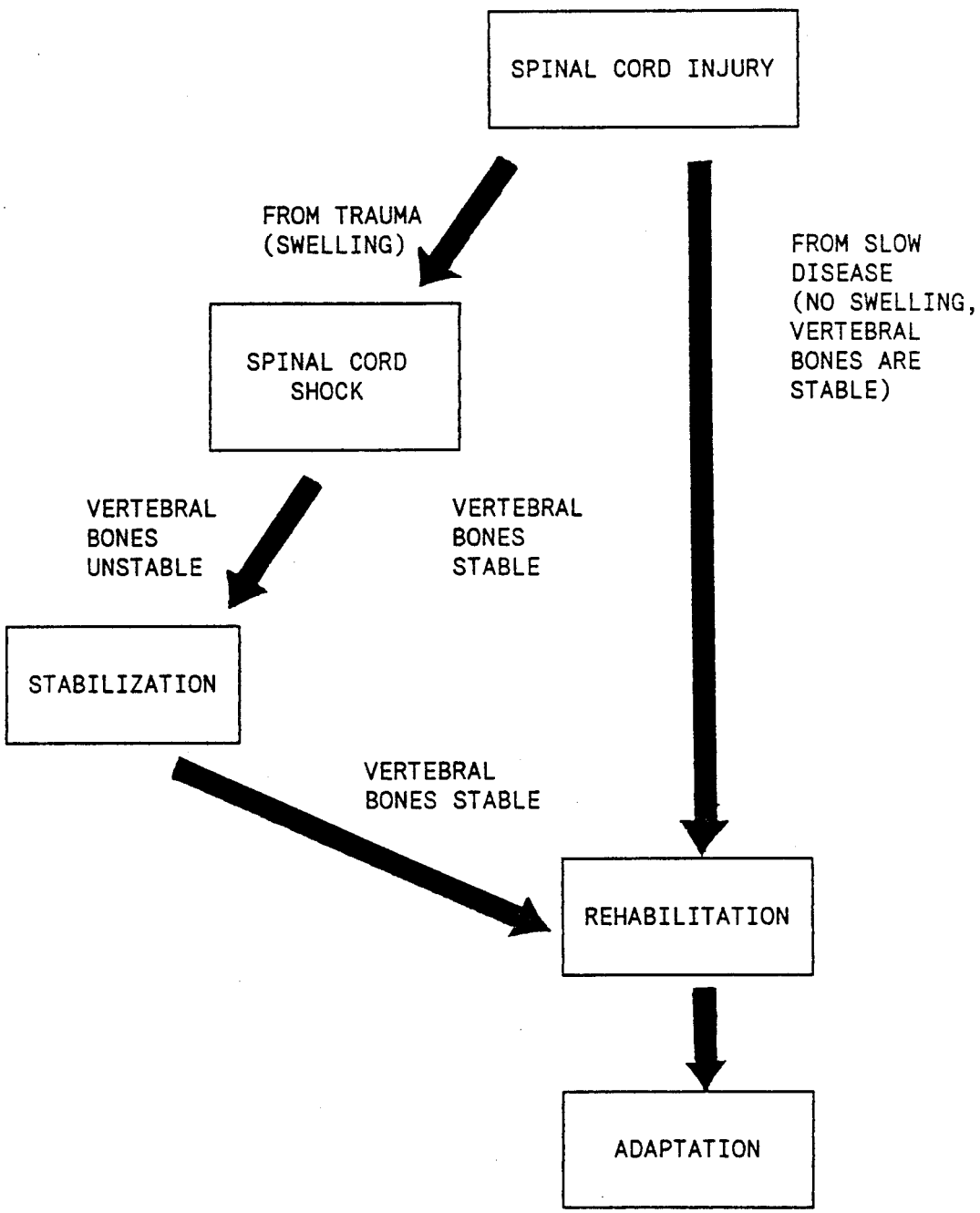
The four general stages are:

a. SPINAL CORD SHOCK

b. STABILIZATION

c. REHABILITATION

d. ADAPTATION

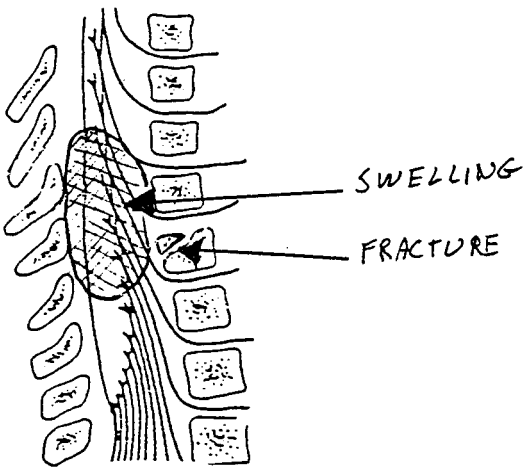


a. **SPINAL CORD SHOCK**

Spinal cord "shock" appears with traumatic spinal cord injuries.

All trauma causes swelling (Examples: fractures and dislocations)

Trauma with the vertebral colum will cause swelling that will put pressure on the spinal cord.



This pressure will cause <u>symptoms</u> that look like complete spinal cord injury.

After 2-3 weeks, the swelling will decrease and the pressure in the spinal cord will stop.

At this time, patients with <u>incomplete</u> spinal cord injuries may start to have increased feeling or movement that they did not have immediately after the injury.

This is because the <u>undamaged part</u> of the spinal cord can continue to deliver messages to and from the brain.

Changes may continue up to to one year afer injury.

With <u>complete</u> spinal cord injuries, feeling and controlled movement will <u>not</u> return to the areas that are below where the spinal cord was destroyed.

IMPORTANT

THE SPINAL CORD CANNOT BE REPAIRED

IF A PART OF THE SPINAL CORD HAS BEEN DESTROYED (COMPLETELY OR INCOMPLETELY) IT WILL NOT RECOVER

A DESTROYED SPINAL CORD WILL REMAIN DESTROYED FOREVER

It is important for the PTA to understand about spinal cord injuries to know how to treat the patient and what to expect for recovery.

Question:

A man has an incomplete spinal cord injury. A PTA tells him him that he may be able to move and feel again because the nerves in the spinal cord can repair themselves. Do you agree with what this PTA has said.

Yes _____ No _____

Explain your answer.

_____

_____

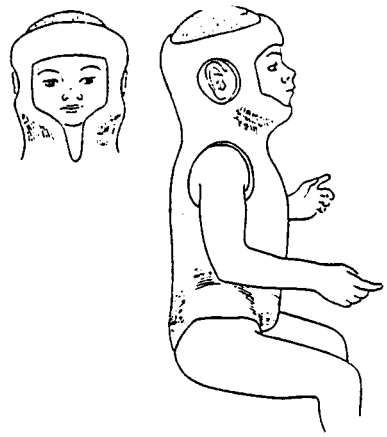
_____

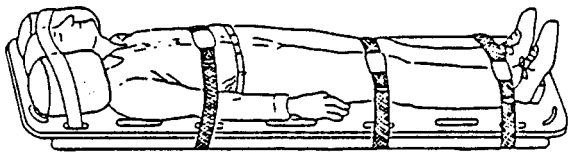
_____

b. STABILIZATION

Most often, stabilization is needed after injuries to the vertebral bones (fractures, dislocations).

In this period, the vertebral column is immobilized to help with bone consolidation and prevent more damage because of bone movement.





The type of immobilization used will depend on the type and location of the vertebral colum, and the doctors decision.

The patients activities will be limited because of the need to keep the vertebral bones as quiet (no movement) as possible.

Depending on the injury and following the doctor's instruction, this stage may last from 1 - 3 months.

c. REHABILITATION

This stage begins when the vertebral colum and spinal cord are stable.

Depending on the injury and following the doctor's instructions, this period may begin directly after SCI or after 1-3 months.

d. ADAPTATION

After the type and location of the spinal cord injury are known, the patient must understand that their movement may never be the same.

When rehabilitation is complete, the patient must be able to **physically** and **mentally** adjust to their new level of ability.

A change in occupation and lifestyle may be needed.

D. MEDICAL TREATMENT FOR A SPINAL CORD INJURY

> **If the spinal cord has been cut or destroyed, no medicine or medical treatments can make it recover.**

Medical treatment tries to PREVENT more damage to the injured area.

Medical treatment can include:

* surgery

* immobilization

Medicines can be given to try to help decrease pain and spasticity.

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH A SPINAL CORD INJURY

The PTA must evaluate the spinal cord injury patient many times to monitor the changes that occur with treatment and time.

PTA evaluation suggestions are given for each period of SCI.

SPINAL SHOCK

* general condition of the patient

* psychology, family support

* skin conditions

* respiratory function

* urinary function

STABILIZATION

* skin condition

* respiratory function

* range of motion

* muscle strength

* sensation

* urinary function

* psychology, family support

REHABILITATION

* skin condition

* respiratory function

* urinary function

* range of motion

* muscle strength

* sensation

* functional abilities

* self care activities

* use of equipment

* psychology, family support

ADAPTATION

* house adaptations

* patient integration into the community

* patient independence

* psychology, family support

E. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH A SPINAL CORD INJURY

The goals of Physical Therapy for patients with SCI are to:

* prevent complications

* help the patient to be as independent as possible

* provide necessary equipment

P.T. treatments will be given for each of the different periods:

1. SPINAL SHOCK

2. STABILIZATION

3. REHABILITATION

4. ADAPTATION

1. SPINAL SHOCK

The PTA must follow the doctor's instructions very carefully during this period!

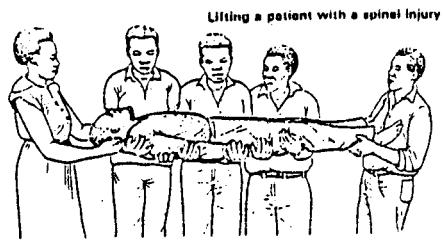
Physical Therapy in spinal shock period includes:

a. prevent pressure sores

b. prevent respiratory problems

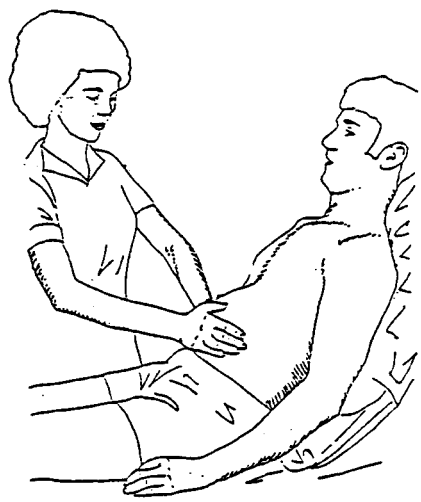
c. give psychological support

a. prevent pressure sores


Lifting a patient with a spinal injury

The patient must be carefully turned (no rotation or bending of the trunk) every 3-4 hours to prevent too much pressure on one area of the skin.

b. prevent respiratory problems



Breathing exercises are given to keep the lungs clear and active. (See RESPIRATORY chapter, Volume 2.)

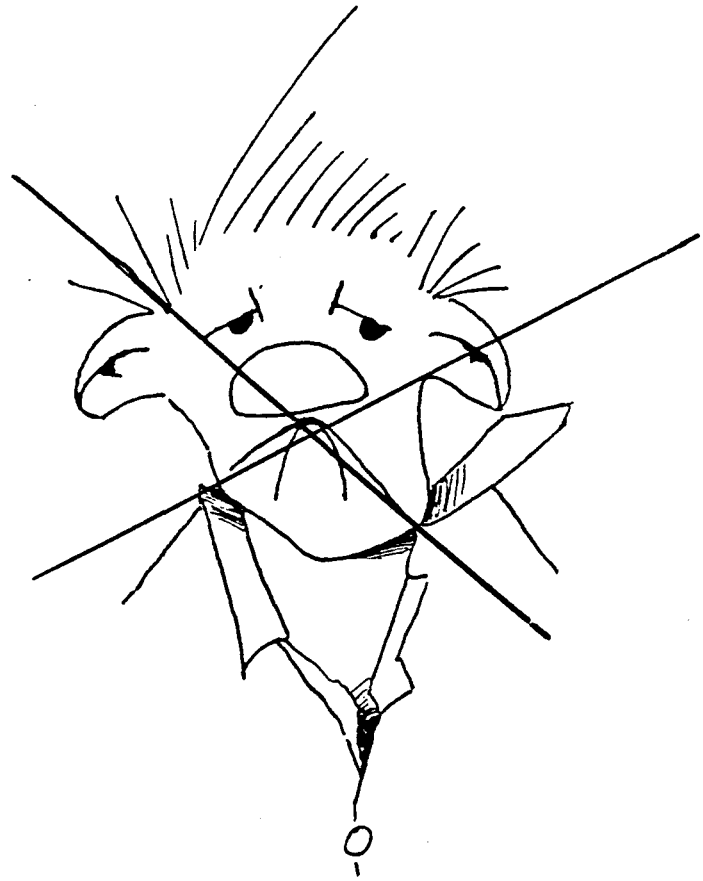
Diaphragmatic breathing for tetraplegics is very important because all of the other breathing muscles are damaged.

c. psychological support

The PTA can also give psychological support to the patient and family.

This support can help to decrease their fear and better understand the patient's condition.

The PTA can explain to the family about a SCI, answer questions, and be optimistic but also realistic about the patient's possibilities.



2. STABILIZATION

Remember, all patients will be different.
The PTA must follow the doctor's instructions in this period.

Question:

Doctors are not trained as specialists in Physical Therapy. Why must the PTA follow the doctor's instructions during the spinal shock and stabiization periods?

_____

_____

_____

Physical Therapy in stabilization period includes:

a. prevent pressure sores

b. prevent respiratory problems (continue breathing exercises)

c. continue psychological support

d. maintain normal range of motion

e. begin strengthening exercises

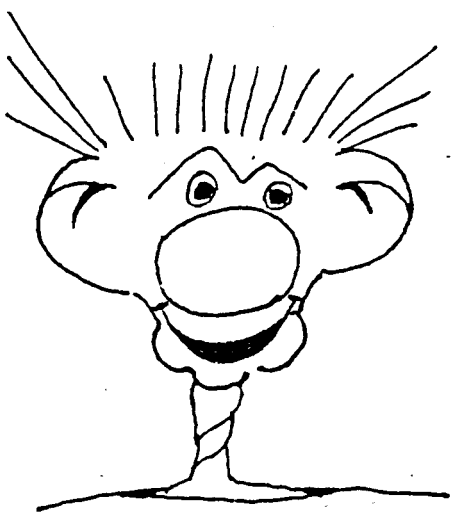
f. begin to evaluate the level of injury

a. <u>prevent pressure sores</u>)
) SEE SPINAL SHOCK PERIOD
b. <u>prevent respiratory problems</u>)

c. <u>continue psychological support</u>

During this period the PTA must begin to tell the patient about the work that the PTA and patient will do together to prevent the patient from becoming depressed and dependent.

It is important for the PTA to motivate the patient to help himself as much as possible.



d. maintain normal range of motion

The methods to maintain normal ROM are:

a) good bed positioning

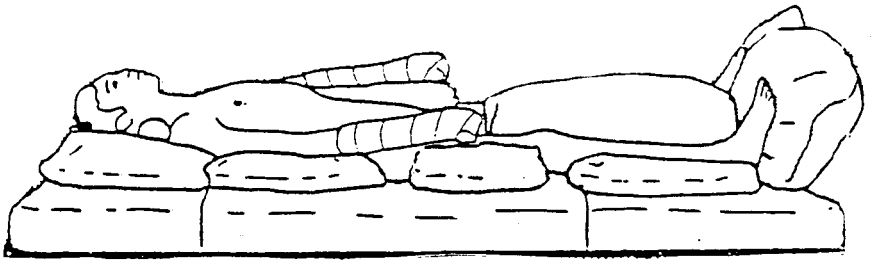
b) moving the limbs through their range of motion.

a) good bed positioning

Paraplegics and tetraplegics who cannot control the ankle muscles will need support for the foot (ankles) to prevent stiffness in a plantar flexion position.

A padded board can be used to help keep the foot in dorsiflexion when the patient is in bed.

If possible, the upper limbs should be a little elevated to prevent swelling.



b) moving the limbs through their range of motion

According to the abilities of the patient, the different levels of ROM techniques can be used (see RANGE OF MOTION chapter, Volume 2).

The PTA must be careful to move the limbs through the NORMAL range of motion only.

The SCI patient cannot feel and will not be able to tell the PTA if he has made too much movement.

SPECIAL NOTE:

On page 19 we have said that tightness in the wrists and fingers can be useful for some tetraplegic patients.

Activity:

A. Relax your fingers and completely flex the wrist. What is the position of your fingers?

_____

B. Relax your fingers and now completely extend the wrist. What is the position of your fingers?

_____

With wrist flexion the fingers passively open.

With wrist extension, the fingers passively close.

For patients that have wrist extensors that work and finger flexors that do not work, a tightness in the finger flexors can help to pick something up.

The strength of this passive wrist-finger movement can be increased with a special device called the FINGER FLEXOR GLOVE.

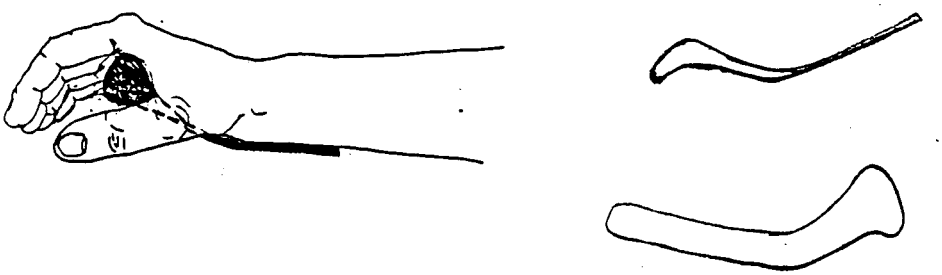
This "glove" helps to hold the hand in 3 main positions.

a. wrist extensors (a little)

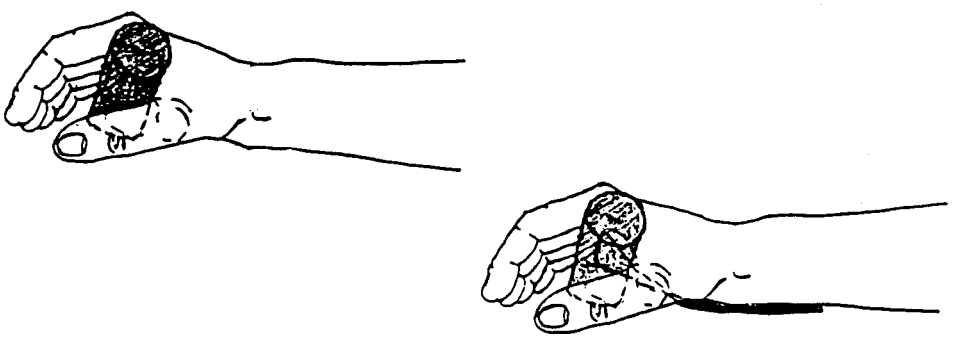
b. finger flexion

c. thumb opposition

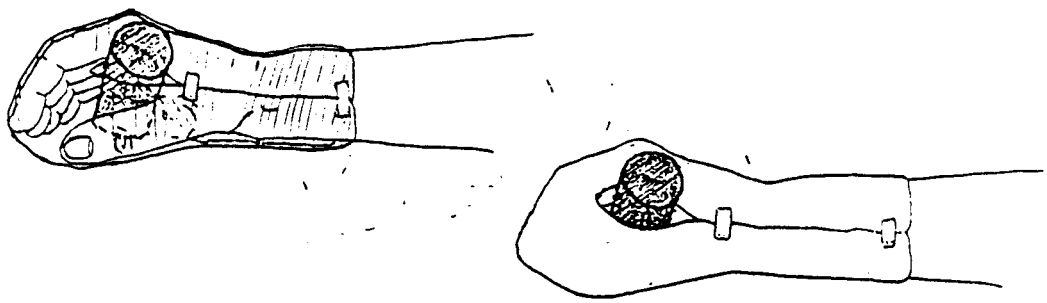
a. small amount of extension is held by plaster or metal



b. opposition is made by putting the thumb around a roll



c) finger flexion is held by an elastic bandage



If possible, the patient should wear this glove every night.

During the day, the PTA must help the patient practice to use this passive grasp method.

NEVER PUSH FINGER EXTENSION WITH WRIST EXTENSION
FOR TETRAPLEGIC PATIENTS !

Question:

A patient has no movement at the wrist. Is it important to allow tightness of the finger flexors for this patient?

Yes _____ No _____

Explain your answer.

_____

_____

_____

e. strengthening exercises

Muscle function may begin to return in some muscles.

The PTA must help to make these muscles strong by giving appropriate strengthening exercises (see STRENGTHENING chapter, Volume 2).

Question:

A patient has C7 incomplete quadriplegia. She has a little movement of the ankles and toes. Will you do strengthening for these areas?

Yes _____ No _____

Explain your answer.

_____

_____

_____

f. begin to evaluate the level of injury

Methods to identifying the functional level of a spinal cord injury were discussed on pages 7-14.

These methods include muscle testing and sensory testing.

The PTA must review muscle testing techniques (see MYOLOGY chapter, Volume 1) and sensory testing techniques (see NEUROLOGY chapter, Volume 1).

Modifications of muscle testing techniques may be needed if the spinal cord injury patient is unable to be in the testing positions.

3. REHABILITATION

After the vertebral column has consolidated
or when trunk movements will not damage the spinal cord,
rehabilitation period begins.

Physical Therapy in this rehabilitation period includes:

a. continue breathing exercises

b. continue psychological support

c. maintain normal range of motion

d. continue strengthening exercises

e. monitor changes in strength and sensation

f. teach patient/family self care activities

g. verticalization

h. focus on functional activities and provide equipment

NOTE:

All of the activities and exercises given in rehabilitation period will depend on the level and type of spinal cord injury.

The PTA must be optimistic and must also be realistic about what a patient will be able to do.

Questions:

1. A patient has C5 complete quadriplegia. Will you work on sitting balance with this patient?

Yes _____ No _____

Why or why not?

_____

_____

_____

_____

_____

_____

2. A patient has L3 incomplete paraplegia. What are three things that you can expect this patient to do independently?

_____

_____

_____

_____

_____

_____

a. continue breathing exercises

Question:

A C7 complete quadriplegic has secretions in the lower part of both lungs. Please list 3 things you can do to help this patient.

_____

_____

_____

b. continue psychological support

During rehabilitation period the PTA must help motivate the patient to become as independent as possible.

The patient must not "wait" for recovery but must "work" for recovery.

The PTA must give positive feedback for successes (or good attempts) and help give exercises that the patient can feel he has made progress.

DO NOT PUT THE PATIENT IN FAILURE SITUATIONS....
help the patient to begin to like himself for who he is.

c. maintain normal range of motion

During rehabilitation period the patient should learn Self-ROM if possible (see pages 47-48).

d. continue strengthening exercises

Strengthening must be given for all muscles that have some movement.

During rehabilitation period, strengthening exercises should be made together with functional activities

e. monitor changes in strength and sensation

Question:

Please give 2 reasons why it is important to monitor a SCI patient's strength during rehabilitation period.

_____

_____

_____

f. teach patient/family self care activities

If possible, the SCI patient must learn to be independent in maintaining good health.

The family must be involved in learning these activities to help the patient when it is needed.

Self care activities include:

a) management of bladder and intestine

b) pressure sore prevention

c) self range of motion

a) management of bladder and intestine

BLADDER MANAGEMENT

Questions:

1. What is the function of the bladder?

2. Why are bladder muscles important?

3. Explain why a patient with a complete spinal cord injury will have a problem urinating (peeing).

We said on page 19 that it is best to empty the bladder completely to prevent urinary infections.

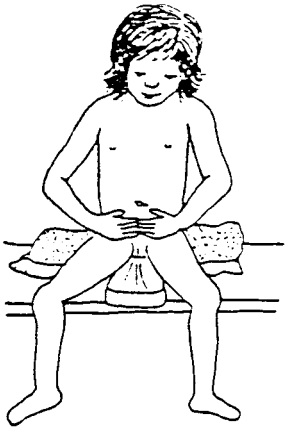
As a result of nerve damage, the muscles of the bladder may not function normally.

If the bladder muscles do not function normally, the patient must manually help to empty the bladder.

After nerve damage, the bladder muscles could be spastic or flaccid.

A patient that has a flaccid bladder needs to push (constant pressure) over the bladder area to help remove the urine.

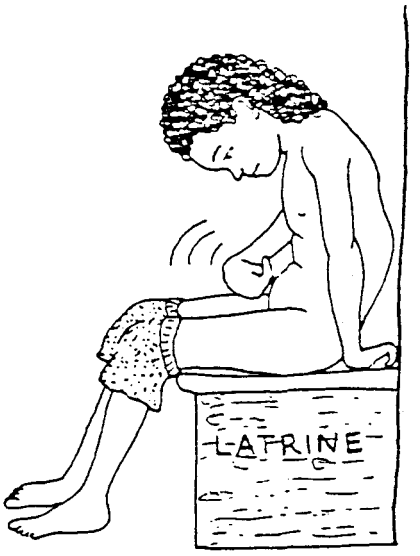
Push down over the bladder with the hands.



A patient that has a spastic bladder needs to tap (intermittent pressure) over the bladder area to help remove the urine.

In some patients, this pushing or tapping does not help remove the urine.

In this case, the patient would need a catheter (a tube that drains the urine always).



The spinal cord injury patient should always drink A LOT of water!

<u>At least two liters every day.</u>

To prevent urinary infections, drink LOTS OF WATER

A full bladder is easier to empty, and large amounts of liquid help to keep the urine passing regularly.

The PTA must teach the patient (and family) the techniques of how to help the patient pass urine.

To help to avoid complications, the SCI patient must continue these techniques for the rest of his life.

BOWEL MANAGEMENT

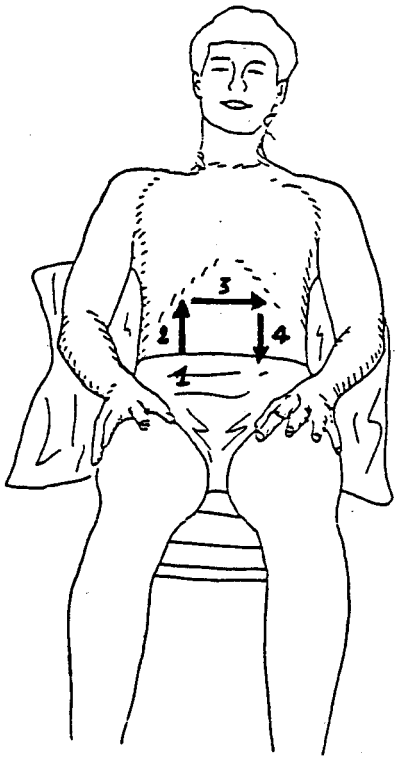
If the patient has difficulty passing stool, <u>deep massage</u> (see MASSAGE chapter, Volume 2) in the abdominal area may help.

It is important that massage is given in the right direction.

(Help to push the stool toward the anus, not the stomach!!)

<u>Direction to give massage:</u>

1. begin in the lower right side of the abdominal area.
2. move the hands superiorly.
3. move the hands toward the left side of the abdominal area.
4. move the hands inferiorly and toward the anus.



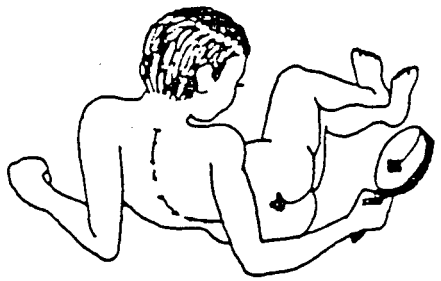
b) **pressure sore prevention**

Pressure sores (bed sores) are explained in PRESSURE SORES chapter, Volume 3).

We have said that pressure sores can be a complication for patients with spinal cord injuries (pages 16-17).

The SCI patient cannot feel many areas of the body and must work hard to prevent pressure sores.

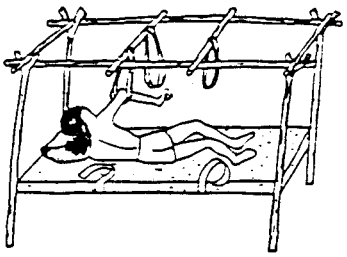
The SCI patient must learn how to regularly <u>check the skin</u> (with mirror or help of the family) over sensitive areas (page 17).



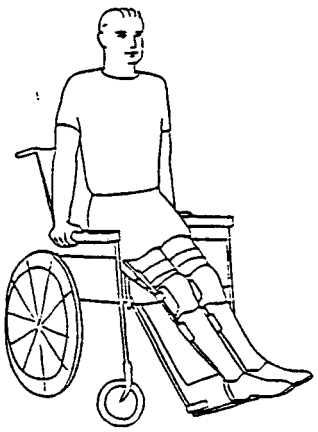
The SCI patient can prevent pressure sores by regularly <u>shifting his weight</u> so that the blood can arrive to all areas of the skin.

The patient can do this by:

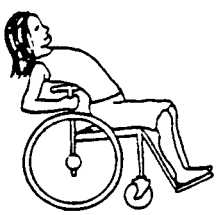
(a) changing positions in bed



b) doing arm push ups from bed or chair



c) leaning to the left or right side in the chair



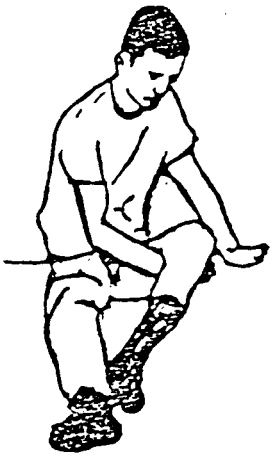
c) **self-range of motion**

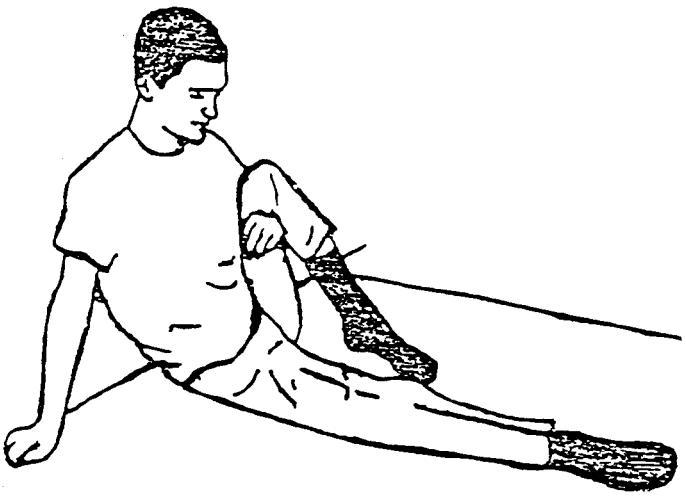
The patient or family must learn how to make range of motion.

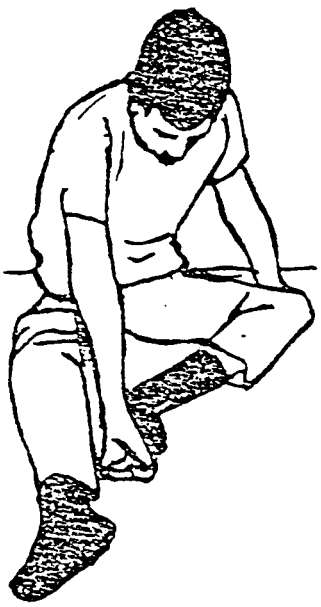
For SCI patients that have good arm and trunk muscles, self-ROM should be encouraged.

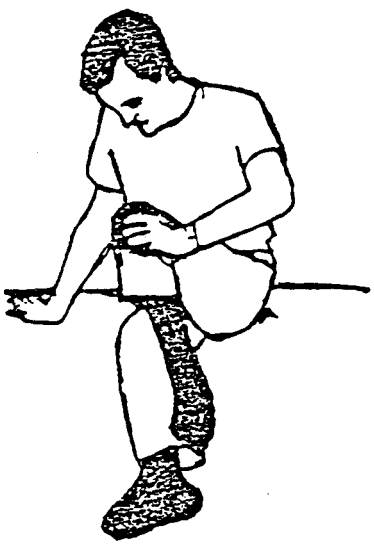
For patients unable to independently make ROM, the family must be encouraged to do this everyday.

Examples of self-ROM techniques are given below.









g. verticalization

Verticalization is sitting and standing positions.

Standing positions are good for all SCI patients during rehabilitation stage because:

* this stimulates the bones of the lower limb so that they remain strong

* it helps stimulate intestine and bladder for better waste removal

* it helps the circulatory system be more active

* it makes the patient mentally feel better

Verticalization is a STEP BY STEP process.

This means the patient does not go from supine to standing in one day.

A special table "tilt table" is used to help stand patients step-by-step.

Rules to remember when putting a patient on a tilt table:

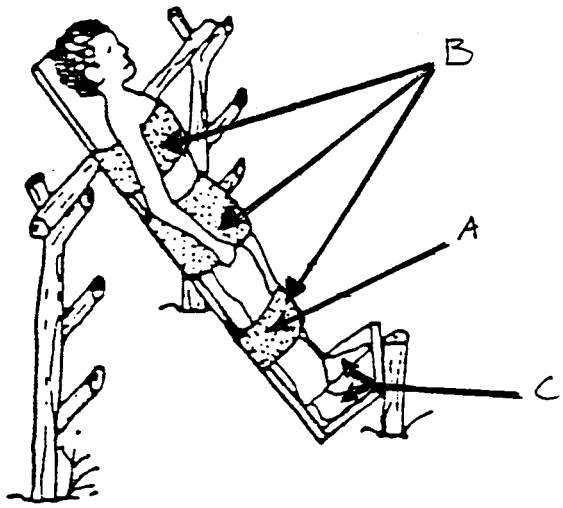
A. bandage a patient's legs before standing; this will help keep the blood equal in the body

B. attach the patient to the table very well so that he doesn't fall

C. take care that feet/legs are in a good position

* if the patient feels dizzy, return him to near horizontal position

* if possible, it is good to have the SCI patient stand 1 - 2 times each day for 15 - 30 minutes each time



h. Focus on functional activies and equipment needs

Functional activities include:

* moving in bed

* sitting

* eating/dressing/bathing

* transfers

* wheelchair use

* braces/walking aids

* **MOVING IN BED**

As soon as possible the SCI patient should learn and practice how to move in bed as independently as possible.

This will help the patient to be more responsible in his care (prevent pressure sores) and provide a base for other activities (sitting, eating, etc).

Bed adaptations are very important to help encourage this independent movement in bed.

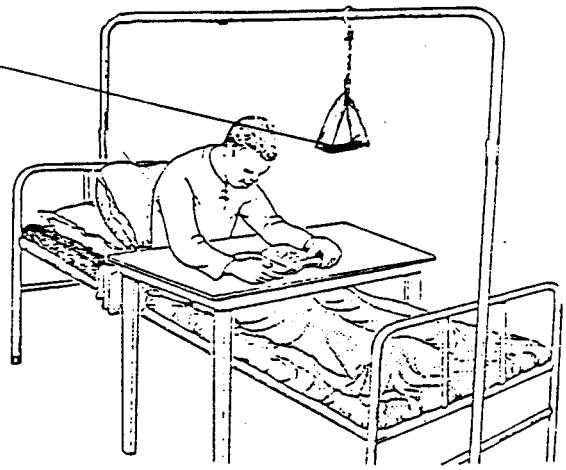
On the next page are pictures of 3 types of bed adaptations that the patient can use to help him move in bed:

TRAPEZE

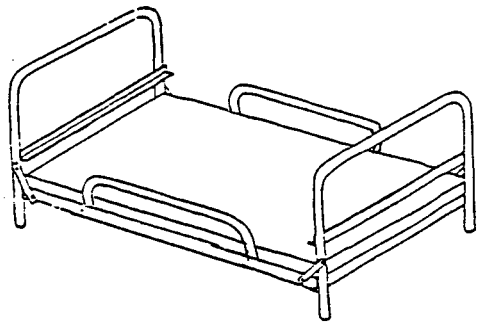
SIDE BARS

LADDER

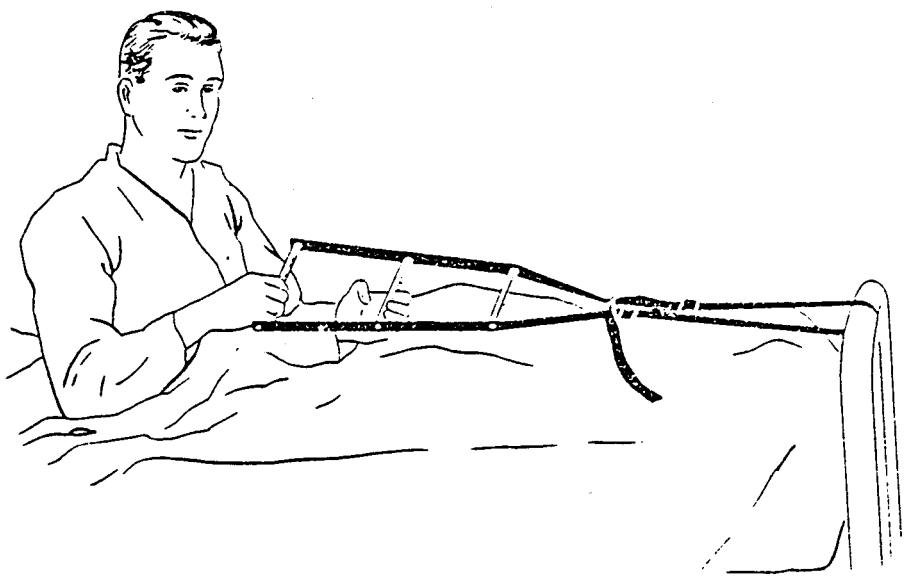
TRAPEZE



SIDE BARS



LADDER



* SITTING

Sitting is a very good position for all SCI patients. In this position, the patient can safely eat, see the area and people around him, and feel less dependent and disabled.

Questions:

1. What is the better position to eat and drink (sitting or lying on the back)?

   _____

   Explain your answer.

   _____

   _____

   _____

2. Why is it important for an SCI patient to sit and see the area and people around him?

   _____

   _____

   _____

Methods to come to a sitting position and to remain in a sitting position will be different for quadriplegics and paraplegics.

Question:

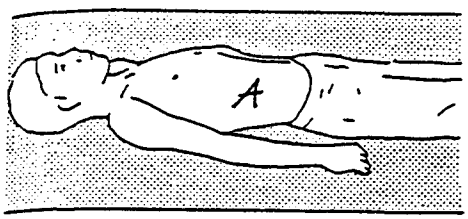
Quadriplegics have more difficulty than paraplegics to come to sitting and to remain sitting. Explain why.

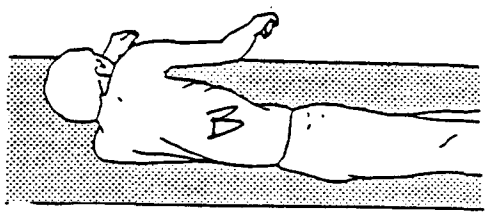
_____

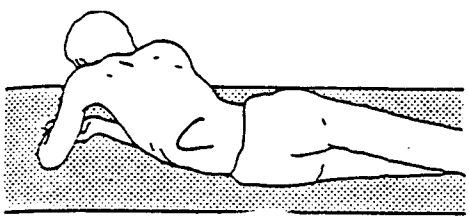
_____

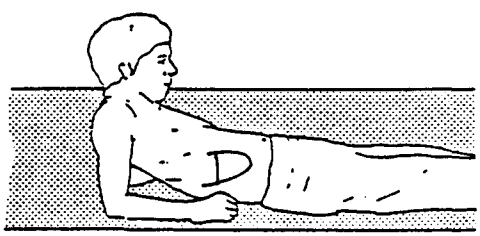
_____

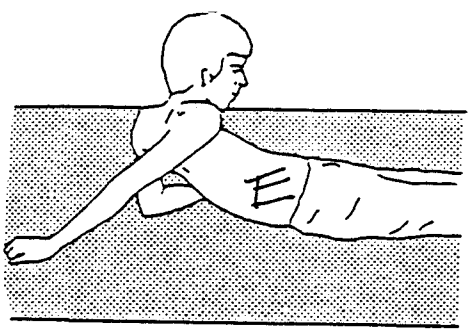
Methods to come to a sitting position can be seen in the pictures below.

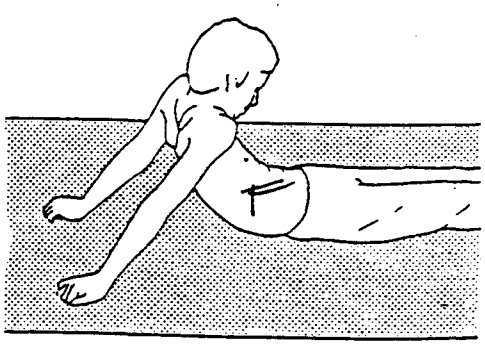


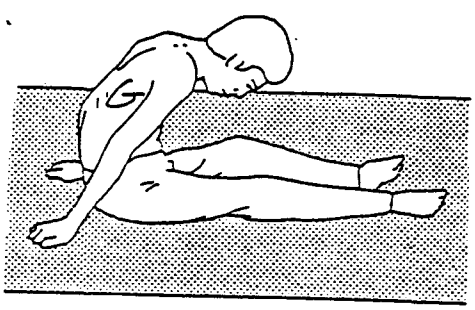




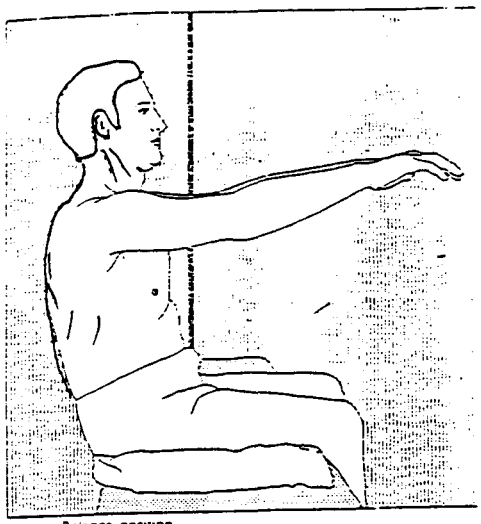




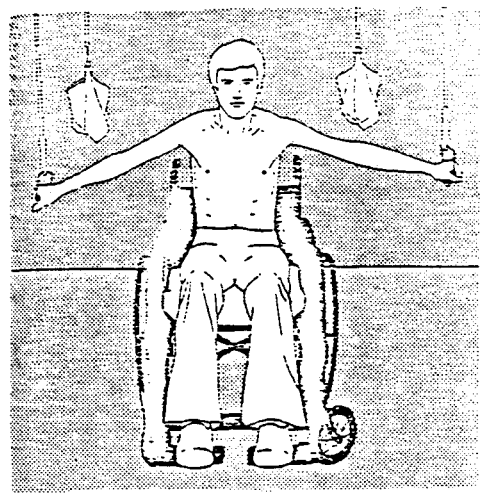




Once in sitting, the patient can work on strengthening exercises or balance exercises.



Balance position



Question:

Generally, balance exercises are more useful for a paraplegic patient that a tetraplegic patient. Please explain why.

_____

_____

_____

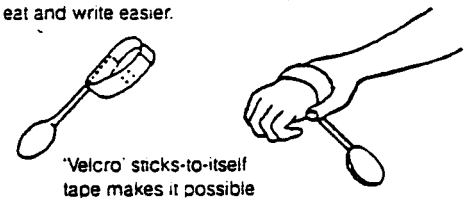
* EATING/DRESSING/BATHING

Again, as early as possible the patient must be encouraged to be as independent as possible for eating, dressing and bathing.

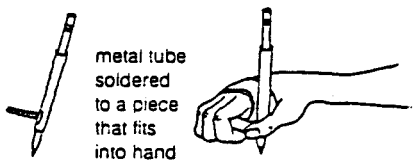
Below are picture of equipment that may help increase the autonomy of a patient.

For other suggestions, see DEVICES FOR AUTONOMY chapter, Volume 2.

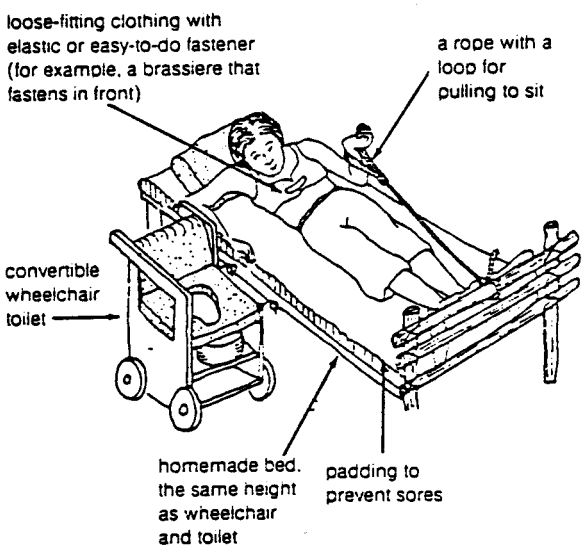
When hands are affected, devices like these (or others that you can invent) make relearning to eat and write easier.



'Velcro' sticks-to-itself tape makes it possible for the person to put on aids by herself.



metal tube soldered to a piece that fits into hand band



Questions:

1. A man is a L5 complete paraplegic. Will this man need special hand devices to help him eat?

   Yes _____ No _____

   Explain your answer.

_____

_____

_____

2. A patient is a C6 quadriplegic. This girl has good biceps muscles but weak hand muscles. Her mother says she cannot feed herself. What could you suggest for this patient to help her be more independent?

_____

_____

_____

* **TRANSFERS**

Transfers are moving from one surface to another surface. Different types of transfer techniques are described in TRANSFERS chapter, Volume 2.

Question:

Please give 2 reasons why transfers are more difficult for quadriplegic patients than paraplegic patients.

_____

_____

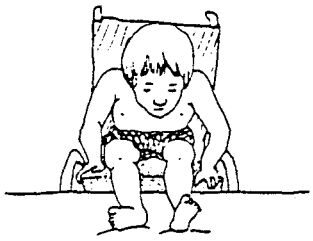
_____

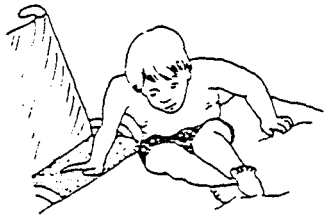
Because quadriplegic patients have decreased arm strength and trunk control, they will need extra help or devices to move from one surface to another.

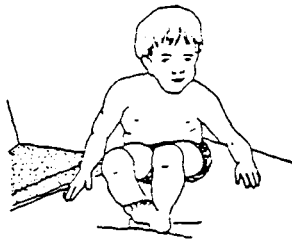
Paraplegics have better trunk and arm strength and should be able to transfer to different surfaces independently.

General rules for transfers:

- try to make both surfaces equal height





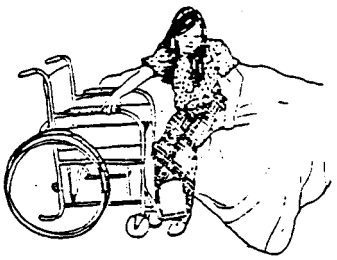


- may use a smooth board to put between the 2 surfaces to make the movement easier

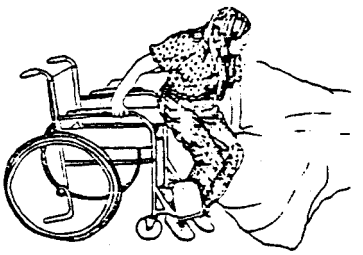
- if possible remove the armrest of the wheelchair on the side you are transferring toward

Pictures of different types of transfer techniques on given on the following pages.

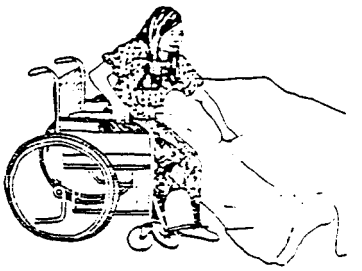
Transfer from cot or bed to wheelchair with armrests



1. Position your wheelchair so that you can swing body past armrests.

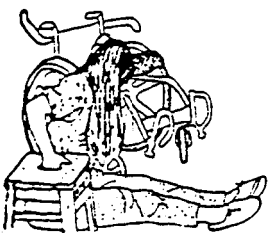


2. Place one hand on bed and one on the far armrest. Push yourself up while leaning forward with head down, weight over knees.



3. Swing body into wheelchair.

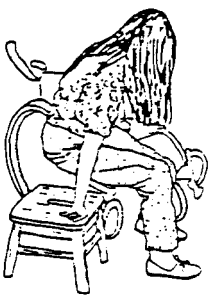
Transfer from floor to wheelchair — with help of a low seat



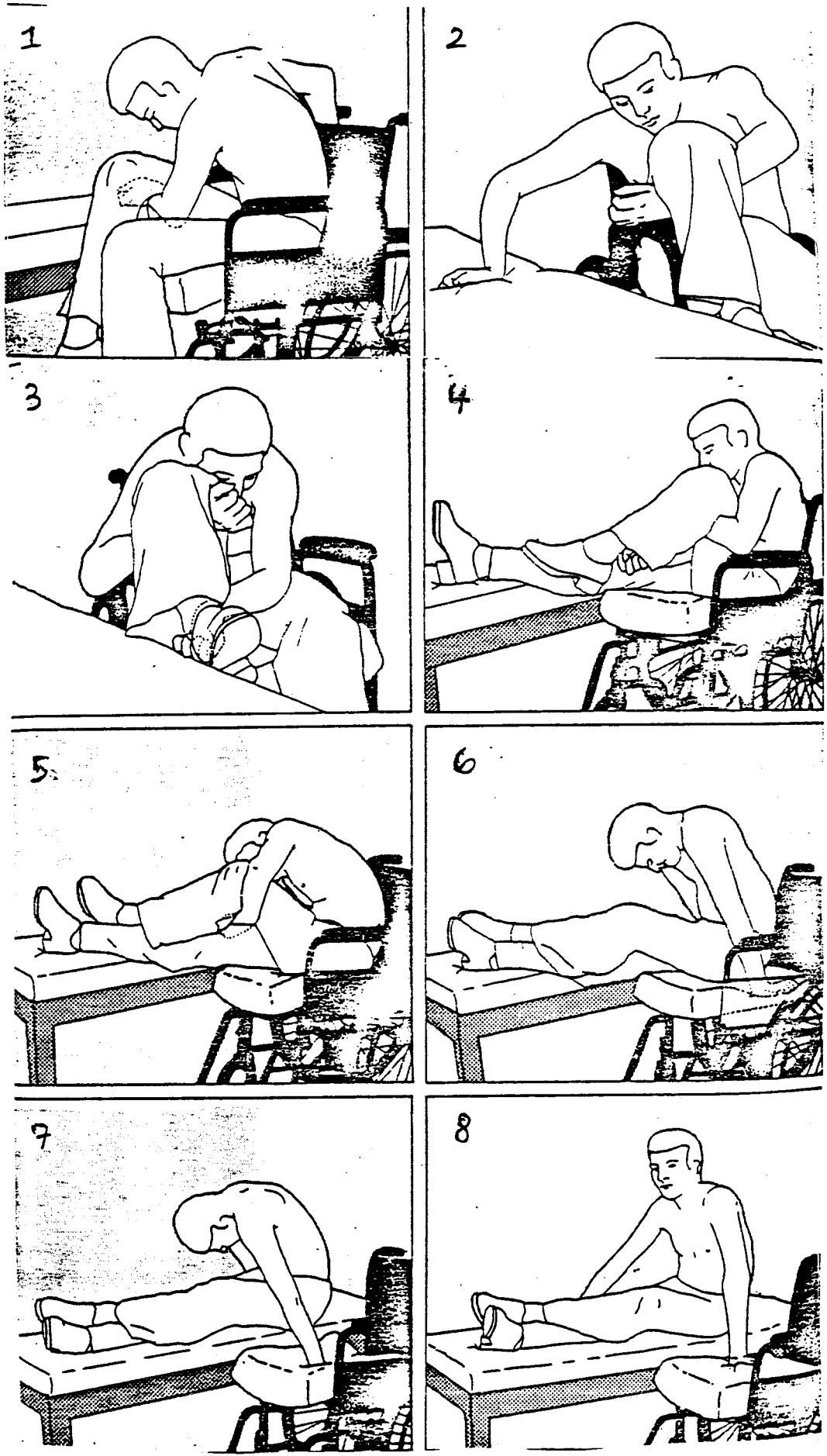
1. Sit with legs straight. Pull seat to your side opposite the wheelchair (a person's knee can also be used).

2. With hands on each chair, push up, with your head forward over knees.

3. Swing onto the seat.

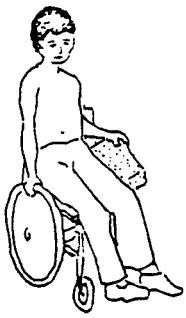


4. Now, with your head forward over your knees, swing body onto the wheelchair.


1
2
3
4
5
6
7
8

Transfer from wheelchair to floor—and back again—without help of a stool

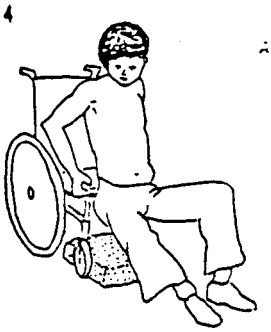
1



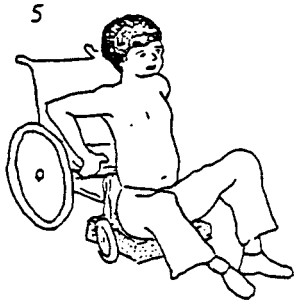
2

3

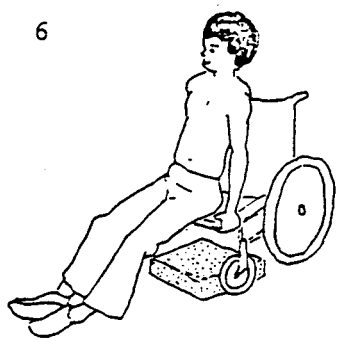
4



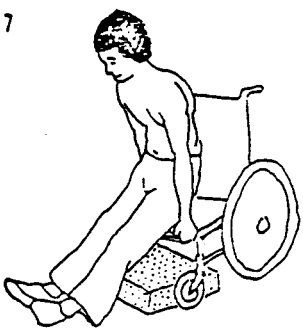
5



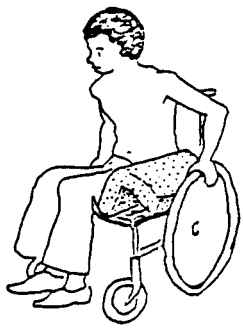
6



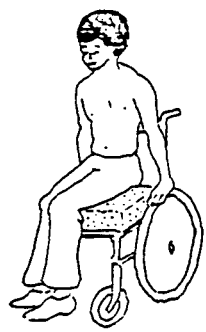
7



8



9



* wheelchair use

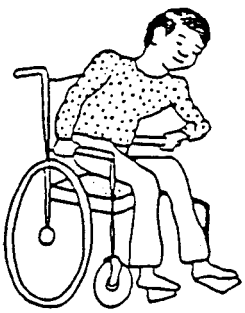
Specific information about wheelchairss is given in WHEELCHAIR chapter, Volume 2.

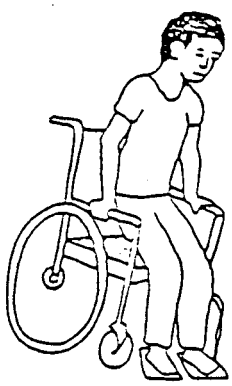
Generally people that cannot walk or can walk only with great difficulty can benefit from the use of a wheelchair.

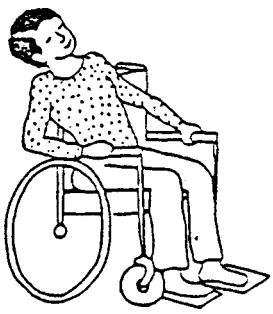
Patients with spinal cord injuries may spend a lot of time in their wheelchairs.

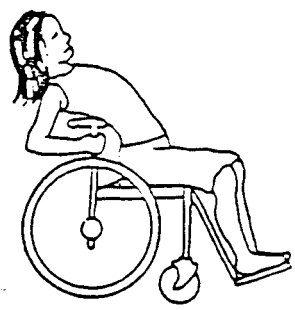
They must be reminded to shift their weight often (every 20 minutes for 2-3 minutes) to prevent pressure sores (see PRESSURE SORES chapter, Volume 3).

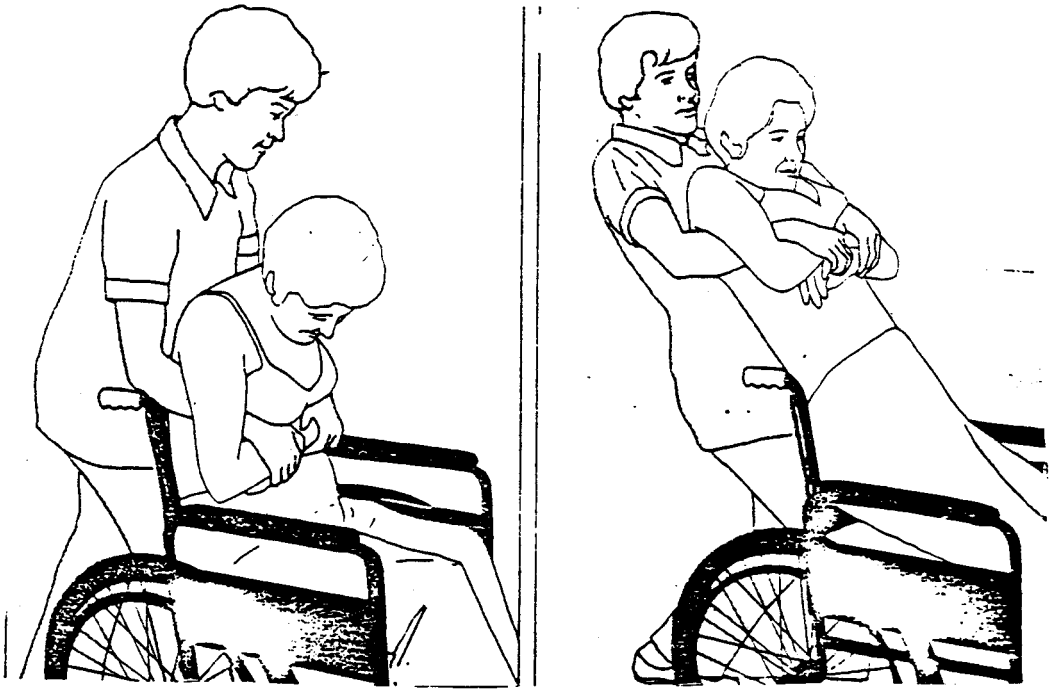
Ideas for ways to decrease pressure over some "sitting area" are seen in the pictures below.











Adaptions for the wheelchair will depend on the needs of the individual patient (See WHEELCHAIRS chapter, Volume 2).

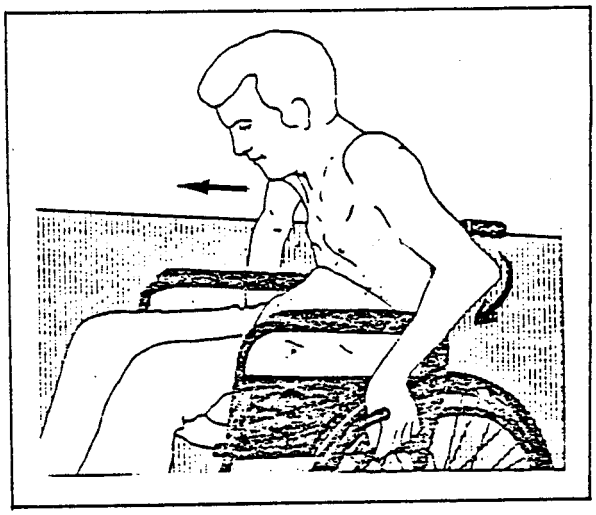
To help encourage the SCI patient to be out of bed, and doing useful activities in the wheelchair, a lap table can be made to fit on the arm rests of the wheelchair.

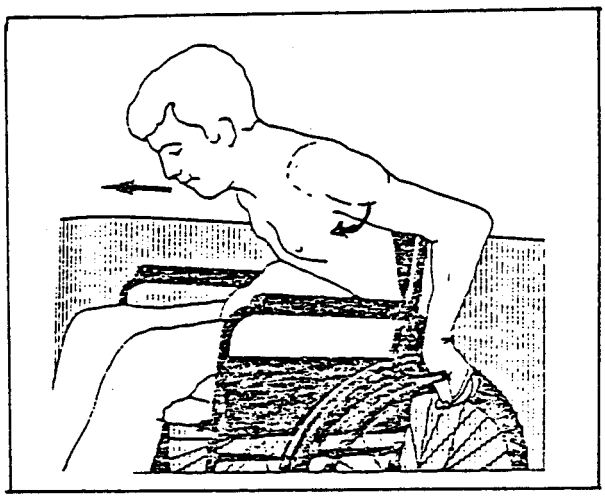
This "table" gives the patient a stable area to work with his hands and can help protect the legs from hot or sharp objects.

Moving the wheelchair forward can be made 2 different ways.

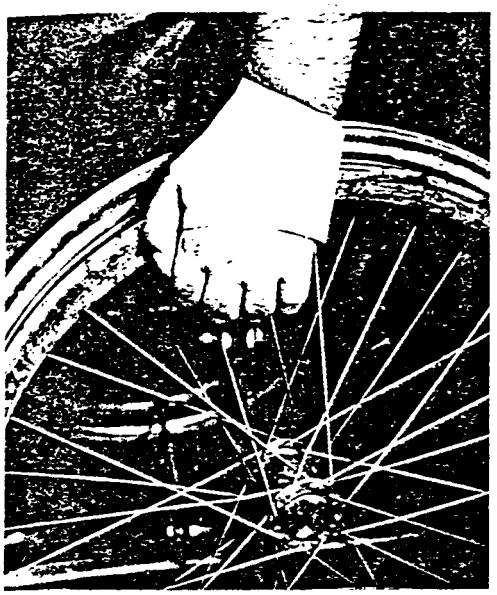
* using elbow extensors (most common)

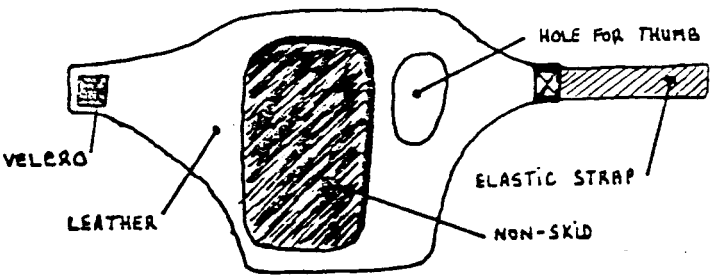
* using elbow flexors and shoulder flexors
(for patients that do not have elbow extensors that work)



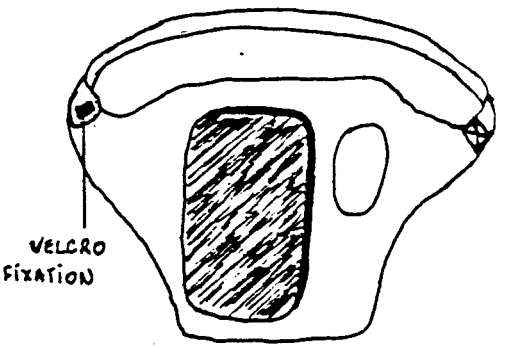


To help all patients with SCI have a better hold on the wheel, a special glove can be made. This glove helps the SCI patient push the wheel with less slipping and less damage to the hands.





NON-SKID GLOVE
(FOR RIGHT HAND)



* braces/walking aids

For patients with good trunk control, hip control and very good strength in the upper limbs, braces and walking aids may be used to help in walking. (See BRACES, and WALKING AIDS chapters, Volume 2.)

Braces will keep joints in a position so that weight bearing is possible (knee extension, ankle neutral).

The type of brace needed will depend on the type of SCI and how the muscles and joints of the lower limb are working.

For details about braces and brace use, please see BRACES chapter, Volume 2.

4. ADAPTATION PERIOD

During adaptation period physical therapy treatment will include:

* psychology and family support
* ensure independent and safety in activities learned in rehabilitation period
* house adaptations
* community integration
* plan for follow-up visits

* psychology and family support

The PTA should discuss with the patient and family that the big changes in how the patient can move have already happened.

The patient and family must continue to MAINTAIN the patient's current level of independence and good health.

In many cases the patient's level of independence can increase as the area around him is adapted to fit his needs.

* ensure independence and safety in activities learned in rehabilitation period

The PTA must check to make sure the patient and family identify what the patient can do, and what he needs help with.

If possible the PTA should travel to see the patient and family in their home to review all areas of rehabilitation.

* **house adaptations**

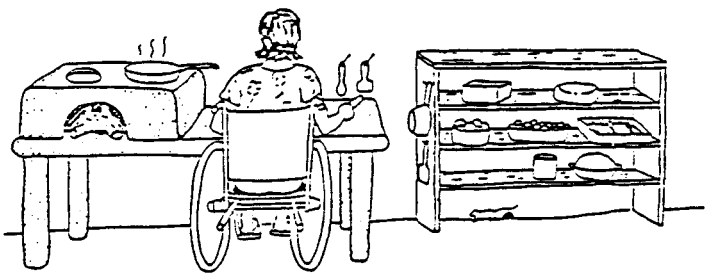
The main adaptation needed for the house is to be able to have a wheelchair enter and move about in the house.

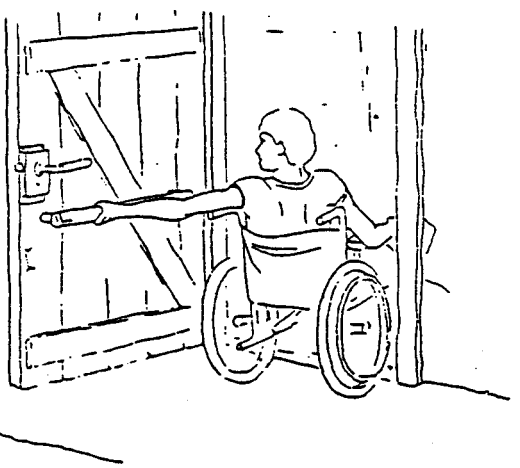
In addition, surfaces (bed, toilet) should be the same level to assist in transfers.

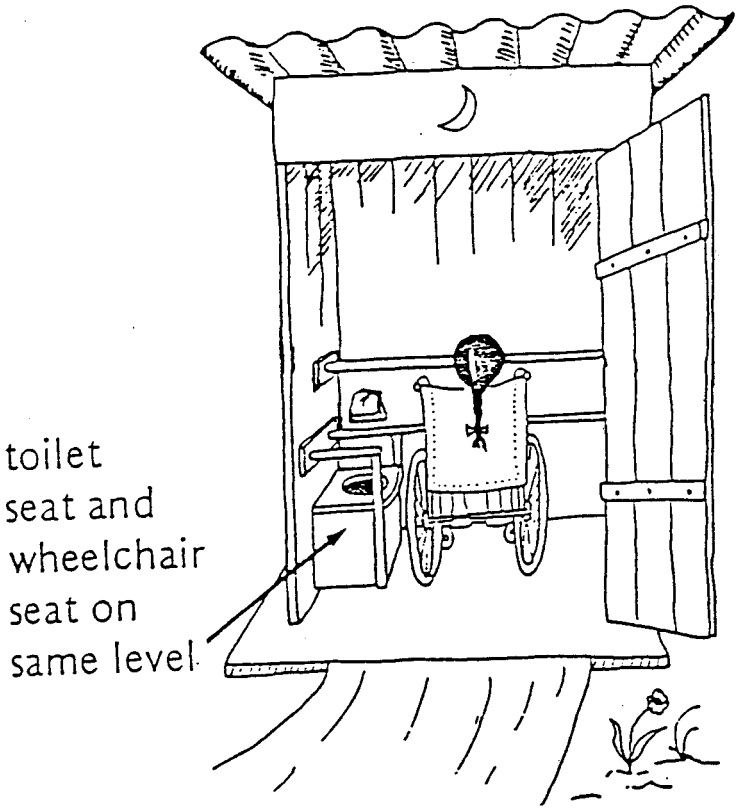
Adaptations for the bed to help mobility and the toilet for mobility, stool removal and washing should be included.

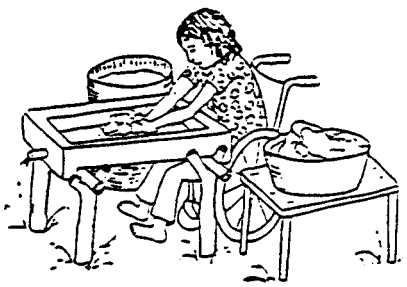
Details about house adaptations can be found in the chapter on HOUSE ADAPTATIONS.

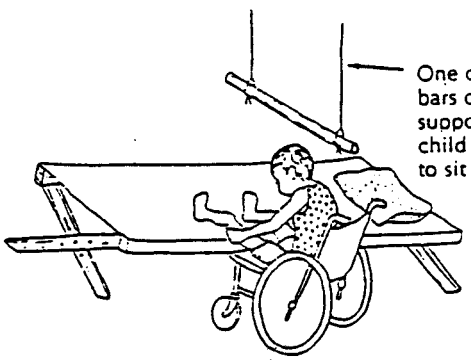
The pictures on the following pages help give ideas about how the house can be adapted so that a SCI patient in a wheelchair can continue to live as independently as possible.

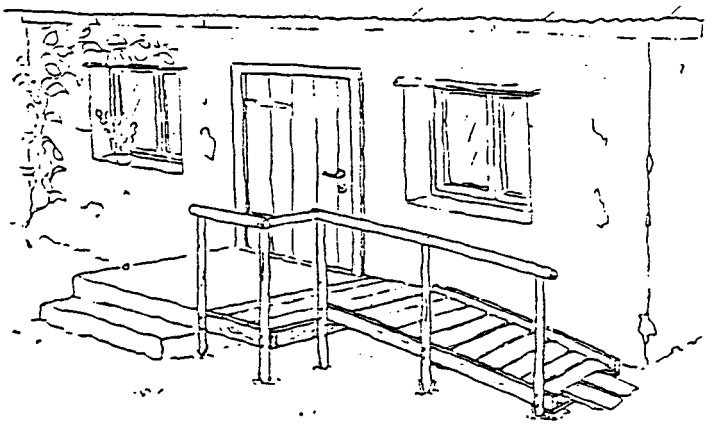


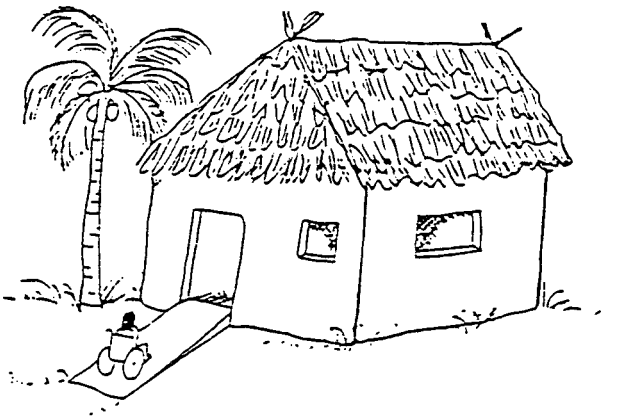


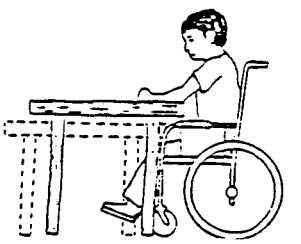

toilet
seat and
wheelchair
seat on
same level

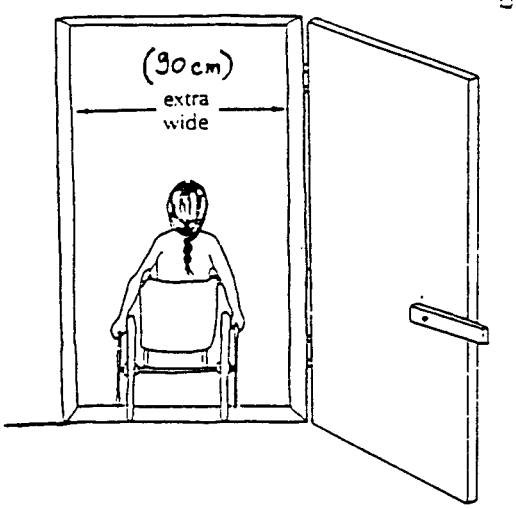



One or more hanging
bars or other
supports may help the
child to transfer or
to sit up in bed.








(90 cm)
extra
wide

H. CHAPTER SUMMARY

A spinal cord injury is damage to the spinal cord.

The spinal cord carries messages about movement and sensation to and from the brain. If the spinal cord is damaged or destroyed, these messages cannot arrive.

Complete SCI means that the spinal cord is completely destroyed in one area and no message can pass.

Incomplete SCI means the spinal cord was not completely destroyed and some messages can continue to pass through this area.

IF PART OF THE SPINAL CORD IS DESTROYED, IT WILL NEVER RECOVER.

A person with a spinal cord injury will have problems with movement and feeling in all body parts below the level of injury.

Quadriplegia is problems with movement and feeling in the upper limbs, trunk, and lower limbs.

Paraplegia is problems with movement and feeling in the lower limbs (and sometimes trunk).

Spasticity is uncontrolled muscle contraction. Spasticity in spinal cord injuries is caused by reflexes (fast decisions made by the spinal cord causing a muscle contraction).

Complications from SCI are:

* pressure sores (bed sores)
* contractures (joint tightness)
* urinary tract infections
* respiratory problems

Suggestions on how to prevent these complications are given in this chapter.

The four stages of recovery that a SCI patient may experience are:

*	SPINAL CORD SHOCK	from traumatic SCI where there is swelling that causes pressure in the spinal cord
*	STABILIZATION	when vertebral bones are not stable they need to be immobilized to prevent more movement and damage to the spinal cord.
*	REHABILITATION	vertebral bones are stable and it is time to work for the best functional recovery (strengthening and equipment).
*	ADAPTATION	patient reintegrated into society, house adaptations, work possibilities.

Specific Physical Therapy evaluation and treatment suggestions are given for each stage of recovery.

CHAPTER 29

RESPIRATORY DISEASES

RESPIRATORY DISEASES cause problems in the respiratory system.

OBJECTIVES

At the time of the exam and with 80% efficiency, the student will be able to correctly:

1. describe asthma (what it is, symptoms and how Physical Therapy can help).

2. describe pneumonia (what it is, symptoms and how Physical Therapy can help).

3. describe bronchitis (what it is, symptoms and how Physical Therapy can help).

4. describe TB of the lung (what it is, symptoms and how Physical Therapy can help).

5. given a patient with a specific respiratory disease, demonstrate the appropriate Physical Therapy evaluation and treatment.

CHAPTER CONTENTS

Note:

Before studying this chapter, the PTA should review anatomy and physiology of the respiratory system (GENERAL BODY SYSTEMS chapter, Volume 1) and general respiratory treatment techniques (RESPIRATORY chapter, Volume 2).

A. INTRODUCTION

Respiratory diseases cause problems in the respiratory system.

Most often these problems are with the air tubes or alveoli.

Questions:

1. What are the names of the different air tubes in the respiratory system?

_____

_____

_____

2. What is the function of the air tubes?

_____

_____

_____

3. What is the function of the alveoli?

_____

_____

_____

The respiratory diseases discussed in this chapter include

* Asthma
* Pneumonia
* Bronchitis
* Tuberculosis of the lung

There are many other types of respiratory disease and problems. The diseases presented in this chapter are the most common in many developing countries.

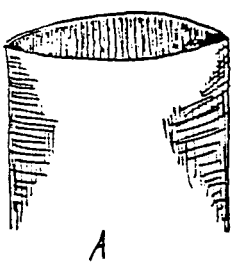
For each disease, the following information will be presented:

1. What it is
2. Cause
3. Specific Information
4. Medical Treatment
5. Physical Therapy Evaluation
6. Physical Therapy Treatment

B. ASTHMA

1. WHAT IS ASTHMA?

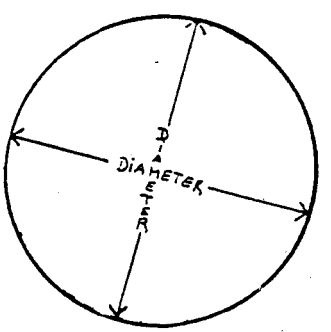
ASTHMA is the <u>decreased diameter of the air tubes</u> and the problems that this causes.



The diameter is a measure of how big a circle is.

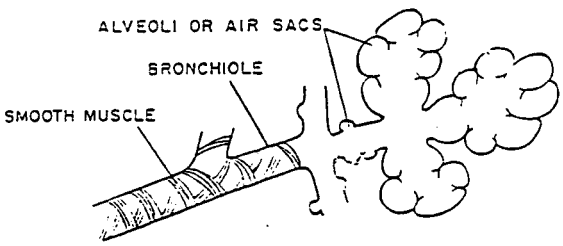
Example:

Tube "A" has a bigger diameter than Tube "B".



Most often, asthma affects the diameter of the bronchii and bronchioles.

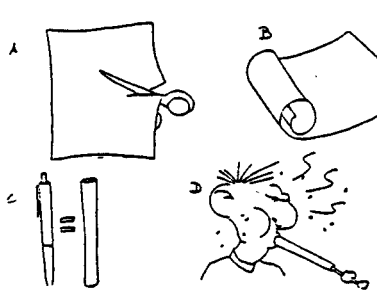
There is smooth (involuntary) muscle on the outside of these tubes.



If these smooth muscles contract, the diameter of these tubes will decrease.

If the diameter of the air tube decreases, there is less space for the air to pass. If there is less space for air to pass, then breathing becomes very difficult.

Activity:



A. All students cut a piece of paper to be half the size of this page.

B. Roll the paper making a tube.

C. This tube should have the same diameter as a pencil.

D. Put your lips around the end of the tube.

Breathe air in and out of the tube. Do this ten times.

Next, breathe without the tube. Do this ten times.

Activity (continued)

1. Describe the difference between breathing air normally, and breathing air through the tube.

_____

_____

_____

2. Which breathing was more difficult?

_____

Why?

_____

_____

_____

The activity above is given to help the PTA understand the feeling of breathing with a decreased diameter of the air tubes.

2. CAUSE OF ASTHMA

The cause of asthma is unknown.

Some people have smooth muscle around the air tubes that is over active. These muscles may be more active with stress, exercise, allergies, smoke, coughing, or laughing.

3. SPECIFIC INFORMATION ABOUT ASTHMA

Information given in this section includes:

a. crisis periods of asthma

b. exhalation problems

a. crisis periods of asthma

People with asthma do not have constant breathing problems.

There are times when the smooth muscles around the bronchii and bronchiolies are very active (contracting, and decreasing the diameter of the air tubes) followed by times when these muscles are relaxed (a more normal diameter of the airtubes).

A crisis period is when the diameter of the air tubes has decreased and the patient experiences big difficulty in breathing.

Symptoms of the crisis period in asthma are:

* Fast superficial breathing.

* Wheezing (a noise you make when it's difficult to breathe).

* Patient is anxious and tries to use ALL respiratory muscles (*including the muscles of the neck*) to pull air into the lungs.

* Difficulty moving air OUT and in.

* Patient may have secretions (extra fluid in the lungs).

Activity:

Review the symptoms of crisis period in asthma. Imagine you are a patient with asthma and you are in a crisis period.

Demonstrate how you are breathing during this period (include the first 4 symptoms as given above).

b. exhalation problems

As we said in symptoms of crisis period in asthma, a patient will have difficulty moving air OUT and in.

REMEMBER:

Inhaling	=	ribs move up and out; this increases the space in the lungs
Exhaling	=	ribs move down and in; this decreases the space in the lungs.

During crisis period, the air tubes have a small diameter.

When the ribs move down and in, this puts pressure on the air tubes.

With more pressure from the outside, the air tibes will become even small when exhaling.

Questions:

Normally a person will exhale the used air (carbon dioxide) out of the lungs and inhale new air (oxygen) into the lungs.

1. In your own words, explain why a person in crisis period will have more problems exhaling than inhaling.

_____

_____

_____

2. Describe the problems a patient will have if he cannot exhale the used air out of the lungs.

_____

_____

_____

Questions: (continued)

3. Why does a patient with asthma feel that there is not enough oxygen in the lungs, even when he inhales often.

_____

_____

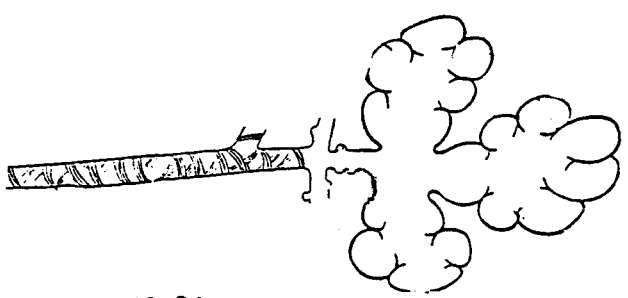
_____

4. MEDICAL TREATMENT OF ASTHMA

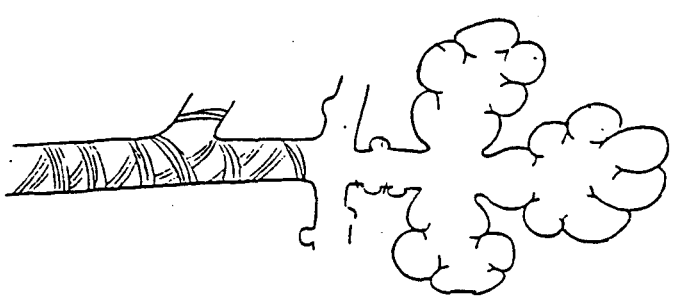
Medicine can be given to the patient to relax the smooth (involuntary) muscles around the bronchii and bronchioles.

Normally, this medicine is "breathed in" by the patient.

When the involuntary muscles around the air tubes relax, the diameter of the tubes will increase and the patient can breathe easier.



SMOOTH MUSCLES CONTRACTED



SMOOTH MUSCLES RELAXED

Question:

Explain the difference between smooth (involuntary) muscle and skeletal (voluntary) muscle.

_____

_____

_____

_____

_____

5. *PHYSICAL THERAPY EVALUATION OF PATIENTS WITH ASTHMA*

* how often the patient has crisis periods (possible causes?)
* medications (how often, how much)
* type of breathing (fast, slow, deep, shallow)
* chest deformities
* how the patient breathes (diaphragm, upper chest, neck muscles)
* functional level of the patient

6. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH ASTHMA

Physical Therapy treatments will be explained for the 2 periods of patients with asthma.

a. before crisis period

b. during crisis periods

a. before crisis period

* patient teaching
* practice correct breathing techniques
* resisted exhalation activities

*** patient teaching**

Before a crisis the patient must understand what is the reason for difficult breathing.

The PTA must explain about the smaller diameter of air tubes AND that RELAXTION can help this diameter increase.

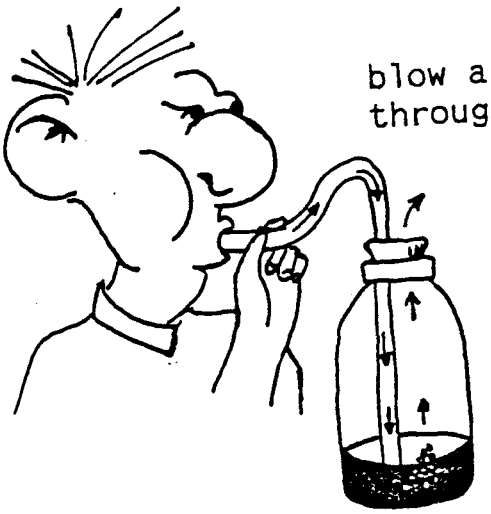
The PTA must also explain related breathing positions and good breathing techniques (see RESPIRATORY chapter, Volume 2).

*** practice correct breathing techniques**

The patient must practice breathing positions and techniques so that these can be used easily when the patient is in crisis period.

* resisted exhalation techniques

To help prevent problems with exhalation (pages 7-8), the patient can exhale into a tube and water jar.



Exhaling through a tube into water will give small resistance that helps to prevent the air tube diameter from being pushed smaller.

Question:

The resistance from the tube and water should be small. If there is too much resistance the patient will have to push hard to exhale.
Explain why this is a problem with patients with asthma.

_____

_____

_____

b. during crisis period

* patient relaxed
* relaxed breathing positions
* good breathing techniques
* NO VIBRATIONS OR CLAPPING

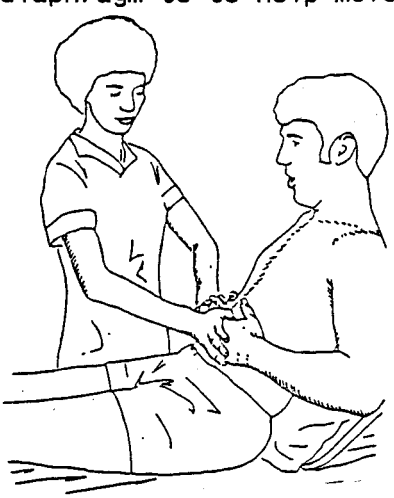
* **patient relaxed**

During crisis period, the patient must try to be as relaxed as possible.

Complete body relaxation will help the smooth muscles around the bronchii/bronchioles relax also.

* **good breathing techniques**

The PTA can help the patient focus on LONG expiration (see RESPIRATORY chapter, Volume 2) and using diaphragm to to help move air in and out of the lungs.



IMPORTANT !

The PTA must not force the patient to make these activities during a crisis period.

The patient should have learned and practiced good positioning and breathing techniques before crisis period.

During crisis period the PTA helps the patient be as calm and relaxed as possible.

* **good breathing techniques**

Some patients may have secretions with asthma. For these patients, medicine to relax the air tubes should be given before physical therapy treatment.

With the diameter of the tubes increased, the patient can breathe easier and secretions can be moved more easily.

Positioning and deep breathing can be used to help remove secretions. (See RESPIRATORY chapter, Volume 2.)

* **NO VIBRATIONS OR CLAPPING**

Clapping and vibrations may cause the diameter of the airways to decrease and make breathing difficult.

Clapping and vibrations should be avoided in patients with asthma.

C. PNEUMONIA

1. WHAT IS PNEUMONIA?

PNEUMONIA is an infection in the lungs.

The result is that the alveoli will fill with secretions.

Questions:

1. What happens in the alveoli?

_____

_____

_____

Questions: (continued)

2. Why is it a problem if the alveoli are filled with secretions?

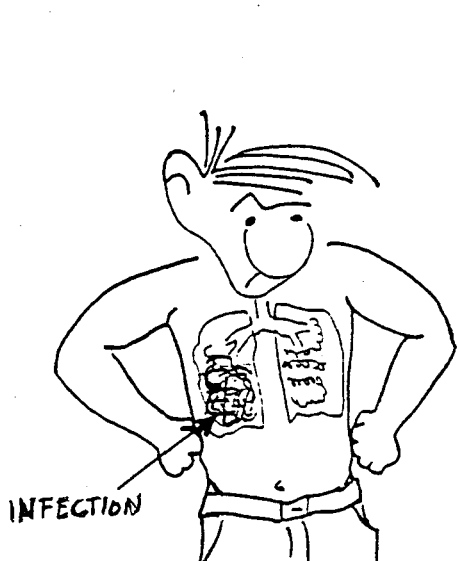
_____

_____

_____

2. *CAUSE OF PNEUMONIA*

If air movement in and out of the lungs is decreased, bacteria can rest in the distal lung areas and cause trouble (infection).



This infection will cause increased secretions in that area.

Questions:

1. A patient has been in bed with very little movement for 1 month. The patient develops pneumonia. Explain why this patient may have developed pneumonia.

2. A patient has C4 complete quadriplegia. This patient develops pneumonia. In your own words, explain why this may have happened.

3. SPECIFIC INFORMATION ABOUT PNEUMONIA

Information give in this section includes:

a. periods and symptoms of pneumonia

b. secretions on x-ray

a. periods and symptoms of pneumonia

There are 2 general periods in pneumonia

* period of infection (fever)
* period of decreased infection (no fever)

Symptoms of pneumonia are:

* high fever (dependent on period of infection)

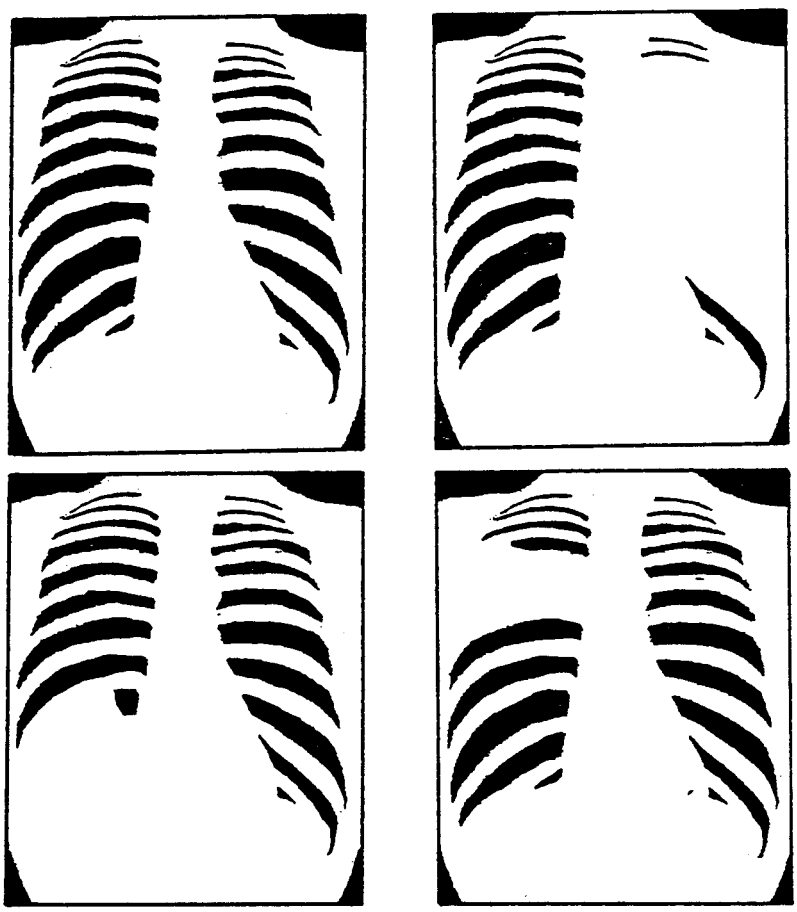
* chest pain

* sputum that is thick, colored, and smells bad

* cough

If secretions are very thick they can be seen on x-ray. The areas with secretions will look more white on an x-ray.

Activity: In the x-rays seen below, please circle the lung area that has secretions.



4. MEDICAL TREATMENT OF PNEUMONIA

Medicine is given to the patient with pneumonia. This medicine helps fight the infection in the lungs.

5. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH PNEUMONIA

- does the patient have a fever?
- secretions (quantity, color, smell)
- type of breathing (fast, slow, deep, shallow)
- pain (where, when, how much)
- location of pnuemonia in the lungs
- other medical problems

6. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH PNEUMONIA

Physical therapy treatment can be used for

a. prevention of pneumonia

b. treatment of patients with fever

c. treatment of patients with no fever

a. <u>prevention of pneumonia</u>

DEEP BREATHING EXERCISES ARE GOOD FOR ALL PATIENTS

Deep breathing exercises bring and remove air from the distal part of the lungs and do not allow bacteria to rest easily.

Deep breathing should be given for all patients

- in bed for a long time
- with respiratory diseases

Deep breathing exercises help prevent pneumonia.

b. <u>treatment of patients with pneumonia and fever</u>

Deep breathing exercises only (see RESPIRATORY cchapter, Volume 2). The patient has infection and is very sick. Physical therapy treatment that is too difficult will worsen the patients condition.

c. <u>treatment of patients with pneumonia and no fever</u>

* patient positioning to help remove secretions from different lung areas
* deep breathing exercises focusing on long expiration
* vibration with exhalation to help loosen secretions
* coughing to help remove secretions from the big airways

<u>Questions</u>:

1. A patient has penumonia and no fever. He has secretions in the lower lobes of both lungs. What position is good to help remove secretions?

_____

_____

_____

Questions: (continued)

2. A patient has penumonia with a fever. What type of P.T. treatment can you give this patient?

_____

Explain why you give this treatment.

_____

_____

_____

2. Deep breathing exercises help to prevent pneumonia. Explain how deep breathing exercises help prevent pnuemonia.

_____

_____

_____

_____

D. BRONCHITIS

1. WHAT IS BRONCHITIS?

BRONCHITIS is a condition where the larger air tubes make too much mucous (thick secretions) for a long time.

2. CAUSE OF BRONCHITIS

The cause of bronchitis is most often due to an irritation (dust or smoke) in the air tubes.

Cigarette smoking may be one cause of bronchitis.

3. SPECIFIC INFORMATION ABOUT BRONCHITIS

The symptoms of bronchitis are:

* coughing with secretions for a long time.
* difficulty breathing because of secretions that have remained for a long time.

4. *MEDICAL TREATMENT OF BRONCHITIS*

Medical treatment will depend on the individual patient, but may include:

- antibiotics (if there is infection)
- medicine to increase the diameter of the air tubes
- oxygen for better air exchange

5. *PHYSICAL THERAPY EVALUATION OF PATIENTS WITH BRONCHITIS*

- how the patient breathes (diaphragm, upper chest, neck muscles)
- chest deformities
- secretions (amount, color)
- how long the patient has had bronchitis
- functional activities of the patient

5. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH BRONCHITIS

* breathing steam from boiled water may help secretions move easier

* patient positioning to drain secretions

* deep breathing exercises focusing on expiration

* clapping and vibration

* coughing to remove secretions from the large airways

For the above techniques, please see RESPIRATORY chapter, Volume 2 for details.

E. TUBERCULOSIS (TB)

(see TUBERCULOSIS chapter, Volume 3)

1. WHAT IS TUBERCULOS (TB)?

TUBERCULOSIS is a disease that causes abscesses in the lungs, bones and joints.

2. CAUSE OF TB

TB is caused by bacteria.

3. SPECIFIC INFORMATION ABOUT TB

Signs of TB are chronic coughing, weight loss, mild fever and pain in the upper chest or back.

Checking secretions from the lungs is the best way to identify if a patient has TB in the lungs.

4. MEDICAL TREATMENT OF TB

Medicine is the only way to cure TB in any part of the body. This medicine kills the bacteria. After the bacteria is killed, the disease can no longer spread from one person to another.

5. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH TB

- chest deformities
- secretions (amount, color, location)
- pain (where, when, how much)
- where TB is in the lungs (see x ray)
- how the patient breathes (diaphragm, upper chest, neck muscles)
- type of breathing (fast, slow, deep, shallow)
- how long the patient has had TB
- is TB in other parts of the body?
- functional activities of the patient.

5. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH TB (lungs)

- deep breathing exercises to use all parts of the lungs as much as possible

- patient positioning, vibrations and coughing to help remove secretions from the airways

> WARNING
>
> DO NOT USE CLAPPING FOR PATIENTS WITH TB IN THE LUNG.
>
> CLAPPING WILL HELP SPREAD THE DISEASE!

F. CHAPTER SUMMARY

Respiratory diseases cause problems in the respiratory system. Most often these problems are with the air tubes or alveoli.

The four diseases presented in this chapter.

ASTHMA - contraction of smooth muscle around the air tubes that decreases the diameter of these tubes

PNEUMONIA - infection in the lungs that causes a lot of secretions (fluid) in the alveoli

BRONCHITIS - too many secretions in the larger air tubes that last for a long time.

TUBERCULOSIS - abscesses in the lungs that damage alveoli and cause secretions in these areas.

Specific Physical Therapy evaluation and treatment are given for all diseases.

Deep breathing exercises are useful in treating all respiratory diseases. Long exhalation will help keep air in the lungs for better air exchange.

CHAPTER 30

POLIO

A. WHAT IS POLIOMYELITIS (POLIO)?

Polio is a disease that damages MOTOR NERVES.

The motor nerves are damaged in the anterior part of the spinal cord.

Only motor nerves are damaged so the person will have problems with movement only.

People with polio have normal sensation (feeling) in their body.

Most often, polio occurs in children under age 5.

Question:

There is a child who has no movement and no feeling in the right leg and foot.
Do you think this child has polio? Yes _____ No _____

Explain your answer. _____

_____

_____

B. CAUSE OF POLIO

Polio is caused by a virus.

This virus can be on the food we eat or in the things we drink.

It can be found in the stool (shit) of infected children.

In early periods it can be transferred to others by coughing or sneezing.

C. SPECIFIC INFORMATION ABOUT POLIO

Information given in this section includes:

1. Periods of polio
2. Secondary problems caused by polio

1. PERIODS OF POLIO

There are four basic periods that happen to a child that has polio:

a. Early Period — (ALL children will have this period)

b. Crisis Period

c. Recovery Period — (Only about 5% of the children with polio virus will have these periods: 95% of children with polio will have killed the virus in the early period.)

d. Final Period

Note: The different periods will overlap. A clear beginning or ending may be difficult to see. Four periods are used to help describe the progression of the polio disease in a simple way.

For each period the following information will be given:

i) What happens in the period
(this describes what the polio virus is doing)

ii) Symptoms of the period
(this describes what we will be able to see from the patient

iii) Progression of the period
(this describes what can be expected to happen)

a. Early Period

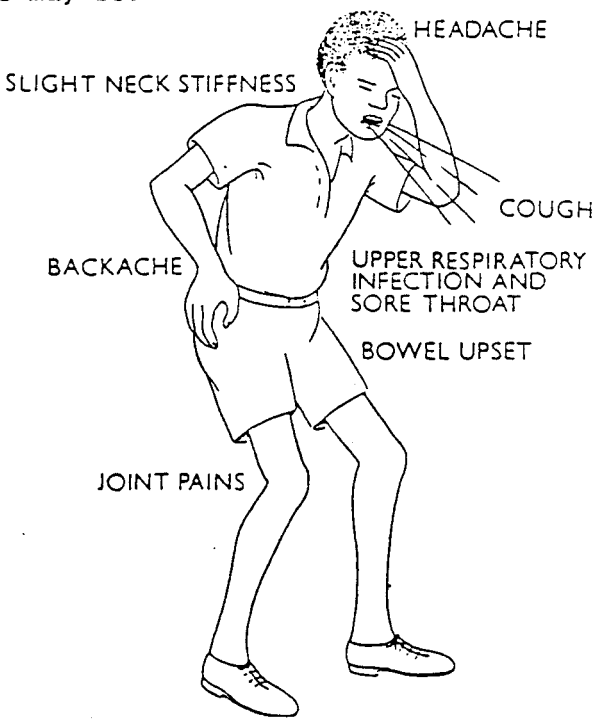
i) What happens in early period

In this period the virus has entered your body. Your body is trying to fight the virus.

ii) Symptoms of early period

A person in this period may have symptoms similar to a common cold or influenza. These symptoms may be:

* headache
* fever
* sore throat, running nose or cough
* diarrhea or constipation
* back ache, joint pain
* some neck stiffness



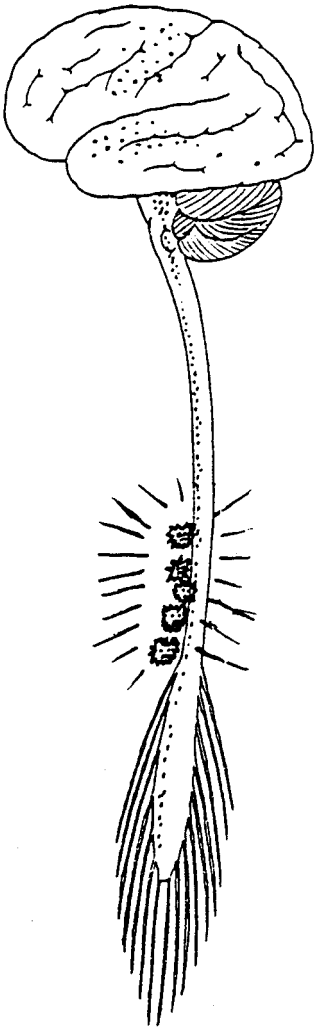
iii) Progression of early period

This stage continues for about three days.

In most cases (95%) the body is strong enough to kill the polio virus and the disease stops.

In other cases (5%) the polio virus is not killed and the disease continues to the crisis period.

b. Crisis Period



i) What happens during crisis period

In this period the virus has arrived at the spinal cord and attacks some motor nerves.

The polio virus can damage any motor nerve in the body.

Damage can be on the right side, left side, upper limb, lower limb, trunk, or respiratory muscles.

The motor nerves most often damaged are the ones for the lower limbs.

The muscles that are are commonly affected by motor nerve damage can be seen on page 6.

ii) Symptoms of crisis period

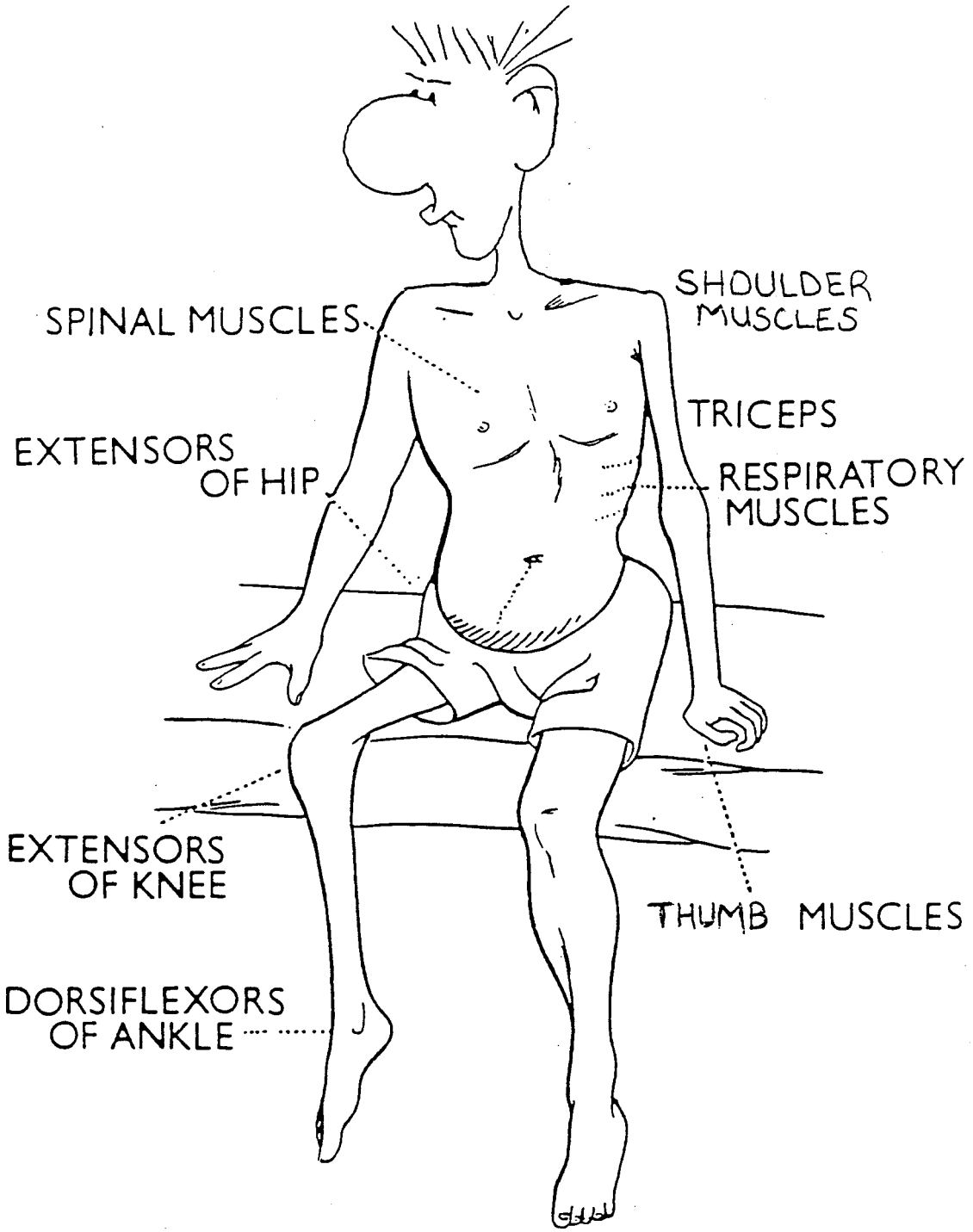
The patient may continue to have influenza symptoms.

The patient may begin to have pain or muscle spasms in some muscles.

The patient may begin to have weakness or paralysis in some muscles.

The muscles most commonly weakened or paralyzed because of nerve damage from polio are seen in the picture on the following page.

MUSCLES COMMONLY AFFECTED IN POLIOMYELITIS



Questions:

1. Polio has destroyed the motor nerves that tell the left knee extensor muscles to work.

a) What problems will the patient have?

_____

_____

The above patient has left knee flexors that are normal.

b) Will the knee joint most often want to be in a position of flexion or extension?

_____

Explain your answer.

_____

_____

_____

2. The polio virus has destroyed all of the motor nerves that tell the right ankle dorsiflexors to work. Describe the problem this patient will have with walking.

_____

_____

_____

3. The polio virus has damaged some of the nerves that tell the diaphragm to work. What problem will this patient have?

_____

Explain your answer.

_____

_____

_____

iii) Progression of crisis period

The amount and location of paralysis will depend on what areas of the spinal cord have been destroyed before the body is able to kill the virus.

Motor nerve damage will continue to increase until the body is able to kill the polio virus.

c. Recovery Period

i) What happens in recovery period

In this period the polio virus has been killed and the undamaged areas of the spinal cord will recover.

If some motor nerves were compressed (from swelling) and were not damaged, they may recover and the muscles will have normal function.

If only some of the motor nerves to a muscle are destroyed, the muscle can work but it may be very weak.

If all of the motor nerves to a muscle are destroyed, the muscle will be paralyzed (unable to move, floppy).

REMEMBER: If a motor nerve in the spinal cord has been destroyed, it will never recover.

ii) Symptoms of recovery period

No more fever, muscle pain, or influenza symptoms.

The patient may have varying levels of muscle weakness or paralysis that may improve.

iii) Progression of recovery period

Motor nerves that were compressed (but not damaged) may recover.

Motor nerves in the spinal cord that were destroyed will never recover.

d. Final Period

i) What happens during final period

Recovery of the motor nerves is complete. No further recovery should be expected.

The patient must physically adapt to the muscular weakness or paralysis that he will have for the rest of his life.

ii) Symptoms of final period

The patient will have unchanging muscle weakness or paralysis.

The patient will see muscle atrophy in nerve damaged muscles.

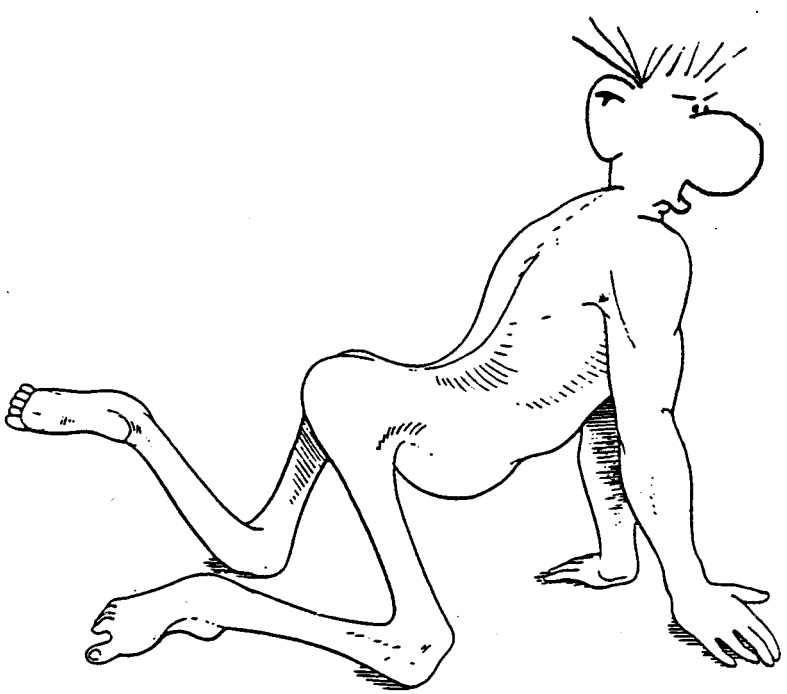
After many years, bone deformities may appear from disuse, muscles imbalances and abnormal body positions (see secondary problems caused by polio, pages 10-19).

iii) Progression of final period

There is no further progression of the disease.

All health workers must help to prevent deformities of the limbs and help the patient continue to be as independent as possible.

THE NEGLECTED POLIO PATIENT.



2. SECONDARY PROBLEMS CAUSED BY POLIO

We have said earlier that polio causes damage to motor nerves. This motor nerve damage will cause weakness or paralysis in different muscles of the body.

Because of weakness or paralysis, a patient may begin to develop other problems, including:

a. changes in the muscles (size and length)

b. joint deformity

c. bone deformity

a. changes in the muscles (size and length)

The two changes that can occur in muscles after they are paralyzed are:

i) change in the size of the muscle (cannot prevent this)

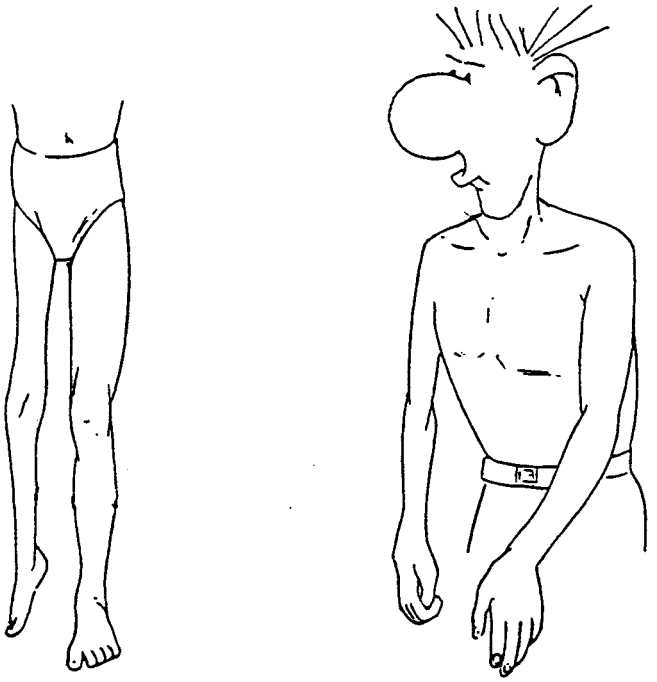
ii) change in the length of a muscle (can prevent this)

i) change in the size of the muscle

A paralyzed muscle receives no message to contract. When muscle fiber don't work, they become thinner and thinner.

This decrease in muscle size is called atrophy.

Muscle atrophy is the reason why a polio patient may have an arm or leg that looks thinner than it normally should.



REMEMBER: Muscle atrophy cannot be prevented in muscles that are completely paralyzed.

ii) **change in the length of a muscle**

In Myology, we learned that at every movable joint there are at least 2 muscles that work (one muscle to move the joint in one direction and one muscle to move the joint in the opposite direction); these are called "muscle opposites".

Questions:

1. What is the muscle that makes the movement opposite to the ankle dorsiflexor?

   _____

2. What is the muscle that makes the movement opposite to the knee extensor?

   _____

3. What is the muscle that makes the movement opposite to the hip extensor?

   _____

Normally, these muscle opposites have a "balance" of strength. This means that both muscles can move the joint equally well. One muscle is not so strong that the other muscle cannot move the joint in the direction.

In patients with polio, some muscles will be paralyzed and some muscles will not be paralyzed.

Question:

In your own words, describe why patients with polio may have some paralyzed muscles in the right let, and some muscles not paralyzed in the right leg?

_____

_____

_____

_____

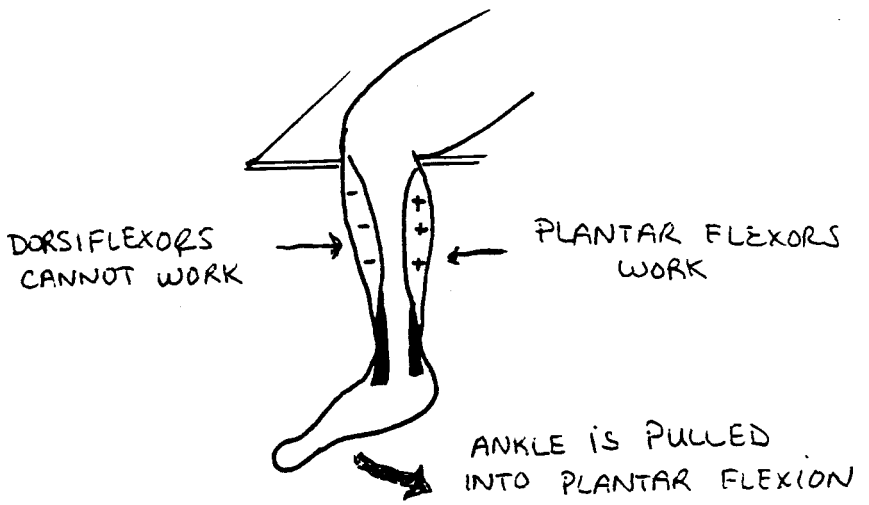
_____

If the polio virus paralyzes the muscles that make movement of a joint and does not damage the muscles that make the opposite movement, there will be a muscle imbalance.

Example

If the polio virus paralyzes the right ankle dorsiflexors and does not damage the right ankle plantar flexors, there will be a muscle imbalance.

(The dorsiflexors cannot make dorisflexion, but the plantar flexors can work as they want; the dorsiflexors cannot balance this, so the joint is pulled into plantar flexion.)



After some time, (and without treatment), muscle imbalances can cause changes in the length of the muscles.

* The paralyzed muscles will become longer (if the opposite muscle continues to work).

* The working muscles will become shorter (if the opposite muscle is paralyzed).

Example

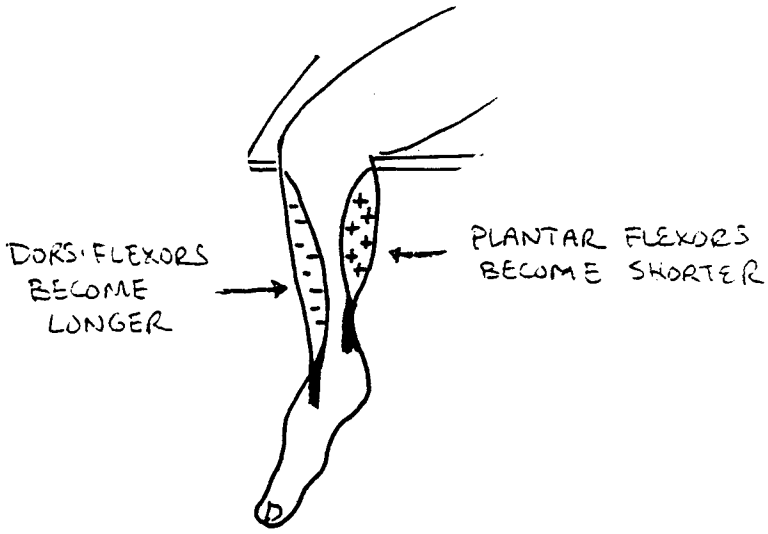
The ankle dorsiflexor is paralyzed and the ankle plantar flexor continues to work.

The ankle plantar flexor always wants to pull the ankle into plantar flexion and the dorsiflexors can do nothing.

The result is that the joint will be pulled into a position by the stronger muscle.

The joint will be pulled into plantar flexion.

After some time, the ankle dorsiflexors will become longer and the plantar flexors shorter.



Questions:

1. The hip ABDuctor muscle is paralyzed. The hip ADDuctor is still working.

   What muscle will become shorter?

   _____

   What will be the position of the joint (abduction or adduction?

   _____

Questions: (continued)

2. A patient has paralyzed left knee extensors, the left knee flexors are not damaged. What will be the position of the joint (knee flexion or extension)?

_____

Explain your answer.

_____

_____

_____

3. A patient has paralyzed elbow extensors and flexors on the left side. What muscle will become shorter?

_____ flexor _____ extensor _____ don't know

Explain your answer.

_____

_____

_____

4. A patient has a paralyzed right hip extensor. His right hip flexor continues to work. What muscle can become shorter.

_____

What will be the position of the joint?

_____

b. joint deformity

Muscles help to move a joint that help to support a joint. If muscles are severely weakened or paralyzed by the polio virus, the joints can develop deformities by:

i) bad positioning of a joint

ii) muscle imbalances around a joint

iii) weight bearing on a joint

i) bad positioning of a joint

If muscles around a joint are paralyzed, the joint will not move. If the joint is not moved it will become stiff in the position that it rests in.

Question:

A boy with polio has paralyzed knee flexors and extensors and paralyzed muscles of the foot. He is always positioned with his knee in flexion and his ankle in plantar flexion.

What joint deformities could you see in the knee and ankle?

_____

_____

_____

ii) muscles imbalances around a joint

As we described in the first section, muscle imbalances at a joint may cause the joint to be pulled in the direction of the stronger muscle.

The stronger muscle will become tight and the joint will stay in this position.

Joint deformity caused from tightness of soft tissues is called a contracture.

Example

A hip flexion contracture means there is tightness of the hip flexors and other parts on the anterior side of the joint. The hip will be in a position of flexion. Hip extension will be limited.

Questions:

1. A patient has a plantar flexion contracture of the right ankle.

   a) What muscle is tight (plantar flexor or dorsiflexor)?

   _____

   b) What muscle is the position of the ankle (plantar flexion or dorsiflexion)?

   _____

   c) What muscle is limited (plantar flexion or dorsiflexion)?

   _____

   d) One of the muscles is paralyzed; what muscle is paralyzed (plantar flexor or dorsiflexor)?

   _____

2. A patient has a left knee flexion contracture.

   a) What movement is limited (knee flexion or extension)?

   _____

   b) What muscle is tight (knee flexor or extensor)?

   _____

   c) What is the position of the joint (flexion or extension)?

   _____

   d) A muscle is paralyzed. Is this paralyzed muscle the knee flexor or extensor?

   _____

Questions: (continued)

3. A patient has paralyzed hip extensors and strong hip flexors in the left hip. This patient receives no treatment.

   a) What muscle could become tight (hip flexor or extensor)?

   _____

   b) What type of contracture could this joint develop (flexion or extension)?

   _____

   c) What direction of movement can be limited (flexion or extension)?

   _____

iii) weight bearing on a joint

We have said that muscles help to move a joint and help to support a joint.

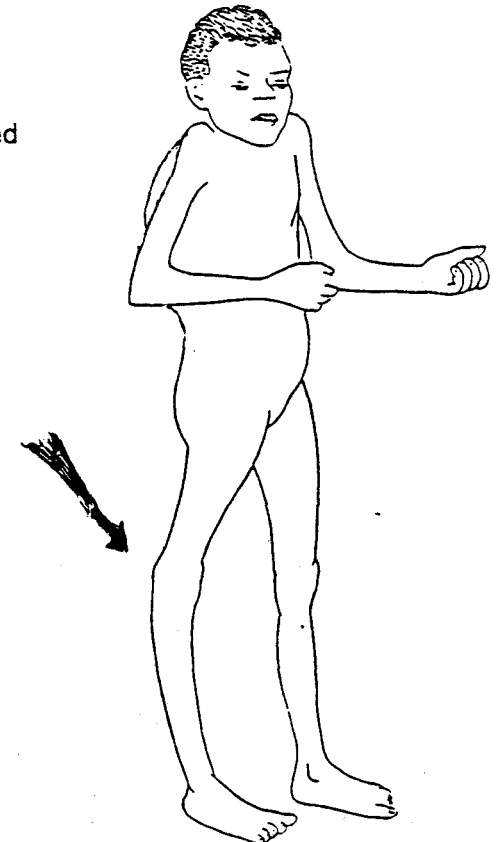
If a patient puts weight on joints that do not have good muscles to help support them, the joints may bend abnormally.

Example

The patient has paralyzed muscles around the knee.

When he stands on this leg the knee bends backward.

After some time it will stay in this position.



c. bone deformity

Bones that have weak or paralyzed muscles attached to them to may develop the following problems:

i) abnormal bending of a bone

ii) shortening of a bone

i) abnormal bending of a bone

As we have said, patients with polio may have some muscles that are paralyzed and some muscles that are not paralyzed. This can cause muscle imbalances around a joint.

The strong muscles will pull the joints and bones in their direction.

After some time, this pulling may cause tightness in a joint and abnormal bending of a bone.

ii) shortening of a bone

Muscles pulling on bones and weight bearing are two activities that help a bone grow and become strong.

Paralyzed muscles do not pull on bones. Paralyzed muscles cannot stimulate bone growth.

Often, patients with polio do not put weight on paralyzed limbs. No weight bearing means no stimulatin for bones to grow or become hard.

Question:

An 18 year old boy had polio virus when he was 5. His left leg was completely paralyzed. Today his left leg looks thinner and shorter than the right leg. In your own words, explain why the right leg is bigger and longer than the left leg.

_____

_____

_____

_____

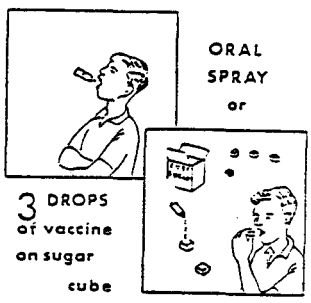
D. MEDICAL TREATMENT FOR PATIENTS WITH POLIO

After the polio disease has entered the body, no medicine can help.

Medical involvement in polio is for PREVENTION of polio.

Prevention of polio is done by giving a POLIO VACCINE.

A polio vaccine can be given by mouth or by injection.



Polio vaccines should be given to <u>all children</u> (about 6 months of age) so that they can be protected from the disease.

WARNING!!

If the child appears to have symptoms of the early stage of polio, do not give any injections!

If the child already has polio in the body, injections may help the polio virus travel to the spinal cord.

In the spinal cord, the polio virus may damage or destroy the motor nerves of the injected limb.

<u>Question</u>

A mother thinks that her child has polio. She takes her child to the doctor to receive a polio vaccine injection to make the child better.
Is this a good idea? _____ yes _____ no

Explain your answer. _____

_____

_____

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH POLIO

Evaluation for patients with recent polio:

- pain (where, when, how much)
- muscle strength (frequent muscle testing to monitor changes)
- range of motion
- respiratory function
- functional ability with and without equipment
- identify what equipment can help the patient to be more independent and functional in everyday life.

Evaluation for patients that have had polio for a long time:

- muscle strength
- range of motion
- respiratory function
- deformities (back deformities, contractures, leg lengths)
- functional abilities with and without equipment
- identify what equipment can help the patient to be more independent and functional in everyday life.

Question:

Compare the two evaluations given above. What are two things that are different in evaluating the two types of patients?

_____

_____

_____

_____

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH POLIO

Information presented in this section includes:

1. Physical Therapy Treatments for Different Periods of Polio.
2. PT Treatments for Patients That Have had Polio for a long Time.
3. Summary of Physical Therapy Goals for Patients With Polio.

1. Physical Therapy Treatments for Different Periods of Polio.

a. Physical Therapy in the early period

No Physical Therapy is given in this period.

Hygiene (good cleaning method) is important to prevent the disease from spreading to others.

BLEACH is best for washing the hands after touching the patient and washing the materials that the patient has used.

b. Physical Therapy in the crisis period

* Family teaching about polio and PT treatments.
* Ensure good patient positioning to help prevent contractures.
* Hot towels (AFTER fever stops) to decrease muscle pain/spasms.
* No aggressive PT treatment; the patient needs rest.

* Family teaching about polio and PT treatments.

Question:

Polio is a disease that effects young children. Why must the parents and family be included in PT treatments?

_____

_____

_____

_____

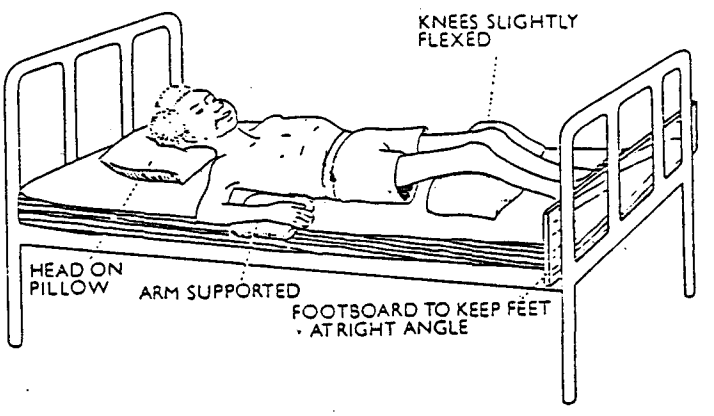
* Ensure good patient positioning to help prevent contractures

The PTA must make sure that the patient is in a good position when sleeping or resting.

If the patient remains in a bad position for a long time, joints will become stiff in these positions.

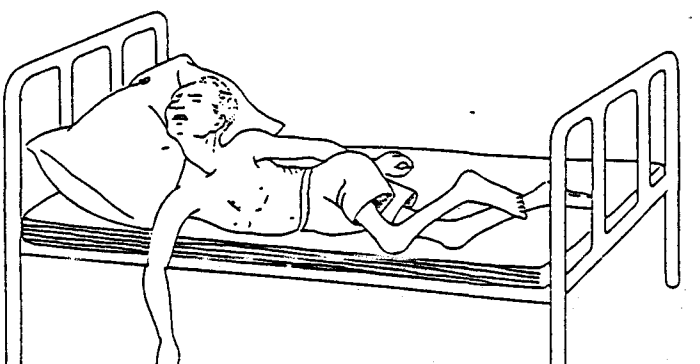
GOOD POSITION

GOOD - MENTAL AND PHYSICAL REST



BAD POSITION

BAD - UNCOMFORTABLE AND LIKELY TO CAUSE CONTRACTURES



Questions:

1. Describe the difference between a "good" resting position and a "bad" resting position. (see page 23)

_____

_____

_____

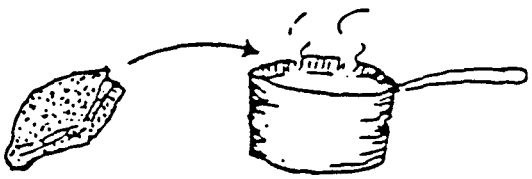
2. A patient is in a bad position (see picture on page 23). Describe 4 areas of joint tightness that could develop if the patient remains in this position for a long time.

_____

_____

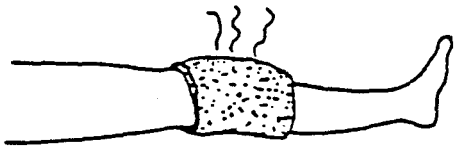
* Hot towels (AFTER fever stops) to decrease muscle pain/spasms.

During the crisis period, the child with polio may have muscle pain and spasms.



Hot towels can be wrapped around the painful limbs.

Hot towels should be applied for 20 minutes; this should be done two times each day.



Hot towels around a limb will help decrease the pain and muscle spasms.

WARNING!!

Do not apply hot towels when the patient has a fever!

* No aggressive PT treatment; the patient needs rest.

Physical Therapy in the crisis period should focus on pain relief and good patient positioning.

When the fever stops, gentle ROM can be given.

No strengthening exercises during this period.

c. Physical Therapy in the recovery period

* Continue family teaching about PT treatments.
* Continue good positioning and begin ROM exercises.
* If needed, request splints to hold joints in good positions.
* Give massage to increase circulation.
* Frequent muscle testing to monitor changes in muscle strength.
* Strengthening exercises for all muscles.
* Functional activities should be emphasized.

* **Continue family teaching about PT treatments**

Question:

The PTA started to teach the family about polio and PT treatments during the crisis period. Describe two treatments that the family could do independently during crisis period.

_____

_____

_____

_____

* **Continue good positioning and begin ROM exercises.**

Good positioning in bed should begin as early as possible and continue for the rest of the patient's life.

Gentle range of motion can begin late in the crisis period when the patient no longer has a fever or painful muscles.

During the recovery period the PTA must make full ROM exercises (see RANGE OF MOTION chapter, Volume 2) and teach the family how to correctly move the patient's upper and lower limbs.

The PTA must also teach the family about "muscle imbalance" and explain why some ROM movements are especially important.

Questions:

1. You are a PTA that must explain muscle imbalance to the parents of a polio patient. What will you say to the parents, and why is this information important for them to know?

2. A young girl has polio. Her left knee extensors are paralyzed. What 2 ROM movements are most important for this child?

   Explain your answer.

Questions: (continued)

3. **Why do you teach the family how to make ROM for the child?**

_____

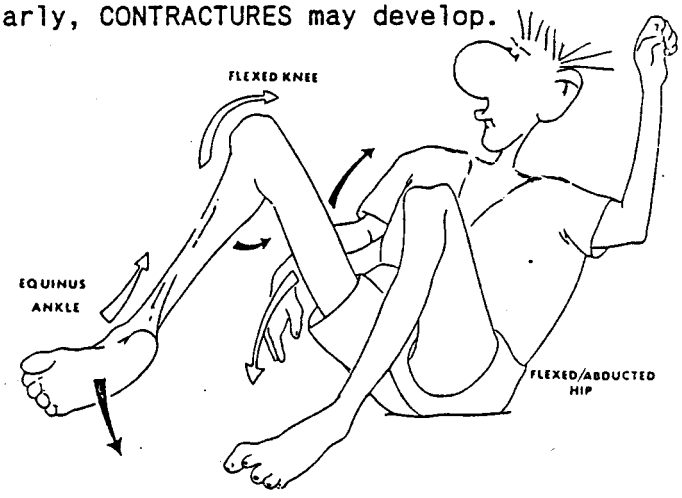
_____

_____

If patients remain in bad positions and their joints are not moved in all directions regularly, CONTRACTURES may develop.

Common contractures that develop in polio children that have not had proper PT treatment,

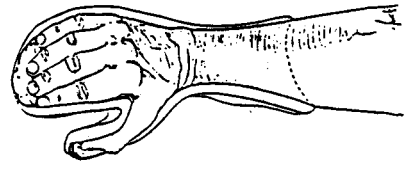
(see picture)



* If needed, request splint to hold joints in good positions.

Some areas (wrist, ankle, hand) may easily rest in bad positions.

Some joints have a muscle imbalance that will pull and hold them in bad positions.



Splints may be needed to help keep joints in good positions.

Questions:

1. A patient has paralyzed dorsiflexors and normal plantar flexors in the right ankle.

a) Without treatment, what will be the position that this joint is pulled in (plantar flexion or dorsiflexion)?

_____

b) What position will the splint help to hold the joint in (plantar flexion or dorsiflexion)?

_____

Explain your answer.

_____

_____

_____

2. A patient has polio. Her finger flexors are normal, but her finger extensors are paralyzed. You decide she needs a splint?

a) How can a splint help this girl?

_____

_____

b) Is this splint preventative or curative treatment?

_____

Explain your answer.

_____

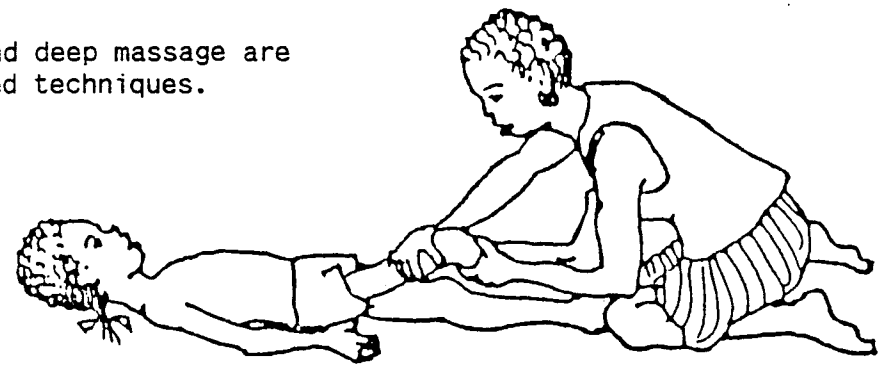
_____

_____

* Give massage to increase circulation

Massage (see MASSAGE chapter, Volume 2) may help relax tight muscles and increase blood supply to massaged areas

Superficial and deep massage are the recommended techniques.



* Frequent muscle testing to monitor changes in muscle strength

Question:

Explain why there may be changes in the strength of a muscle during the recovery period of polio.

Muscle testing (see MYOLOGY chapter, Volume 1) is given to check the strength of different muscles of the body.

It is important for the PTA to know the strength of different muscles to be able to monitor the patient's progress and begin to identify what equipment the patient may need in the future.

* Strengthening exercises for all muscles

Strengthening exercises (see STRENGTHENING chapter, Volume 2) should be a priority during the recovery period of polio.

The patient must try to use all muscles as much as possible.

The PTA must remember:

Strengthening exercises will not help paralyzed muscles (motor nerves destroyed) become stronger.

Strengthening exercises will help working muscles (motor nerves not damaged) be as strong as possible.

Questions:

A PTA is working with a young boy who has polio in both legs.

1. You see the PTA working on leg strengthening exercises.

Is this a good idea? _____ yes _____ no

Explain your answer. _____

_____

_____

_____

2. You also see the PTA working on arm strengthening exercises.

Is this a good idea? _____ yes _____ no

Explain your answer. _____

_____

_____

_____

Questions:

3. A young girl has polio. Her ankle dorsiflexors are very weak and her ankle plantar flexors are normal. The PTA wants to strengthen both the plantar flexors and the dorsiflexors.
   What would you recommend to make this treatment even better?

_____

_____

_____

4. A young girl has polio. She has very weak knee extensors and can only dorsiflex and plantar flex her foot a little. All other muscles are normal. The PTA makes only passive ROM for this patient.
   Will this help her to become stronger?

   _____Yes _____No

   What specific treatment would you recommend to help increase this girl's strength.

_____

_____

* **Functional activities should be emphasized**

The patient should begin functional activities as soon as possible.

This means that independent eating, dressing, toileting, moving in bed, standing and walking (if appropriate) should begin as soon as possible.

d. Physical Therapy in the final period

* Continue family teaching.
* Continue good positioning and Range of Motion exercises.
* Continue strengthening exercises and functional activities.
* Give the patient appropriate walking aids or equipment.
* Community integration

* Continue family teaching

Question:

1. The PTA has worked closely with the patient's family during all periods of polio. What are three things that the family could do to help treat a child with polio?

_____

_____

_____

* Continue good positioning and Range of Motion exercises

Questions:

1. Some people with polio have muscle shortening (contractures) and joint stiffness. What causes these problems?

_____

_____

2. How can these problems be prevented?

_____

* **Continue strengthening exercises and functional activities**

Question:

You are treating a patient during the final stages of polio. Do you expect to see big changes in muscle strength during this period?

_____ yes _____ no

Explain your answer. _____

_____

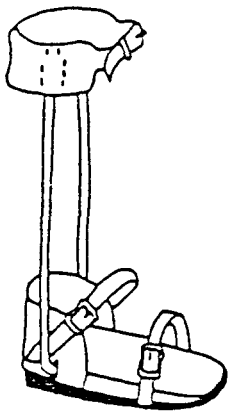
_____

_____

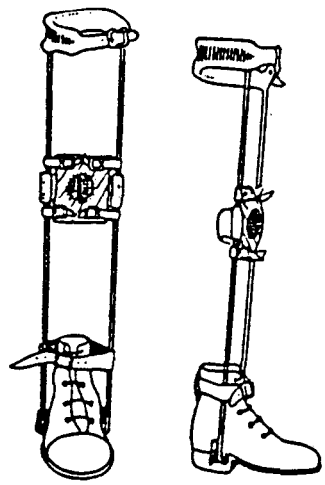
* **Give the patient appropriate walking aids or equipment**

Patients with muscle paralysis or weakness may need walking aids or braces for increased stability and joint support. (See WALKING AIDS, and BRACES chapters, Volume 2.)

Examples of different braces for polio are seen below.



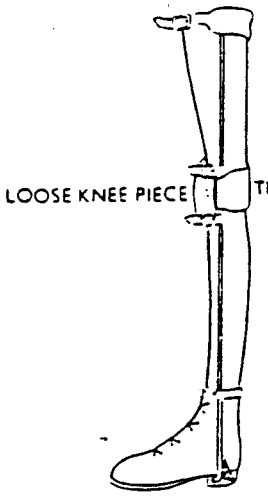
below-knee brace



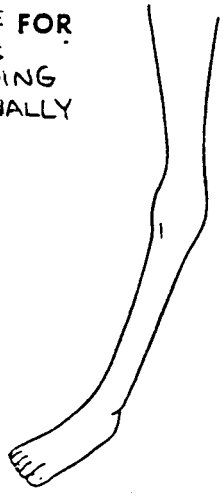
ABOVE-KNEE BRACES

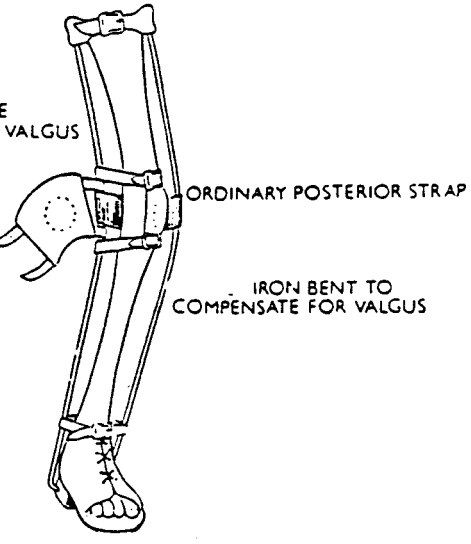
BRACE FOR SLIGHT FLEXION DEFORMITY

BRACE FOR KNEE BENDING POSTERIORLY



BRACE FOR KNEE BENDING MEDIALLY





Questions:

1. A patient has paralysis in the left knee flexor, knee extensor and ankle dorsiflexor muscles. What type of device(s) may be helpful for this type of polio patient?

_____

_____

Why? _____

_____

_____

2. A patient has paralysis in his left ankle dorsiflexor muscles only. What problem with this patient have when he walks?

_____

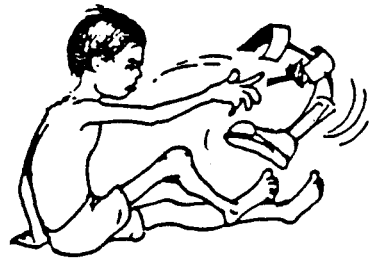
_____

What type of brace can help this patient?

_____

IMPORTANT:

It is very important to remember that not all polio patients will need or want braces or other equipment!



The PTA must look to see:

Does the equipment help the patient?
Does the patient want the equipment?

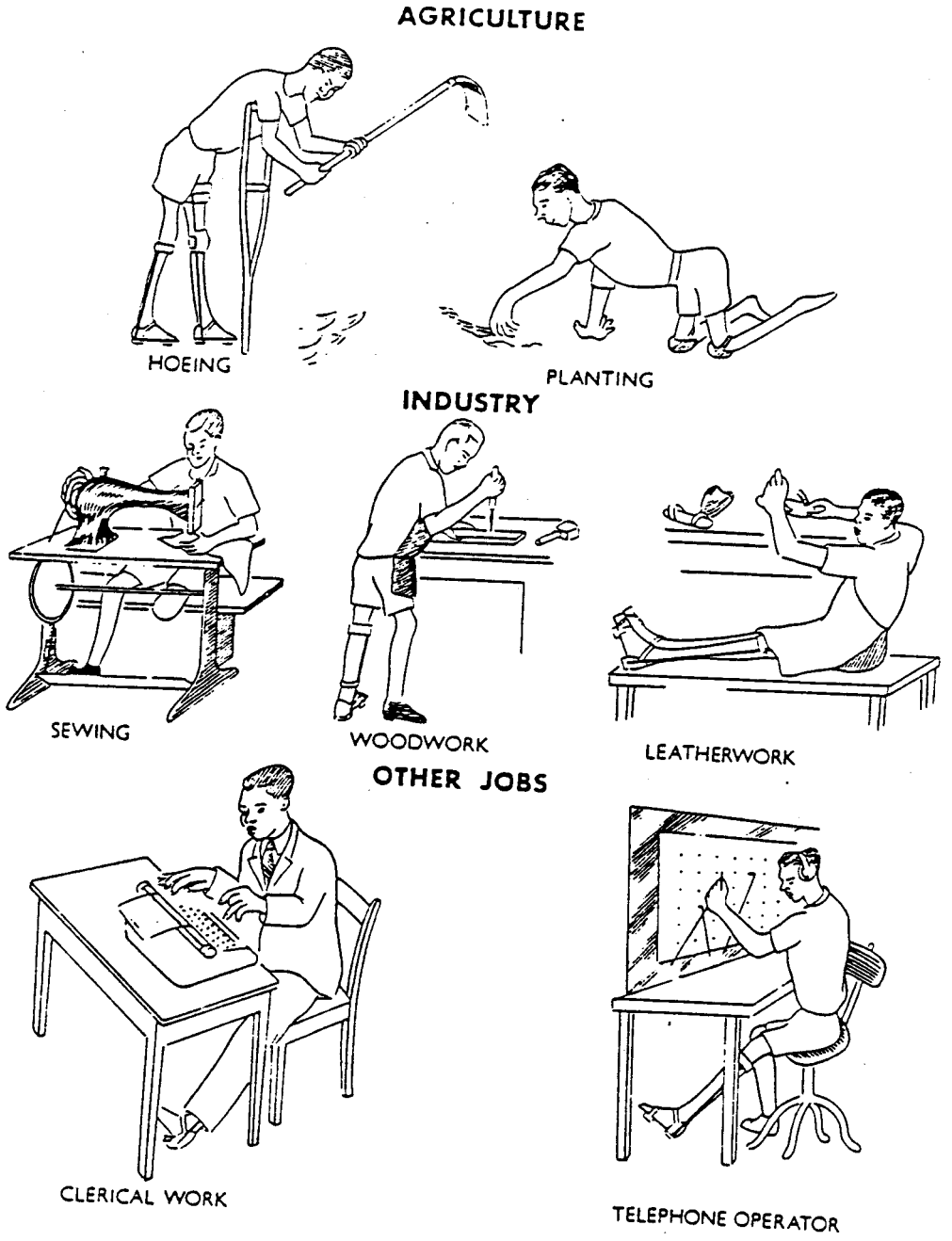
If the patient does not want the equipment, then it probably will not be used!

AVOID MAKING THE PATIENT TOO DEPENDENT ON EQUIPMENT!
(If the patient can walk, let him walk!)

* Community integration

REMEMBER: Rehabilitation does not stop after the patient receives equipment and leaves the hospital.

People with polio must be encouraged to have an active and contributing role in the community.



2. PT Treatments for Patients That Have had Polio for a Long Time

The PTA must do muscle testing and take ROM measurements.

The PTA must carefully evaluate these patients for deformities and note if these deformities are functional for the patient.

The PTA may try to correct joint contractures (or recommend surgery to correct contractures) if it will help increase the function of the patient.

The PTA can give some strengthening exercises for the muscles that do not have motor nerve damage or have complete motor nerve damage.

The PTA may provide necessary equipment if it will help increase the function of the patient.

Improving the patient's function is most important in these cases.

3. Summary of Physical Therapy for Patients With Polio

* include the family in all PT treatments (all periods)
* prevent joint stiffness and contractures (all periods)
* decrease muscle pain and spasms (crisis period)
* strengthen all muscles as much as possible (recovery period)
* provide braces or equipment as needed (final period)
* community integration (final period)

G. CHAPTER SUMMARY

Polio is a virus that damages motor nerves.

The nerves that are destroyed cannot be repaired; the patient will have problems with movement.

Polio generally happens in young children. Polio can be PREVENTED by a polio vaccine (by mouth or by injection).

After the child has polio, no medicine can help.

Polio has four periods:

The EARLY PERIOD (the polio virus has entered the body) looks similar to influenza.

The CRISIS PERIOD (the polio virus attacks the spinal cord) is when paralysis may occur.

The RECOVERY PERIOD (the polio virus has been killed by the body) is when undamaged nerves begin working again.

The FINAL PERIOD (no further progression of the disease) is when the patient must adapt to permanent motor nerve damage (muscle weakness and paralysis).

Secondary problems caused by polio are:

* changes in the muscles (size and length)
* joint deformity (contractures, abnormal bending)
* bone deformity (bending, shortening)

Appropriate PT treatments were given for the different stages of polio and for patients that have had polio for a long time.

The PTA must remember that functional abilities and independence are very important for patients with polio.

Avoid making patients too dependent on equipment.

CHAPTER 31

PERIPHERAL NERVE INJURIES

PERIPHERAL NERVE INJURY is a damaged or destroyed peripheral nerve (caused by trauma).

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. describe what happens to a peripheral nerve after it is damaged or destroyed.
2. identify 3 complications that may happen after a peripheral nerve injury.
3. describe how Physical Therapy can help a person with a peripheral nerve injury.

CHAPTER CONTENTS

NOTE: Before studying peripheral nerve injuries, it is recommended that the PTA read the chapter on the NERVOUS SYSTEM. (See NEUROLOGY chapter, Volume 1.)

A. WHAT IS A PERIPHERAL NERVE INJURY

A peripheral nerve injury is a peripheral nerve that has been damaged or completely destroyed.

Question:

A person was shot by a gun. His spinal cord is cut at C7. Is this a peripheral nerve injury?

Yes _____ No _____ Explain your answer.

_____

_____

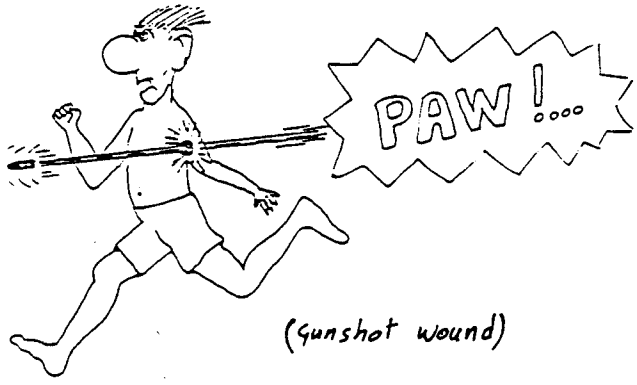
_____

B. CAUSE OF A PERIPHERAL NERVE INJURY

The cause of peripheral nerve injuries is from TRAUMA.

Examples are:

* gunshot wound
* knife wound
* fractured bone
* mine injury
* overstretched joint
* too much pressure on the nerve for a long time



(Gunshot wound)

C. SPECIFIC INFORMATION ABOUT A PERIPHERAL NERVE INJURY

The information that is important for the PTA ito understand is:

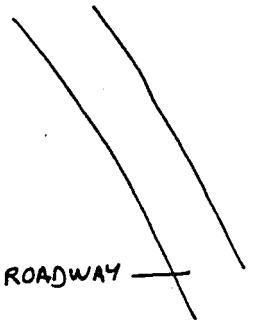
1) nerve and muscle relationship

2) peripheral nerve growth after injury

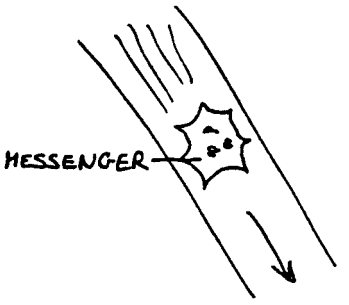
3) problems caused by peripheral nerve damage

1) Nerve and muscle relationship

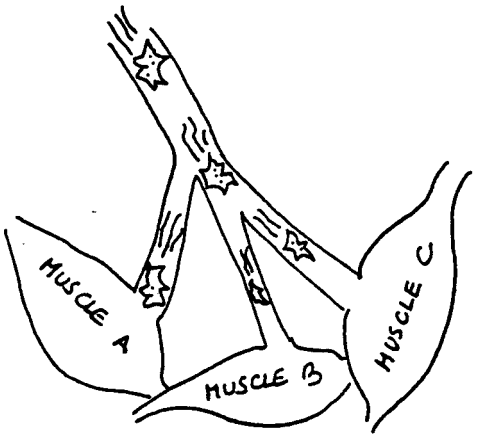
a. Nerve are like roadways.



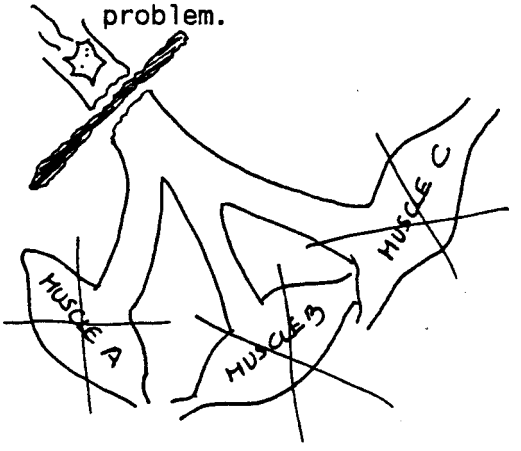
b. These roadways carry messages to tell the muscle to work.



c. One nerve can give messages to many muscles



d. If this nerve is cut or damaged, all of these muscles will have a problem.



Question:

A nerve that tells the right shoulder flexor and right elbow flexors to work was completely cut.
Please circle the movements that may be difficult for this patient.

right hand to mouth	left shoulder flexion
right shoulder abduction	right shoulder extension
right elbow extension	right shoulder flexion
left elbow extension	right elbow flexion

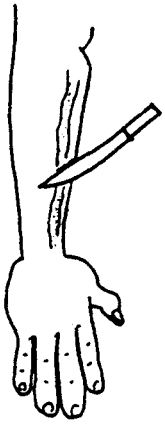
2. Peripheral nerve growth after injury

Peripheral nerves can grow after they are cut.

* The nerve proximal to the cut will grow.
* The nerve distal to the cut will die.

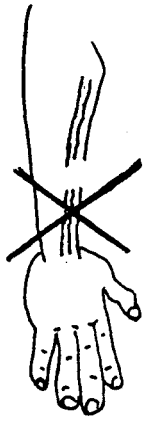
Example:

A man cut a nerve in his right arm.



The part proximal to the cut will grow.

The part distal to the cut will die.



* The growth is very slow.
* Most often, the growth is not in the right direction.

With incomplete cuts, the nerve might grow in the right direction.

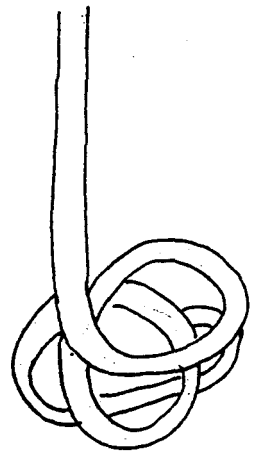
Example:

A PARTIALLY CUT NERVE

A partially cut nerve may be able to follow the same direction as the remaining nerve part.

In this way, a partially cut nerve might be able to grow in the right direction.

A COMPLETELY CUT NERVE



A completely cut nerve has no direction to follow.

The completely cut nerve will often grow in circles.

This nerve bundle is called a neuroma.

3. Problems caused by peripheral nerve damage

The problems caused by peripheral nerve injuries are:

a) muscle weakness or paralysis (no movement)

b) sensory loss and skin problems

c) joint stiffness

a) muscle weakness or paralysis (no movement)

Questions:

1. In your own words, describe how a peripheral nerve injury causes muscle weakness.

_____

_____

_____

2. In your own words, describe how a peripheral nerve injury causes muscle paralysis.

_____

_____

_____

b) sensory loss and skin problems

A peripheral nerve injury can also include sensory nerves.

Questions:

1. Please describe why you will have decreased feeling in an area after the sensory nerve has been damaged.

2. Give two examples of how loss of feeling can lead to skin problems.

c) joint stiffness

Question:

1. Explain how a peripheral nerve injury can lead to joint stiffness if the patient does not receive proper care.

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH A PERIPHERAL INJURY

* when the injury occurred
* location of peripheral nerve injury
* type of nerve injury (complete or incomplete?)
* other wounds or problems?
* general muscle strength (what muscles are weak or paralyed)
* sensation (areas patient has decreased feeling, or cannot feel)
* functional ability of the patient
* range of motion (for complete nerve injuries or old nerve injuries)
* special instructions from the doctor

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH A PERIPHERAL NERVE INJURIES

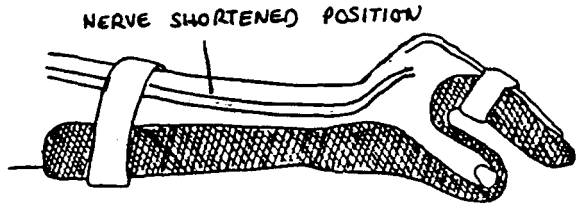
General Physical therapy treatment guidelines are:

1. follow the doctor's instructions
2. prevent joint stiffness
3. strengthen remaining muscles
4. give necessary equipment

1. <u>follow the doctor's instructions</u>

For nerve injuries that are incomplete and very recent, the doctor may recommend that the nerve be in the <u>shortened position</u>.

In the shortened position, the nerve ends are closer together. In this position, the nerve ends may have more opportunity to grow together.



Depending on the type and date of injury, and the doctor's instructions, positions that cause the nerve ends to be <u>apart</u> from each other should be avoided.

<u>Questions</u>:

1. A nerve passes on the posterior side of the wrist. What wrist position will put this nerve in the shortened position? (wrist flexion or wrist extension).

   _____

   Explain your answer.

   _____

   _____

   _____

Questions: (continued)

2. A nerve passes on the posterior side of the elbow. If the elbow is flexed, will the nerve be stretched or shortened?

_____

_____

_____

3. If this nerve was partially cut, would you want to have the elbow immobilized in a flexed position or extended position?

_____

Explain your answer.

_____

_____

_____

2. prevent joint stiffness

If a muscle is paralyzed, it cannot make movement.

If there is no movement, the joint will become stiff.

The PTA can prevent joint stiffness by moving the joint in the same direction that the paralyzed muscle would make.

It is important to follow the doctor's instructions about making joint movements with patients who have incomplete peripheral nerve injuries.

Questions:

A patient comes to a PTA; the patient's left wrist extensors and left finger extensors paralyzed from a peripheral nerve injury. This happened one year ago. The patient received no treatment.

After evaluation, the PTA finds that the wrist is very stiff and the fingers are contracted.

1. From the information given, in what direction is the wrist stiff (flexion or extension)?

   _____

   Explain your answer.

   _____

   _____

2. Describe the position of the contracted fingers.

   _____

   _____

   _____

3. How could these problems have been prevented?

   _____

   _____

   _____

3. strengthen remaining muscles

Weakened muscles may get stronger.
Paralyzed muscles will not change.

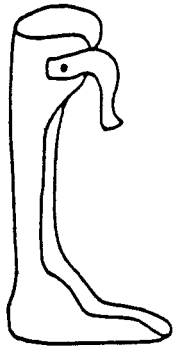
The PTA must know what muscles are weakened by a peripheral nerve injury and what muscles are paralyzed by a peripheral nerve injury.

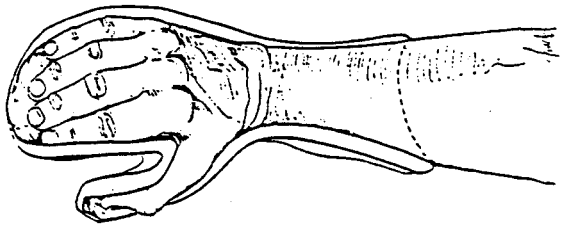
It is important to follow the advice of the doctor to know what muscles can be strengthened and how to prevent more nerve damage.

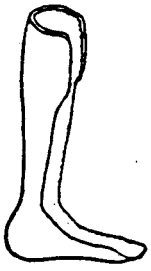
4. <u>give necessary equipment</u>

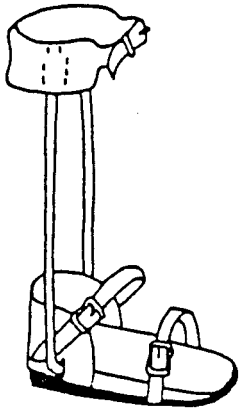
SPLINTS may be needed to keep the joint in a good position.

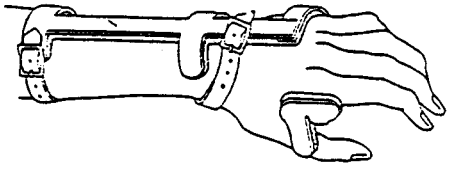
BRACES may be needed to help with mobility or joint support.

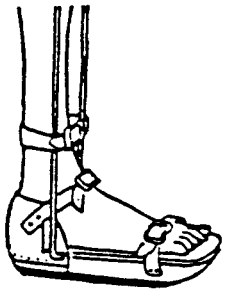


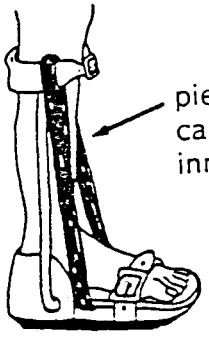












Questions:

When the ankle dorsiflexor muscles are paralysed, the patient has "DROP FOOT".

1. In your own words, describe the active ankle movement of a patient with drop foot.

_____

_____

2. Will this patient have a problem with walking?

Yes _____ No _____

Why or why not?

_____

3. What type of brace will your give this patient?

_____

How will it help?

_____

_____

G. CHAPTER SUMMARY

A peripheral nerve injury is a peripheral nerve that has been damaged or completely cut.

If a peripheral nerve is cut, the part proximal to the cut will grow and the part distal to the cut will die.

If a cut is incomplete, the nerve may grow in the right direction by following the remaining part of the nerve.

If the cut is complete, the nerve has no direction and will often grow in circles; the bundle of misdirected nerves in called a neuroma.

Complications from peripheral nerve injuries are muscle weakness or paralysis, sensory loss, and possible joint stiffness.

Physical therapy can help patients with peripheral nerve injuries by:

- following the doctor's instructions (immobilization, ROM guidelines.
- strengthening available muscles
- giving necessary equipment.

CHAPTER 32

LEPROSY

LEPROSY is a disease that causes damage to the nerves and skin.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. describe the general symptoms of leprosy.
2. describe how and when leprosy can be given to another person.
3. describe levels of disability in leprosy and why preventative treatment is important at each level.
4. describe the five main self-care ideas that a leprosy patient must follow.
5. given a patient problem, demonstrate appropriate Physical Therapy treatment to help make this problem better and suggest was to prevent it in the future.

CHAPTER CONTENTS

A. WHAT IS LEPROSY?

Leprosy is a disease that causes damage to the NERVES and skin.

Leprosy is also called HANSEN'S DISEASE.

Leprosy is a word that many people know, but not many understand.

Lack of understanding causes fear.

It is very important for the PTA to understand leprosy to be able to give good treatments and correctly educate others.

Activity:

In the space provided, the PTA should write two things that he knows about leprosy and two things that he would like to understand about leprosy.

Knows

_____

_____

_____

_____

Like to understand

_____

_____

_____

_____

B. CAUSE OF LEPROSY

Leprosy is caused by a bacteria similar to TB.

The bacteria may be carried in the spit.

Leprosy does not spread as easily as TB.

Some leprosy cannot be given to others at all.

C. SPECIFIC INFORMATION ABOUT LEPROSY

The following information is presented in this section:

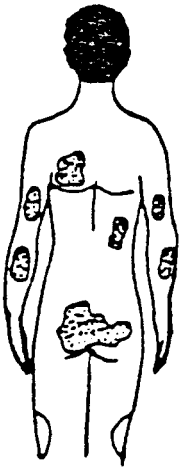
1. Symptoms of Leprosy.

2. Levels of Disability in Leprosy.

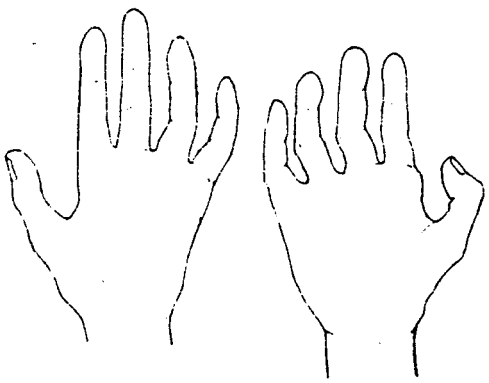
1. Symptoms of Leprosy

** An area of skin that is a different color than normal skin.

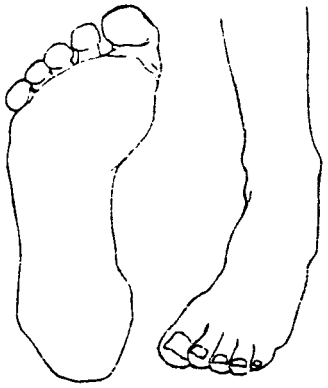
** Most often this area of skin has decreased feeling or no feeling at all.



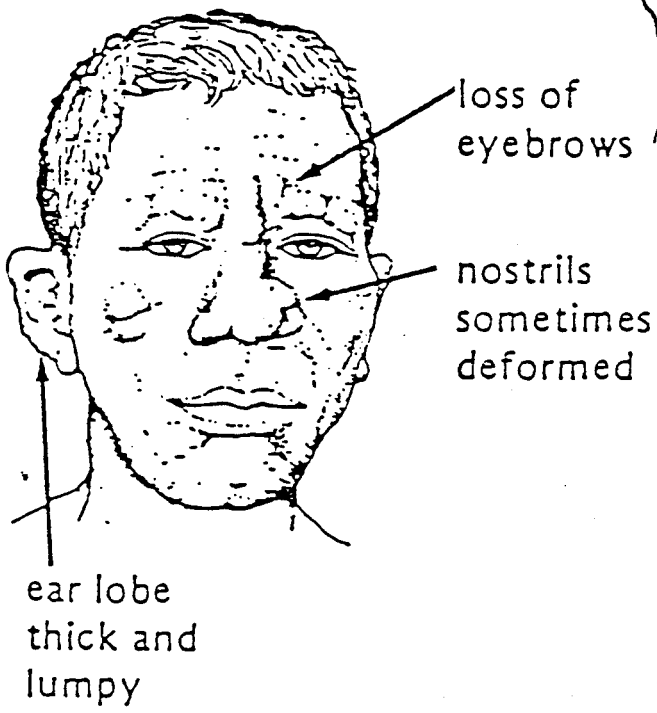
* Decreased feeling in the hands and feet.



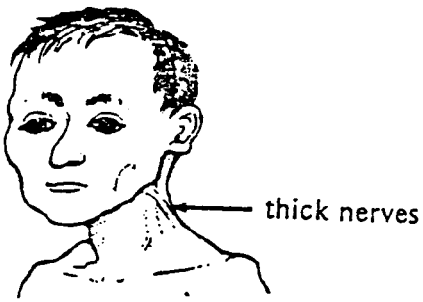
* Muscle weakness in the hands and feet.



* Possible changes in the face (loss of eyebrows, ears become thick).



* Thickened nerves.



There are different kinds of leprosy.

NOT ALL LEPROSY PATIENTS WILL HAVE ALL OF THESE SYMPTOMS.

Generally, if a person has an area of skin that has abnormal color and feeling, and/or has decreased feeling in the hands or feet, he should see a doctor to check for leprosy.

A skin test is a way to check for the leprosy bacteria.

2. Levels of Disability in Leprosy

There are three main levels of disability in leprosy.

a) Direct damage from the disease
(problems that leprosy bacteria causes)

b) Possible damage if neglected
(results of poor care of original problems)

c) Eventual damage from neglect
(results of continued poor care)

a) Direct damage from the disease

The leprosy bacteria can cause:

i) LOSS OF SENSATION (FEELING) IN:

* skin areas
* feet
* hands
* eyes

ii) LOSS OF SWEATING IN:

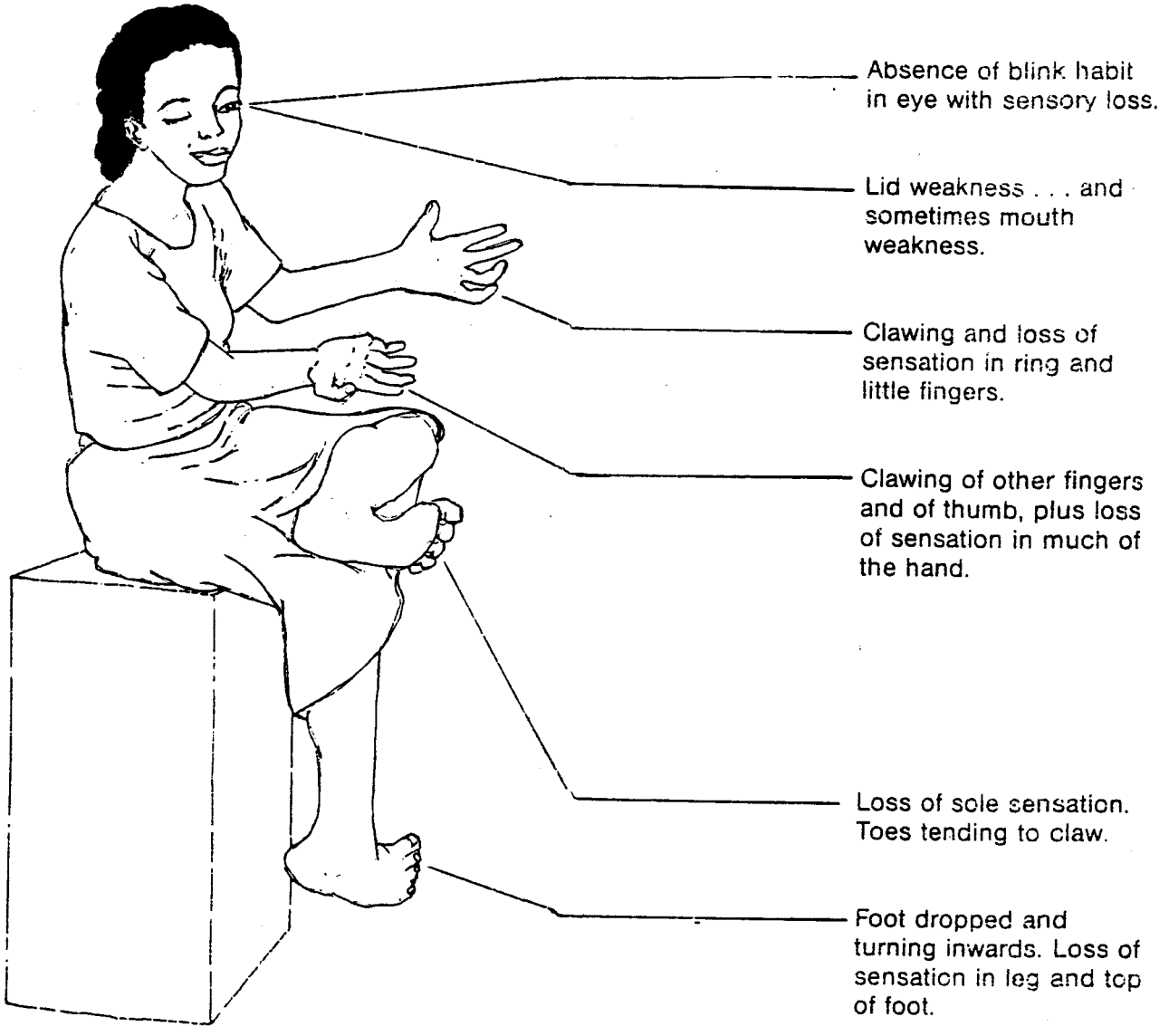
* skin areas
* feet
* hands

iii) LOSS OF MUSCLE STRENGTH IN:

* finger extensors
* foot dorsiflexors and evertors
* toe extensors
* eye lid

DAMAGE CAUSED BY LEPROSY BACTERIA

Loss of sensation
Loss of sweat
Loss of muscle strength



b) Possible damage if neglected

Not taking good care of the damaged area is called neglect.

If a patient does not take good care of parts damaged by leprosy (if the patient neglects damaged parts), the problems will become worse.

Below are problems that may happen if damaged parts are neglected.

i) IF THE PATIENT NEGLECTS LOSS OF SENSATION:

* wounds on hands, feet, and skin from sharp objects, hot temperatures, and over-use.

* eye irritation

ii) IF THE PATIENT NEGLECTS LOSS OF SWEAT:

* skin on hands and feet can become dry and cracked; this can cause more wounds.

iii) IF THE PATIENT NEGLECT LOSS OF MUSCLE STRENGTH:

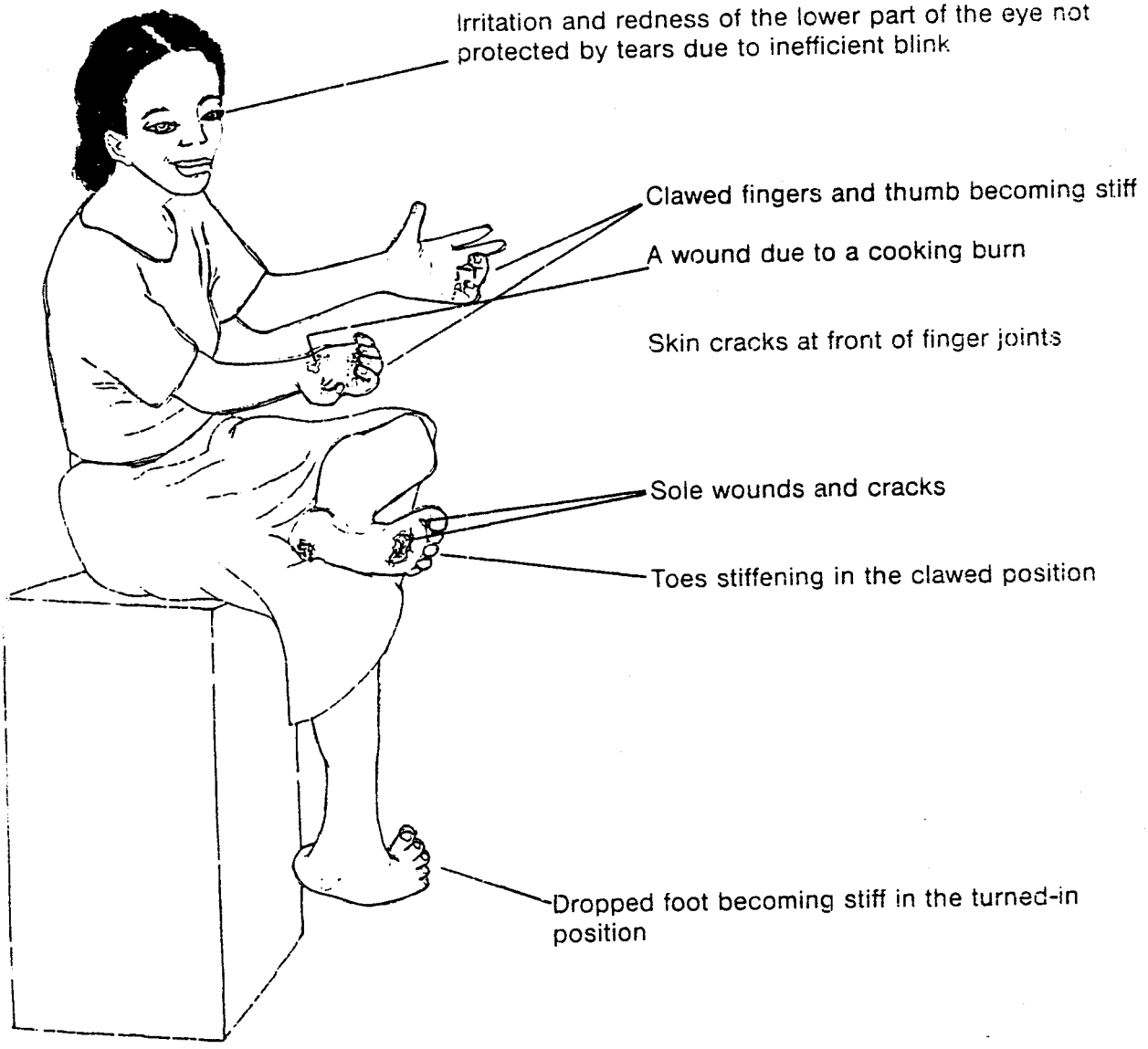
* strong muscles will continue to work and pull joints into shortened positions (foot drop, toe clawing, and finger clawing).

* these contracted areas may also develop wounds.

* eyelid doesn't close so the eye becomes more dry and irritated.

DAMAGE CAUSED BY NEGLECT

Neglect of sweat loss → skin cracks
Neglect of feeling loss → wounds
Neglect of loss of muscle → contractures



c) Eventual damage from neglect

If the patient continues to neglect damaged parts, the problems become very severe.

Eventual damage is damage that happens because the patient has not taken care of the part for a long time.

Below are problems that happen when the damaged part continues to be neglected for a long time.

i) CONTINUED NEGLECT OF LOSS OF SENSATION:

* wounds on hands and feet become very infected; this causes tissue damage, scarring, and loss of soft tissue.

* loss of vision (blindness)

ii) CONTINUED NEGLECT OF LOSS OF SWEAT:

* skin cracks on feet and hands become infected; new skin cracks develop.

* infection causes more damage and loss of soft tissue.

iii) CONTINUED NEGLECT OF LOSS OF MUSCLE STRENGTH:

* abnormal positions of joints can lead to wounds in these areas.

* wounds become infected and the soft tissue becomes very damaged from this infection.

DAMAGE CAUSED BY CONTINUED NEGLECT

Neglecting skin cracks ⟶ infection
Neglecting wounds ⟶ infection
Neglecting contractures ⟶ wounds

Bone and soft tissue damage and loss.

Loss of vision as a result of eye dryness and of repeated and neglected eye irritation and injury

Shortening and scarring in fingers and thumb with sensory loss

Loss of toes, damage to foot bones plus damage and scarring to soft tissues of the sole

A problem of recurrent wounds under the outer border of a turned-in foot

Summary: Levels of Disability in Leprosy

Level 1 direct damage from the disease NERVE DAMAGE	Loss of sensation	+ Loss of sweating	+ Loss of muscle strength
Level 2 possible damage if neglected NEGLECT	(eye problems) Wounds	+ Skin Cracks	+ Joint Stiffness
Level 3 eventual damage from neglect NEGLECT	(blindness) Infection	Infection	Contractures
	Bone and soft tissue damage and loss		

Leprosy causes nerve damage.

Neglect is the reason why patients with leprosy have large wounds and tissue damage.

Large wounds and tissue damage can be prevented!!

The most important rule for patients with leprosy is to be able to take good care of nerve damaged areas.
(See P.T. treatments, pages 14-45.)

D. MEDICAL TREATMENT OF LEPROSY

Our body will try to fight the leprosy bacteria.

* In some people the body is stronger than the leprosy bacteria and they will not get the disease.

* In some people the leprosy bacteria is stronger than the body and they will get leprosy.

  (For example, people who are weak, diseased, and malnourished may not fight the leprosy bacteria well.)

For the people who have leprosy, medicine is the only way to stop the disease.

Medicine kills leprosy bacteria.

After 2-3 days of taking the medicine, patients with leprosy cannot give the disease to other people.

Medicine may need to be taken for a long time (1-2 years).

Question:

You meet a leprosy patient who has been taking medicine for leprosy for one month. Can you get leprosy from this person?

Yes _____ No _____

If yes, how?

_____

_____

If no, why not?

_____

_____

Medicine cannot help nerves that have been damaged. Medicine only prevents nerve damage from happening.

If nerve damage has been less than 6 months, the nerve may recover.

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH LEPROSY

The PTA must carefully evaluate the following:

* sensation (what areas have decreased feeling, or no feeling)

* range of motion (location and direction of joint tightness)

* muscle strength (muscles of the hand, foot, ankle, wrist)

* deformities (parts that have been lost, contractures)

* wounds (location, how big, infection, possible cause)

* functional abilities of the patient

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH LEPROSY

Physical Therapy should begin 2-3 days after the patient has started to take the medicine to kill the leprosy bacteria.

If the patient is taking the medicine, then a person cannot get leprosy from touching or being close to a patient with leprosy.

Information presented in this section includes

1. Physical Therapy Treatment for different levels of disability in Leprosy.
2. Summary of self-care ideas for patients with leprosy.

1. PHYSICAL THERAPY TREATMENTS FOR DIFFERENT LEVELS OF DISABILITY IN LEPROSY

Question:

Please list the 3 levels of disability in leprosy and describe what happens in each level.

Level 1 _____

What happens?

_____

_____

_____

Level 2 _____

What happens?

_____

_____

_____

Level 3 _____

What happens?

_____

_____

_____

This section will discuss:

a. Physical Therapy for patients with direct damage from leprosy

b. Physical Therapy for patients with damage from neglect.

a. PHYSICAL THERAPY FOR PATIENTS WITH DIRECT DAMAGE FROM LEPROSY

Physical Therapy for this level of disability includes:

* Educate patient and family about leprosy
* Protection for areas with decreasing feeling
* Skin softening activities
* Range of Motion exercises and equipment
* Strengthening excercises

*** Educate patient and family about leprosy**

Again, it is important for the patient and family to know that after the patient begins to take medicine to kill leprosy, the patient CANNOT give leprosy to others.

It is also important that the patient understands that leprosy does NOT mean the the patient must lose his fingers and toes.

The PTA must tell the patient that wounds and tissue damage are from NEGLECT and not from leprosy bacteria.

It is possible for the patient to PREVENT wounds and tissue damage by taking good care of areas that have nerve damage.

Questions:

1. A patient learns that he has leprosy. He is very sad because he knows that he will lose all of his fingers and toes.
   Do you agree with this man?
   Yes _____ No _____
   Explain your answer.

_____

_____

_____

2. Leprosy can damage sensory and motor nerves. Describe the two main problems a patient will have because of this nerve damage.

_____

_____

* **Protection for areas with decreased feeling**

Lack of pain is a very big problem for patients with leprosy.

Pain is the way our body tells us that something is wrong.

When we feel pain, we stop what we are doing or change the way we are doing something to decrease the pain.

With leprosy, patients do not feel pain in the areas where the sensory nerves have been damaged.

Patients with leprosy will not stop what they are doing or they will not change the way they are doing something because they do not feel pain in that area.

Examples comparing people that can feel pain and people that cannot feel pain are seen on the next pages.

Example #1:

A woman has normal feeling in her hands.

A. This woman tries to lift a pot (it is very hot).

B. She stops because it was very hot to touch.

C. She uses a towel to help her lift the pot so she will not burn her hands.

WOMAN CAN FEEL POT IS HOT

SHE PROTECTS HER HANDS

Example #1:

A woman has leprosy. She cannot feel her hands (she has sensory nerve damage in her hands).

A. This woman tries to lift a pot (it is very hot).

B. She cannot feel that the pot it hot.

C. She carries the pot and she burns her hands. She cannot feel this.

WOMAN CANNOT FEEL POT IS HOT

Example #2:

A woman has normal feeling in her eyes.

A. It is a very hot and windy day.

B. This woman's eyes feel very dry and painful.

C. She blinks (closes) her eyes often to help protect them and keep them wet.

A WOMAN FEELS DRY AND PAINFUL EYES

SHE BLINKS TO WET THEM.

Example #2:

A woman has leprosy. She cannot feel her eyes (she has sensory damage in her eyes).

A. It is a very hot and windy day.

B. This woman has no feeling in her eyes and she forgets to blink (close) her eyes.

C. After some time, her eyes become very dry and damaged. She cannot feel them.

A WOMAN CANNOT FEEL THAT HER EYES ARE DRY AND PAINFUL; SHE DOES NOT BLINK

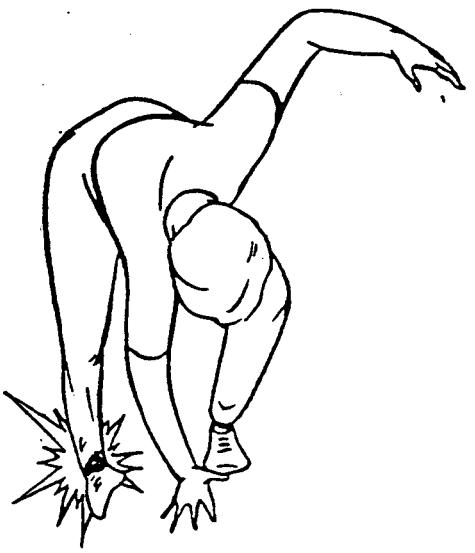
Example #3:

A man has normal feeling in his feet.

A. This man is not wearing shoes.

B. He steps on a sharp stone and feels pain in his foot.

C. He puts less weight on that foot and is more careful when he walks.



A MAN FEELS PAIN IN HIS FOOT

Example #3:

A man has leprosy. Hùe cannot feel his feet (he has sensory nerve damage in his feet).

A. This man is not wearing shoes.

B. He steps on a sharp stone and he cannot feel it. He feels no pain.

C. He continues to walk like this all day. At the end of the day his feet have many small wounds. He cannot feel them.

A MAN CANNOT FEEL
HIS FOOT

It is very important to remember that "NO PAIN" DOES NOT MEAN "NO PROBLEM" FOR PATIENTS WITH LEPROSY.

A patient with leprosy must learn to protect the hands and eyes and feet that have no feeling.

METHODS TO PROTECT THE HANDS

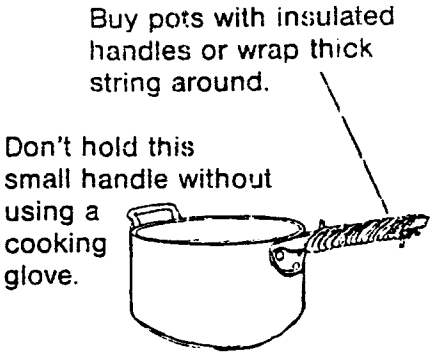
Common injuries to the hands are from hot objects, rough objects and overuse.

Protecting the hands from hot objects

Leprosy patients with no feeling in their hands must not hold hot objects without padding or some protection for the hands.

Ideas for protecting the hands from hot objects are given in the pictures below.

Use some sort of holder for your glass or cup.



Use a stick or tongs to poke the fire. (Keep a smooth stick near you for the purpose.)

Avoid touching hot handles.

REMEMBER

Patients with leprosy will not feel pain.

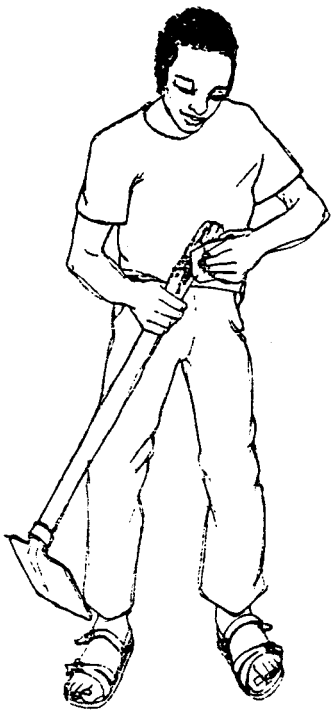
These patients must know what objects will be hot and protect the hands from problems that could happen.

Protecting the hands from rough objects

Again, patients with leprosy cannot feel pain and must protect the hands from possible injury.

The skin on the hands can be damaged easily.

Ideas given for protecting the hands from rough objects are given below.



Smoothing rough handles.

Keeping distance from nails.

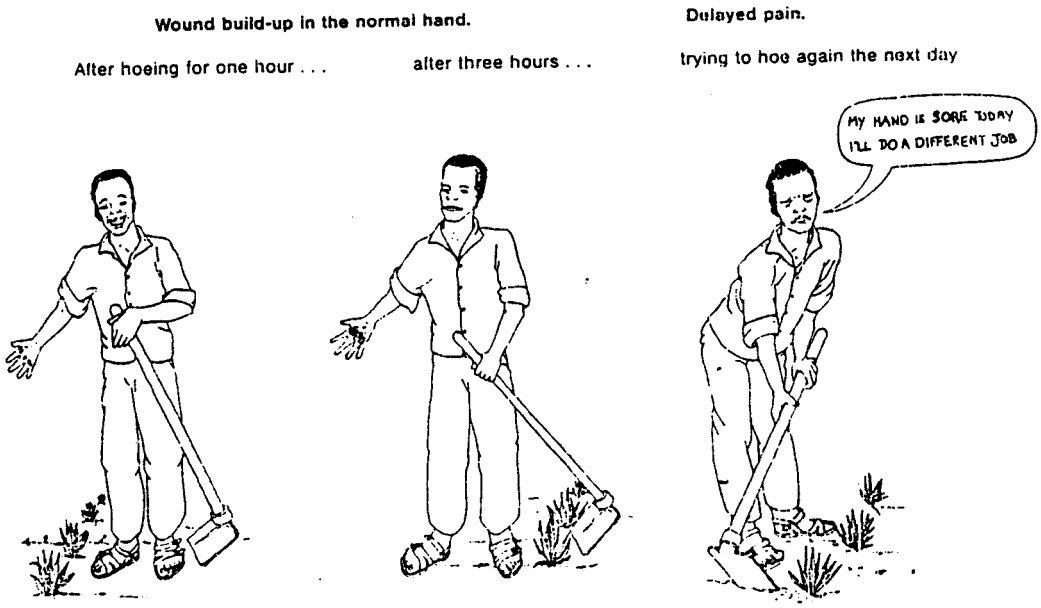
Using leather gloves, or hand pockets with a leather patch over the palm surface

Protecting the hands from overuse

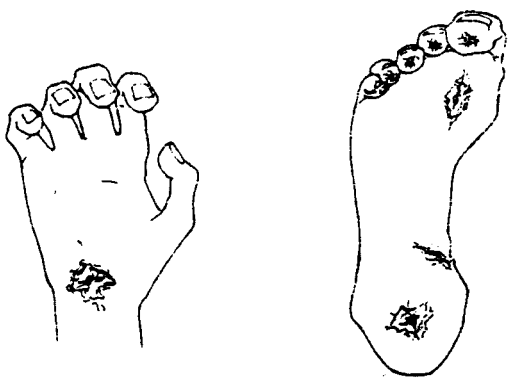
Patients with leprosy cannot feel their hands. The skin covering the hands is weak and can be damaged easily.

The patient must take care to LOOK at the hands very carefully every day.

IF ANY PART OF THE HAND FEELS HOT, IS RED, HAS A WOUND OR SKIN CRACKS, THE PATIENT MUST STOP AND REST THIS AREA.



If the patient continues to use the part of the hand that feels hot, is red, or has a wound, there will be more damage to the area.



METHODS TO PROTECT THE EYES

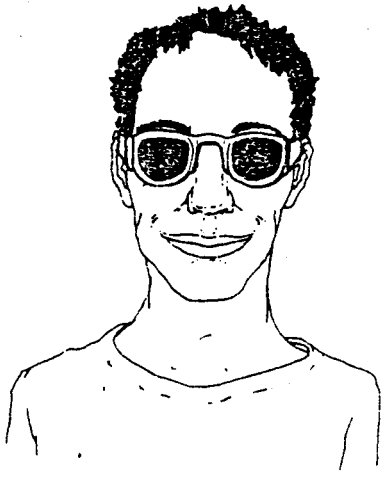
Some patients with leprosy cannot feel if their eyes have a problem.

Common injuries to the eyes are from dryness, dust and sometimes flies.

Ways to help protect the eyes are seen in the pictures below.

Use your headcloth to shield your eyes from sun, wind and dust.

Wear sunglasses with large lenses . . . and if possible sidepieces.



Wear a hat with a brim.

keep flies away from your eyes

METHODS TO PROTECT THE FEET

Common injuries to the feet are from rough objects and overuse.

Protecting the feet from rough objects

Patients with leprosy should always wear shoes to help protect their feet.

Many types of shoes are possible, but the best shoes to help protect the feet are shoes that have:

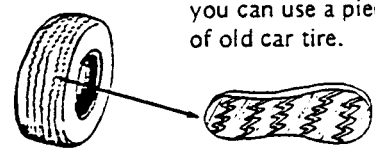
* soft inside of the shoe that will help cushion the foot when the patient walks.

  A soft inside will decrease the pressure on the foot.

For the inner sole, you can use a soft sponge sandal or 'thong'. Or buy 'microcell' rubber, which is soft but firm.

* hard bottom of the shoe that will protect the foot against hard or sharp objects.

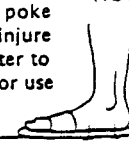
For the under-sole you can use a piece of old car tire.



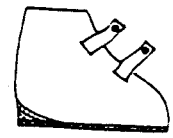
* no nails in the shoe; glue or thread should be used to make the shoes.

AVOID:

- plastic shoes or sandals
- soft-soled sandals or thongs that thorns can pass through
- using nails to fasten heels and soles (These might poke through and injure the foot. Better to sew on soles or use glue.)



* upper part of the shoe that does not injure the foot:



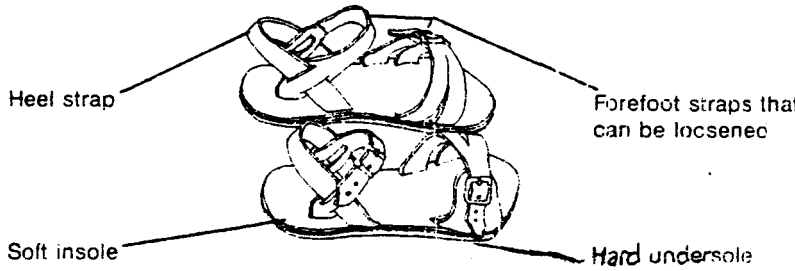
- heel strap or filled in heel so that the patient does not have to use the toes to keep it on.

- straps over the forefoot that can be loosened to make space for a bandage or swelling of the foot.

- fits well; has plenty of room for the toes.

* The shoes should not look so different that the patient does not want to wear them.

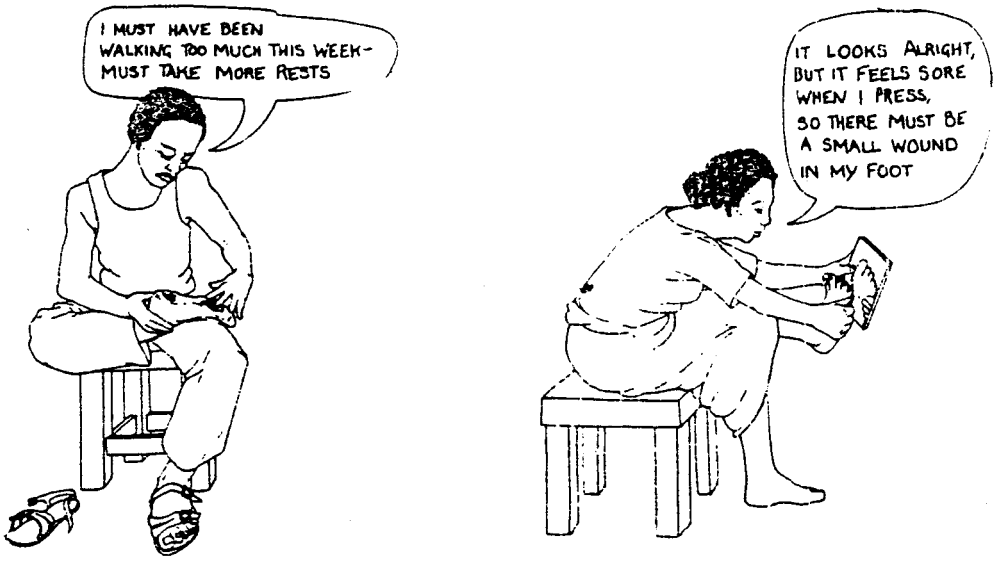
A common type of protective footwear used in hot countries



TO PROTECT THE FEET, THE PATIENT MUST WEAR THE SHOES !

Protecting the feet from overuse

The patient with leprosy must carefully check the feet every day and after walking for some distance.



Questions:

1. Why does the patient with leprosy need to carefully check the feet after walking?

_____

_____

_____

2. At the end of the day a patient with leprosy checks his feet and finds a small wound on the left heel. He feels no pain and plans to continue walking normally. Do you agree with this patient's plan?

Yes _____ No _____

Explain your answer.

_____

_____

_____

Questions: (continued)

3. A patient checks his feet after walking 3 km and finds a large red area on the lateral side of his right foot. What does this mean?

_____

_____

What should the patient do?

_____

_____

_____

REMEMBER

Areas that have signs of overuse (redness, wounds, skin cracks) must have REST. The patient should not put weight on any of these areas until they have healed.

* **Skin softening activities**

Questions:

1. Why does the patient with leprosy often have dry skin on the hands and feet?

_____

_____

_____

Questions: (continued)

2. Dry skin cracks easily. Why are skin cracks a problem?

_____

_____

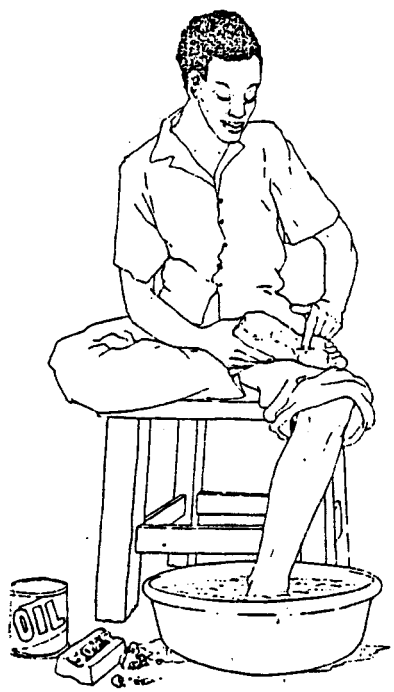
Skin softening activities include:

- soaking the dry skin
- oiling the softened skin
- removing the thick or hard skin

soaking the dry skin

A patient with leprosy must soak the hands and feet in cool water until the skin is soft.

The skin is soft because water has come into the dry skin areas.



Question:

A patient with leprosy would like to soak his hands and feet in hot water. This is NOT recommended.
Explain why.

_____

_____

_____

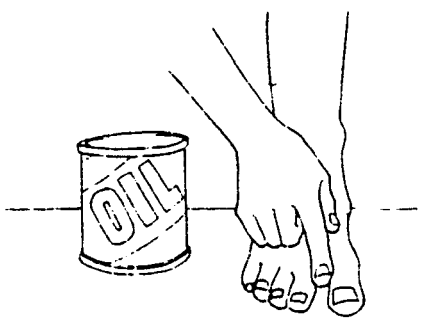
_____

_____

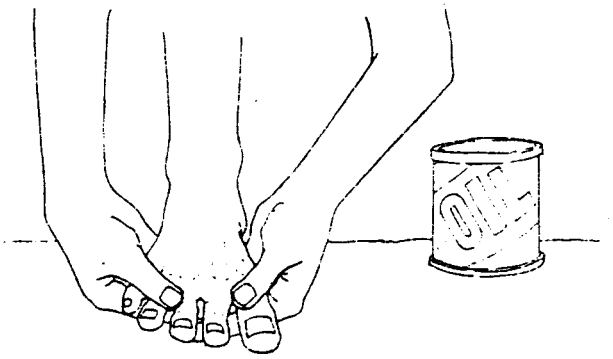
Oiling the softened skin

After the skin is soft, the patient rubs oil or vaseline into the skin covering the hands and feet.

Vaseline or oil will help to keep the water in the skin.



Oil well between and under the toes



. . . straightening them so that they do not get stiff.

Question:

A patient with leprosy wants only to apply vaseline to the skin to make it soft. The patient does not want to soak the skin in water.
Explain why this treatment is not effective in softening the skin.

_____

_____

_____

_____

Removing the thick or hard skin

Areas that are thick or hard can crack easily; it is best for the patient with leprosy to remove these hardened areas.

After soaking the limb, the patient can rub or scrape skin areas that feel thick and hard.

The patient must never pull or cut hard skin off (this can cause an open wound).

Everyday after soaking, the patient must gently rub or scrape the unwanted hard skin.

If there is hard skin around a crack, hold the crack closed and rub along the edge.

Question:

Why is it recommended that a patient rub hardened skin off after soaking?

_____

_____

* **Range of Motion exercises and equipment**

The patient with leprosy must try to prevent contractures.

Question:

Explain why patients with leprosy may develop contractures.

_____

_____

_____

_____

The two ways that physical therapy can help prevent contractures are

- to make ROM exercises
- to give equipment

ROM exercises

After skin soften activities, the patient must make ROM for the hands and feet. ROM should be made every day.

Question:

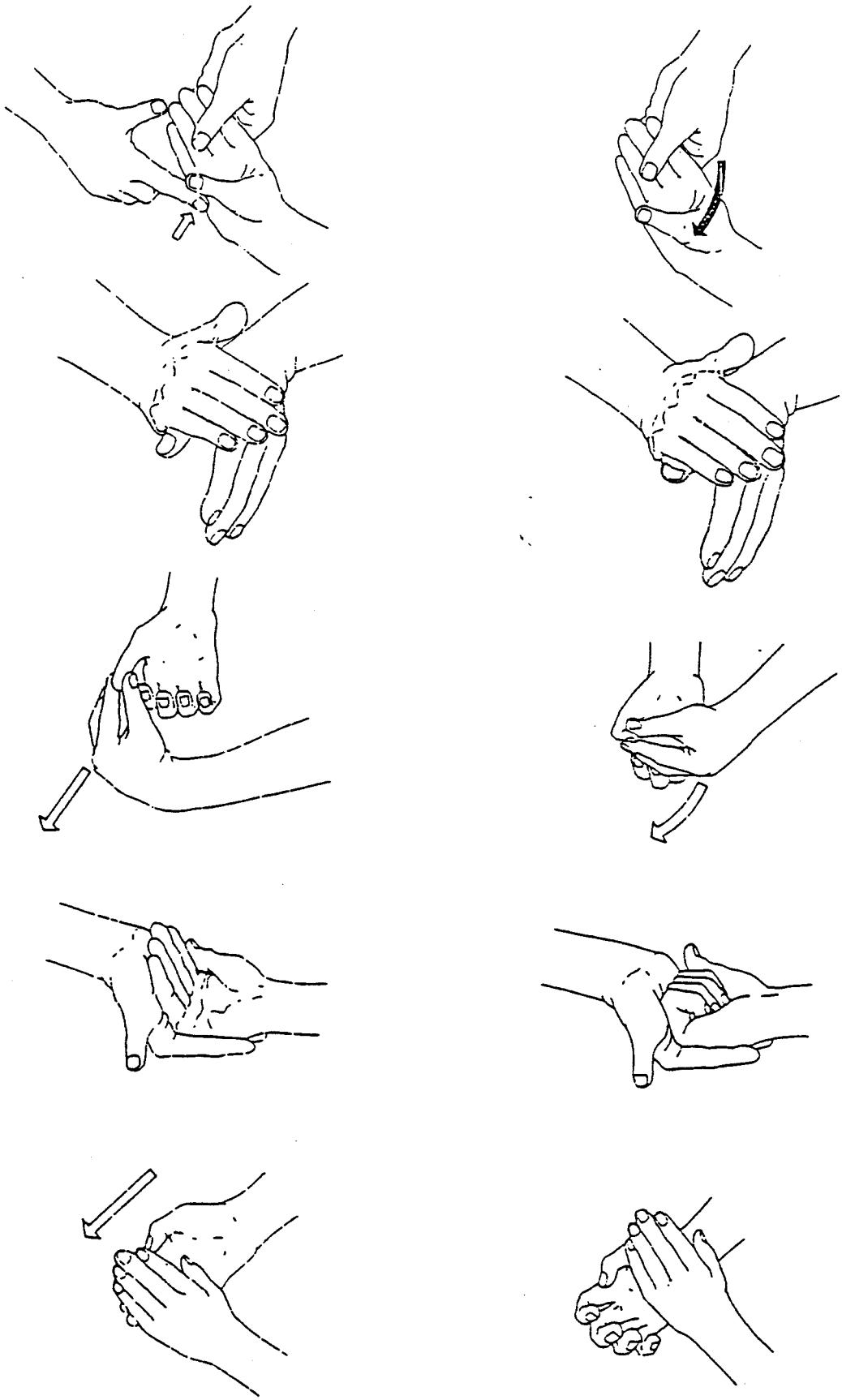
Why is it better to make ROM after skin softening and not before skin softening?

_____

_____

_____

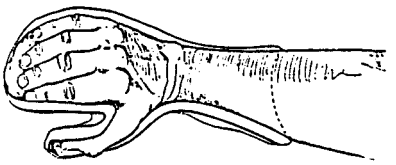
Examples of ways to make ROM for the hands and feet are given below.

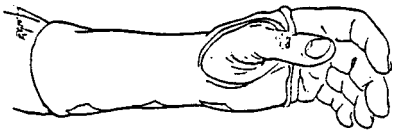


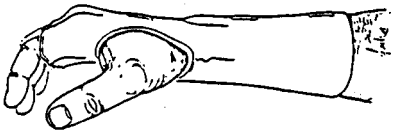
Equipment

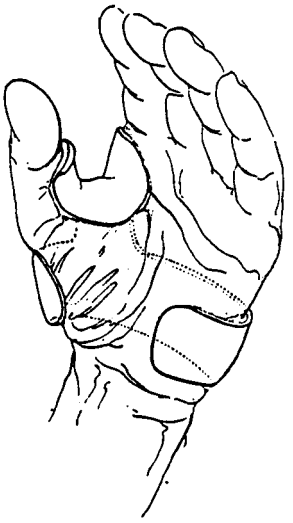
A splint can help to hold the patient's hand in a good position to help prevent contractures.

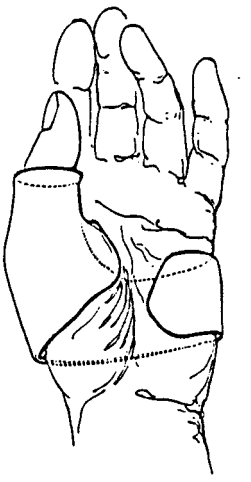
Examples of different splints are seen below.

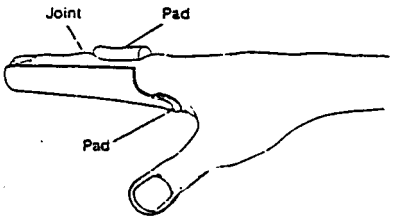










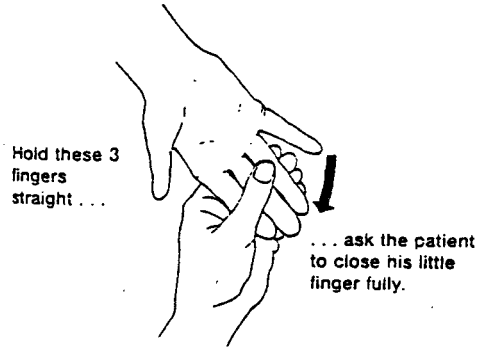


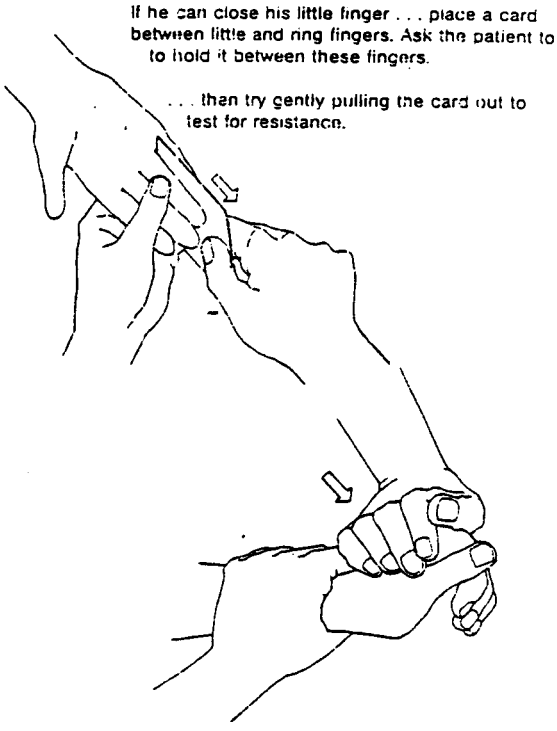
* Strengthening exercises

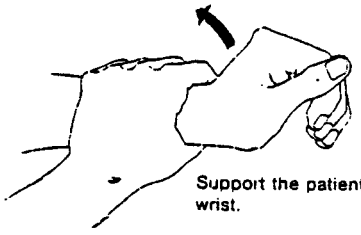
The patient with leprosy may have weakness or paralysis in some muscles.

It is important for the PTA to try to strengthen these very weak muscles as much as possible.

Examples of exercises are given below.



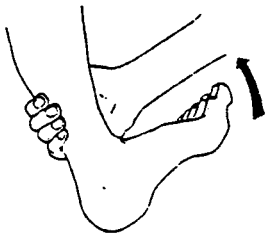




Ask the patient to pull his wrist back fully

Press gently but firmly at the back of the hand to test for resistance.

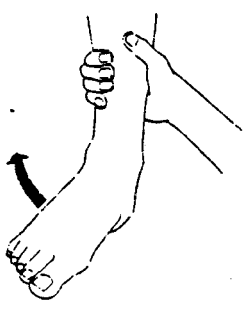
Support behind the patient's ankle.

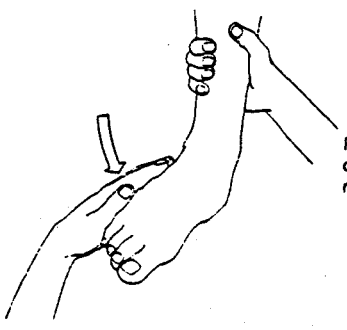


Ask the patient to pull his foot up fully

Press at the top of the foot to test for resistance.

FOOT OUT
Ask the patient to turn his foot out.





Press at the outside of the foot to test fo resistance.

b. PHYSICAL THERAPY FOR PATIENTS WITH DAMAGE FROM NEGLECT

* wound care
* provide equipment
* continue treatments as in 1st level to prevent more damage

* **wound care**

After the patient has a wound, he must

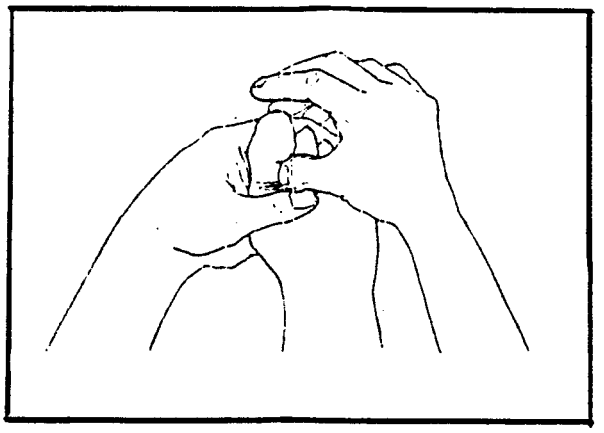
- take care of the wound
- prevent the wound from happening again

<u>take care of the wound</u>

Wash the wound first, and then soak in soapy or salted water for 20-30 minutes.

Remove hardened or dead skin after soaking. Remember, <u>rub</u>, do not pick at or pull the skin.

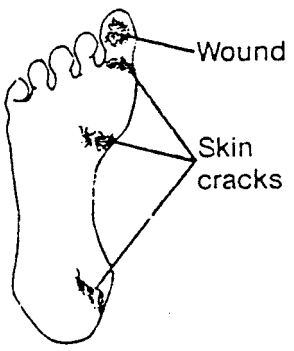
Rubbing should be along the edge of the wound, not across it.

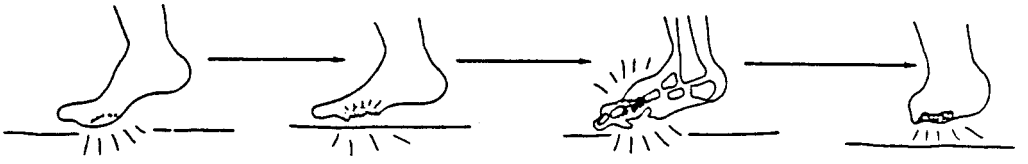


Cover the wound if this is needed to help keep it clean.

REST the wound area! If a patient sees a wound on the hand or foot, she should stop using that part until it has healed.

Continued use will make a wound worse.





<u>prevent the wound from happening again</u>

The patient must learn the CAUSE of his wounds.

If he does not know the cause, he will continue to develop the same wound.

After the patient knows the cause, he can remove this cause to prevent the wound from happening again.

The patient must learn that after every wound, the skin becomes weaker.

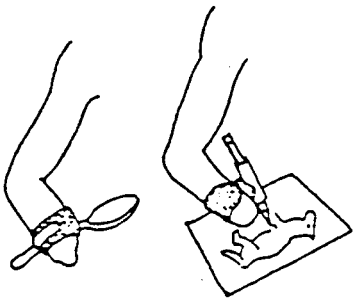
If a patient has had many wounds in one area, the skin is very weak and another wound can happen easily.

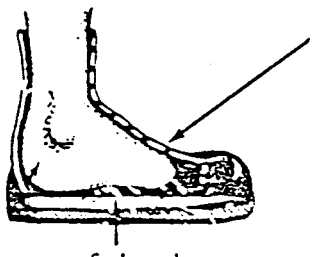
Preventing the first wound from happening is best.

* **provide equipment**

If the patient has paralysis or severe tissue loss, special equipment may be needed to help him be use his limbs as well as possible.

Examples of equipment are given below.





soft insole

An insole that is thick may work if the foot is already short.

For other suggestions, please see DEVICES FOR AUTONOMY chapter, Volume 2.

* **continue treatments as in 1st level to prevent more damage**

These treatments including continuing:

- education for patient and family about leprosy
  (the patient must ret with area with open wounds!!)
- protection for areas with decreased feeling
- skin softening activities
- ROM and strengthening exercises

2. SUMMARY OF SELF CARE IDEAS FOR PATIENTS WITH LEPROSY

The patient with leprosy must understand that he is responsible to take care of nerve damaged areas for the rest of his life.

These everyday activities are called self care activities.

To help patients remember what they must do for daily self-care, the patient should remember the spelling of LEPROSY.

L E P R O S Y

An explanation of what each letter means is given on the following page.

LEPROSY ------> Identify that you have Leprosy, see a doctor, take medication, and learn to prevent damage.

EXAMINE ------> Examine all parts that have no feeling to look for areas that are hot, red, have wounds or skin cracks.

PROTECT ------> Protect all parts that have no feeling from heat, dryness, sharp ojects, or overuse.

REHABILITATE ------> Stretching, strengthening and equipment can help to prevent deformities.

OFTEN ------> All of these self-care ideas must be done at least one time each day.

SOAK ------> Soak hands and feet in cool water; scrape off old skin so it does not become too thick; apply oil to areas after soaking to keep the skin moist.

YES!! ------> If leprosy is treated early and the patient does self-care, limb damage can be prevented.

G. CHAPTER SUMMARY

Leprosy is a bacteria that causes damage to the nerves and skin.

Symptoms of leprosy can be:

- a skin area that is a different color and has no feeling;
- decreased feeling in the hands and feet; (BIG PROBLEM)
- muscle weakness in the hands, feet, and eye lid;
- decreased sweat in the hands and feet.

Not all leprosy patients have all of these symptoms.

A skin test is used to test for leprosy bacteria.

Medicine can kill this bacteria. After 2-3 days of taking the medicine, leprosy patients cannot give the disease to another person.

There are three levels of disability in leprosy.

- The first level is a direct result of nerve damge (muscle weakness, loss of sensation, loss of sweat)
- The second level is from neglect of the nerve damaged areas (wounds, skin cracks, joint stiffness)
- The third level is from continued neglect of the nerve damaged areas (wounds, severe infection, tissue damage and loss)

A patient with Leprosy can prevent tissue damage and loss by doing self-care every day.

One way to remember all of the parts of self-care is to learn:

L=leprosy
* E=examine
* P=protect
* R=rehabilitation
* O=often
* S=soak
Y=yes

Specific Physical Therapy evaluation and treatment ideas are given in this chapter.

CHAPTER 33

BURNS

BURNS are damaged skin areas most often caused from extremely hot temperatures.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. describe the three types of burns.
2. list three basic rules in burn treatment.
3. describe a skin graft (what it is and why it is done).
4. demonstrate appropriate Physical Therapy treatment for patients with a burn.

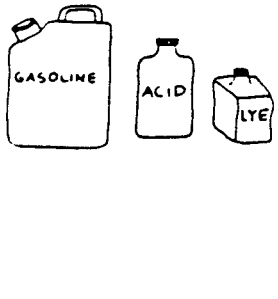
CHAPTER CONTENTS

A. WHAT IS A BURN?

A burn is an injury to the skin (see GENERAL BODY SYSTEMS chapter, Volume 1) and sometimes deeper body parts. Most often, burns are from extremeley hot temperatures.

B. CAUSE OF A BURN

There are many causes of burns. Burns can be caused from fire, hot liquids, hot objects, the sun, explosions, and many other things.



C. SPECIFIC INFORMATION ABOUT A BURN

There are three types of burns:

1. First degree - not severe
2. Second degree - moderately severe
3. Third degree - very severe

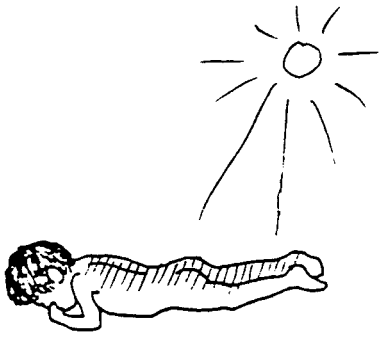
1. First degree burn

* Damages the most top part of the skin.

* There may be REDNESS and PAIN in the burned area.

* A mild sunburn is an example of a first degree burn.

* These type of burns normally heal by themselves in about one week.

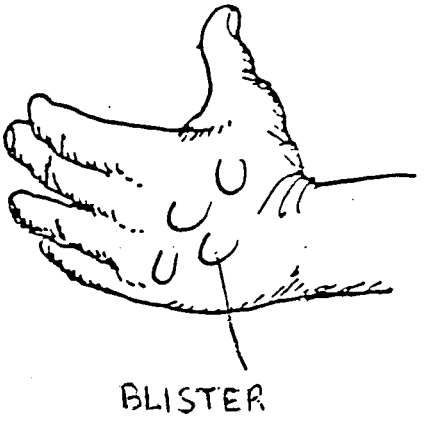


2. Second degree burn

* Damages deeper parts of the skin.

* There may be REDNESS, PAIN, and BLISTERS (like small water sacs on the surface of the skin).

* A burn from boiling water may be an example of a second degree burn.



3. Third degree burn

* Damages the entire thickness of the skin and may also damage the parts under the skin.

* Usually the burn will be black or gray.

* The skin may not be painful because the sensory nerves may have been damaged.

* The skin may also smell like it has been burned.

D. MEDICAL TREATMENT OF A BURN

General Rules for Burn Treatment:

DO NOT APPLY ICE DIRECTLY ON A BURN!

DO NOT BREAK BLISTERS

DO NOT APPLY OINTMENTS, BUTTER, SALVE OR CREAMS ON NEW BURNS.

First degree burns:

- cold compress
- put in cold flowing water

Second degree burns:

- cold compress
- clean the burn and give dressings to keep the burn clean

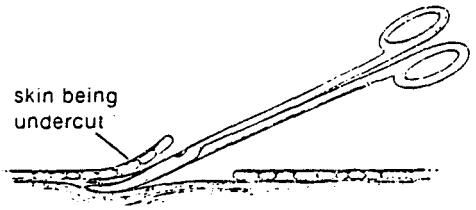
Third degree burns:

- clean the burn
- remove dead skin
- dressings to keep the burn very clean
- if the burn is very deep, a SKIN GRAFT may be needed

SKIN GRAFT

A skin graft is an operation where skin is removed from a healthy part of the body and put on a damaged area.

It is hoped that this thin piece of skin will grow and replace the dead or damaged skin.



Questions:

1. A child has burns on her thigh from boiling water. She has a large blister on her right thigh. Will you break this blister?

   Yes _____ No _____

   Explain your answer.

_____

_____

_____

Questions: (continued)

2. A patient has a very bad burn on his arm. His friend tells him to put butter or pig fat on the burn. Is this a good idea?

   Yes _____ No _____

   Explain your answer.

_____

_____

_____

3. A woman received a burn on her hand from holding a hot pan. She puts ice directly on the burn to make it cold. Do you agree with her treatment?

   Yes _____ No _____

   Explain your answer.

_____

_____

_____

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH A BURN

The PTA should carefully evaluate the following:

* general condition of the patient (fever, other complications)
* cause and degree of the burn (1st, 2nd, or 3rd degree burn)
* location of the burn (where is the burn)
* status of the burn (is it clean, infected)
* range of motion (what joint movements are limited and why)
* pain (where, when, how much)
* sensation (places where the patient has decreased or no feeling)
* functional ability of the patient

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH A BURN

Physical Ttherapy treatments for burns will be discussed in the following order.

1. Physical Therapy for patients with 1st degree burns

2. Physical Therapy for patients with 2nd and 3rd degree burns

3. Physical Therapy for patients with skin grafts

4. Physical Therapy for burn patients that have retracted, hard or abnormally shaped skin

1. PHYSICAL THERAPY FOR PATIENTS WITH 1ST DEGREE BURNS

No physical Therapy treatment is needed for these patients.

Questions:

1. Please give an example of a first degree burn.

_____

_____

2. Explain why patients with first degree burns do not need Physical Therapy.

_____

_____

_____

2. PHYSICAL THERAPY FOR PATIENTS WITH 2ND AND 3RD DEGREE BURNS

The main goals of Physical Therapy for patients with 2nd and 3rd degree burns are to prevent contractures and prevent infection.

Specific Physical Therapy treatment includes:

a. follow doctors instructions carefully

b. good positioning to prevent contractures

c. range of motion exercises

d. active exercise and functional activities as much as possible

e. support the nurse to keep the burned area clean

f. family teaching

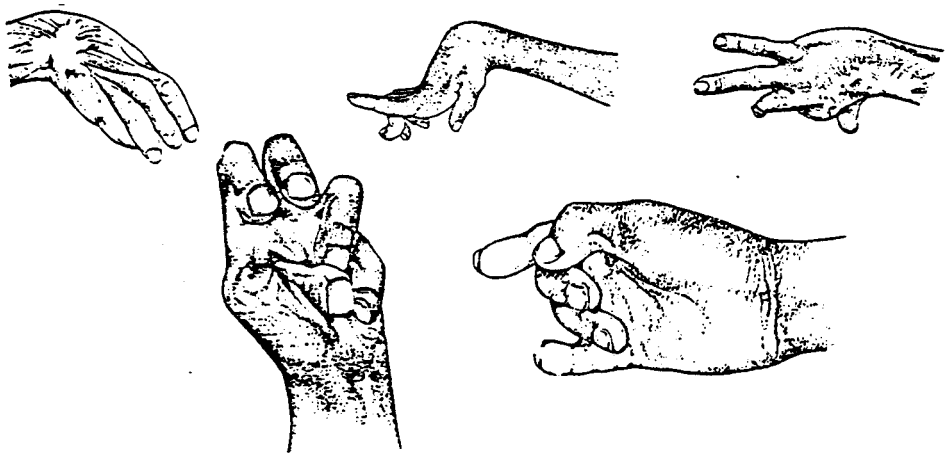
a. <u>follow doctors instructions carefully</u>

For patients with severe burns (very big or very deep) the doctor may give specific instructions for care of the patient.

b. <u>good positioning to prevent contractures</u>

When burns heal, the new skin wants to retract (become smaller).

If the burn covers (is at) a joint and the skin retracts (becomes smaller), there will be decreased movement at the joint.



Questions:

1. A patient has a very severe burn covering the anterior elbow area. If this burned skin becomes tight, what movement will be limited?

_____

2. A patient has a severe burn covering the posterior knee area. If this burned skin becomes tight, what movement will be limited?

_____

GOOD PATIENT POSITIONING IS VERY IMPORTANT FOR PATIENTS WITH BURNS

The joints should be in a position that stretches the burned skin to prevent retractions and tightness around a joint.

Questions:

1. A patient has severe burns in the palms of both hands. If the skin becomes retracted in this area, what will be the position of the hand?

_____

What can you do to prevent these retractions?

_____

_____

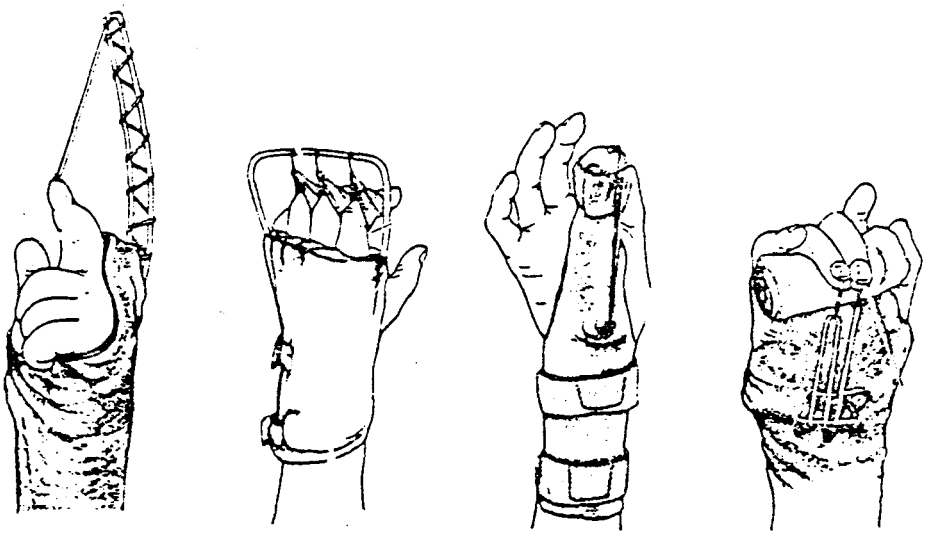
2. A patient has severe burns covering the anterior and inferior shoulder area. What position will you recommend for this patient to help stretch this burned skin?

_____

_____

_____

Splints and special equipment may also be needed to help keep the joint in a good position.



Patients and their families must understand <u>what</u> <u>positions</u> are best and <u>why</u> these positions are recommended.

<u>Question</u>:

A patient has severe burns on the anterior neck area. The family and patient prefer to have the neck in a relaxed position because it is less painful for the patient. What will you say to this patient and his family?

_____

_____

_____

<u>REMEMBER</u>: SKIN RETRACTIONS ARE EASY TO PREVENT,
BUT VERY DIFFICULT TO HELP!

C. Range of motion exercises

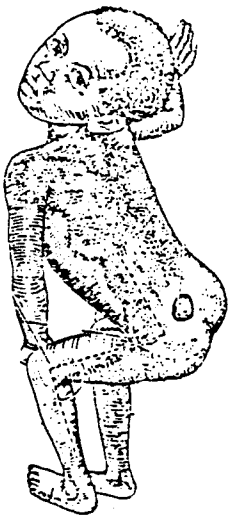
REMEMBER: TIGHT SKIN WILL LIMIT JOINT MOVEMENT

The PTA must regularly move the limbs of a burned patient to prevent the skin from becoming tight and stiff around the joint.

This may be painful for the patient, but ROM is necessary if normal movement is to be maintained.

The family should be instructed on how to help the patient move the burned area in all directions to prevent stiffness.

A NEGLECTED BURN



Question:

A patient has burns covering the anterior hip area. What hip movements will you instruct the family to help the patient make?

_____

_____

The PTA must be careful not to tear the burned skin, but should apply pressure to stretch the burned area.

d. active exercise and functional activities as much as possible

The patient must be encouraged to make active movements of all body parts to prevent weakness.

The patient should try to sit, stand, and feed himself as soon as possible to prevent other problems and avoid becoming dependent on others.

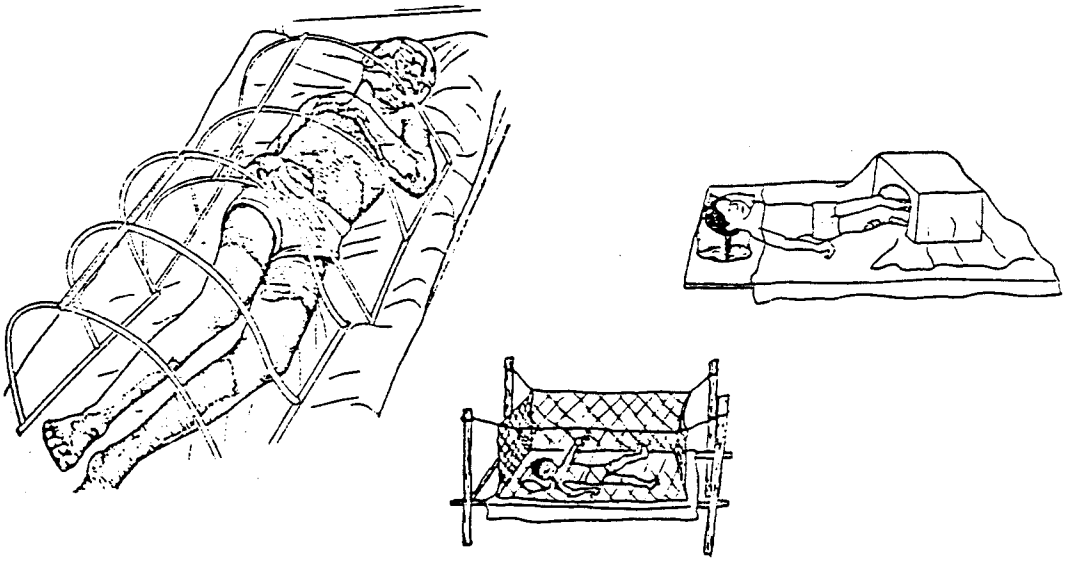
If the burned patient is obliged to stay in bed for a long time, the PTA should turn to BEDRIDDEN PATIENTS chapter, Volume 3, for other treatment suggestions.

e. support the nurse to keep the burned area clean

Infection must be prevented. The nurse will apply dressings over severe burns.

These dressings helps to keep dirt away from the burn and sometimes include a special cream to fight infection.

The burned area may also be covered by a mosquito net to prevent insects, ants or flies from attacking the burned area.



The PTA and nurse must work together to help the patient recover.

Question:

List 2 ways a nurse can support a PTA to help a patient with severe burns.

_____

_____

f. family teaching

Burns heal very slowly and may need special care for a long time.

It is important that the family receive good instruction on how they can help in the care and treatment of burned patients.

Question:

A 12 year old boy has a severe burn on the anterior side of both hips and thighs.

The parents would like to help their son, but do not know how.

Please describe 5 things that this family can do to help their son recover.

_____

_____

_____

_____

_____

3. PHYSICAL THERAPY FOR PATIENTS WITH SKIN GRAFTS

Physical Therapy for patients with skin grafts includes:

a. follow doctors instructions very carefully

b. keep skin graft area quiet for at least 8-10 days

c. follow general treatment guidelines as given for 2nd and 3rd degree burns.

a. follow doctors instructions very carefully

After this special surgery a doctor will have very special instructions for the skin graft area to prevent damage or injury.

The PTA must learn these instructions and follow them carefully.

Question:

A patient had a skin graft to replace burned skin on the forearm and elbow. The doctor orders no movement of this area.

A PTA arrives and makes ROM for the elbow. Is this treatment good for the patient?

Yes _____ No _____

Explain your answer.

_____

_____

_____

_____

_____

b. keep skin graft area quiet for at least 8-10 days

The new skin must have enough time to attach well.

If there is too much movement, the new skin cannot attach to the area. If the new skin does not attach well, blood cannot arrive and this new skin will die.

THE PTA MUST BE VERY CAREFUL IN WORKING WITH PATIENTS THAT HAVE HAD SKIN GRAFTS.

c. <u>follow geneneral treatment guidelines as given for 2nd and 3rd degree burns</u>

<u>Questions</u>:

1. Why are positioning and ROM exercises important for patients with skin grafts?

_____

_____

_____

2. A patient has had a skin graft. What are 2 areas that must be kept clean to prevent infection?

_____

_____

3. After 15 days the PTA begins ROM with a patient that has had a skin graft. The PTA finds that the skin is tight. He pulls to have normal ROM and the skin breaks. Is this a good treatment?

Yes _____ No _____

Explain your answer.

_____

_____

_____

4. PHYSICAL THERAPY FOR BURN PATIENTS THAT HAVE RETRACTED, HARD OR ABNORMALLY SHAPED SKIN

After a burn has healed, there can be many problems with the skin. The skin may be retracted, hard or abnormally shaped.

Physical Therapy treatment for these patients includes:

a. massage

b. stretching

c. elastic bandage

a. massage

After the burn has healed, deep massage is given to help soften the scar. Massage can be used to help stretch the skin if it is tight.

Different massage techniques were discussed in MASSAGE chapter, Volume 2.

Question:

A patient has a healed burn. The skin is hard and a little tight. Please describe 2 types of massage that can be used to help this patient.

_____

_____

b. stretching

If a patient has decreased joint movement as a result of poor care during recovery from a burn, the PTA can help by applying stretching techniques (see STRETCHING chapter, Volume 2).

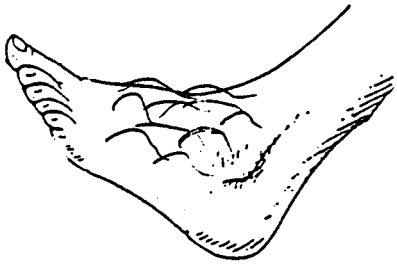
IMPORTANT!

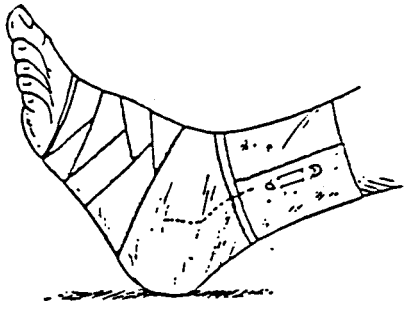
It is very difficult (sometimes impossible) to stretch shortened skin. Helping to prevent skin retractions is very important work for the PTA.

c. <u>elastic bandage</u>

After the burn has healed, sometimes the scar will have a big or unnatural shape.

An elastic bandage applied around the limbs can help to give the scar a good shape. For bandaging guidelines, see BANDAGING chapter, Volume 2).





BIG BURN
OF THE FOOT

The patient must wear this bandage for a long time.

G. CHAPTER SUMMARY

Burns are damaged skin areas most often caused from extremely hot temperatures.

There are 3 types of burns

- Minor burns that do not form blisters (1st degree)
- Burns that cause blisters (2nd degree)
- Deep burns (3rd degree)

DO NOT BREAK BLISTERS IN BURNED AREAS - this can increase the chance of infection.

NEVER PUT ICE ON A FRESH BURN - the skin is already damaged, and ice will cause more damage from extreme cold.

NEVER PUT GREASE OR BUTTER ON FRESH BURNS - the grease will insulate a burn, and not allow heat to be released.

A skin graft is a type of surgery that removes a thin piece of skin from a healthy area to replace the skin that is severely damaged or dead.

No Physical Therapy treatment is needed for 1st degree burns.

Physical Therapy goals for 2nd and 3rd degree burns are to prevent contractures and infection.

Specific Physical Therapy Evaluation and Treatments for burn patients are given in this chapter.

CHAPTER 34

PRESSURE SORES

A PRESSURE SORE is a wound caused from decreased blood supply to the skin.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. describe the cause of a pressure sore.
2. identify early signs of a pressure sore.
3. describe how Physical Therapy can help prevent and treat pressure sores.

CHAPTER CONTENTS

A. WHAT IS A PRESSURE SORE?

A pressure sore is a special type of wound or damaged skin area.

Pressure sores are most often found over bony areas of the body.

B. CAUSES OF A PRESSURE SORE

The cause of pressure sores is from long term pressure on the skin.

Pressure over bony areas will stop blood from coming to the skin.

Without blood, the skin will become sick and die.

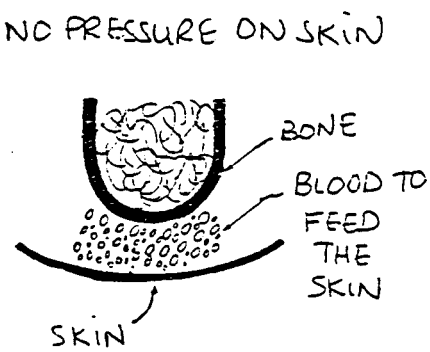
SKIN AND PRESSURE SORES

The skin is alive. The skin receives necessary food and oxygen from the blood.

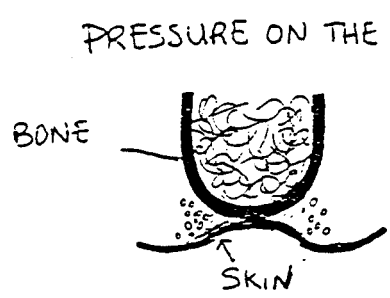
The blood that feeds the skin is located just below the surface of the skin (A).

If there is pressure on the skin so that the blood cannot arrive, the skin will not receive food. (B)

(A) NORMAL BLOOD FLOW



(B) PRESSURE ON SKIN AND BLOOD CANNOT ARRIVE, SKIN IN THIS AREA WILL DIE.



Activity:

On the end of each finger, you have a "finger nail". With another finger, push down on the end of the nail and observe what happens to the skin color under the nail.

What did you see? _____

Why did this happen? _____

_____

If the skin does not receive food for a short time, it can still survive.

If the blood is blocked for a long time and the skin does not receive food, it will die.

When the skin dies, a wound may occur. Common names for this type of wound are: "PRESSURE SORE", "BED SORE", or "PRESSURE WOUND".

In this manual, pressure sore and bed sore have the same meaning.

Question:

A man fell from his bed and damaged the skin on his elbow. Is this a "bed sore"?

_____ yes _____ no

Explain your answer. _____

_____

_____

_____

It is important for the PTA to remember:

1. The skin must have food (blood) to live.
2. If there is too much pressure, the food (blood) cannot arrive.
3. If the food does not arrive for a long time, the skin will die.
4. If the skin dies, a wound may occur.
5. If there is a wound there may be infection.
6. If there is infection, there is trouble!

Activity:

Again read the step 1-6 above about how pressure sores and infections happen. In the space provided please draw pictures to explain steps 1-6 above.

C. SPECIFIC INFORMATION ABOUT A PRESSURE SORE

To better understand pressure sores, the following information is given:

1. Patients that may develop pressure sores
2. Early signs of pressure sores
3. Common pressure sore areas

1. Patients that may develop pressure sores

Patients that have increased chances of developing pressure sores are:

* patients that have decreased feeling in their body

* patients that are unable to move their body

* patients that are obliged to stay in bed for a long time (See BEDRIDDEN PATIENTS chapter, Volume 3)

* patients that have a device (plaster, brace, splint) that presses on a bony area

Questions:

1. Explain why patients with decreased feeling have an increased chaance to develop pressure sores.

1a. Give two examples of patients that have decreased feeling.

2. Explain why patients that cannot move their body have an increased change to develop pressure sores.

2a. Give two examples of patients that cannot move their body.

3. Explain why some bedridden patients may develop pressure sores.

3a. Give two examples of bedridden patients.

2. Early signs of pressure sores

The early signs of pressure sores are:

* red or dark colored skin over a bony area
* shiny skin or small breaks in the skin over a bony area
* pain on a specific area (if the patient has feeling)

Questions:

1. Why is it important for the PTA and family to know the early signs of pressure sores?

_____

_____

_____

_____

2. What causes the early signs of pressure sores?

_____

_____

_____

3. Why are the early signs of pressure sores most often over bony areas?

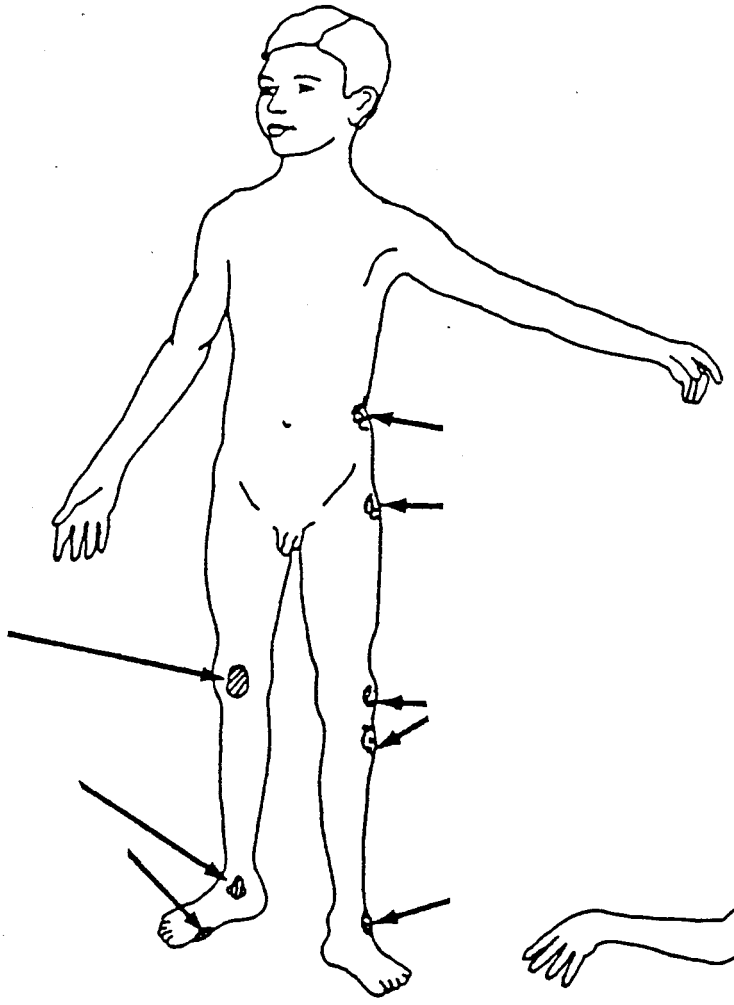
_____

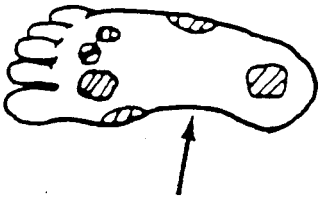
_____

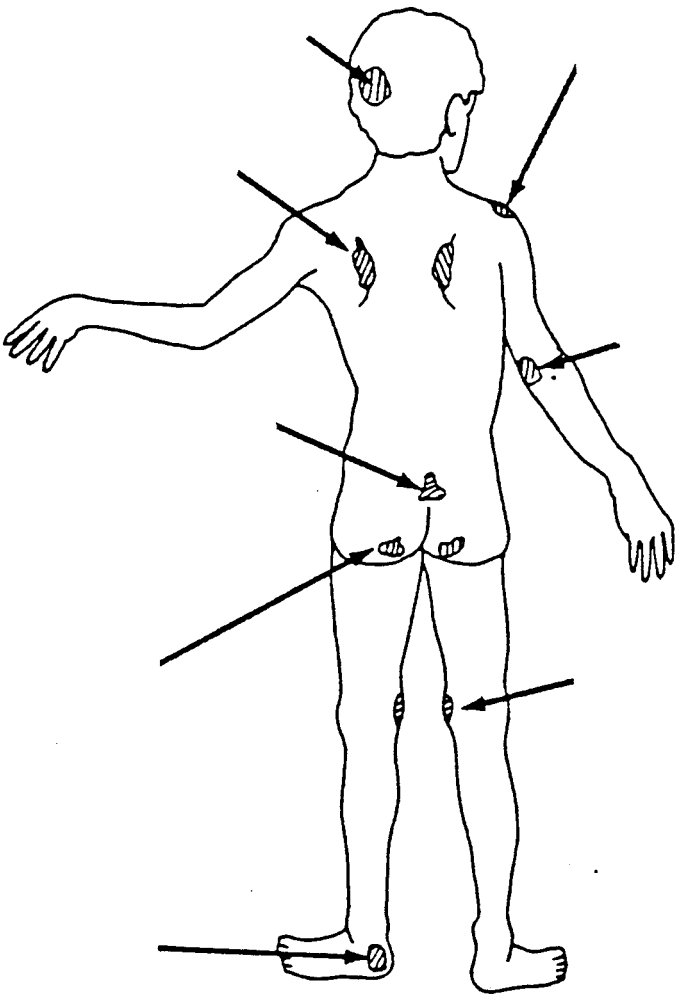
_____

3. Common pressure sore areas

Areas that most commonly develop pressure sores are seen in the pictures below.







Questions:

1. Describe (in your own words) what general areas of the body most often get pressure sores.

_____

_____

2. A patient is sidelying for many hours and cannot move. List three places that this patient may have bed sores.

_____

_____

_____

3. A patient is in a coma. He cannot move. He has been on his back for many hours. List five areas that you must check for early signs of bed sores.

_____

_____

_____

_____

_____

4. A patient cannot move. A nurse puts him on his stomach to prevent hip contractions. The nurse leaves the patient on his stomach for 3 hours. What areas could have developed early signs of pressure sores.

_____

_____

_____

D. MEDICAL TREATMENT FOR PRESSURE SORES

Medical treatment to help pressure sores includes:

* appropriate wound care and dressings.
* medicine to help fight infection.
* surgery if the bed sore is very severe.

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH A PRESSURE SORE

On page 5 we discussed patients that may develop pressure sores.

Especially for these types of patients, the PTA must carefully evaluate the following areas:

Before the patient has a pressure sore the PTA must evaluate:

* sensation (identify areas that the patient cannot feel)
* strength (identify areas that the patient cannot move)
* skin over bony areas for early signs of pressure sores (skin that is red, dark colored, shiny, has small breaks)
* function of the patient (can he move in bed independently)
* fit of the device to make sure there is no pressure over bony areas
* pain (if patient has sensation) over specific skin areas

Question:

Why must the PTA make an evaluation before the patient has a pressure sore?

_____

_____

After the patient has early signs of a pressure sore the PTA must evaluate:

* describe the early sign of the pressure sore (location, size, color)
* identify possible cause to prevent more damage in the future
* sensation (identify areas that the patient cannot feel)
* strength (identify areas that the patient cannot move)
* skin over other bony areas for early signs of pressure sores (skin that is red, dark colored, shiny, has small breaks)
* function of the patient (can he move in bed independently)
* fit of the device to make sure there is no pressure over bony areas
* pain (if patient has sensation) over specific skin areas

After the patient has a pressure sore the PTA must evaluate:

* describe the pressure sore (location, how big, how deep, smell)
* infection?
* identify possible cause to prevent more damage in the future
* sensation to identify areas that the patient cannot feel
* strength to identify areas that the patient cannot move
* skin over other bony areas for early signs of pressure sores (skin that is red, dark colored, shiny, has small breaks)
* function of the patient (can he move in bed independently)
* fit of the device to make sure there is no pressure over bony areas
* pain (if patient has sensation) over specific areas

F. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH A PRESSURE SORE

There are three periods when P.T. can help with pressure sores.

1. before the patient has a pressure sore.
2. after early signs of a pressure sore.
3. after the patient has a pressure sore.

1. before the patient has a pressure sore

In this period the PTA must work to prevent bed sores.

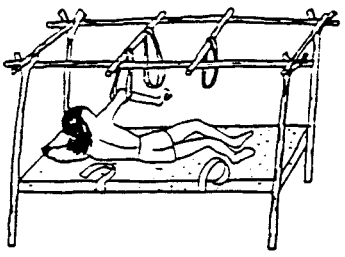
Physical Therapy treatment during this period includes:

* Teaching the patient, family, and medical team about pressure sores (cause, early signs, and prevention).
* Making sure the patient is turned every 2-3 hours.
* Massaging sensitive areas (and teaching family to do this).
* Making sure a device correctly fits the patient.

*** Teaching the patient, family, and medical team about pressure sores (cause, early signs, and prevention)**

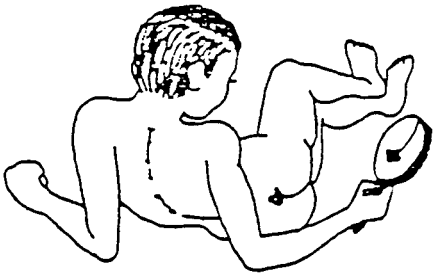
The PTA must clearly explain that pressure sores are from decreased blood to the skin and they CAN be prevented!!

- <u>Movement is very important</u>!! The family can help turn the patient, and bed adaptations can be used for patients to begin to move by themselves.



- A clean bed and clean patient will also help prevent pressure sores. If a bed is wet or soiled, it will irritate the skin and pressure sores can develop very easily.

- If available, a small mirror can be given to the patient so that he can be responsible to check for early signs of pressure sores.



Questions:

1. A patient cannot move himself in bed and cannot feel his arms or legs. The family thinks it is best to keep the patient on his back. They do not want to put him on his stomach or his side because these positions are not safe.

   Please describe what you will say to this family.

2. Why is it important to teach the patient's family about the cause, early signs, and prevention of pressure sores?

3. What are two ways that the family can help to prevent pressure sores?

4. When is an important time to check for pressure sores?

5. What are the important areas to check for pressure sores?

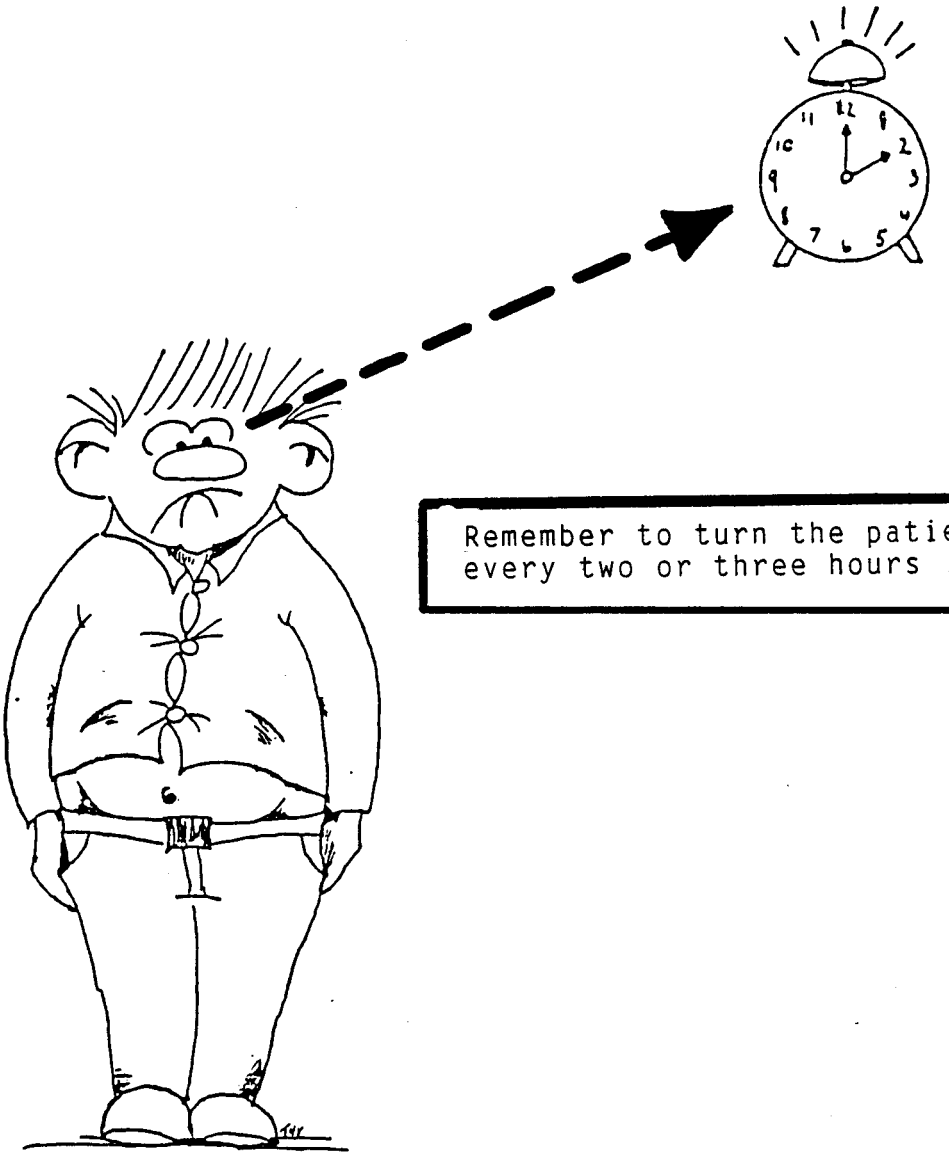
* **Making sure the patient is turned every 2-3 hours**

All skin areas must receive food regularly.

Blood cannot come to areas that have pressure on them.

Changing the patient's position in bed will allow the blood to come to all areas at different times.

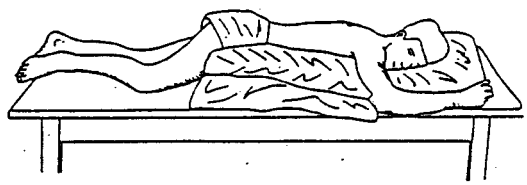
The family and medical workers can develop a schedule to help remind them when the patient must be turned.



Activity:

Below are pictures of patients in different bed positions. For each picture, name the areas that have a decreased blood supply (the areas that could develop a pressure sore).

A.



possible pressure sore areas:

_____

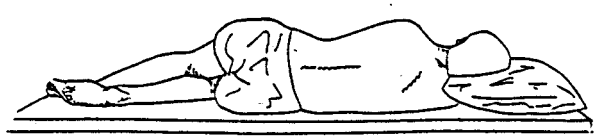
_____

_____

_____

_____

B.



possible pressure sore areas:

_____

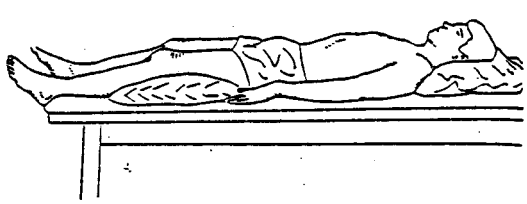
_____

_____

_____

_____

C.



possible pressure sore areas:

_____

_____

_____

_____

_____

* **Massaging sensitive areas (and teaching family to do this)**

Question:

The family does not understand why they should give the patient a massage when the patient has no pain.

What will you explain to the family?

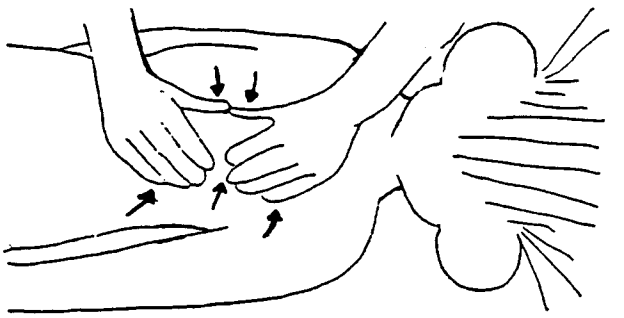
_____

_____

_____

_____

The massage technique that is best for increasing blood supply to the skin is lifting the skin and gently pushing it together.



This type of massage should be continued for 10-15 minutes; 2-3 times each day.

See MASSAGE chapter, Volume 2, for more details.

Question:

For patients that could develop pressure sores, why is it better to lift the skin and gently squeeze rather than put deep pressure directly into the skin?

_____

_____

_____

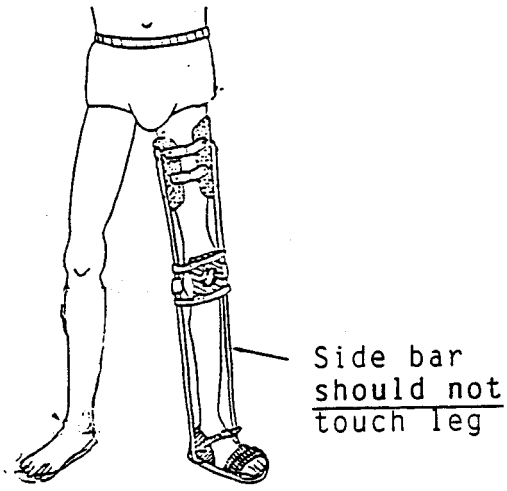
* **Making sure a device correctly fits a patient**

Braces, shoes, splints, and paster casts must not put pressure over bony areas.

If a device is too tight, it can cause damage to the skin (and to other body parts under the skin!).

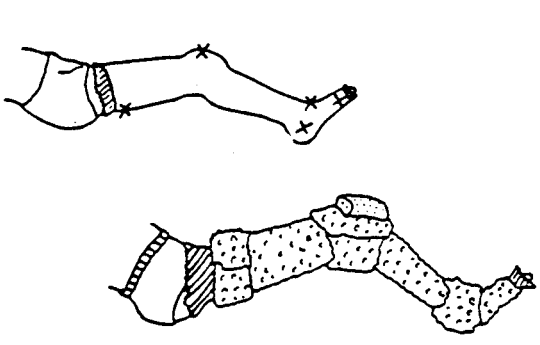
The shape of the device needs to be carefully adjusted or made so that there is no pressure on bony areas.

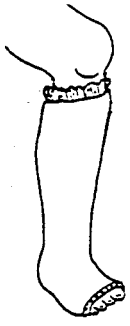
Example:



For plaster casts (POP), the bon areas should be padded to decrease pressure from the hard plaster. (See PLASTER chapter, Volume 2.)

Below are pictures showing the areas that need padding and special care when applying splints or plaster.





Question:

The PTA has applied plaster to a patient's foot. The foot is not in a good position. The PTA pushes on the wet plaster to change the position of the foot.

Is this a good idea?

Yes _____ No _____

Explain your answer.

_____

_____

_____

_____

_____

2. after early signs of a pressure sore

Questions:

1. What are the early signs of pressure sores?

_____

_____

2. What causes early signs of pressure sores?

_____

_____

_____

In this period the PTA must increase circulation to damaged areas and prevent more damage from happening.

Physical Therapy treatment during this period includes:

* Continue teaching the patient, family, and medical team about pressure sores.

* Special attention to turn and position the patient correctly.

* Stimulate the patient to move.

* Devices to help decrease pressure over problem areas.

* Sunshine.

* Continue massage over problem areas.

* Adjust specific device if it has caused skin damage.

* **Continue teaching patient, family, and medical team about pressure sores**

Because the patient has early signs of a pressure sore, there is some area of care that must be improved.

The PTA, patient, family and medical team must work together to find the cause of this early pressure sore and try to prevent more damage in the future.

Questions:

1a. The PTA has told the patient, family, and medical team about pressure sores many times. Why must the PTA again teach about pressure sores at this time?

_____

_____

_____

_____

Questions: (continued)

1b. What must the PTA include in this teaching?

_____

_____

_____

_____

* **Special attention to turn and position the patient correctly**

The patient has early signs of a pressure sore. This means that there has not been a good blood supply to that area of skin.

Special care must be given to decrease the amount of time the patient spends on this area and continue to change the patient's position regularly.

Questions:

1. A patient has small breaks in the skin over the sacrum/ coccyx area. What has caused these small breaks?

_____

_____

2. How could this have been prevented?

_____

_____

3. What positions are good to decrease pressure over this area?

_____

_____

* **Stimulate the patient to move**

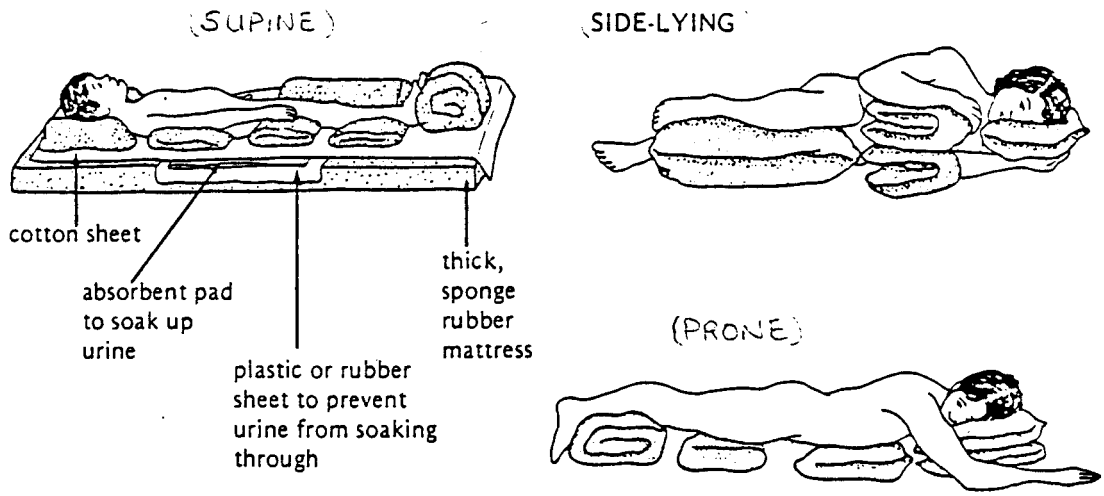
The patient must be encouraged to move himself as much as possible.

Active movement will help prevent muscle weakness and will help increase circulation of the blood for faster wound healing.

* **Devices to help decrease pressure over problem areas**

There are many different ways to decrease pressure over problem areas.

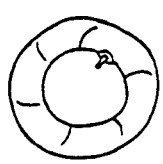
Pillows or soft blankets can be put around bony areas to give decrease pressure on these areas.



For big areas that have early signs of pressure sores, a "donut" can be made to decrease pressure the specific area.

A "donut" is a device that has a hollow center.

The outside ring will hold the patient's weight so that there is no pressure on the damaged skin area.



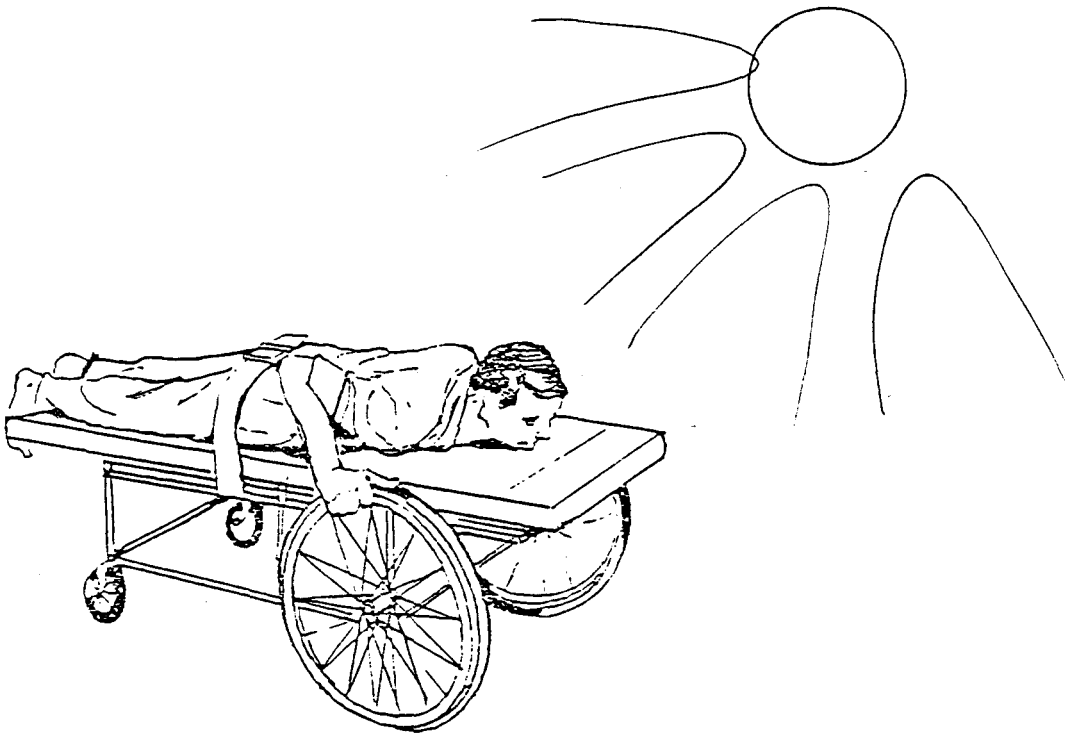
WARNING: For small areas such as heels, *never* use a ring or 'donut' of cloth to keep weight off the sore. This can cut off blood supply to the skin inside the ring and make the sore worse.

NO!

"Donuts" can be made out of many materials. A common type is made out of the innertube of a tire.

* Sunshine

For many patients, <u>early</u> morning or <u>late</u> afternoon sunshine can improve the condition of the skin.



WARNING!

Hot sun during midday must be avoided.

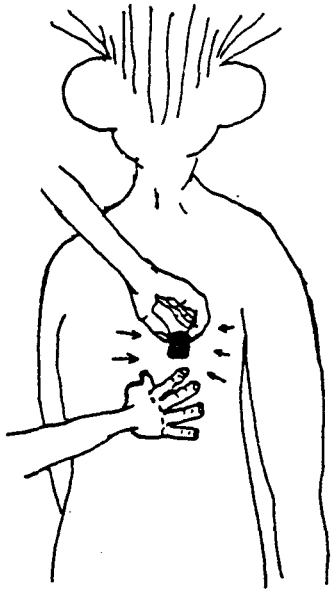
The sun will burn the skin and increase pressure sore problems!

* **Continue massage over problem areas**

If available, ice may be rubbed over the area with early signs of pressure sores.

This cold temperature will bring more blood to the area to try to keep the skin warm.

Ice should be applied for 5-10 minutes to try to increase blood supply to the area.



General massage using gentle lifting and squeezing techniques may be continued.

* **Adjust specific device if it has caused skin damage**

Question:

A patient has plaster over his leg and ankle. He complains of pain over the left external malleolus because of the plaster. What can you do for this patient?

_____

_____

_____

c) **after the patient has a pressure sore**

In this period the PTA must try to help heal the wound and prevent more damage from happening.

Physical Therapy treatment during this period includes:

* Continue teaching the patient, family, and medical team about pressure sores.

* Continue to stimulate the patient to move.

* Special attention and devices to keep pressure off the wound.

* Massage around the edge of the wound.

* Sunshine

* Support the nurse to help keep the wound clean.

* **Continue teaching the patient, family, and medical team about pressure sores**

Patients can die from pressure sores. The family must understand that pressure sores are very serious. Until now, the patient has not received proper care to prevent pressure sores.

The PTA must identify the behaviors that caused the pressure sore and make sure that these behaviors are stopped.

Questions:

1a. A patient was sitting in his wheelchair for six hours. During that time he did not change his position at all. This patient developed pressure sores because of this.

Describe the location of these pressure sores.

_____

_____

Questions: (continued)

1b. How could these pressure sores have been prevented?

_____

_____

_____

* **Continue to stimulate the patient to move**

As much as possible, the patient should be encouraged to make active movement of the body.

Strengthening, ROM, and functional activities may need to be adapted to avoid pressure on an area, but these activities should continue.

Questions:

1. A patient has complete paralysis of both legs. This patient has a pressure sore on the sacrum. The PTA stops all treatment until the pressure sore has healed.

   Do you agree with this decision?

   Yes _____ No _____

   If yes, why?

   _____

   _____

   _____

   If no, what would you do for treatment of this patient?

   _____

   _____

   _____

   _____

* **Special attention and devices to keep pressure off the wound**

The patient must be positioned to keep pressure off the wound as much as possible.

Questions:

1. A bed sore should have no pressure on it. Explain why.

_____

_____

_____

2. A patient is lying on her back in the bed. She has bed sores on the heels of both feet. Please write two things that you can do to remove the pressure from these areas.

_____

_____

_____

3. A baby has worn plaster on his legs for one week. When you take the plaster off to exchange it for a new one you see that the child has a pressure sore on the external side of the foot.
   How will you continue the treatment for this child?

_____

_____

_____

_____

_____

* **Massage around the edge of the wound**

Question:

1. Why does the PTA give massage around the edge of the wound?

_____

_____

_____

_____

2. Is it a good idea for the PTA to give a massage inside the wound?

Yes _____ No _____

Explain your answer.

_____

_____

_____

_____

* **Sunshine**

As we said earlier, early morning or late afternoon sunshine may help improve the condition of the skin.

The PTA must make sure that the wound has a light dressing to prevent flies from entering the wound.

* **Support the nurse to keep the wound clean**

Generally, nurses will take care of removing the dead skin, cleaning, and dressing of the pressure sore.

The PTA should not remove the dressings or touch the inside of the wound without using special gloves.

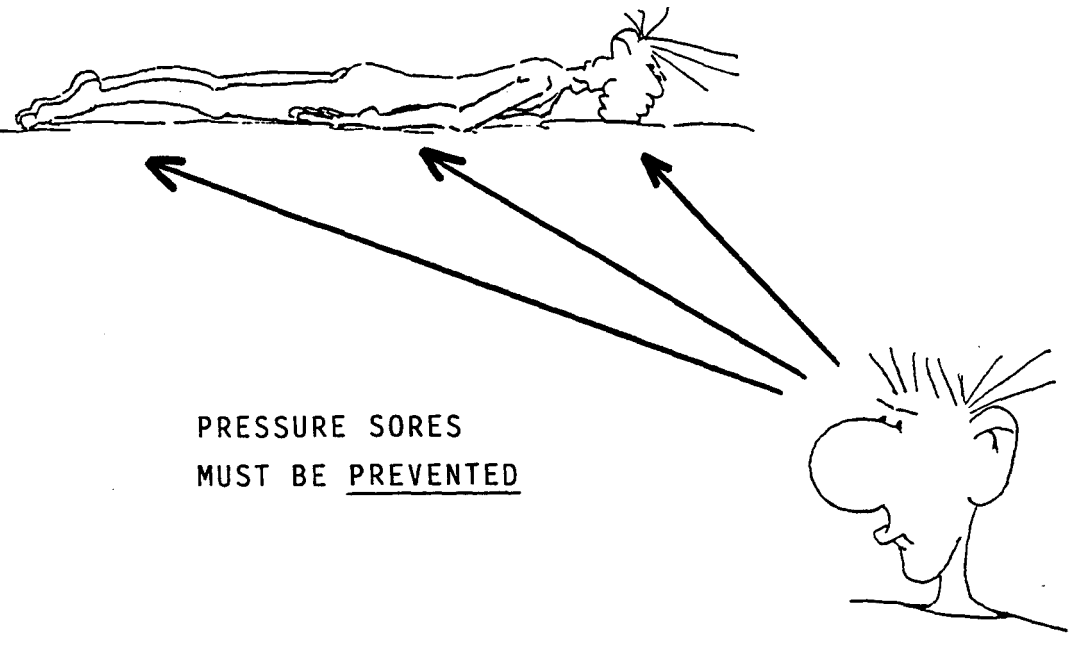
The PTA's hands should always be washed before and after working in the area of a pressure sore.

The guidelines (above) are given to help prevent infection.

REMEMBER

It is very difficult to treat pressure sores!

The best solution is to PREVENT pressure sores from happening.



G. CHAPTER SUMMARY

Pressure sores (bed sores) are wounds caused from decreased blood supply to the skin.

People that may easily get pressure sores are those that:

- have decreased feeling in the body
- are unable to move their body
- are obliged to stay in bed for a long time
- have a device that puts pressure over a bony area

Early signs of bed sores are:

- red or dark colored skin over a bony area
- shiny skin or small breaks in the skin over bony areas
- complaints of pain (if the patient has feeling)

Common pressure sore areas are over bony parts of the body. Specific areas at risk are given in the chapter.

It is very important to teach the patient, family, and medical staff about pressure sores, prevention, and treatment. Everone must work together to fight pressure sores.

Specific Physical Therapy evaluation and treatment suggestions are given for patients:

- that have no signs of pressure sores
- that have early signs of pressure sores
- that have pressure sores

Pressure sores are prevented easier than they are treated.

CHAPTER 35

BEDRIDDEN PATIENTS

A BEDRIDDEN patient is a person who is obliged to remain in bed for a long time.

OBJECTIVES

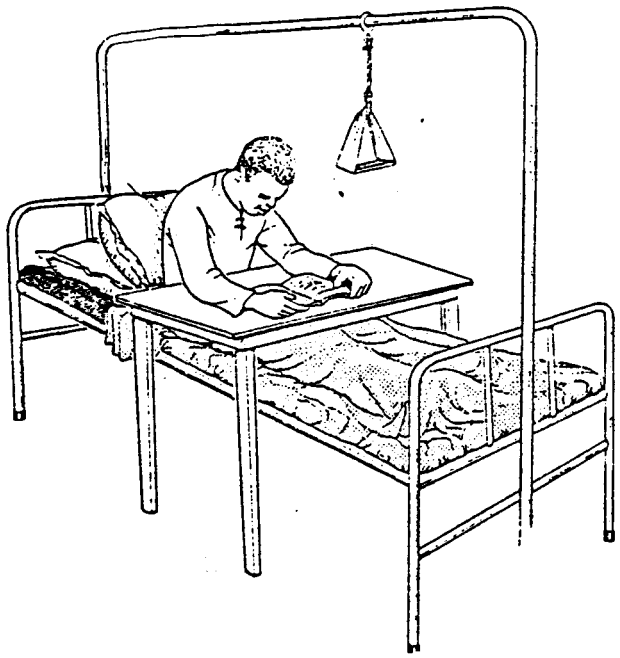
At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. identify four main problems that could develop in bedridden patients.
2. describe 3 different ways that Physical Therapy can help bedridden patients.
3. compare curative and prevenatative Physical Therapy treatments for bedridden patients.
4. given a patient problem, demonstrate appropriate Physical Therapy treatment techniques.

CHAPTER CONTENTS

A. WHAT IS A BEDRIDDEN PATIENT?

A bedridden patient is a person who is obliged to remain in bed for a long time.



There are many different types of bedridden patients. They can be:

conscious	or	unconscious
able to move	or	unable to move (paralyzed)
hopeful	or	depressed

Bedridden patients may have to stay in bed for different lengths of time.

The time can be 1 week, 1 month, 1 year or longer, depending on the patient's problem.

B. CAUSE OF BEING BEDRIDDEN

Patients are obliged to remain in bed because of specific body problems. These problems can be caused by:

1. disease (examples: malaria, pneumonia)
2. surgery (examples: severe internal body operations)
3. trauma (examples: mines, head injury, spinal cord injury)

C. SPECIFIC INFORMATION ABOUT A BEDRIDDEN PATIENT

All bedridden patients may develop more problems if they do not receive proper care.

In this section we will discuss the problems that bedridden patients may develop.

Questions:

1. A patient stays in bed for a long time without moving. Explain the skin problem that this patient may develop, and where this skin problem may occur.

2. A patient stays in bed for a long time without moving. What problems could he have with the muscles, joints, and bones.

4. What other problems could a bedridden patient develop?

Problems that could develop in bedridden patients include:

1. bed sores (pressure sores)
2. respiratory problems
3. joint stiffness
4. muscle weakness
5. changes in blood circulation system
6. changes in bone strength
7. depression

1. Bed Sores

If there is pressure on one area of skin for a long time, blood cannot arrive to feed the skin and it will die.

This is the cause of a bed sore or pressure sore (see PRESSURE SORES chapter, Volume 3, for details).

Question:

Patients who do not change their position in bed may develop a bed sore. In your own words, explain why this happens.

_____

_____

_____

_____

_____

_____

2. Respiratory Problems

If the patient is in bed for a long time and is not active, the deep areas of the lungs will not be used much.

If the areas are not used, they may collect secretions and cause respiratory problems (pneumonia). (See RESPIRATORY chapter, Volume 2; and RESPIRATORY DISEASES chapter, Volume 3.)

3. Joint Stiffness

If the patient's limbs are not moved regularly through COMPLETE ROM, the joints will become tight and stiff.

If the joints stay in the same position for a long time, the muscles, tendons and ligaments will become tight also.

4. Muscle Weakness

If a patient does not use his muscles, they will become weaker.

The more time a patient spends in bed without exercise, the weaker he will become.

5. Changes in Blood Circulation System

When a patient has been horizontal for a long time without movement, the blood circulation system does not have to work very hard to move blood to and from the heart.

Questions:

1. Explain why the blood circulation system does not have to work very hard moving blood to and from the heart when the patient is in a horizontal position.

_____

_____

Questions: (continued)

2. When the patient is vertical (not horizontal), will the blood circulation system have to work more or less?

_____

Explain your answer.

_____

_____

6. Changes in Bone Strength

Movements and weight bearing on bones helps to keep them strong.

If the patient has decreased movement and no weight bearing on the bones, they may become weak. Weak bones can break easily.

7. Depression

If the patient must stay in bed for a long time, he may become bored, feel useless and dependent, and slowly become depressed.

Question:

Imagine you were obliged to stay in bed for 6 months and were unable to move your body by yourself. You have become depressed.
List 5 things that someone could do to help you feel better when you are like this.

_____

_____

_____

_____

D. MEDICAL TREATMENT OF A BEDRIDDEN PATIENT

Medical treatment of a bedridden patient will depend on the specific problem of that patient.

E. PHYSICAL THERAPY EVALUATION OF A BEDRIDDEN PATIENT

The PTA must carefully evaluate the following:

1. Mentation (is the patient conscious, can he understand and follow directions, is he hopeful, depressed?)

2. Pain (where, when, how much, cause?)

3. Skin condition (bed sores, wounds, sutures, infection)

4. Respiratory condition (lungs clear, patient has any problems breathing).

5. Range of Motion (joint stiffness)

6. General muscle strength

7. Sensation (can the patient feel all body areas)

8. Functional ability (how much help does the patient need to move in bed, eat, dress)

9. Family support (is the family motivated to help work with the patient, how often)

F. PHYSICAL THERAPY TREATMENT OF A BEDRIDDEN PATIENT

In INTRODUCTION OF PHYSICAL THERAPY (Volume 1), we discussed the difference between preventative and curative treatments.

Questions:

1. Describe the difference between preventative and curative Physical Therapy.

2. Physical Therapy for bedridden patients is generally preventative treatment. What does this mean?

3. List 4 things that Physical Therapy treatment can help prevent in bedridden patients.

Physical Therapy treatment for bedridden patients includes:

1. Family/Nursing teaching.
2. Good patient positioning to prevent contractures and bed sores.
3. Regular turning of the patient to prevent bed sores.
4. Range of motion exercises.
5. Breathing exercises to prevent respiratory problems
6. General strengthening exercises for all body parts.
7. Progress to functional activities as soon as possible (sitting in bed, independent eating and dressing)

1. Family/Nursing teaching

Bedridden patients need a lot of care to prevent complications.

The PTA must remind nurses and teach family members about how to help in preventing complications.

Information for nurses and family members should include:

* keeping the bed clean (wet or dirty beds can increase the chance of bed sores)
* keeping the patient clean
* correct bad positioning for the patient
* turning the patient and helping the patient turn himself to prevent pressure sores
* emotional support - different ways to help prevent depression (books, games, speaking with others, handicrafts)

Whenever possible, the nurses and family must be included in the treatments of bedridden patients.

2. Good patient positioning to prevent contractures and bed sores

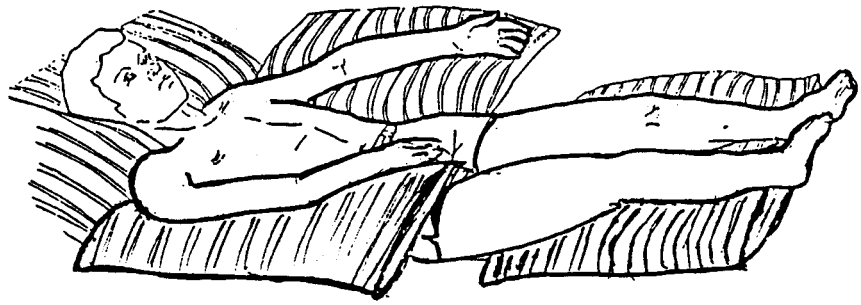
In this section we will give general guidelines for patient positioning in SUPINE, PRONE, and SIDELYING positions. (They may need to be adapted for different patients.)

A patient's position should be changed every 2-3 hours to prevent pressure sores.

IMPORTANT: Nurses and family members must be taught these positions and demonstrate how to put the patient in these positions.

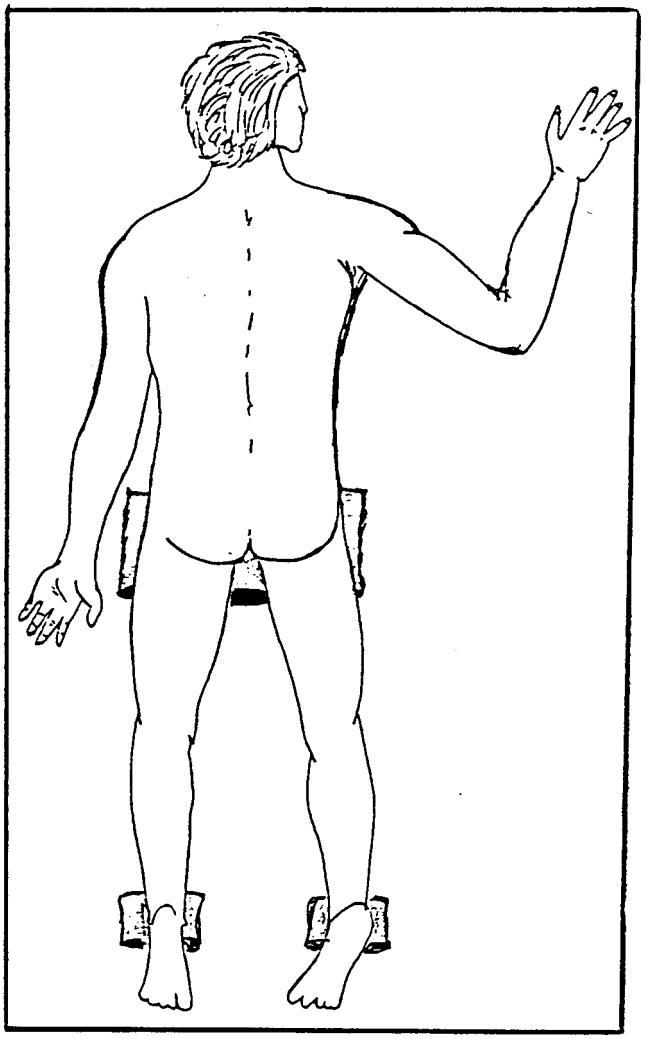
Good bed position in SUPINE position is:

- pillow under the head
- pillow to support the arms (if available)
- pillow under the knees
- foot board to keep ankle in dorsiflexion (if needed)



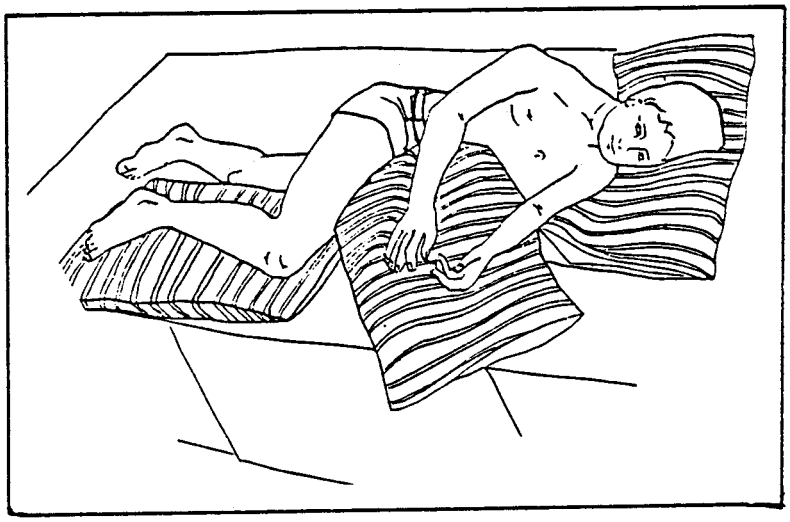
Good bed positioning in PRONE position is:

- no pillow under the patient's head
- arms positioned for comfort
- small pillow placed under hips for comfort
- small pillow placed under ankles for comfort



Good bed positioning in SIDELYING position is:

- small pillow under the patient's head
- shoulders are a little flexed for comfort
- arm (on the bed) positioned for comfort
- arm (away from the bed) resting on a pillow in front of the patient
- lower limb (on the bed) positioned for comfort
- lower limb (away from the bed) is in flexion and resting on pillows that support the knee and ankle.



3. Regular turning of the patient to prevent bed sores

Again, nurses and family members (and the patient if possible) must be instructed about how a patient's position can be changed and when a patient's position should be changed to help prevent bed sores.

Bed sores are caused by a decreased blood supply to an area of the body and the skin dies.

Every 2-3 hours a patient must change his position so that blood can arrive to all areas of the skin.

For more information on bed sore prevention and treatment, see PRESSURE SORES chapter, Volume 3.

Question:

A PTA carefully explains to the nurse and family how and why a patient's position must be changed every 2-3 hours.

The nurse and family correctly demonstrate this.

The next day the PTA arrives and sees the patient on his back. The patient has early signs of a pressure sore on his sacrum.

The patient has been on his back for 12 hours without movement.

What should the PTA do?

_____

_____

_____

_____

4. Range of Motion exercises

To prevent joint stiffness and contractures, ROM exercises must be made every day with the bedridden patient. (See RANGE OF MOTION chapter, Volume 2.)

ROM can be passive, active, or active assistive. The patient should be encouraged to help make this ROM as much as he can.

Generally, ROM is made by the PTA but nurses and family must be instructed about how to make ROM (and why it is important) to help support the PTA as much as possible.

Questions:

1. Why do we make ROM exercises for bedridden patients?

_____

_____

2. Is this treatment preventative or curative? _____

3. Describe how you will teach nurses and family to make ROM.

_____

_____

_____

_____

5. Breathing exercises to prevent respiratory problems

Deep breathing exercises are recommended for ALL bedridden patients (see RESPIRATORY chapter, Volume 2).

Deep breathing exercises helps to use all parts of the lungs and help prevent secretions from collecting in lower lung areas.

In addition, sitting positions and having the patient actively move as much as possible will help in preventing respiratory problems.

6. General strengthening exercises for all body parts

Most often, bedridden patients will recover and be able to leave the bed.

Strengthening exercises will help with blood circulation, help keep the bones strong, and help prepare the patient to leave the bed when he is able.

Questions:

1. In the upper limb, is it more useful to strengthen the elbow flexors or extensors?

   _____

   Why?

   _____

   _____

2. In the lower limb, is it more useful to strengthen the hip flexors or extensors?

   _____

   Why?

   _____

   _____

3. In the lower limb, is it more useful to strengthen the knee flexors or extensors?

   _____

   Why?

   _____

   _____

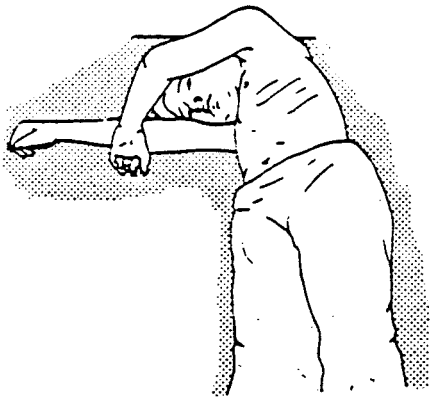
7. Progress to functional activities as soon as possible

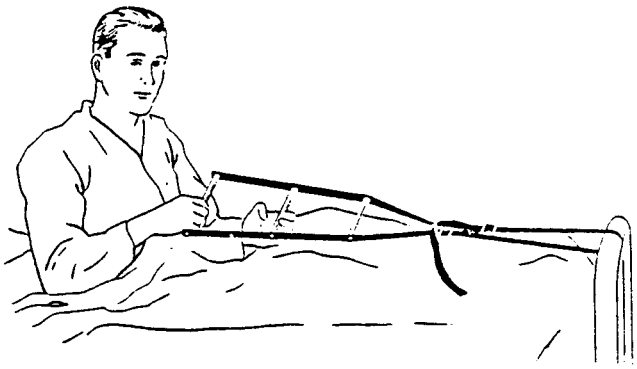
From the very beginning, the nurse, family and PTA must encourage the patient to MOVE!!

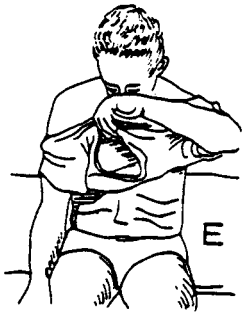
* ACTIVE MOVEMENT should be emphasized for all bedridden patients.

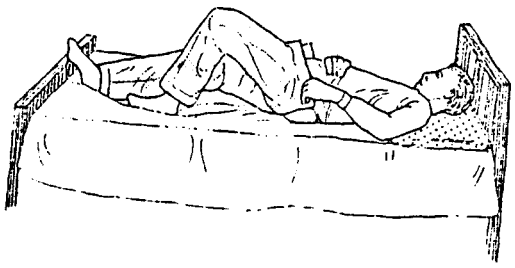
  This means active movement of the arms, legs, fingers, toes, trunk muscles ..... active movement of any area the patient can move!!

As soon as possible these movements must be applied to functional activities (rolling in bed, sitting, eating, dressing).









Functional activities must be practiced step by step. Each day the patient must learn and practice the simple parts of different activities.

<u>REMEMBER</u>: If active movement begins early, it will help decrease complications, and allow functional activities to be practiced as early as possible.

G. CHAPTER SUMMARY

A bedridden patient is a person that is obliged to stay in bed for a long time.

Patients may be bedridden because of disease or trauma.

If patients stay in bed for a long time without proper care, the following complications may happen:

- bed sores
- respiratory problems
- joint stiffness
- muscle weakness
- changes in blood circulation
- changes in bone hardness
- depression

Physical Therapy for bedridden patients is given to prevent complications from happening.

Bedridden patients need good care; nurses and family members must be taught some basic Physical Therapy treatment techniques to help prevent complications.

Specific evaluation and treatment techniques for bedridden patients are given in this chapter.

CHAPTER 36

TUBERCULOSIS (TB)

TUBERCULOSIS (TB) is a disease that causes abscesses in the lungs, bones or joints.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

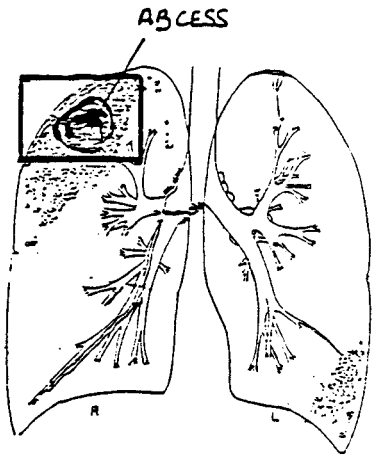
1. describe the effects of TB in the main parts of the body.
2. describe how TB is given to other people.
3. describe how Physical Therapy can help patients with TB.

CHAPTER CONTENTS

A. WHAT IS TUBERCULOSIS (TB)?

TB is a disease that causes abscesses.

Most often these abcesses are in the lungs.

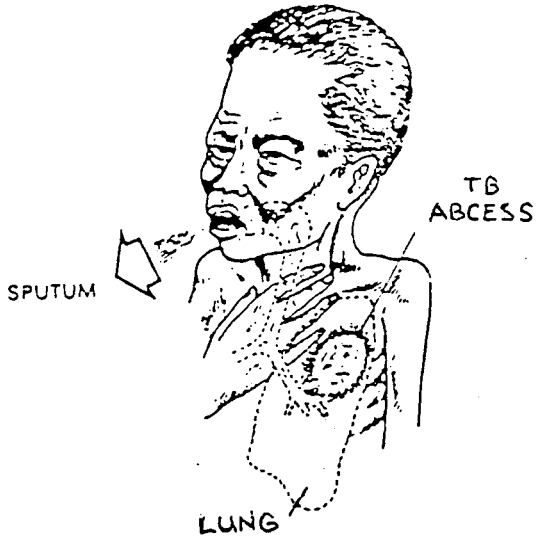


This disease may sometimes cause abscesses in the bones (Pott's Disease), and joints (vertebral column, hips, and knees).

These abscesses can cause serious damage to these parts.

TB can be very long lasting (chronic).

B. CAUSE OF TB



TB is caused from a bacteria that can be easily spread from one person to another.

It can be carried in the air by spit. When a person with active TB coughs, he can spread TB bacteria.

Question:

Why should a person with active TB cover their mouth when they cough?

_____

_____

_____

C. SPECIFIC INFORMATION ABOUT TB

Signs of TB can be chronic coughing, weight loss, mild fever and pain in the upper chest and back.

Methods to check for TB are:

- sputum (spit) testing
- x-rays
- skin tests

D. MEDICAL TREATMENT OF TB

Medicine is the only way to cure TB in any part of the body.

This medicine kills the bacteria. After 15 days the bacteria is killed, and the disease can no longer spread from one person to another.

The treatment normally takes a long time (from 6 to 18 months).

E. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH TB

Physical Therapy evaluation will depend on where the TB is in the patients body.

TB in the lungs (see RESPIRATORY DISEASE, Volume 3)

* chest deformities
* secretions (amount, color, location)
* where TB is in the lungs (see x-ray)
* how the patient breathes (diaphragm, upper chest, neck muscles)
* type of breathing (fast, slow, deep, shallow)
* how long the patient has had TB
* is TB in other parts of the body?
* functional abilities of the patient

TB in the bones (Potts Disease)

* location of TB (what bones, specific area of vertebral column)
* deformities (where, how much)
* swelling, inflammation or pain in the area
* does patient have TB in any other body areas (lungs?)
* range of motion
* functional ability of the patient
* general muscle strength and sensation (any nerve damage from vertebral bone compression)
* how long has patient had TB

TB in the joints

* location of TB (what joints?)
* joint condition (hot, red, swollen)
* pain (where, when, how much)
* range of motion
* limb deformities or contractures
* does patient have TB in any other body areas (lungs?)
* functional ability of the patient.

F. PHYSICAL THERAPY TREATMENT OF TB

All physical therapy treatment should come after the doctor has given medicine to kill the bacteria (stop the disease).

TB in the lungs: (see RESPIRATORY DISEASES, Volume 3)

The goals of Physical Therapy treatment are to remove secretions from the lungs and help the patient breathe better.

Removing secretions

It is important to remove secretions from the lungs because:

* secretions make air exchange more difficult in the lungs

* secretions can lead to other respiratory diseases

* doctors may request secretions from the lungs to test for TB.

Question:

Describe how secretions in the lungs (alveoli) make air exchange more difficult.

_____

_____

_____

_____

Techniques that can help to remove secretions are:

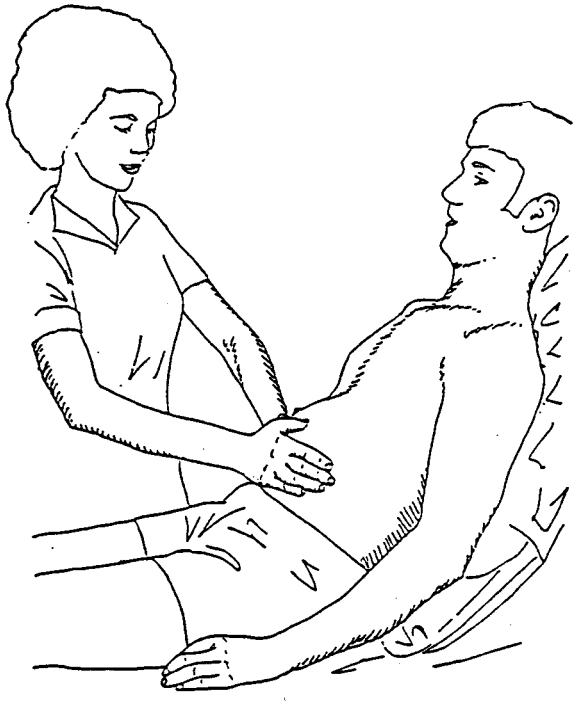
* deep breathing
* patient positioning
* vibrations
* coughing

> WARNING
>
> Clapping is NOT recommended for patients with TB in the lung;
>
> it may help to spread the disease !!

Help patient breathe better

If parts of a patient's lungs have abscesses and secretions, they will not be useful for good air exchange.

The patient may have difficulty breathing.



Techniques to help the patient breathe better are:

* deep breathing exercises
* diaphragmatic breathing

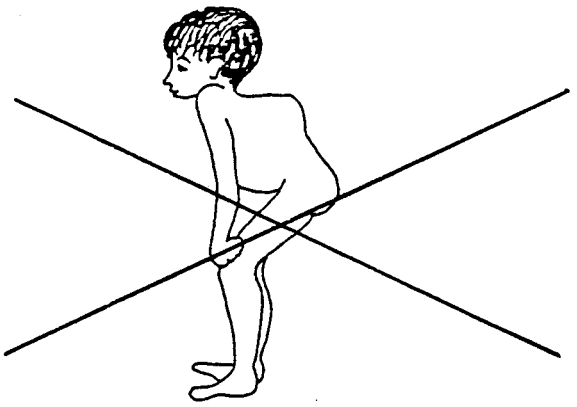
For instruction on how to do specific Physical Therapy techniques, please see RESPIRATORY chapter, Volume 2).

TB in the bones (Potts disease):

Most often, TB attacks the bones of the vertebral column.

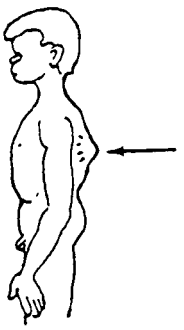
When TB is in the vertebral column, it may cause damage to the vertebral bodies.

The goal of Physical Therapy treatment is to prevent deformity.



Treatment of these patients is similar to treatment of patients with vertebral body fractures (see FRACTURES chapter, Volume 3).

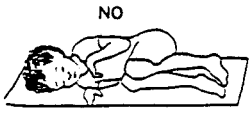
In these cases, the vertebral column may bend abnormally causing an increase in KYPHOSIS.

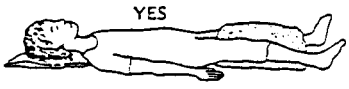


TB of
the backbone

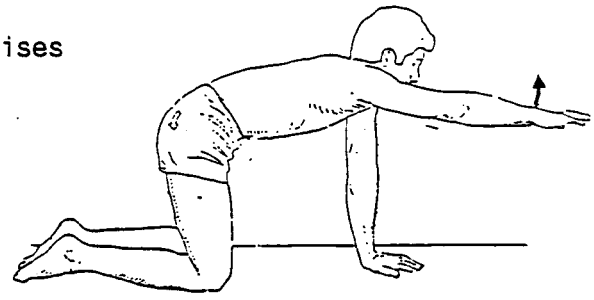
The PTA should try to prevent this bending by:

* good patient positioning

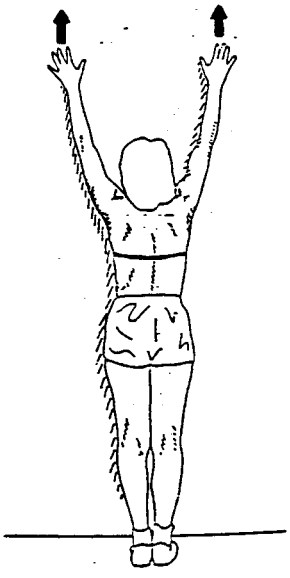




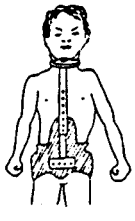
* gentle strengthening exercises for the back.

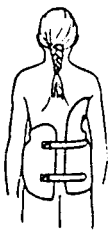


* gentle stretching for the anterior part of the chest and trunk.



* providing a back brace if needed.





If nerve damage is caused from this compression, the patient should be treated similar to a patient with a spinal cord injury. (See SPINAL CORD INJURIES chapter, Volume 3, for more details.)

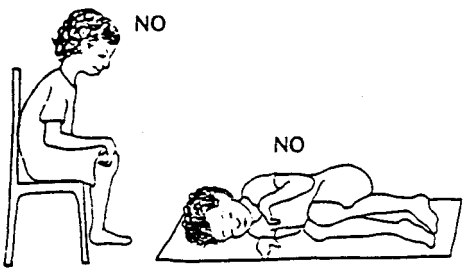
TB in the joints:

The goal of Physical Therapy treatment is to prevent contractures.

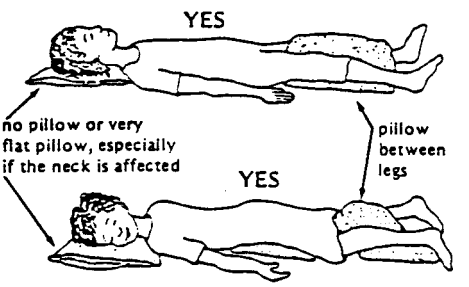
TB is the joints is similar to arthritis.

* Good patient positioning is needed to prevent joint stiffness. Ice can be used to help decrease pain

Help the child to be in positions that keep the arms, wrists, hips, and legs as straight as possible.

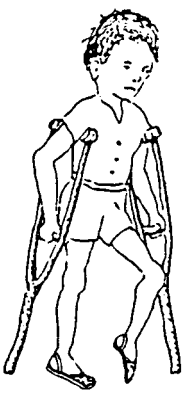


In these positions, contractures develop more easily.



In these positions, contractures are less likely to develop.

* Walking Aids may be needed to decrease weight bearing on the joint.



Please see ARTHRITIS chapter, Volume 3, for more details about Physical Therapy treatment.

G. CHAPTER SUMMARY

TB is a disease that most often damages the lungs. It may also damage the vertebral column or other parts of the body.

TB can be cured only by medicine from a doctor. The patient must take the medicine for a very long time for it to completely work (6-18 months).

For TB in the lungs, Physical Therapy can help remove secretions and help the patient breathe easier. No clapping is used for patients that have TB in the lung.

For TB in the vertebral column, Physical Therapy can help prevent increased kyphosis with positioning, exercise, and back bracing. Treatment for these patients is similar to treatment for patients with vertebral body fractures.

Patients with nerve damage from vertebral bone compression should be treated similar to patients that have had a spinal cord injury.

For TB in the joints, patients should be treated similar to patients with arthritis.

CHAPTER 37

BACK DEFORMITIES

BACK DEFORMITIES are exaggerated or abnormal curves of the vertebral column.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:.

1. describe the difference between kyphosis, lordosis and scoliosis.

2. name the areas and side of a scoliotic curve.

3. identify soft tissue changes seen with different back deformities.

4. given a patient problem, correctly identify the back problem and demonstrate stretching or strengthening techniques to make this problem better.

CHAPTER CONTENTS

A. INTRODUCTION

Before studying the exaggerated or abnormal shapes of the vertebral column, the PTA must understand the NORMAL shape of the vertebral column.

In OSTEOLOGY chapter, Volume 1, the shape of the vertebral column was described in detail.

The questions below are given to review the information learned in OSTEOLOGY.

Questions:

1. What are the two views that you can see the shape of the vertebral column (anterior view, posterior view, or lateral view)?

   _____

2. Normally, the vertebral column has curves in an anterior-posterior direction. For each area of the vertebral column, please write if the curve is anterior or if the curve is posterior.

   Cervical area _____

   Thoracic area _____

   Lumbar area _____

   Sacral area _____

3. Please describe kyphosis.

   _____

   _____

   _____

Questions: (continued)

3a Is kyphosis normally seen in the vertebral column?

Yes _____ No _____

If yes, describe where?

_____

_____

4. Please describe lordosis.

_____

_____

_____

4a. Is lordosis normally seen in the vertebral column?

Yes _____ No _____

If yes, describe where?

_____

_____

5. You are standing behind a man. When you look at his vertebral column you see it has a lateral bend to the left. The vertebral column is not straight. Is this normal?

Yes _____ No _____

Explain your answer.

_____

_____

_____

_____

_____

B. WHAT ARE BACK DEFORMITIES?

Back deformities are exaggerated or abnormal cuves of the vertebral column.

Normally, the vertebral column has anterior curves and posterior curves.

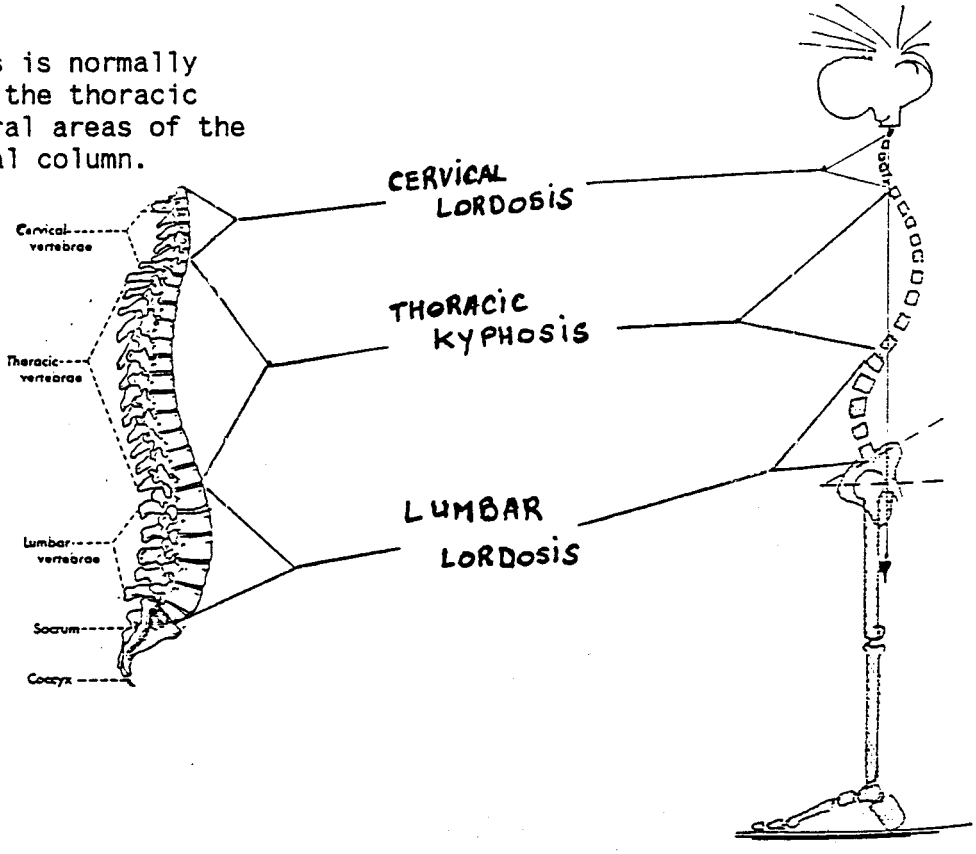
These can be seen from a lateral view of the person.

These anterior curves are called lordosis.

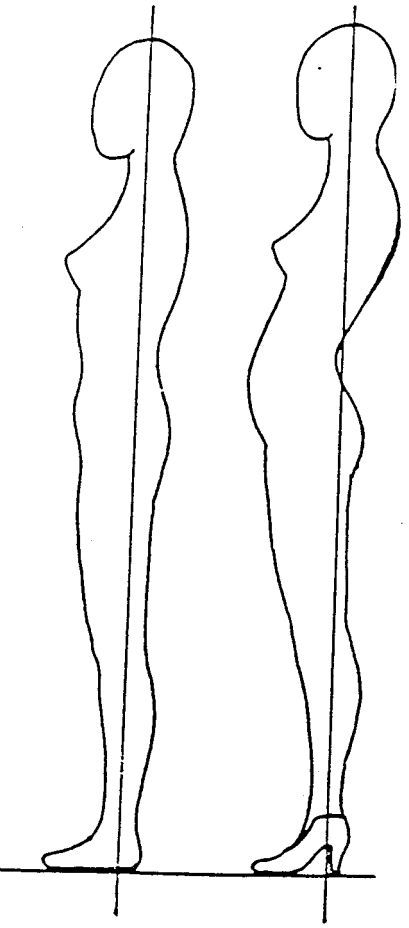
Lordisis is normally seen in the cervical and lumbar areas of the vertebral column.

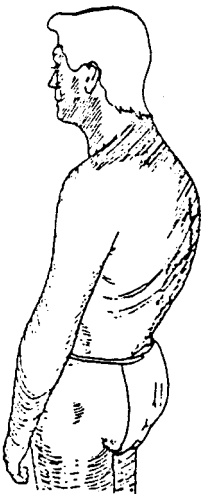
The posterior curves are called kyphsosis.

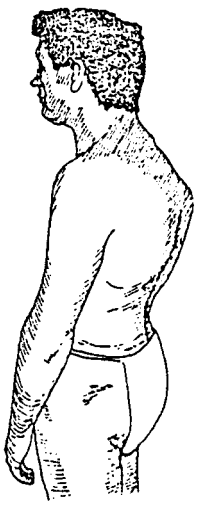
Kyphosis is normally seen in the thoracic and sacral areas of the vertebral column.

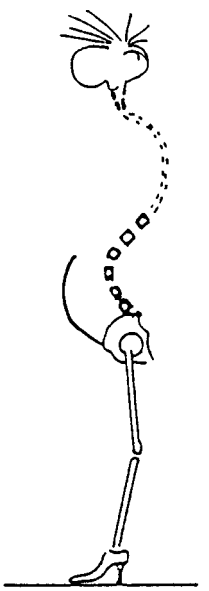


If the kyphosis and lordosis curves become exaggerated (too big) then this may cause a back deformity.

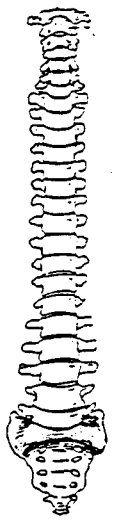




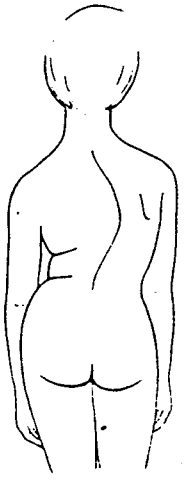


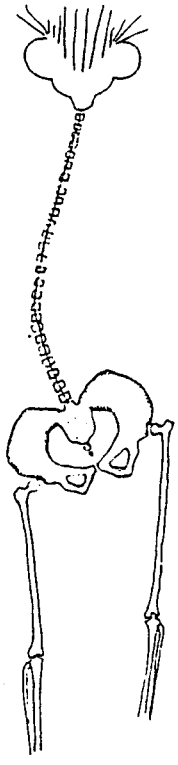


Normally, the vertebral column looks straight from a posterior view.



If a person is standing in anatomical position and the vertebral column laterally curves to the left or the right, these are abnormal curves of the vertebral column





A lateral curve of the vertebral column is called <u>SCOLIOSIS</u>. Scoliosis is never a normal curve in the vertebral column.

IN SUMMARY

Back deformities can be:

Exaggerated Lordosis or Kyphosis

Lateral curve of the vertebral column - SCOLIOSIS

B. CAUSE OF BACK DEFORMITIES

Back deformities may be caused by many different reasons. Causes of back deformities include:

* bone disease (vertebral body damage)
* muscle imbalance (muscles pulling on the vertebrae unequally)
* trauma (injury)
* congenital deformity of the bone (baby is born with abnormally shaped vertebral bones)
* leg length differences (one leg is shorter than the other)
* bad positional habits (holding the back in the same position every day)
* unknown reasons

Questions:

1. A woman had a disease that destroyed parts of the vertebral bodies in her thoracic vertebrae. What back deformity may occur in this area (increased kyphosis or increased lordosis)?

   _____

   Explain your answer.

   _____

   _____

   _____

2. A young boy has paralysis of the vertebral muscles on the left side of the vertebral column. The muscles on the right side of the vertebral column are normal. What type of deformity could this boy develop (increased kyphosis, increased lordosis, or scoliosis)?

   _____

Questions: (continued)

Explain your answer.

_____

_____

_____

3. A woman sits and makes baskets all day, every day. After 15 years of doing this work she has developed a back deformity. She has exaggerated kyphosis in the thoracic area.
In your own words, explain how this happened.

_____

_____

_____

_____

D. SPECIFIC INFORMATION ABOUT BACK DEFORMITIES

Information presented in this section includes:

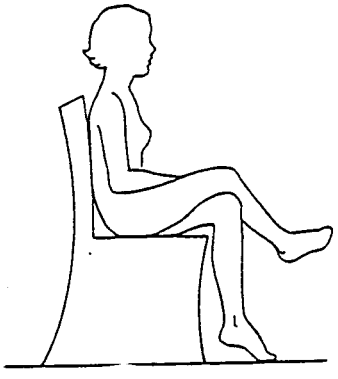
1. Posture
2. Describing back deformities (scoliosis)
3. Soft tissue changes that are seen with back deformities
4. Bony changes that may be seen with back deformities
5. Other problems caused by back deformities

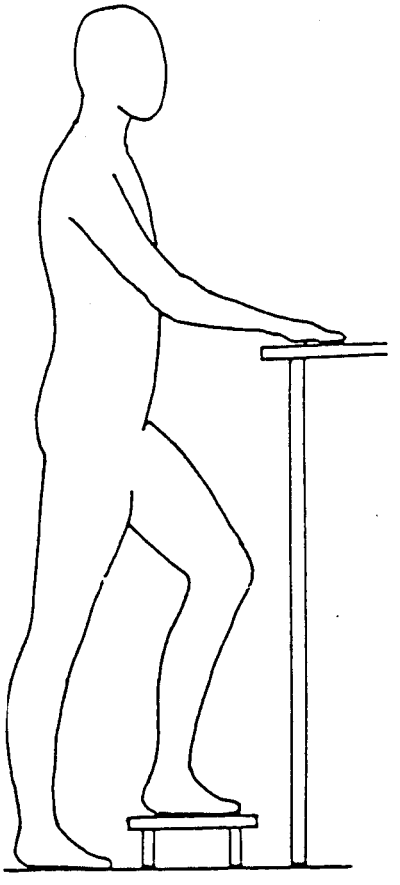
1. POSTURE

Posture is a position of the body.

"Good posture" in sitting and standing usually means the following:

* head in midline, looking forward
* shoulders equal level
* trunk straight (no lateral curves)
* normal anterior/posterior curves of the vertebral column
* pelvis is level
* upper and lower limbs in neutral in standing





2. DESCRIBING BACK DEFORMITIES (SCOLIOSIS)

When working with a medical team the PTA must know how to correctly describe a back deformity (and be able to understand when someone is describing a back deformity!).

Scoliosis is generally the most difficult deformity to describe.

When describing the location of scoliosis, the PTA must include:

* what side the bend is on (left or right)

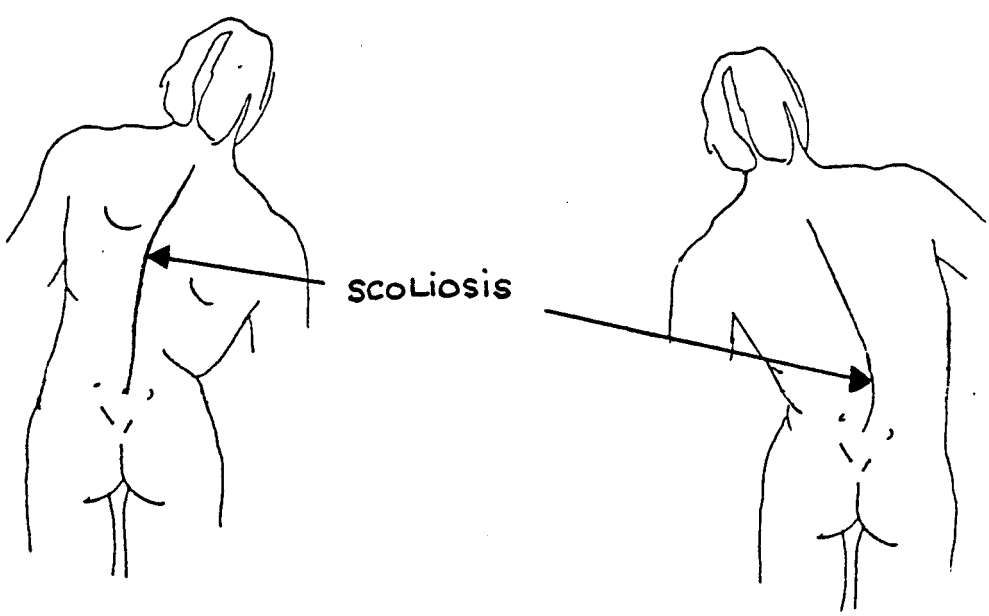
* what vertebral area the bend is in (cervical, thoracic, lumbar)

Example

This person has
LEFT THORACIC SCOLIOSIS

Example

This person has
RIGHT LUMBAR SCOLIOSIS

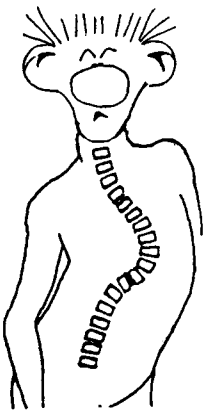


Activity:

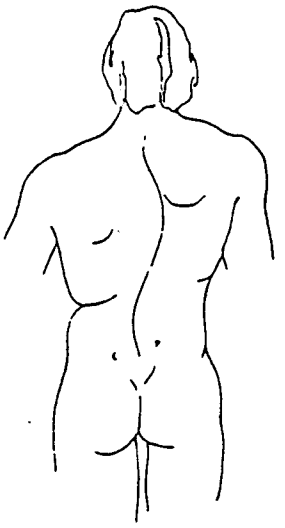
In all the pictures given below, please describe the type of scoliosis (what side, what area) seen in each picture. (Note: some pictures may have more than one curve.)

A.

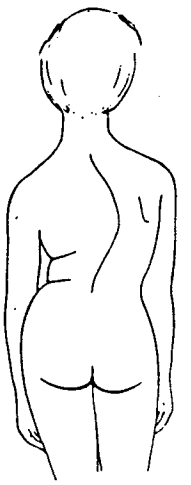
B.



C.



D.



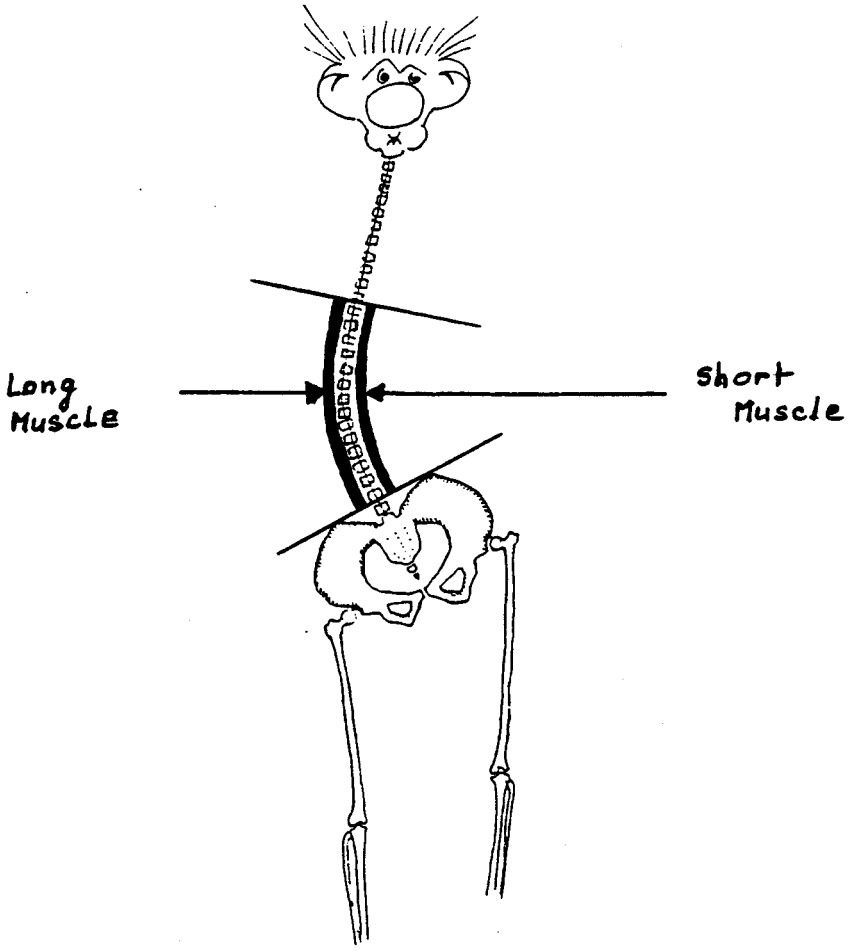
2. SOFT TISSUE CHANGES THAT ARE SEEN WITH BACK DEFORMITIES

The causes of back deformities may be different for different people.

For all back deformities the following soft tissue (ligament, tendon/muscle) changes will happen:

* lengthening of soft tissues on the same side as the curve

* shortening of soft tissues on the opposite side of the curve



Questions:

1. A man has exaggerated (increased) lumbar lordosis. Will the ligaments on the anterior side of the vertebral column become shortened or lengthened?

   _____

2. A girl had a disease that paralyzed the vertebral muscles of the right thoracic area. What type of deformity could this girl develop?

   _____

   In the thoracic areas, on what side of the vertebral column will the ligaments and muscles be shortened, (left or right)?

   _____

3. A man has increased thoracic kyphosis and increased cervical lordosis. In the space provided please draw a picture of this man.

   In the thoracic area, where are the soft tissues shortened (anterior side or posterior side of vertebral column)?

   _____

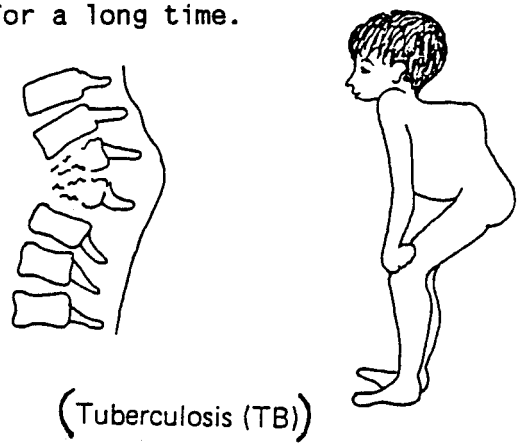
   In the cervical area, where are the soft tissues shortened (anterior side or posterior side of vertebral column)?

   _____

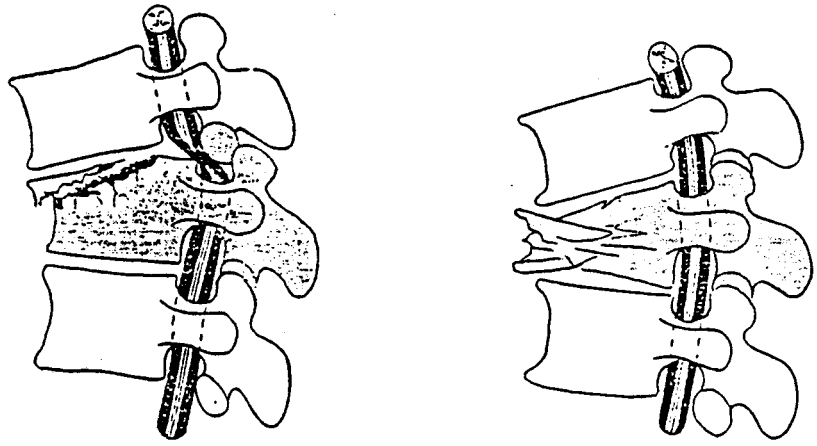
4. BONY CHANGES THAT MAY BE SEEN WITH BACK DEFORMITIES

In some patients with back deformities, there may be changes seen in the vertebral bones.

Abnormal bone shape may be congenital (the baby has it when he is born), may be from disease (Tuberculosis), from trauma (compression fracture of the vertebral bodies), or from abnormal pressure on the vertebral bones for a long time.



(Tuberculosis (TB))



(TRAUMA)

It is important to know if back deformities have bony changes; an X-ray can be used to identify if there have been changes in bone shape.

5. OTHER PROBLEMS CAUSED BY BACK DEFORMITIES

The other problems that a back deformity may cause are:

a. compensatory curve

b. pain

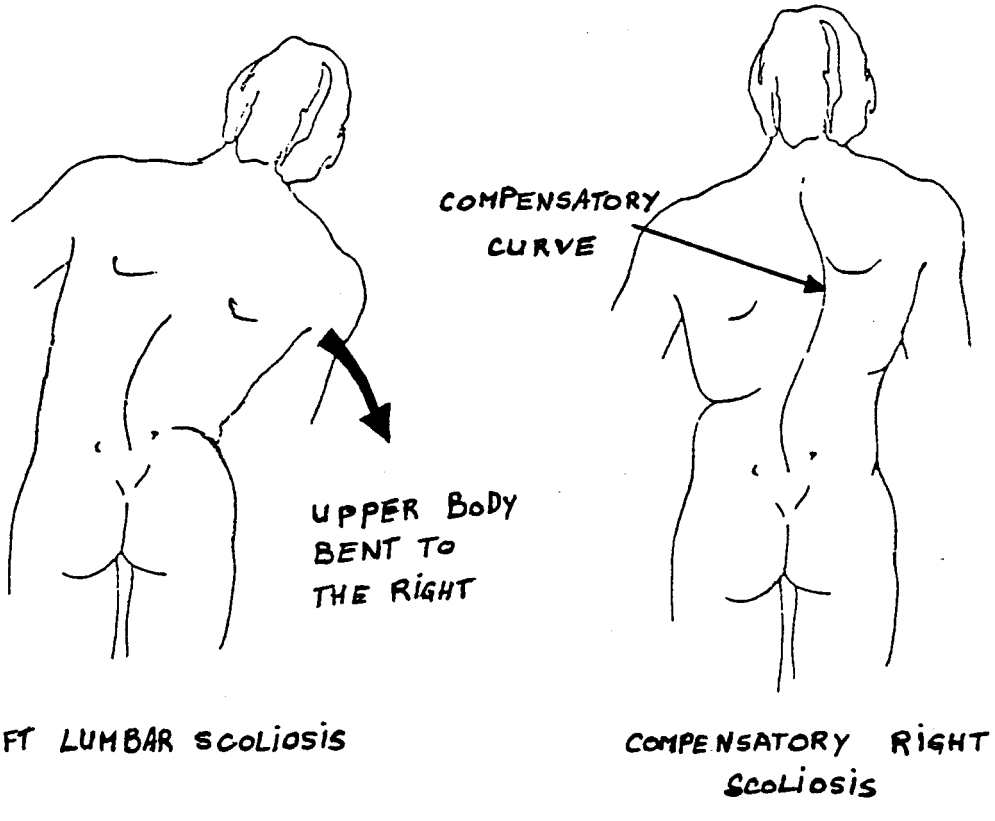
c. respiratory difficulties

a. compensatory curve

If our back has an exaggerated or abnormal curve in one direction, generally we will develop a curve in the opposite direction to help keep the body straight. This secondary curve is called a compensatory curve.

Example

A man has left scoliosis in his lumbar area. His upper body will bend to the right. To keep his upper body straight, he may develop right scoliosis (a compensatory curve) in the thoracic area to help keep the body straight.



Questions:

1. A woman has severe kyphosis in the thoracic area. In your own words, describe the position of the body with this deformity.

To help this woman hold her head straighter, what compensatory curve will happen in the cervical area (increased or decreased lordosis)?

Explain your answer.

2. A man has left scoliosis in the thoracic area. To help put his body in a straight position, what compensatory curves could be made? (Describe where and what side.)

b. Pain

In OSTEOLOGY and NEUROLOGY chapters, Volume 1, we described the shape of the vertebral column and where nerves enter and leave through the vertebral column.

Activity:

In the space provided, please draw a picture of how and where sensory and motor nerves leave the vertebral column.

If the spaces where the nerves enter and leave the vertebral column become smaller or have a change in shape, there will be pressure on the nerves.

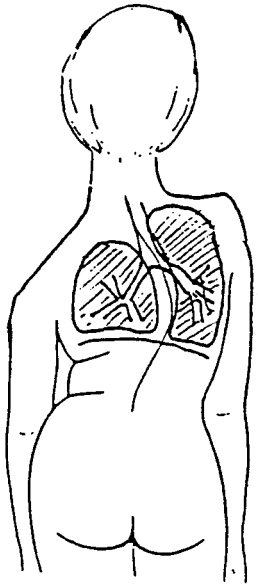
This pressure can cause pain in the back area, or anywhere the specific nerve travels.

c. Respiratory difficulties

If exaggerated or abnormal curves in the vertrebral column happen in the thoracic area, a patient may have problems brining air into and out of the lungs.

Example

If a patient has severe right scoliosis in the thoracic vertebrae, the ribs on the left will have no space to move. Air coming into and going out of the left lung will be greatly decreased.



E. MEDICAL TREATMENT OF BACK DEFORMITIES

In severe cases, surgery may be given to correct bone deformities and give an appropriate immobilization device.

In other cases, a doctor may give a back brace to help hold the back in a good position between Physical Therapy treatments.

Medicine may be given to help decrease pain or muscle spasms.

Generally, medical treatment for back problems is limited. Back problems are problems with muscles, joints, ligaments, movement, and body position .... helping back problems is the work of the Physical Therapy Assistant.

F. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH BACK DEFORMITIES

In seeing a patient with a back deformity, the PTA should carefully evaluate:

* general posture of the patient
  (check posture in standing, sitting, and lying positions to compare differences)

* identify the back deformity(s)
  (type of deformity, vertebral area, what side, how severe)

* pain (where, when, how much)

* identify other joint deformities or abnormal body positions

* range of motion (all lumbs AND trunk)

* strength (including trunk and abdominal muscles)

* respiratory function

* can the deformity be corrected
  (by active movement of the patient or by passive positioning by the PTA)

* leg length (measure in supine position from ASIS to medial malleous of same leg)

* how long has the patient had this deformity?

* possible cause of the back deformity

* functional ability of the patient

G. PHYSICAL THERAPY TREATMENT OF PATIENTS WITH BACK DEFORMITIES

Physical Therapy treatment of patients with back deformities includes a combination of postural teaching, stretching exercises and strengthening exercises.

Application of each of these techniques will depend on the individual needs of the patient.

Information given in this section includes treatment ideas for the most common types of back deformities.

The PTA must understand WHY different exercises are given, and then apply these exercises (or make new exercises) for different patients.

Contents of this section includes:

1. postural teaching for all patients
2. identifying cause of back deformity
3. patients with increased cervical lordosis
4. patients with increased thoracic kyphosis
5. patients with increased lumbar lordosis
6. patients with scoliosis
7. patients with vertebral bone deformities

1. POSTURAL TEACHING FOR ALL PATIENTS

All patients with back deformities should relearn what "good posture" is. The PTA must explain about good posture to the patient. In addition, all patients must actively relearn good posture.

Active learning includes:

a. feeling good posture

b. seeing good posture

c. practicing good posture

(Note: Not all patients will be able to have "good posture". Many may be limited by bony deformities. The PTA and patient should work together to help improve the patient's posture as much as possible.)

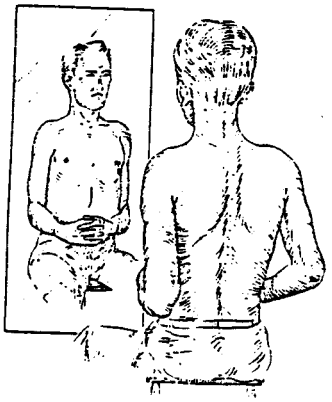
a. feeling good posture

The PTA should help position the patient so that the back has a good position. (Supine position and correction of abnormal curves is useful for patients with scoliosis.)

The corrected position may feel "abnormal" at first, but the patient should continue with activity until the corrected position feels normal.

b. seeing good posture

It is helpful to have a mirror so that the patient can see himself and correct abnormal posture as much as possible.



c. practicing good posture

If the patient practices good posture for the time he works with the PTA and then practices poor posture the rest of the time, the patient's back deformity will not improve.

Practicing good posture must continue all day, every day, for the rest of the patient's life.

2. IDENTIFYING CAUSE OF BACK DEFORMITY

The PTA and patient must work together to help identify the cause of the patient's back deformity.

For some scoliosis patients, the cause may be unequal leg lengths.

For some patients with increased lordosis or kyphosis, the cause may be poor sitting or standing habits.

The PTA should try to understand the cause of the back deformity. In some cases this information may help greatly in the patient's recovery.

3. PATIENTS WITH INCREASED CERVICAL LORDOSIS

(Remember, complete correction of a deformity is not possible in all patients ... especially patients that have changes in vertebral bone shape.)

As we have said at the beginning of this section, all Physical Therapy for patients with back deformities will include some stretching and strengthening exercises.

Questions:

A woman has increased cervical lordosis.

1. What muscles will be tight and shortened (neck flexors or extensors)?

   _____

2. Where will ligaments be shortened (on the anterior or posterior side of the vertebral column)?

   _____

3. What neck movement will stretch the tissues in this patient (neck flexion or neck extension)?

   _____

4. What muscles do you want to strengthen (neck flexors or neck extensors?

   _____

   Explain your answer.

   _____

   _____

   _____

   _____

   _____

To help correct excessive cervical lordosis, the PTA and the patient must work together to do the following:

a. stretch the muscles on the posterior side of the neck

b. strengthen the muscles on the anterior side of the neck

a. <u>stretch the muscles on the posterior side of the neck</u>

Neck extensors are stretched in a chin to chest position. (see picture)

b. <u>strengthen muscles on the anterior side of the neck</u>

One suggested technique is a chin-tuck exercise, (see picture)

<u>Activity</u>:

Form groups of 2-3 people in each group. Together discuss and develop 2 stretching exercises and 2 strengthening exercises that may help correct exaggerated cervical lordosis.

All groups will demonstrate their ideas. The whole class together with the instructor will discuss the advantages and disadvantages of each exercise.

4. PATIENTS WITH INCREASED THORACIC KYPHOSIS

(Remember, complete correction of a deformity is not possible in all patients ... especially patients that have changes in vertebral bone shape.)

Questions:

A man has increased thoracic kyphosis.

1. Describe the trunk extensors in the thoracic area. Will they be shortened or lengthened?

_____

2. What 2 compensatory curves may develop because of increased thoracic kyphosis?

_____

3. What muscles need to be stretched (the muscles of the anterior side of the trunk or posterior side of the trunk)?

_____

4. Increased thoracic kyphosis may limit rib movement. Describe how this decreased rib movement may limit the amount of air going into the lungs.

_____

_____

_____

_____

_____

To help correct excessive thoracic kyphosis, the PTA and the patient must work together to do the following:

a. stretch the ligaments, tendons, and muscles in the chest area on the anterior side of the trunk

b. strengthen the trunk extensor muscles in the thoracic area

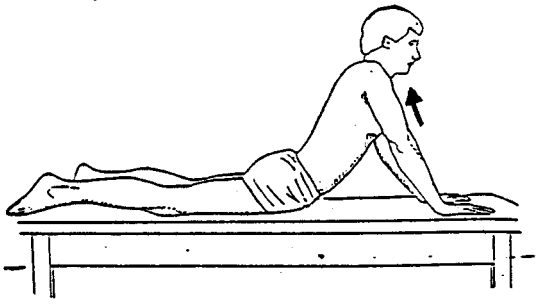
c. work on breathing exercises with rib movement

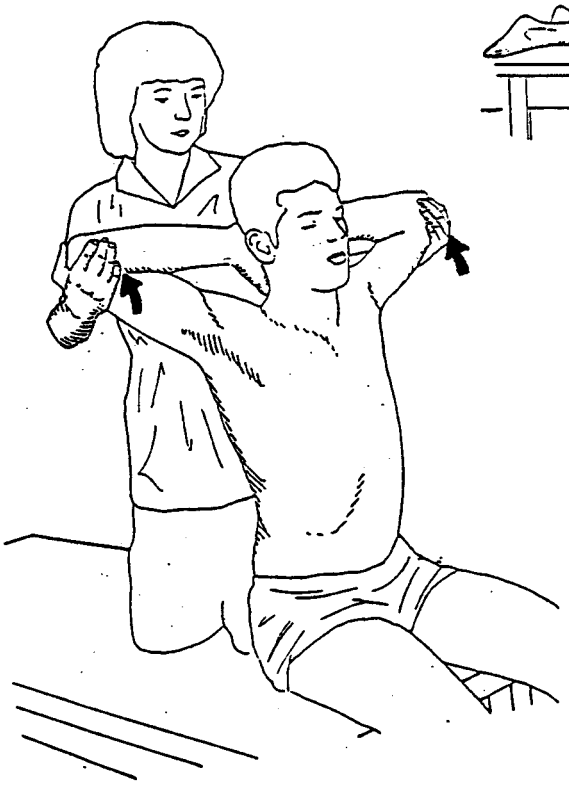
d. be careful not to encourage compensatory curves in the cervical or lumbar areas

e. treat other curves if they are present

a. <u>stretch the ligaments, tendons, and muscles in the chest area on the anterior side of the trunk</u>

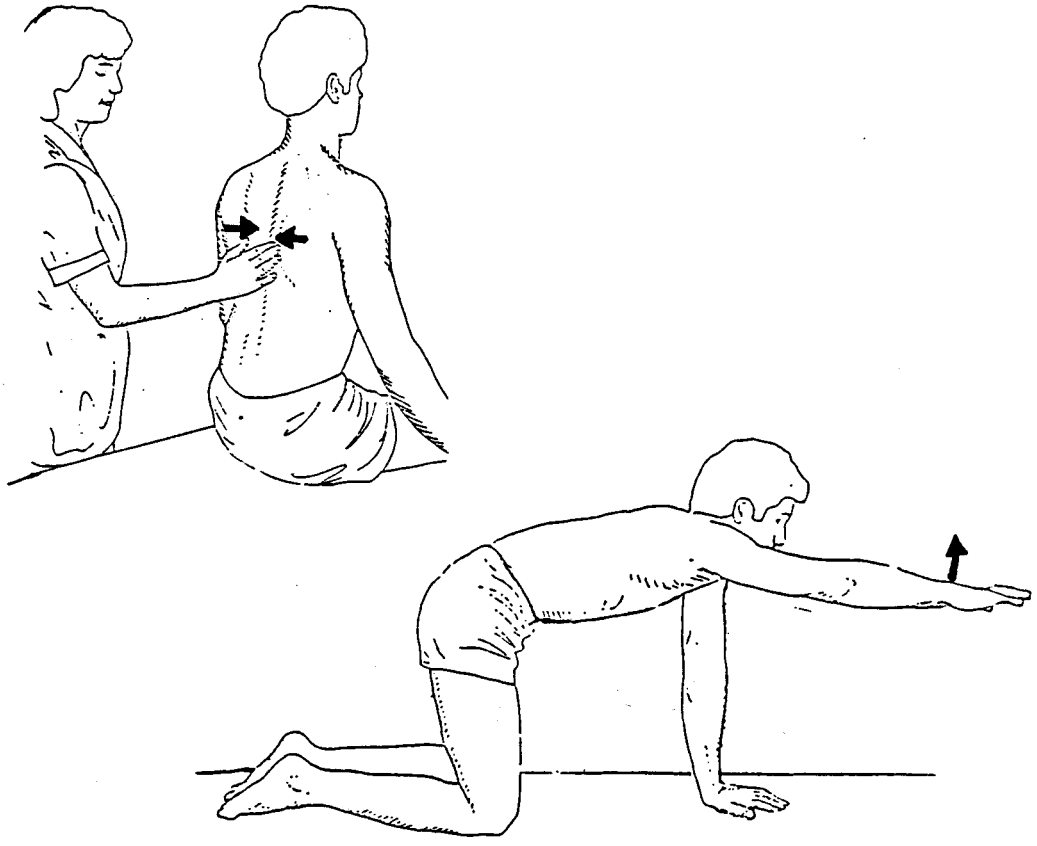
Movements of trunk extension, and shoulder abduction, flexion and external rotation are all helpful in stretching appropriate muscles on the anterior side of the trunk. See pictures below for suggestions.





b. <u>strengthen the trunk extensor muscles in the thoracic area</u>

Strengthen the trunk extensor muscles in the thoracic area.



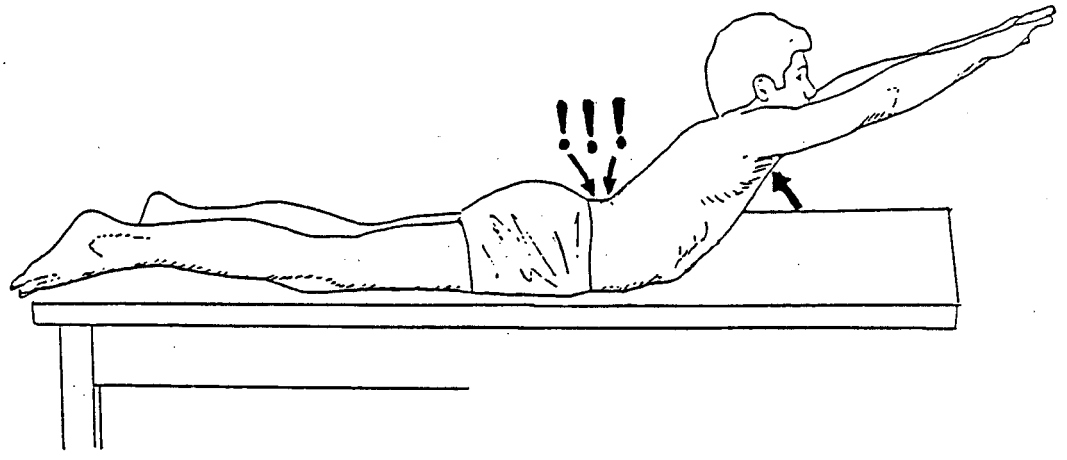
c. <u>work on breathing exercises with rib movement</u>

Normally the ribs move up and out when we inhale. When we exhale, the ribs move down and in.

The PTA and patient must work together to regain or maintain these rib movements.

d. <u>be careful not to encourage compensatory curves in the cervical or lumbar areas</u>

Avoid exercises that will increase cervical lordosis and lumbar lordosis. If possible these areas should be in a normal position during all exercises.



e. <u>treat other curves if they are present</u>

If there are other exaggerated or abnormal curves, the PTA must include exercises in the treatment program that will help to normalize these curves.

<u>Activity</u>:

Form groups of 2-3 people in each group. Together discuss and develop 2 stretching exercises and 2 strengthening exercises that may help correct exaggerated thoracic kyphosis.

All groups will demonstrate their ideas. The whole class together with the instructor will discuss the advantages and disadvantages of each exercise.

5. PATIENTS WITH INCREASED LUMBAR LORDOSIS

(Remember, complete correction of a deformity is not possible in all patients ... especially patients that have changes in vertebral bone shape.)

Questions:

A man has increased lumbar lordosis.

1. How will hip flexion and position change this curve (increase or decrease lumbar lordosis)?

   _____

   Explain your answer.

   _____

   _____

   _____

2. The abdominal muscles are on the anterior side of the trunk. In this patient are the abdominal muscles lengthened or are the abdominal muscles shortened?

   _____

   Explain your answer.

   _____

   _____

   _____

3. What is a good stretching position for this patient (lumbar flexion or lumbar extension)?

   _____

   Explain your answer.

   _____

   _____

   _____

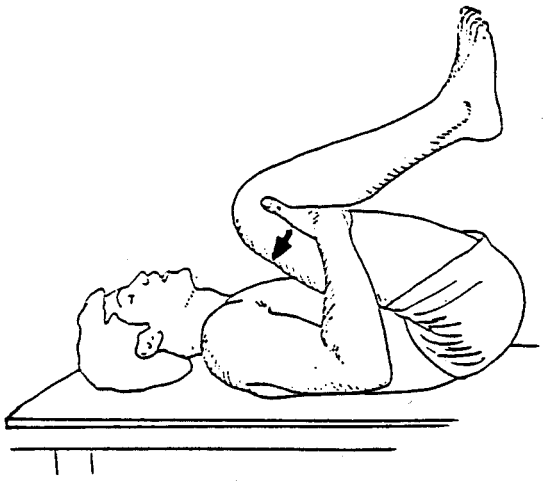
To help correct increased lumbar lordosis, the PTA and the patient must work together to do the following:

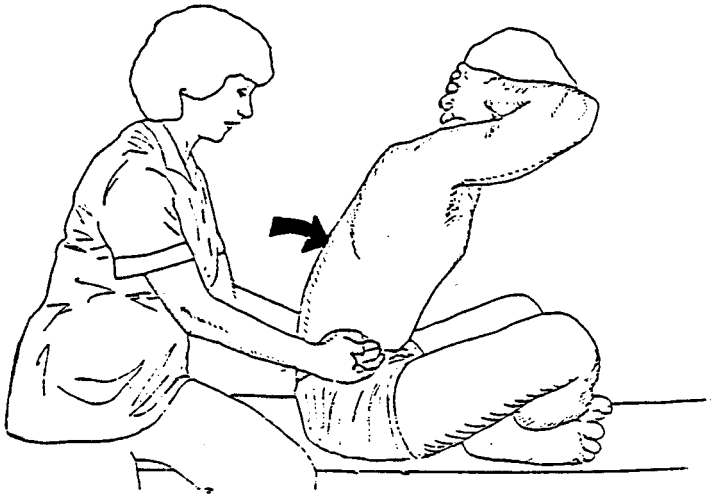
a. stretch the ligaments, tendons, and muscles in the low back area on the posterior side of the trunk

b. strengthen muscles on the anterior side of the trunk (abdominal muscles)

a. <u>stretch the ligaments, tendons, and muscles in the low back area on the posterior side of the trunk</u>

Trunk flexion movements are good for stretching tight trunk muscles. See pictures for suggested exercises.





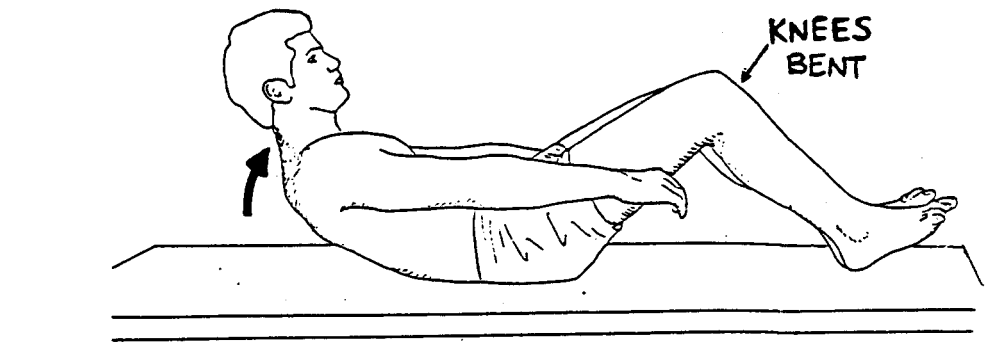
b. <u>strengthen muscles on the anterior side of the trunk (abdominal muscles)</u>

WARNING

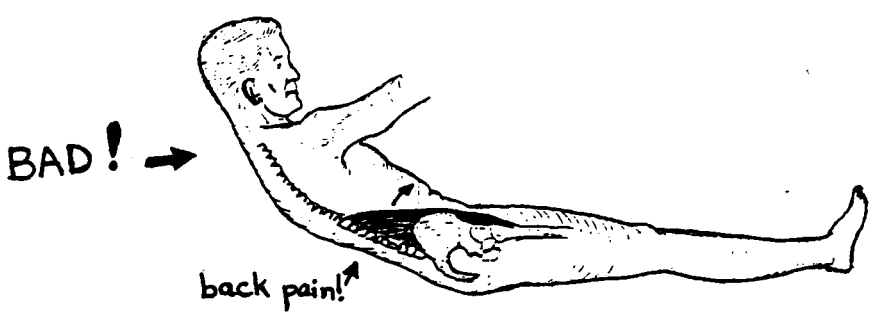
Many people try to strengthen abdominal muscles with the lower limbs straight. This technique is <u>NOT</u> recommended.

With the legs straight, muscles and bones will pull the lumbar area into MORE lordosis!

To prevent this, all abdominal exercises should be made with the knees and hips flexed.



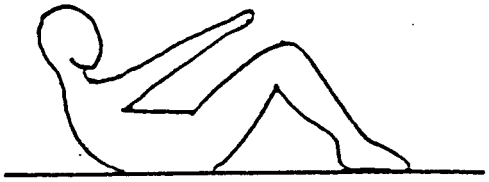
ABDOMINAL MUSCLES WORKING



HIP FLEXOR MUSCLES WORKING

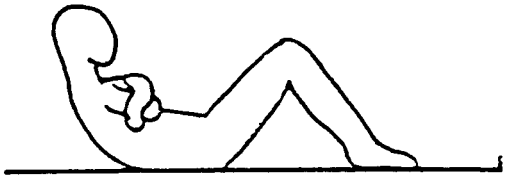
Examples of abdominal strengthening exercises are given in the pictures below.

EASY



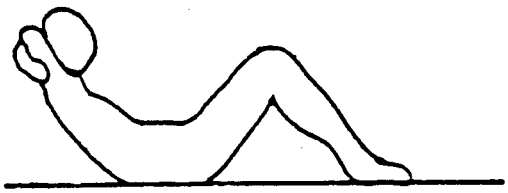
1

DIFFICULT

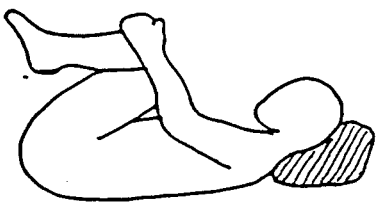


2

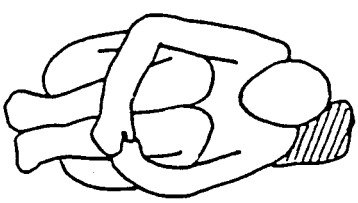
VERY DIFFICULT



3



4



5

Activity:

Form groups of 2-3 people in each group. Together discuss and develop 2 stretching exercises and 2 strengthening exercises that may help correct exaggerated lumbar lordosis.

All groups will demonstrate their ideas. The whole class together with the instructor will discuss the advantages and disadvantages of each exercise.

6. PATIENTS WITH SCOLIOSIS

(Remember, complete correction of a deformity is not possible in all patients ... especially patients that have changes in vertebral bone shape.)

Questions:

A man woman has left thoracic scoliosis.

1. Where are thoracic muscles tight (in the left side or right side of the vertebral column)?

   _____

2. What lung may have decreased air moving in and out of it (right lung or left lung)?

   _____

3. The patient has a compensatory curve in the cervical area. Where is this cervical scoliosis located (the left side or the right side)?

   _____

Questions: (continued)

4. In the thoracic area what muscles will you stretch (muscles on the left side or right side of the vertebral column)?

_____

Explain your answer.

_____

_____

_____

To help correct scoliosis, the PTA and the patient must work together to do the following:

a. stretch all the ligaments, tendons, and muscles that are on the opposite side of the curve

b. strengthen muscles that are on the same side as the curve

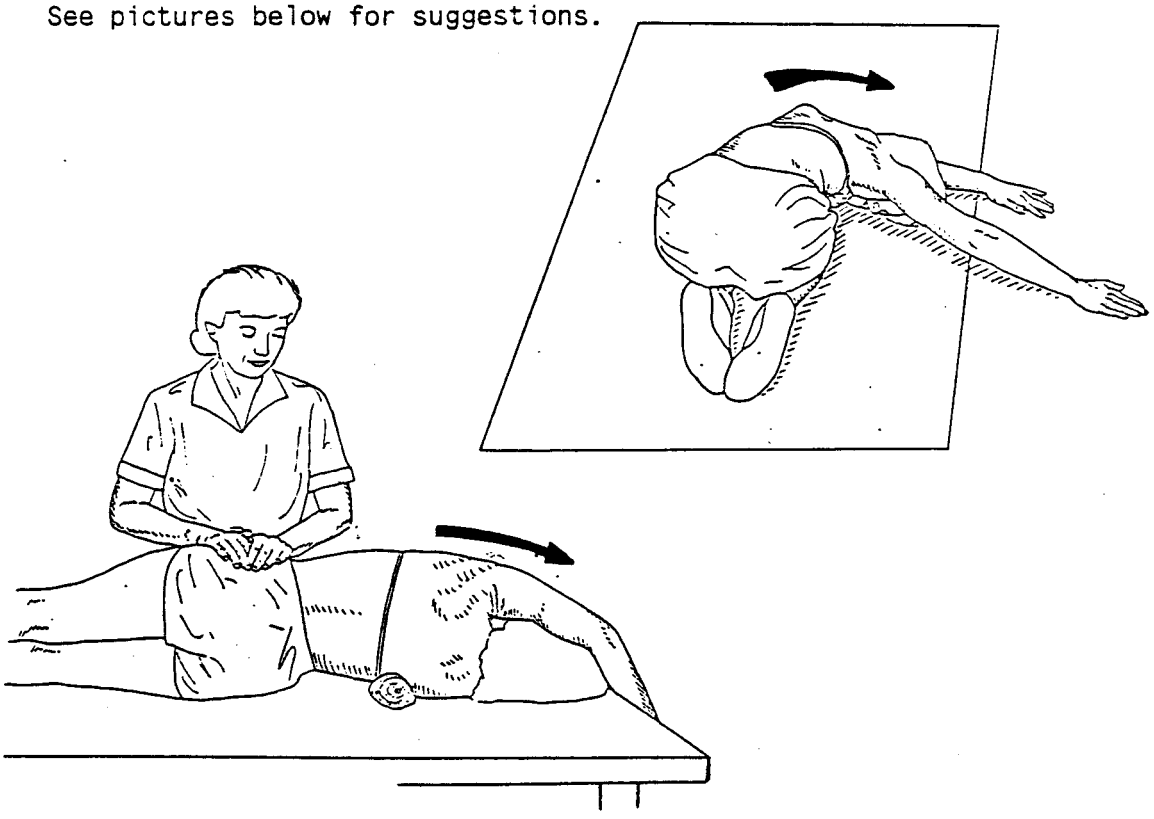
c. respiratory exercises to increase rib space and rib movement on the opposite side of the curve.

d. be careful not to encourage compensatory curves in other areas

e. treat other back deformities present.

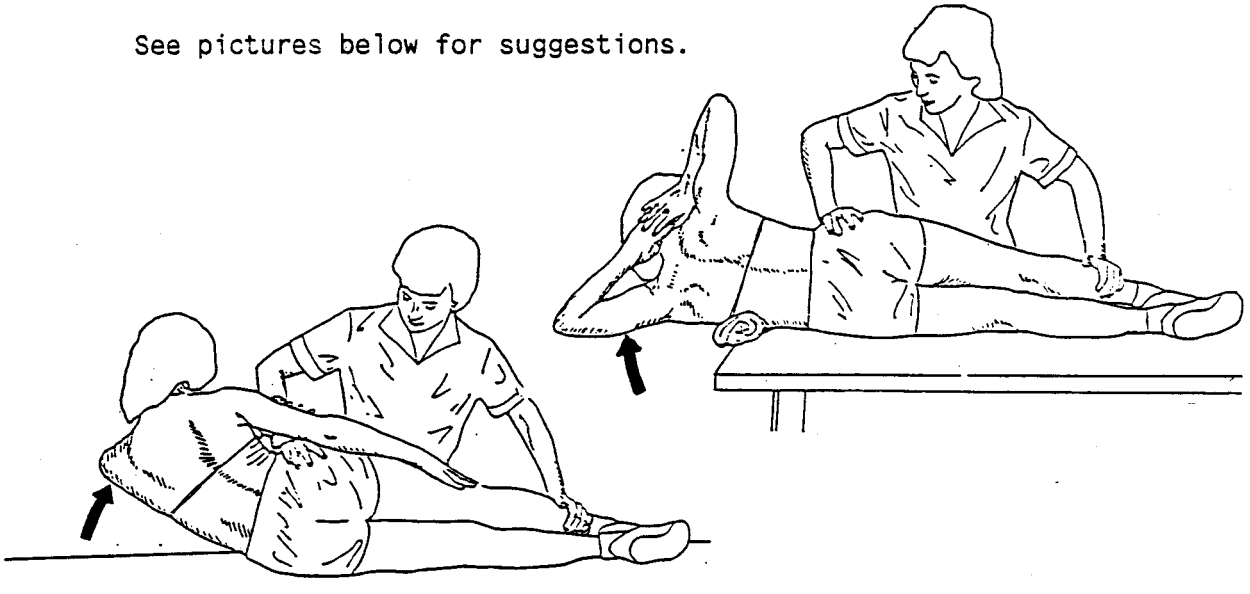
a. <u>stretch all the ligaments, tendons, and muscles that are on the opposite side of the curve</u>

See pictures below for suggestions.



b. <u>strengthen muscles that are on the same side as the curve</u>

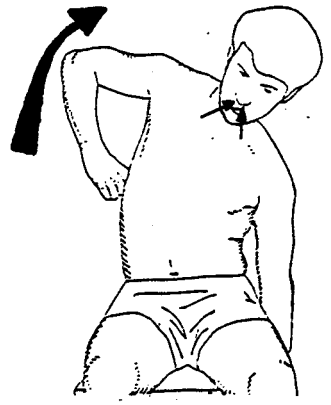
See pictures below for suggestions.



c. <u>respiratory exercises to increase rib space and rib movement on the opposite side of the curve</u>

See pictures below for suggestions.

<u>INHALING</u>



d. <u>be careful not to encourage compensatory curves in other areas</u>

As in the treatment of all back deformities, the PTA cannot look at only one area, but must look at the <u>whole</u> back.

When giving an exercise, the PTA must look at how this exercise will cause movement in the whole vertebral column.

e. <u>treat other back deformities present</u>

Back deformities often occur in more than one area of the vertebral column.

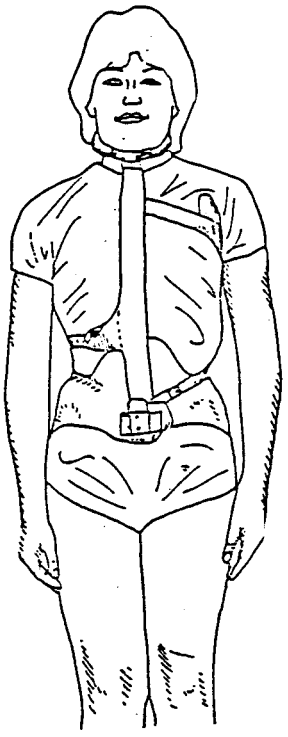
The PTA must be aware of all problem areas and treat them appropriately.

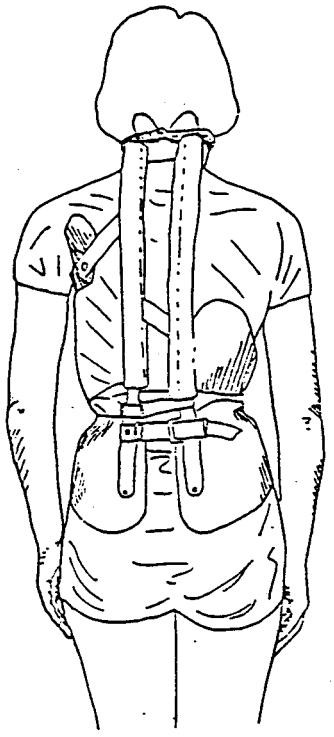
7. PATIENTS WITH VERTEBRAL BONE DEFORMITIES

Patients with vertebral bone deformities may improve a small amount with stretching and strengthening techniques.

Most often, these patients may need surgery and immobilization to correct the deformity, or may have to adjust to the back deformity that is present.

Examples of some back braces used to immobilize the vertebrae are given below.





Stretching and strengthening exercises will depend on the patient's problem and doctor's instructions.

The PTA must work together with the patient to try and improve posture as much as possible.

H. CHAPTER SUMMARY

Back deformities are exaggerated or abnormal curves of the vertebral column.

Kyphosis is a posterior curve that happens normally in the thoracic and sacral areas.

Lordosis is an anterior curve that happens normally in the cervical and lumbar areas.

Too much (exaggerated) lordosis or kyphosis in these areas may be considered a back deformity.

Scoliosis is a lateral bend in the vertebral column; scoliosis is never a normal curve.

Posture is a position of the body.

"Good posture" in sitting and standing includes:

- head in midline, looking forward
- shoulders equal level
- trunk straight (no lateral curves)
- normal anterior/posterior curves of the vertebral column
- pelvis is level
- upper and lower limbs in neutral in standing

Scoliosis is named by including:

- what side the bend is on (left or right)
- what vertebral area the bend is in (cervical, thoracic, lumbar)

Soft tissue changes seen in back deformities include:

- lengthening of soft tissues on the same side as the curve
- shortening of soft tissue on the opposite side of the curve

Physical Therapy evaluation and treatment suggestions are given for commonly seen back deformities.

CHAPTER 38

ARTHRITIS

ARTHRITIS is an inflammation of a joint.

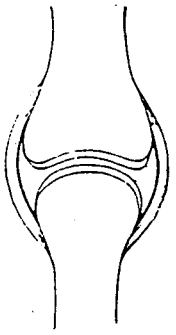
OBJECTIVES

At the time of the exam and with 80& proficiency, the student will be able to correctly:

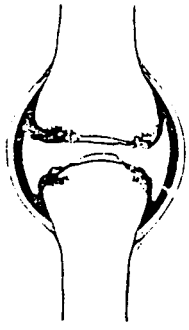
1. identify a joint that has arthritis.
2. compare treatments for "hot painful joints" with treatments that are "not so hot or painful".
3. describe 3 different Physical Therapy treatments that can be used to help patients with arthritis and <u>when</u> these treatments are used.

CHAPTER CONTENTS

A. WHAT IS ARTHRITIS?



a normal joint..



a joint with arthritis..

Arthritis is an inflammation of a joint.

An inflammed joint is one that is red, a little hot to touch, and very painful to move.

Arthritis generally is not a short term problem; joints with arthritis may have problems for a long time.

B. CAUSE OF ARTHRITIS

Long lasting joint pain and inflammation may be caused from infectious disease, damaged cartilage from overuse, or other reasons that are unknown.

C. MEDICAL TREATMENT OF ARTHRITIS

Aspirin may be given to help decrease pain and swelling.

D. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH ARTHRITIS

The PTA should carefully evaluate the following:

* location of arthritis (what joints have a problem)

* condition of the arthritic joint (color, temperature, swelling)

* how long the patient has had arthritis (months, years?)

* pain in the joint (what joints, when, how much)

* range of motion (limited by pain or tightness)

* limb deformities or contractures (where, what type)

* functional ability of the patient

  (What kind of help is needed for the patient to walk, eat, dress himself, go to the toilet, move in bed)

E. PHYSICAL THERAPY TREATMENT FOR PATIENTS WITH ARTHRITIS

Basic rules to remember are :

* Physical Therapy treatment will not cure arthritis.

* The goals of physical therapy treatment for patients with arthritis are to <u>decrease the pain</u> and <u>prevent joint stiffness and deformity</u>.

* The PTA should <u>follow the doctor's instructions</u>. Doctors have more medical information about the disease and know when and what kind of treatment is needed.

* Physical therapy treatments for arthritis can also be applied for patients with TB of the joints (TUBERCULOSIS chapter, Volume 3).

The 2 main conditions that a patient with arthritis will have are:

1. when the joint is hot and painful
2. when the point is not so hot or painful

These conditions may change often. The PTA must evaluate the patient with each visit to know the condition of the joint.

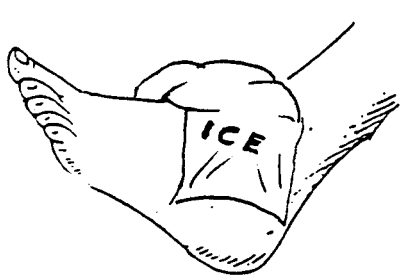
1. <u>when the joint is hot and painful</u>

Physical Therapy treatments for arthritic joints that are hot and painful includesL

* ice
* good positioning
* no exercise
* equipment to help decrease weight bearing on arthritic joints

* **ice**

Ice can be used to help decrease pain. Ice can be put in a plastic bag and then the bag is put on the joint for 15-20 minutes.

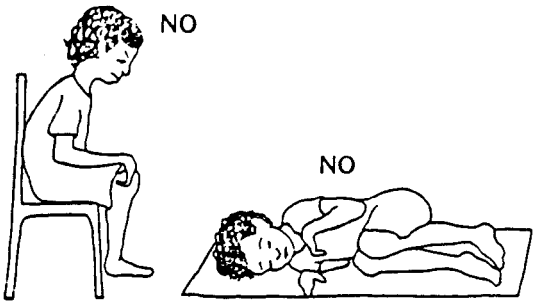


A thin towel can be put around the plastic bag or a towel can be put over the patient's joint to help absorb the water from the ice melting.

* **good positioning**

Most often, flexion positions are the most comfortable for patients with arthritis.

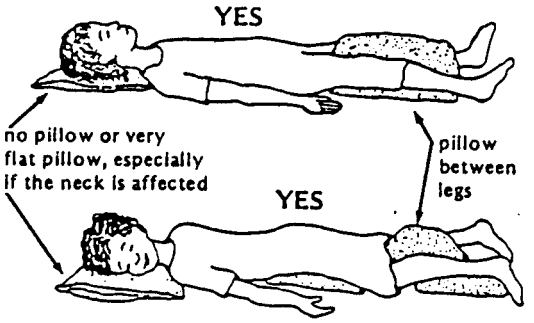
If the patient always remains in flexion positions, the joints may become stiff and tight in these positions.



In these positions, contractures develop more easily.

To prevent flexion contractures in the hips, knees, and elbows, these joints should be in extension as much as possible.

The PTA must not force the hot and painful joints into extension.



In these positions, contractures are less likely to develop.

The PTA and patient must work together to find comfortable positions that also help in preventing contractures.

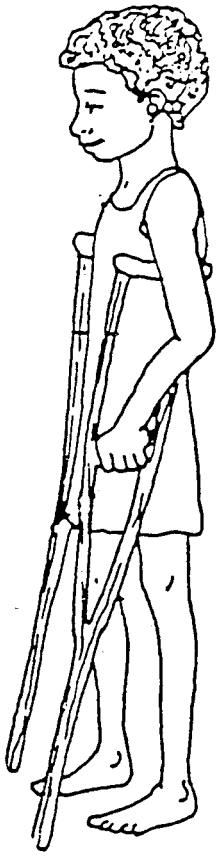
* **no exercise**

When a patient with arthritis has a hot and painful joint, he must rest this joint.

No exercise is used for hot and painful joints. Exercise will cause more pain for the patient and may cause a lot of damage to the joint.

* equipment to help decrease weightbearing on arthritic joints

If a patient has arthritis in the lower limb (hip, knee, ankle), he will need a walking aid so that no weight is on the hot and painful joint. (See WALKING AIDS chapter, Volume 2).



2. <u>When the joint is not so hot or painful</u>

Physical Therapy treatment for joints that are not so hot or painful includes:

* heat or ice
* good positioning
* gentle exercise
* equipment to help decrease weight bearing on arthritic joints

* **heat or ice**

Question:

When a joint is hot and painful, why does a PTA apply ice (not heat) to help decrease pain?

_____

_____

_____

* **good positioning**

Because the patient has less pain, the PTA can encourage extension positions as much as possible.

Question:

Normally, patients with arthritis want to be in flexion positions because they are the most comfortable.
A PTA has a patient with arthritis in the knee. This patient prefers to keep the leg is extension.
Does the PTA need to help this patient for positioning to prevent contractures?

Yes _____ No _____

Explain your answer.

_____

_____

_____

_____

* **gentle exercise**

Exercises that work to strengthen muscles to decrease contractures are given.

Questions:

1. A patient has arthritis and has a hip flexion contracture.
   What muscles will you try to strengthen (hip flexors or hip extensors)?

   _____

   Why?

   _____

   _____

   _____

   _____

2. A patient has arthritis and has an elbow flexion contracture.
   What muscles will you try to strengthen (elbow flexors or elbow extensors)?

   _____

   Why?

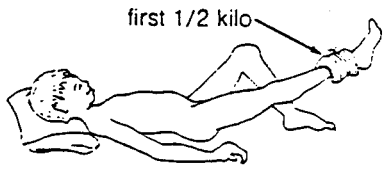
   _____

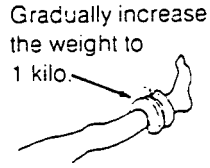
   _____

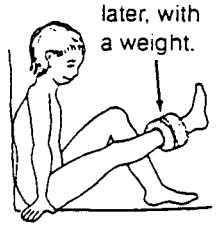
   _____

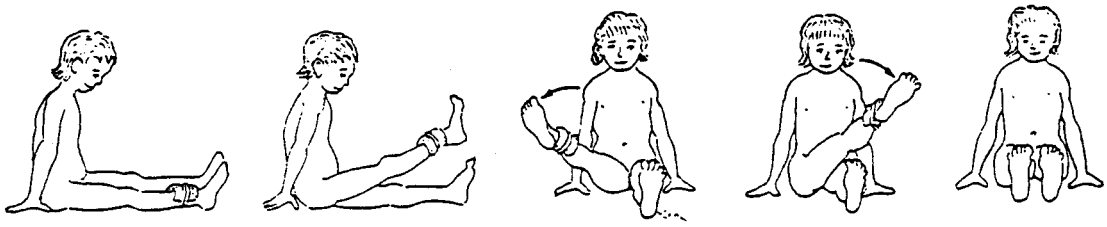
   _____

Isometric exercises or exercises that make little joint movement are best for patients with arthritis.









1. Tighten the muscle on top of the thigh.
2. Lift the leg, keeping it straight.
3. Move the leg to the side and turn it outward.
4. Move the leg back in and turn it inward.
5. Lower the leg and relax.

* **equipment to decrease weight bearing on arthritic joints**

Generally, patients should avoid putting full weight on joints with arthritis.

In some cases, weight bearing may increase the problems of an already damaged joint.

CHAPTER 39

PATIENT CHART

The PATIENT CHART is a paper that gives guidelines to help describe a patient.

OBJECTIVES

At the time of the exam and with 80% proficiency, the student will be able to correctly:

1. describe "evaluation" and state why evaluation is important in completing a patient chart.
2. list three reasons why a patient chart is used.
3. explain how to decide what treatment a patient should receive.
4. given a patient problem, complete a patient chart that correctly describes the specific patient.

CHAPTER CONTENTS

A. WHAT IS A PATIENT CHART?

A patient chart is a paper; on this paper are <u>guidelines</u> to help the PTA describe the patient.

There are many different types of patient charts.

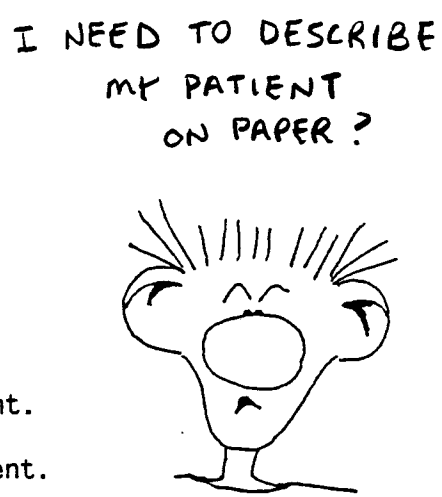
Some are specific, some are general, some are short and some are long.

All patient charts will have space for the PTA to describe:

GENERAL INFORMATION about the patient.

PHYSICAL INFORMATION about the patient.

TREATMENT given to the patient.



<u>Questions:</u>

A patient comes to you for treatment.

1. What <u>general information</u> do you want to know about this patient?

2. What specific <u>physical information</u> do you want to know about this patient?

3. How do you decide what <u>treatment</u> to give the patient?

B. HOW DO YOU USE A PATIENT CHART?

You must use a patient chart "step-by-step". The order that it should be completed is:

1. write general information
2. write physical information
3. write treatment

1. write general information

General information can be collected from:

a. talking with the patient (or the family if the patient cannot communicate)

b. copying information from the patient chart that was made by the doctor.

The general information needed is:

* NAME
* SEX (male or female)
* D.O.B. (date of birth)
* ADDRESS (where does the patient live)
* DIAGNOSIS (medical name of the patient's problem)
* HISTORY (when and how did the problem happen, why did the patient come, how was the patient before the problem)

Questions:

1. Why do you want to know the address of the patient?

_____

2. Why do you want to know when the problem happened?

_____

_____

2. write physical information

Physical information should be gathered from the patient only.

It is the PTA's responsibility to gather correct and complete information about the patient's physical condition.

To gather physical information, the PTA must make an EVALUATION.

To "evaluate" means to "find out".

A PTA evaluates a patient to find out the problems.

A complete PHYSICAL EVALUATION includes:

a. observation

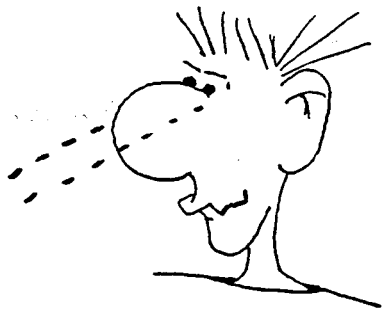
b. special questions

c. specific tests

a. <u>observation</u>

Observation means to LOOK at something very carefully.

All PTA's must carefully LOOK at a patient to be able to identify problems.



<u>IMPORTANT!!</u>

If a PTA cannot identify the patient's problem, he will not know how to help the patient!

General areas the PTA should observe are:

* SKIN PROBLEMS (abscess, wound, scar, swelling)
* DEFORMITY (abnormal shape of body parts)
* IMMOBILIZATION (POP, splint, external fixator)
* SPASTICITY/ATROPHY
* PATIENT'S BREATHING (if respiratory patient)
* PLACE OF AMPUTATION (if amputee patient)
* PATIENT'S BEHAVIOR

<u>Question</u>:

Why is it important to carefully observe a patient <u>before</u> decided the treatment?

_____

_____

_____

_____

b. special questions

Special questions ask about PAIN.

The PTA will need to ask the patient:

* IF the patient has pain
* WHEN the patient has pain
* WHERE the patient has pain
* WHAT KIND of pain the patient has

c. specific tests

The PTA is trained to give specific tests to find out the patient's problems.

The four basic tests are for:

MUSCLES:

Muscle tests are given to find out how strong or weak different muscles are. (See MYOLOGY chapter, Volume 1.)

JOINTS:

Range of motion tests are given to find out how stiff or movable different joints are. (See ARTHROLOGY chapter, Volume 1.)

SENSATION:

Sensation tests are given to find out if the patient's feeling is decreased or normal in different parts of the body. (See NEUROLOGY chapter, Volume 1.)

FUNCTIONAL ACTIVITIES:

These tests are given to see how much help a patient needs to do functional activities.

Examples are sitting, standing, balance, walking, grasping.

IMPORTANT!

WE MAKE A PHYSICAL EVALUATION TO FIND THE PATIENT'S PROBLEMS.

AFTER WE KNOW THE PATIENT'S PROBLEMS, WE CAN DECIDE WHAT TREATMENT WILL HELP.

RESULTS FROM PHYSICAL EVALUATION WILL DECIDE THE TREATMENT.

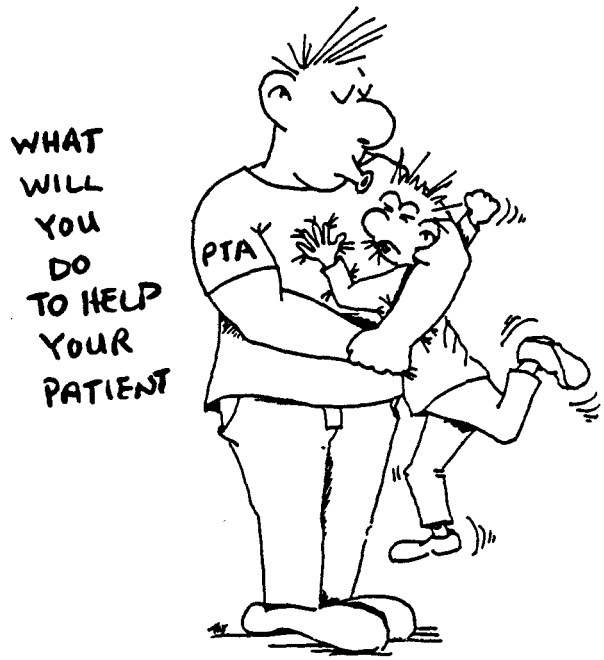
Question:

Describe why results from the physical evaluation will decide what treatment a patient should receive.

_____

_____

3. write treatment



Treatment is the way to move or work with a patient to try to make him better.

After the PTA knows the problem of the patient, the PTA can decide what treatment is best to help make the problem better.

Please see all of Volume 2 for the different ways that a PTA can help a patient.

C. WHEN IS A PATIENT CHART USED?

A patient chart is used at two general times:

1. when the PTA first sees the patient
2. when there is a change in physical information

1. when the PTA first sees the patient

At this time the PTA will write the general information, physical information, and the treatment that will help the patient.

Questions:

1. Please list two ways to gather general information about a patient.

_____

_____

2. Please list three ways to gather general information about a patient.

_____

_____

3. How does the PTA decide what treatment should be given?

_____

_____

_____

2. <u>when there is a change in physical information</u>

Generally, a patient should get better (recover) after some time.

When a patient recovers, the physical information will change.

When the physical information changes, the treatments to help the patient will also change.

On a piece of paper like the patient chart, the PTA should write:

* what physical changes have happened
* what changes in treatment are needed

<u>Question:</u>

When the PTA observes <u>physical changes</u> in the patient, why does the <u>treatment</u> need to change?

_____

_____

_____

The PTA can describe the changes as often as every day. This can take a lot of time.

Generally, the PTA should describe patient changes (and treatment changes) at least one time each week.

D. WHY IS A PATIENT CHART USED?

The patient chart is used for four main reasons:

1. help PTA see patient progression

The PTA can look at the patient chart to remember how the patient was on the first day. The PTA can compare this with current information to objectively see if the patient has improved after treatments.

2. communicate with other health professionals

Doctors and nurses may look at the patient chart to see what the patient's problems are and what treatments the patient has received.

3. communicate with other Physical Therapy Assistants

If a PTA is absent or the patient is transferred to another area, a new PTA will know what treatments the patient has received and how the patient has progressed.

4. help the PTA to organize the patient evaluation

The patient chart will help remind the PTA what to evaluate to find the patient's problems and decide what treatment is needed.

E. EXAMPLE OF A PATIENT CHART

On the following pages is an example of a patient chart.

This chart is proposed by Handicap International in Thailand.

The guidelines of how to use this chart are included.

F. CHAPTER SUMMARY

The patient chart that gives guidelines to help describe a patient.

The main parts of a patient chart are:

- GENERAL INFORMATION (patient identification and history)
- PHYSICAL INFORMATION (patient's problems)
- TREATMENT (ways to make the problems better)

Evaluate means to find out.

A PTA will do an evaluation to find out a patient's problem.

An evaluation includes:

- observation
- special questions
- special tests

Treatment cannot be decided before the physical evaluation; the PTA must know the problem first and then decide how to make it better.

The patient chart should be used when the PTA first sees the patient and every time there is a change in the physical information of the patient.

Reasons for using the pateint chart:

- help the PTA see patient progression
- communicate with other health professionals
- communicate with other Physical Therapy Assistants
- help the PTA to organize the patient evaluation

HANDICAP INTERNATIONAL

PATIENT CHART GUIDELINES

Diagnosis :

* Medical name for the patient's problem

History :

* How was the patient before the injury?
* When did it happen?
* How did it happen?
* Treatment received before coming?
* Other medical problems?
* Type of family support

General observation :

What do you observe when you first see the patient?

* Deformities
* Immobilization (Where?, What kind?)
* Respiratory
* Spasticity/Atrophy
* Patient behavior

Pain :

* Where?
* When?
* What kind?

Skin :

* Color
* Scar
* Wound
* Burn
* Swelling
* Graft
* Abcess
* Sensitivity

Remarks :

* Special care instructions

Joint evaluation/Muscle evaluation :

* Describe all areas that are stiff/weak/spastic:

SHOULDER :
* Flexion
* Extension
* Abduction
* Adduction
* Internal Rotation
* External Rotation

ELBOW :
* Flexion
* Extension

FOREARM :
* Supination
* Pronation

WRIST :
* Flexion
* Extension
* Abduction
* Adduction

FINGERS :
* Flexion
* Extension
* Abduction
* Adduction

HIP :
* Flexion
* Extension
* Abduction
* Adduction
* Internal Rotation
* External Rotation

KNEE :
* Flexion
* Extension

ANKLE :
* Dorsiflexion
* Plantar flexion

FOOT :
* Inversion
* Eversion

TOES :
* Flexion
* Extension

THUMB :
* Opposition
* Abduction

Functional evaluation :

* What can the patient do without help?
* What can the patient do with help? (How much help?)
* What is the patient not able to do at all?

  - Balance (sitting and standing)
  - Standing
  - Walking
  - Going to the toilet
  - Eating, dressing, washing him/herself

Treatment :

* After finding the patient's problems, what will be done to make these problems better?

HANDICAP INTERNATIONAL

PATIENT CHART

No. _____

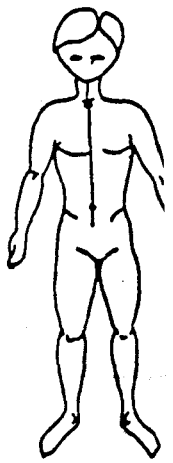
Name :

Date of first consultation :

Sex :

Date of birth :

Address :



Diagnosis :

History :

Evaluation of the patient

General observation :

Skin :

Pain :

Joint evaluation :

Muscle evaluation :

Functional evaluation :

Treatment :