

HANDICAP INTERNATIONAL
PHYSICAL THERAPY
ASSISTANT MANUAL

VOLUME 2

PHYSICAL THERAPY
TECHNIQUES AND DEVICES



ACKNOWLEDGEMENTS

The preparation and production of this Manual has only been made possible through the efforts of the Handicap International team in Thailand composed of Physical Therapists, Occupational Therapists, and office support personnel.

During the process of developing appropriate and standardized training courses for Physical Therapy Assistants (PTA), the following key contributors devoted countless hours of both their work and leisure time to the wide range of tasks involved.

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Special appreciation and sincere thanks are due to Luci, Sonia, Myriam, Jean-Christophe, Sumitra, Fred, and Claude for their assistance and hard work in compiling the final product.

Appreciation is also extended to Susan Walker, the Regional Director of Handicap International, for her continued support throughout the project.

The illustrations used in this Manual were assembled from a variety of sources. Some of these illustrations have been modified and others have been directly incorporated. David Werner's publication, "Disabled Village Children", was extensively utilized for this purpose.

Appreciation is extended to all authors listed in the Reference Section provided at the end of each Volume.

INTRODUCTION

Handicap International came to Thailand in 1981 with the purpose of meeting the need for low cost prosthetic devices using appropriate technologies for amputees in camps and evacuation sites along the Thai-Cambodian border. In 1984, Handicap International expanded its operations to include Physical Therapy and rehabilitation. The current program at this border has the objective of training Khmer refugees and displaced persons in the basic techniques of Physical Therapy.

From 1984 to 1988, the expatriates working within this program developed individual course work in each of those camps having a Physical Therapy Assistants (PTA) training program. This process was often very time-consuming. There was little or no continuity between the consecutive missions of the expatriates, and there was no standardization between the different camps in order to integrate the activities of the program as a whole.

In 1989, a decision was made to develop a standardized PTA curriculum in the camps along the border. The team of Physical Therapists and Occupational Therapists working for Handicap International in Thailand cooperated in the preparation and application of this curriculum. This Manual is the result of the first comprehensive attempt at meeting this need.

The manual is composed of 3 Volumes that should preferably be used in the order as numbered. However, the content has been developed in such a way that individual chapters or combinations of chapters may be extracted and applied as self-sufficient units in accordance with the varying needs of each group of users. Examination and evaluation material covering all 3 Volumes is provided as a separately bound document.

In order to avoid confusion in terminology which may possibly arise from the combination of French, Belgian and American nationals who worked together in the development of the Manual, it should be noted that the following terms are directly interchangeable.

Term used in the Manual	Common European equivalent
Range of Motion (verb)	Mobilization
Range of Motion (noun)	Amplitude
Strengthening	Muscultation
Stretching	Posture

In using the Manual in the field, it may be found that certain topic areas are too detailed and others too generalized. As a pilot exercise, the team in Thailand is currently testing the manual in order to identify those areas requiring future modifications.

Through a continuing process of monitoring, evaluation and feedback, it is intended that the Manual may be progressively improved in order to meet the basic training needs of the Physical Therapy Assistant.

All users and other interested individual and groups are invited to send comments, suggestions as well as descriptions of application experiences, to:

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May 1990

HANDICAP INTERNATIONAL PHYSICAL THERAPY ASSISTANT MANUAL

CONTENTS LIST

VOLUME 1: THEORY AND BASIC ANATOMY

1. INTRODUCTION TO PHYSICAL THERAPY
2. THE BODY AND MEDICAL VOCABULARY
3. GENERAL BODY SYSTEMS
4. OSTEOLOGY
5. ARTHROLOGY
6. MYOLOGY
7. NEUROLOGY

REFERENCES

VOLUME 2: PHYSICAL THERAPY TECHNIQUES AND DEVICES

8. MASSAGE
9. RESPIRATORY TREATMENTS
10. RANGE OF MOTION
11. STRETCHING
12. STRENGTHENING
13. TRANSFERS
14. STANDING UP
15. GAIT TRAINING
16. WALKING AIDS
17. BRACES
18. WHEELCHAIRS
19. SLINGS
20. BANDAGING
21. PLASTER
22. DEVICES FOR AUTONOMY
23. HOUSE ADAPTATIONS

REFERENCES

VOLUME 3: PATHOLOGIES AND PHYSICAL THERAPY TREATMENTS

24. FRACTURES
25. AMPUTATIONS
26. CLUB FOOT
27. HEMIPLEGIA
28. SPINAL CORD INJURIES
29. RESPIRATORY DISEASES
30. POLIO
31. PERIPHERAL NERVE INJURIES
32. LEPROSY
33. BURNS
34. PRESSURE SORES
35. BEDRIDDEN PATIENTS
36. TUBERCULOSIS (TB)
37. BACK DEFORMITIES
38. ARTHRITIS
39. PATIENT CHART

APPENDIX: PATHOLOGY TREATMENT SUMMARIES
REFERENCES

HANDICAP INTERNATIONAL PHYSICAL THERAPY ASSISTANT MANUAL

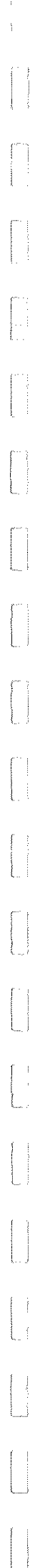
CONTENTS LIST

VOLUME 2: PHYSICAL THERAPY TECHNIQUES AND DEVICES

8. MASSAGE
 9. RESPIRATORY TREATMENTS
 10. RANGE OF MOTION
 11. STRETCHING
 12. STRENGTHENING
 13. TRANSFERS
 14. STANDING UP
 15. GAIT TRAINING
 16. WALKING AIDS
 17. BRACES
 18. WHEELCHAIRS
 19. SLINGS
 20. BANDAGING
 21. PLASTER
 22. DEVICES FOR AUTONOMY
 23. HOUSE ADAPTATIONS
- REFERENCES

8

MESSAGE



MESSAGE is moving the soft tissues of the body.

OBJECTIVES

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

1. describe when and why you give a massage.
2. identify when not to give a massage.
3. describe 5 general guidelines in giving a massage
4. given a patient problem, demonstrate appropriate massage technique.

CHAPTER CONTENTS

- A. WHAT IS MASSAGE?
- B. WHAT MASSAGE CAN DO
- C. WHAT MASSAGE CANNOT DO
- D. WHEN TO GIVE A MASSAGE
- E. WHEN NOT TO GIVE A MASSAGE
- F. TYPES OF MASSAGE
- G. GENERAL GUIDELINES FOR GIVING MASSAGE
- H. CHAPTER SUMMARY

A. WHAT IS MASSAGE?

MASSAGE is moving soft tissues of the body. Generally, massage is given with the hands.

B. WHAT MASSAGE CAN DO

- * Massage can relax tight muscles (decrease pain).
- * Massage can soften scar tissue.
- * Massage can increase blood circulation.
- * Massage can calm a patient.
- * Massage can help remove waste from the intestine and bladder.

C. WHAT MASSAGE CANNOT DO

- * Massage will not prevent muscle atrophy.
- * Massage will not increase muscle strength.
- * Massage cannot maintain muscle length.
- * Massage will not reduce fat areas.

Questions:

1. A patient would like to strengthen the muscles of his left thigh. Will a massage help this patient?

Yes _____ No _____

Explain your answer.

Questions: (continued)

2. An amputee has a scar that is very hard. Will a massage help this patient?

Yes _____ No _____

Explain your answer.

D. WHEN TO GIVE A MESSAGE

Activity:

Below are patient problems. Check (✓) when you would give a massage. (If you need help, see page 2, "What massage can do".)

- _____ The patient has tight muscles.
- _____ The patient has a soft and movable scar.
- _____ The patient is nervous and tense.
- _____ The patient has shortened muscles.
- _____ The patient needs increased blood to an area.
- _____ The patient needs help to remove urine and stool.
- _____ The patient has pain because of muscle tightness.
- _____ The patient has swelling and needs help to move blood.
- _____ The patient has weak muscles.
- _____ The patient has a scar that is tight and stiff.

E. WHEN NOT TO GIVE A MASSAGE

- * Do not give massage over open areas or wounds.
- * Do not give massage over scars that are not completely healed.
- * Do not give massage when the patient has a fever.
- * Do not give massage over broken bones.
- * Do not give massage on joints that are hot, red, and swollen.
- * Do not give massage over damaged or diseased blood vessels.

F. TYPES OF MASSAGE

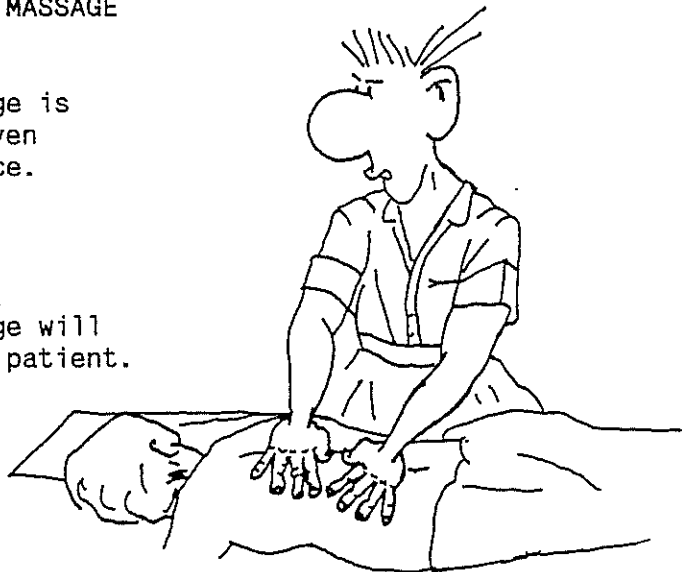
There are four basic types of massage:

1. SUPERFICIAL MASSAGE
2. DEEP MASSAGE
3. FRICTION MASSAGE
4. HACKING MASSAGE

1. SUPERFICIAL MASSAGE

Superficial massage is light pressure given on the body surface.

When given slowly, superficial massage will help to relax the patient.



2. DEEP MASSAGE

Deep massage is moderate pressure given into the body surface.

Two deep massage techniques are:

- a) stroking
- b) lifting and squeezing

a) Stroking

Stroking is giving moderate pressure moving toward the center of the body.

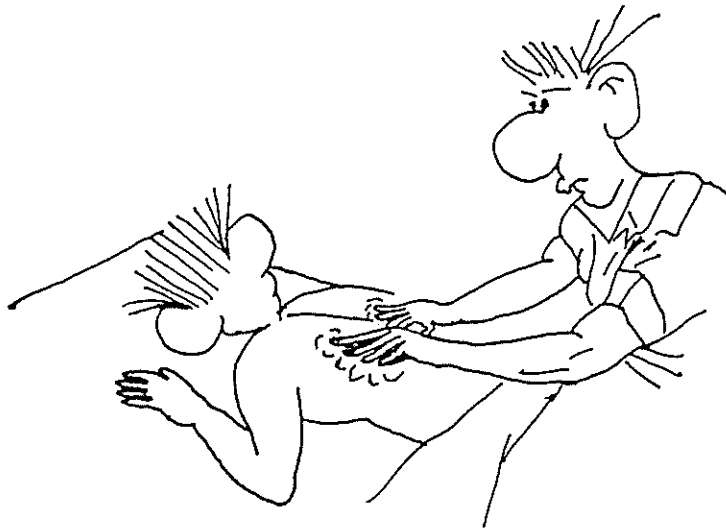
Stroking is given with two hands that surround a body part.

- * Stroking can help decrease swelling.

(The proximal part of the limb should be cleared before trying to decrease swelling in the distal part.)

- * Stroking can increase relaxation.

- * Stroking may cause a small stretch in soft tissues.

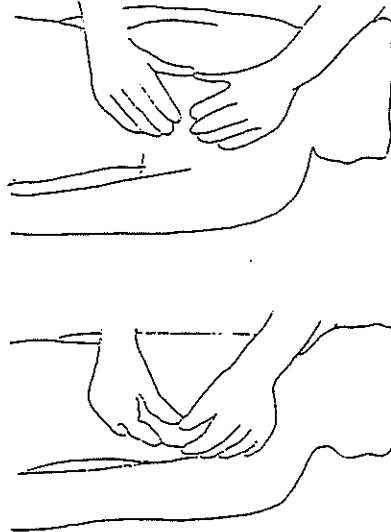
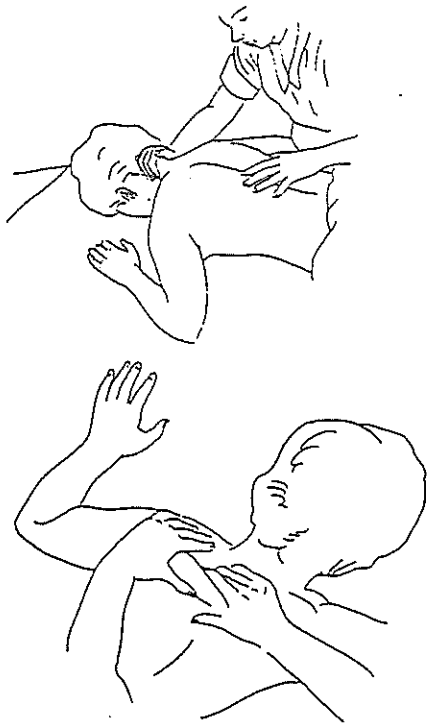


b) lifting and squeezing

In this technique, the PTA tries to hold the muscle, lift - squeeze - release.

Lifting and squeezing can:

- * relax tight muscles
- * increase blood flow to and from tight muscles
- * soften scar tissue



3. FRICTION MASSAGE

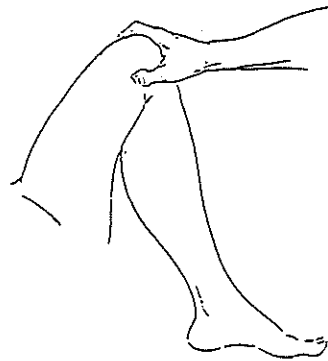
Friction massage is firm pressure given into the body surface.

Generally, friction massage is given to small areas of the body.



Friction can be made with the thumb or fingers.

The pressure can be circular or in a straight line.



Friction massage helps to:

- * soften scar tissue.
- * relax specific area of tight muscles.

Questions:

1. Do you think that friction massage is comfortable for a patient?

Yes _____ No _____

Explain your answer.

2. Normally, would you start or finish a massage with friction?

Yes _____ No _____

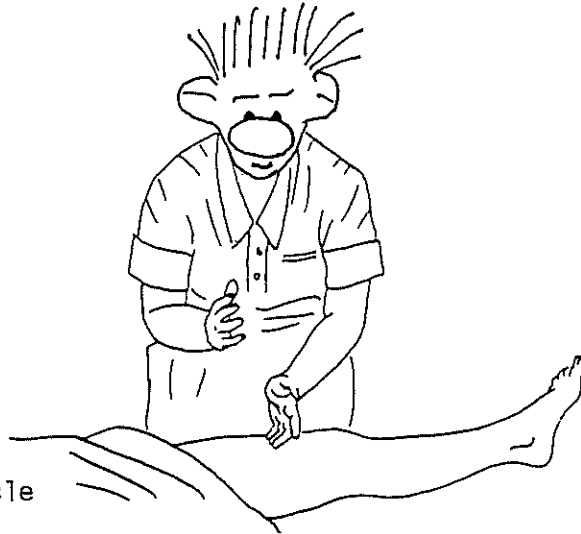
Explain your answer.

4. HACKING MASSAGE

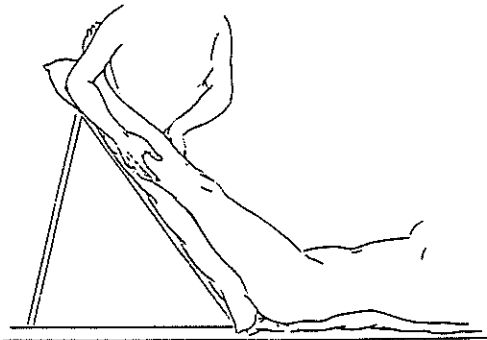
Hacking massage is hitting the body surface with the ulnar side of the hands.

Hacking massage may:

- * increase muscle tone
- * stimulate the patient
- * small stretching of muscle



G. GENERAL GUIDELINES FOR GIVING MASSAGE



1. If possible, massage should be given directly on the patient's skin (not over the top of clothes).
2. The patient should be positioned with the muscle in a relaxed position.
3. If massage is given to decrease swelling, the limb must be in an elevated position.

This will help blood return to the heart.

4. Massage should generally be given for 15-30 minutes to have good results.
5. To help hands move more easily along the skin, the PTA can apply:
 - soap and water
 - coconut oil
 - vaseline
 - powder

Questions:

1. A patient arrives with a very hot and swollen ankle. She tells you that she fell about 3 hours before coming. Will you give her a massage to decrease the swelling?

Yes _____ No _____

Explain your answer.

2. Explain why deep stroking massage should be given in a direction that is toward the center of the body.

3. An amputee has an open wound on the scar of his stump. Will you give a massage to this patient?

Yes _____ No _____

Explain your answer.

4. Why should massage be given directly to the skin and not on top of clothes?

Questions: (continued)

5. What is a "relaxed position" for a muscle?

6. Why should a massage be given with a muscle in a relaxed position?

7. A patient has swelling in the hand. The PTA gives a deep stroking massage to the arm, forearm and then hand. The patient is in sitting position with her arm on the table. What is the problem with this treatment?

How would you change the treatment to make it better?

8. A patient has a lot of hair on his skin. When the PTA gives a massage, the patient complains of pain because of the hair. What can the PTA do to solve this problem?

Questions: (continued)

9. A very large woman arrives and would like a massage to decrease the fat in her arms. What type of massage will you give?

Explain your answer.

H. CHAPTER SUMMARY

Massage is moving soft tissues of the body. Generally, massage is given with the hands.

Massage can be given to help

- . relax tight muscles
- . soften scar tissue
- . increase blood circulation
- . calm a patient
- . help evacuate intestine and bladder.

Do not give massage:

- . over open areas or wounds
- . over scars that are not completely healed
- . when the patient has a fever
- . over broken bones
- . over joints that are hot, red and swollen
- . over damaged or diseased blood vessels

Four basic massage techniques are given:

- . SUPERFICIAL MASSAGE
- . DEEP MASSAGE (stroking, lifting and squeezing)
- . FRICTION MASSAGE
- . HACKING MASSAGE

Guidelines for giving a massage:

- . directly on patient's skin
- . muscle in relaxed position
- . limb elevated if massage is to decrease swelling
- . 15 - 30 minutes
- . coconut oil, vaseline, soap and water, or powder may help the hands move more easily on the patient.

RESPIRATORY TREATMENTS



RESPIRATORY TREATMENTS help to remove lung secretions and make breathing easier.

OBJECTIVES

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

1. describe how air is pulled into the lungs.
2. demonstrate 2 chest movements that happen with inspiration and expiration.
3. demonstrate 3 different breathing exercises and explain how these exercises will help a patient.
4. describe 4 different ways to remove secretions from the lungs.
5. explain why deep breathing is better than clapping for all respiratory patients.
6. demonstrate evaluation and treatment of a patient with a respiratory problem.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. ANATOMY OF THE RESPIRATORY SYSTEM
- C. MOVEMENTS THAT HAPPEN WHEN WE BREATHE
- D. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH RESPIRATORY PROBLEMS
- E. PHYSICAL THERAPY TREATMENTS OF PATIENTS WITH RESPIRATORY PROBLEMS
- F. EVALUATION AND TREATMENT OF CHILDREN WITH RESPIRATORY PROBLEMS
- G. CHAPTER SUMMARY

A. INTRODUCTION

Respiratory treatments help to remove lung secretions and make breathing easier.

It is important to know some anatomy of the respiratory system and how we normally breathe to better understand respiratory treatments.

In GENERAL BODY SYSTEMS (Volume 1) the PTA received an introduction to the respiratory system.

This chapter will discuss more details of how we breathe and how to help people who have problems with breathing.

B. ANATOMY OF THE RESPIRATORY SYSTEM

Anatomy of the respiratory system was discussed in GENERAL BODY SYSTEMS chapter, Volume 1.

Activity:

As a review, please draw a picture of the complete respiratory system in the space provided.

The picture should include:

nose
mouth
alveoli
trachea
bronchi
bronchioles

Questions:

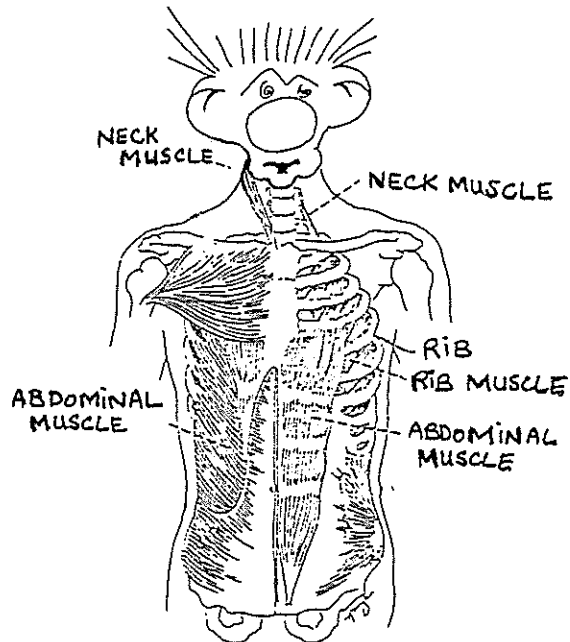
1. What is the name of the air tube that you can feel in the front of your neck?

2. Where does AIR EXCHANGE happen?

In your own words, describe why air exchange is important.

Other parts that help with breathing are the:

- * diaphragm
- * ribs
- * muscles between each rib
- * abdominal muscles
- * some muscles of the neck **



Respiratory muscles (anterior view).

** Muscles of the neck are not used in relaxed breathing. Neck muscles are used when the patient has difficulty pulling enough air into the lungs.

Questions:

1. What is the function of the ribs?

2. What is the name of the most important muscle used in breathing?

C. MOVEMENTS THAT HAPPEN WHEN WE BREATHE

Breathing (respiration) is the movement of air going in and out of our body.

Three areas that move when we breathe are:

1. Diaphragm
2. Ribs
3. Abdominal muscles

* Diaphragm

The movement of the diaphragm is discussed in GENERAL BODY SYSTEMS, Volume 1.

Activity:

As a review, please draw how the diaphragm moves in breathing.

(inspiration) (expiration)

* Ribs

Activity:

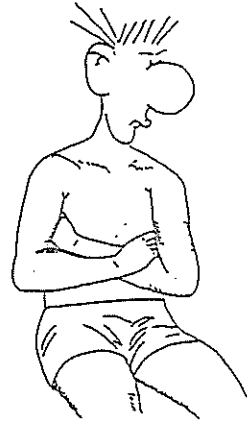
A. Put both hands on your chest. Inhale very deeply (take as much into your lungs as you can). Then exhale. Repeat these movements 3-4 times.

1. What movement did you feel when you inhaled?

2. What movement did you feel when you exhaled?

Activity: (continued)

- B. Cross your arms in front of your placing each hand on the opposite side of your body. Your hands should be resting on the external rib area.



Inhale deeply and then exhale; do this 3-4 times.

3. What movement did you feel when you inhaled?

2. What movement did you feel when you exhaled?

From the activity the PTA should have identified the main rib and chest movement that occurs with respiration.

When we INHALE (air pulled in), the ribs move UPward and OUTward.

This increases the space inside the chest and lungs so that air is pulled in.

When we EXHALE (air pushed out), the ribs move DOWNward and INward.

This decreases the space inside the chest and lungs so that air is pushed out.

REMEMBER

INHALE = RIBS MOVING UP AND OUT

EXHALE = RIBS MOVING DOWN AND IN

The small muscles that are found between each rib are what cause this movement.

* Abdominal muscles

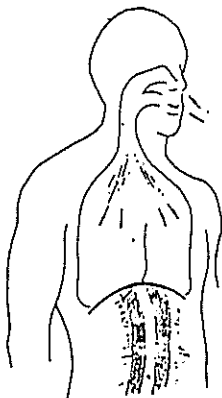
Activity:

Place your right hand on your stomach and your left hand in front of your open mouth.
Contract your abdominal muscles as hard and as fast as you can.

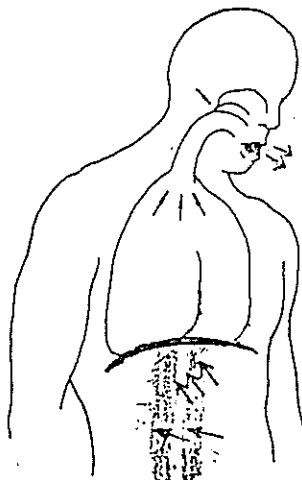
1. What did you feel with your left hand?

2. What did you feel with your right hand?

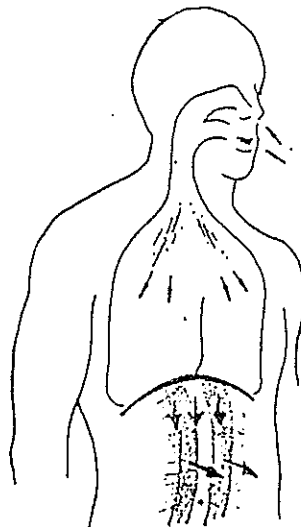
- (X) During normal breathing, the abdominal muscles work very little.
- (Y) To push air out of your lungs quickly and strongly (as in coughing or blowing out a candle), the abdominal muscles must work.
- (Z) To take a big breath in (inhale deeply), the abdominal muscles must be relaxed.



(X)



(Y)



(Z)

Activity:

A. Contract your abdominal muscles as much as you can. Keeping your abdominal muscles contracted, inhale deeply. Exhale. Repeat this 3-4 times.

B. Relax your abdominal muscles. Keeping abdominal muscles relaxed, inhale deeply. Exhale. Repeat this 3-4 times.

1. Was it more easy to take air into your lungs with abdominal muscles contracted or relaxed?

Why?

2. Did you feel more air pulled into your lungs with abdominal muscles contracted or relaxed?

Why?

SUMMARY OF BREATHING

A. PULLING AIR INTO THE LUNGS (INHALE, INSPIRATION)

1. Diaphragm muscle contracts, moves downward, and pulls inferior part of the lungs downward.
2. Rib muscles contract helping to bring the ribs up and out.
3. Abdominal muscles relax, giving more room for the diaphragm to move downward.

ALL OF THESE MOVEMENTS HELP TO INCREASE THE SPACE
INSIDE THE LUNGS TO PULL AIR IN.

B. PUSHING AIR OUT OF THE LUNGS (EXHALE, EXPIRATION)

1. Diaphragm muscle relaxes, moves upward, and the inferior part of the lungs moves upward also.
2. Rib muscles relax allowing the ribs to move down and in.
3. To push air out forcefully, the abdominal muscles will contract; this makes less space for the diaphragm.

ALL OF THESE MOVEMENTS HELP TO DECREASE THE SPACE
INSIDE THE LUNGS TO PULL AIR IN.

D. PHYSICAL THERAPY EVALUATION OF PATIENTS WITH RESPIRATORY PROBLEMS

The PTA must carefully evaluate:

- * movements used in breathing
(diaphragm, upper chest, neck muscles)
- * type of breathing
(fast, slow, deep, shallow, difficult, easy)
- * secretions?
(location, amount, color, smell, can patient remove secretions independently?)
- * fever?
- * how long patient has had respiratory problems
- * chest deformities
- * other medical problems
- * functional level of the patient
(describe what the patient can do independently, what he needs help with)

E. PHYSICAL THERAPY TREATMENTS OF PATIENTS WITH RESPIRATORY PROBLEMS

The type of treatment given will depend on the result of the evaluation of the patient.

Below are 3 main treatments ideas that can be used with many different patients. These are:

1. Patient positioning for comfortable and effective breathing.
2. Breathing exercises.
3. Techniques to remove secretions.

1. PATIENT POSITIONING FOR COMFORTABLE AND EFFECTIVE BREATHING

Patients with respiratory problems may not know what positions are best to help bring more air into the lungs and help make them feel more comfortable.

The PTA must work closely with the patient to find different positions to help the patient breathe easier.

Guidelines for comfortable and effective breathing positions:

- * Abdominal muscles are in a relaxed position
- * Ribs have space to move up and out
- * Diaphragm has space to move downward
- * The upper body is supported so that the trunk muscles are relaxed. (It is a lot of work for the trunk muscles and respiratory muscles to both work at the same time.)
- * Knees may be a little flexed (for comfort)
- * Head and chest are above other body parts

Questions:

Guidelines for comfortable and effective breathing positions are given on page 11. Please answer the following questions.

1. Explain why abdominal muscles should be in a relaxed position.

2. Explain why ribs need space to move up and out.

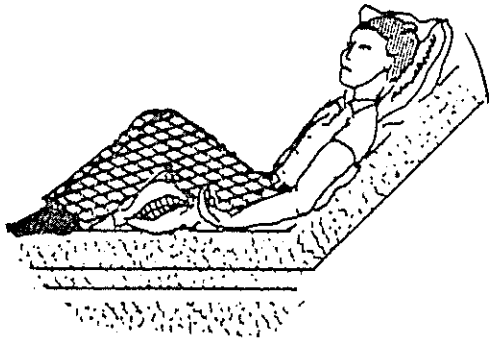
3. Explain why the diaphragm needs space to move downward.

4. Explain why the head and chest should be positioned above other body parts.

Examples of comfortable and effective breathing positions can be seen in the following pages.

Remember that these are only examples and can be modified for different patients.

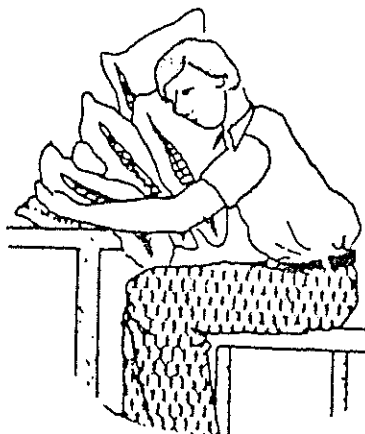
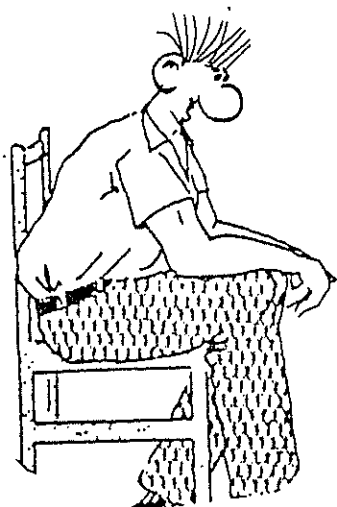
SUPINE POSITION



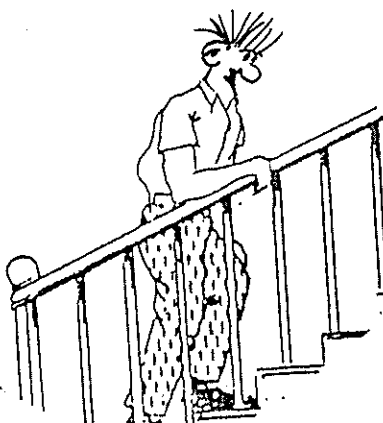
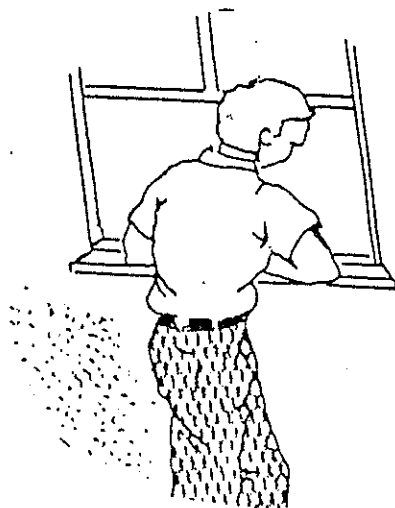
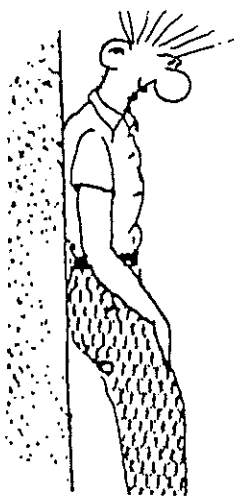
SIDELYING POSITION



SITTING POSITION



STANDING POSITION



Activity:

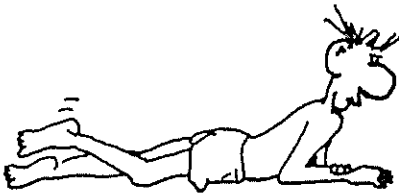
1. Sit on a chair. Lift your feet onto the chair and hold both knees tightly to your chest. Breathe deeply.

Describe 2 reasons why this may not be an effective breathing position.



2. Lie in prone position with your upper body on your elbows. Breathe deeply.

Describe 2 reasons why this may not be an effective breathing position.



2. BREATHING EXERCISES

Breathing exercises are given for three reasons.

- a) to increase the amount of air going into the lungs
- b) to keep air in the lungs for better air exchange
- c) to help remove secretions (see page 26)

BREATHING EXERCISES ARE THE MOST IMPORTANT
TREATMENT FOR ALL PATIENTS WITH RESPIRATORY PROBLEMS

The type of breathing exercise used will depend on the patient's problem.

- a) Breathing exercises to increase the amount of air going into the lungs

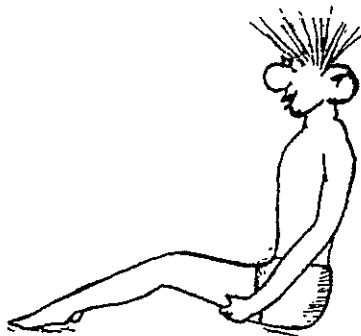
Two different types of exercises to increase the amount of air going into the lungs are:

- i) exercises to increase the downward movement of the diaphragm
- ii) exercises to increase the upward and outward movement of the ribs.

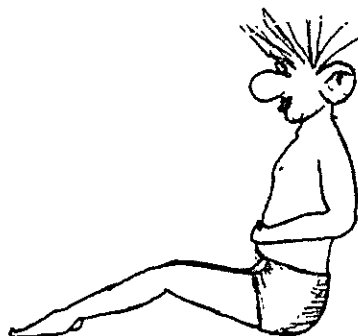
i) exercises to increase the downward movement of the diaphragm

* patient learns to FEEL the movement

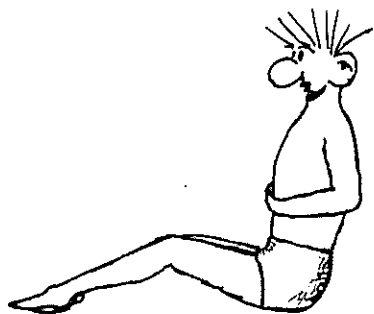
- patient is positioned with abdominal muscles relaxed



- patient puts hand over abdominal area to FEEL it move during breathing



- the abdominal area should feel "bigger" when inhaling



- the abdominal area should feel "smaller" when exhaling

- The PTA can also put his hand on top of the patient's hand to help give feedback for the movement



Question:

The diaphragm needs space to move downward. Is there more space with the abdominal muscles contracted or more space with the abdominal muscles relaxed?

Explain your answer.

ii) exercises to increase the upward and outward movement of the ribs

Exercises to increase upward and outward movement of the ribs include:

- * patient instruction/demonstration
- * pushing into hands
- * trunk movements
- * limb movements

- * Patient instruction/demonstration

Position the patient appropriately.

Tell the patient (and demonstrate) how the ribs should normally move.

Have the patient practice this.

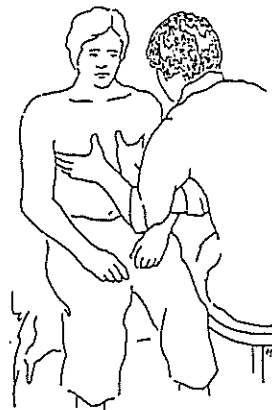
* Pushing into hands

PTA can put her hands on the anterior rib area of the patients.



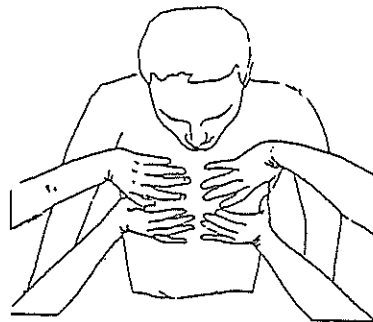
Ask the patient to push the anterior ribs into the hands when inhaling.

PTA can put her hands on the external side of the patient's ribs.



Ask the patient to push the external rib area into the PTA's hands when inhaling.

PTA can put her hands in any combination on the patient's rib area.

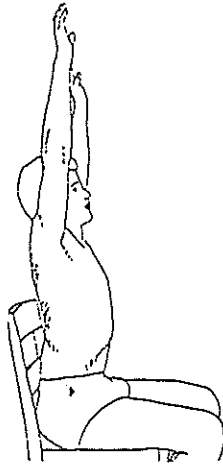


Repeat the exercises as above.

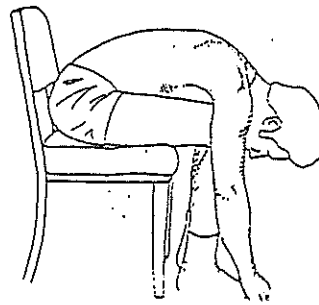
Patient pushes ribs into the hand when inhaling.

* Trunk movements

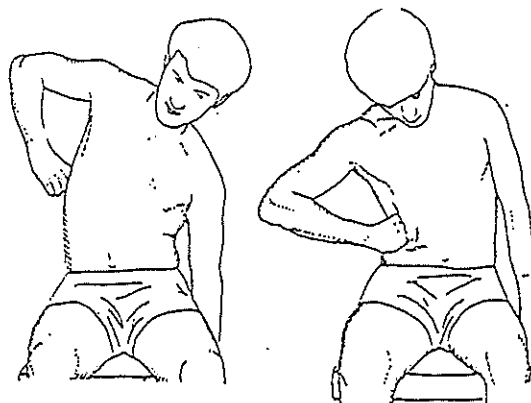
Trunk extension is used
with inhaling



Trunk flexion is used
with exhaling



Lateral bending is used
to increase air coming
into one side of the
lungs.



Questions:

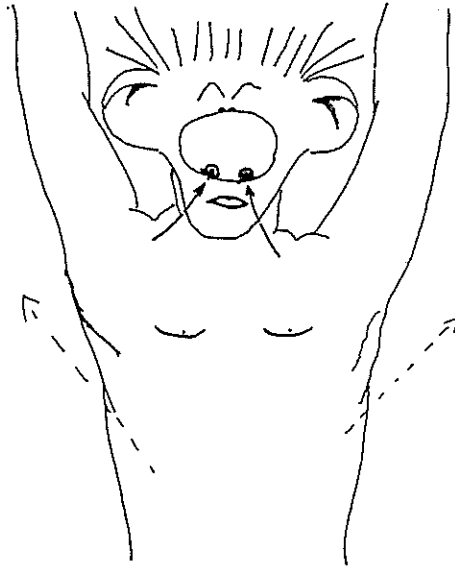
1. Why is trunk extension recommended for inhaling and not exhaling?

2. The PTA instructs the patient to make lateral bending to the left when inhaling. What side of the lungs will have increased air flow, right or left?

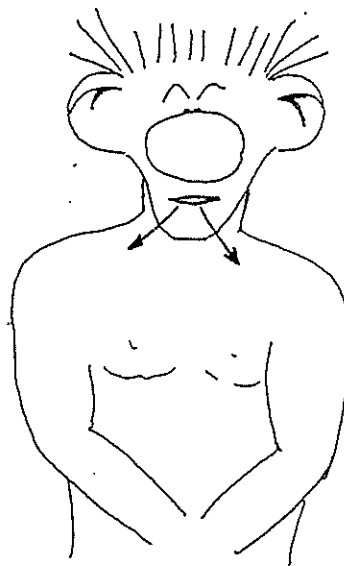
Explain your answer.

* Limb movements

Moving the upper limbs
in a combination
flexion-abduction
direction is used
with inhaling.



Moving the upper limb
in a combination
extension-adduction
direction is used
with exhaling.



b) Keep air in the lungs for better air exchange

If air moves in and out of the lungs very fast there may not be enough time to have a good exchange of oxygen and carbon dioxide.

IMPORTANT RULE TO REMEMBER

EXPIRATION SHOULD BE LONGER THAN INSPIRATION

Controlling what happens at the nose and mouth is very important in helping to keep air in the lungs.

Questions:

A. Take air in through your nose. Hold it, open your mouth very wide (big), now let the air out through your open mouth. Repeat this three times.

B. Take air in through your nose. Hold it, open your mouth so that your lips are close together, now let the air out through the space between your lips. Repeat this three times.

1. In what position did the air leave the lungs more slowly?

Why? _____

2. In what position did the air stay in the lungs longer?

Breathing technique to keep air in your lungs for better air exchange is as follows:

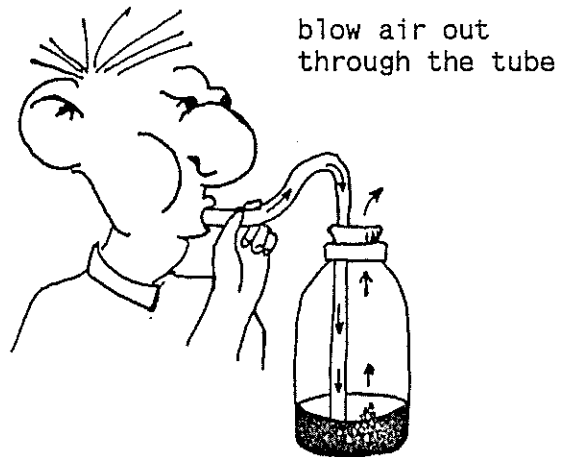
INHALE: mouth closed
 air enters through nose

EXHALE: lips close together
 air leaves slowly from the mouth only

RESISTED EXHALATION WITH TUBE AND WATER

Another exercise that can help keep air in the lungs is resisted breathing.

The patient blows air out of the mouth into a tube that empties into a jar with a small amount of water.



The resistance given by the water and tube help keep air in the lungs longer.

Questions:

1. A patient has a problem breathing with the diaphragm. Describe the breathing exercises you could do for this patient.

Questions: (continued)

2. A patient exhales very quickly. Describe the breathing exercises that you could give this patient to help air stay in the lungs longer.

3. A patient has no movement of the right rib area when breathing. Describe the exercise that you could give this patient to have more movement in this area when inhaling.

4. You would like the patient to try to bring more air into the posterior and inferior lung area. How will you do this?

c) Removing secretions from the airways

If secretions are in the airways (nose, trachea, bronchii, alveoli), breathing becomes very difficult and sometimes impossible.

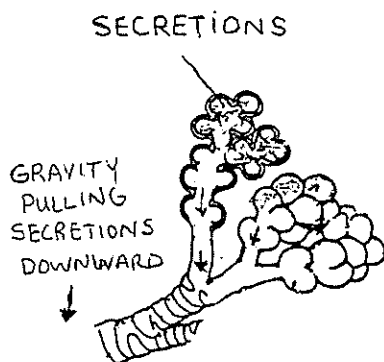
Two ways to identify if a patient has secretions are to listen to the breathing, and feel over the lung areas for liquid movements.

It is important that all airways remain as clear as possible for good air travel and exchange.

3. TECHNIQUES TO REMOVE SECRETIONS

- a) patient positioning
- b) breathing exercises
- c) use of steam
- d) vibration/clapping
- e) assist coughing
- f) suction

a) Patient positioning



If there are secretions in the small air tubes and air sacs in the lungs, we can position the patient so that GRAVITY will help to pull these secretions into the large air tubes.

When secretions are in the large air tubes, they can more easily be removed from the body.

The following rules can help the PTA better decide what position is best for removing the patient's secretions.

<u>LOCATION OF SECRETIONS</u>	<u>PATIENT POSITION TO HELP REMOVE SECRETIONS</u>
* Superior parts of lungs	* Sitting
* External part of left lung	* Sidelying with left side up
* External part of right lung	* Sidelying with right side up
* Anterior parts of lungs	* Supine (back-lying)
* Posterior parts of lungs	* Prone (stomach-lying)
* Inferior parts of lungs	* Lying with upper body a little inferior to lower body

The above positions are general recommendations for positioning.

It is important that the PTA knows that CHANGING the patient's position regularly (3-4 times each day) is the best for general removal of secretions.

Generally, the patient should remain in the specific position for 15-20 minutes.

Before putting the patient in different positions, the PTA must ALWAYS CHECK WITH THE DOCTOR.

The doctor will say what positions should be avoided for different patients.

Activity:

The PTA must learned different patient positions to help remove secretions from the lungs.
 For each picture given, please write where the secretions are, and draw them in the picture.

Example:



Location of secretions :

SUPERIOR PARTS
OF LUNGS



A. Location of secretions

B. Location of secretions :



C.



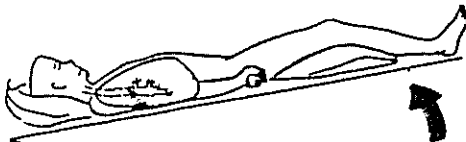
C. Location of secretions :

D. Location of secretions :

D.



E.

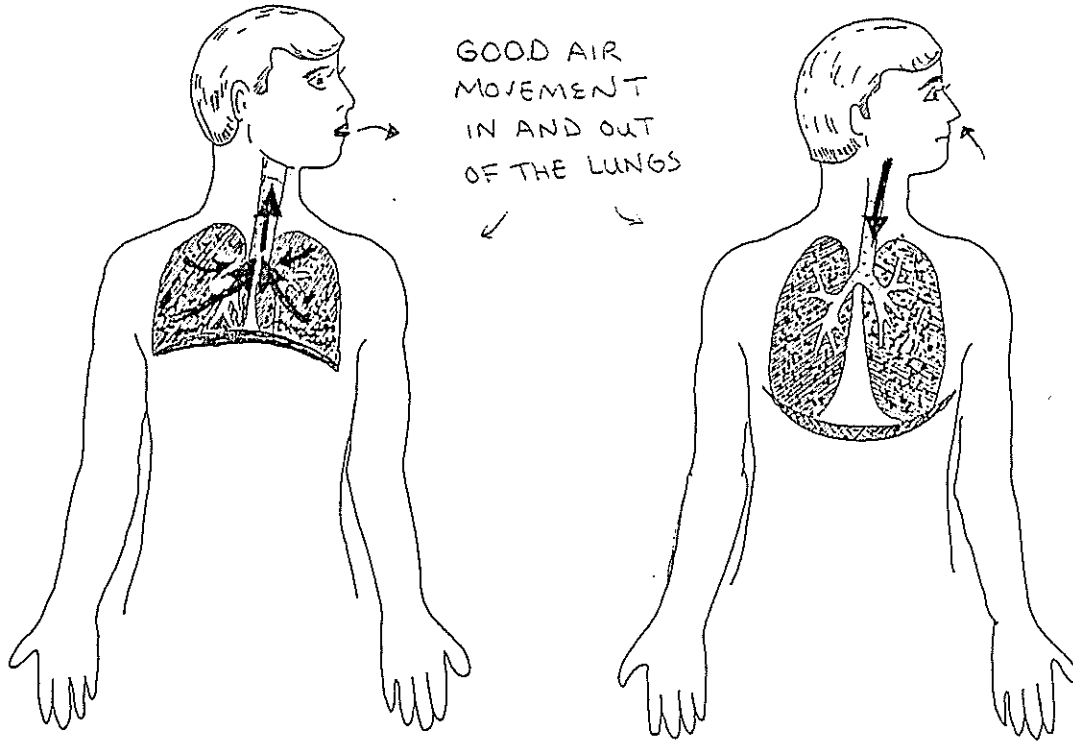


E. Location of secretions :

b) Breathing exercises

Breathing exercises are very important and should be used in ALL respiratory treatments.

Deep breathing fills the alveoli with air. This air movement into the lungs can help keep alveoli open, and help movement of secretions out of the alveoli.



Deep breathing exercises are the most important treatment for removing secretions from the lungs.

Examples of deep breathing exercises are given on pages 16-24.

c) Use of steam

Steam is the small drops of water that lift in the air from hot water.

If a patient can inhale steam when deep breathing, it will help to make secretions in the lungs more liquid.



Secretions are more "water-like" and can move from the lungs easier.

d) Vibration/Clapping

Sometimes gravity and breathing exercises are not enough to help move the secretions out of the small air tubes and air sacs.

In this case, the PTA must manually try to help move the secretions.

The PTA can try to move secretions by:

* Vibration

Vibration is very small and fast shaking movements.

These small and fast shaking movements may help to make the secretions more loose (less attached to walls of air tubes and air sacs).

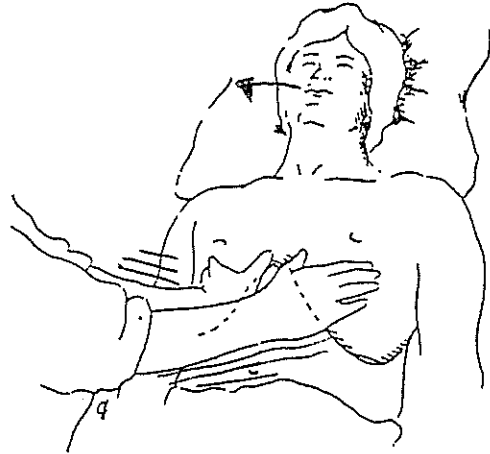
The PTA's hand will rest over the area of the lung that has secretions.

Vibration is given through the upper limb of the PTA. The arm, forearm, and hand all work together to give vibration.

Vibration is given at the same time the patient exhales.

Small pressure is also given to the patient with vibration.

This pressure is in the same direction as the movement of the ribs ... down and in.



Question:

Why are pressure and vibration given when the patient exhales and not when the patient inhales?

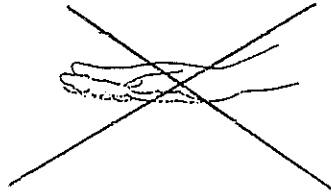
* Clapping

Clapping is a rounded hand contracting the surface of the body.

The hand is rounded to trap air in the space between the hand and body surface.

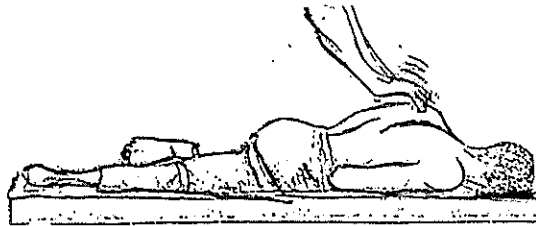


This trapped air will cause movement in the secretions that are under the hand.



If the hand is flat, it will be more painful for the patient and will not be effective in moving secretions.

The PTA gives clapping over the lung areas that have secretions.



CAUTION

Clapping may be effective in removing secretions, but may also hurt the patient.

- * Clapping may help spread disease - do not use clapping on TB patients.
- * Clapping may break small air sacs - use caution in applying clapping with pneumonia.

VIBRATION and CLAPPING are used together with patient positioning.

Questions:

1. Explain why vibration and clapping should be done in positions where gravity helps to move secretions.

2. A patient has secretions in the lower parts of his lungs. The PTA does clapping in sitting position. The patient does not get better. List 2 ways the treatment could be changed so that secretions can be more easily removed.

Note:

Clapping is a very overused technique.

The use of clapping should be decreased and the use of deep breathing should replace it.

e) Assist coughing

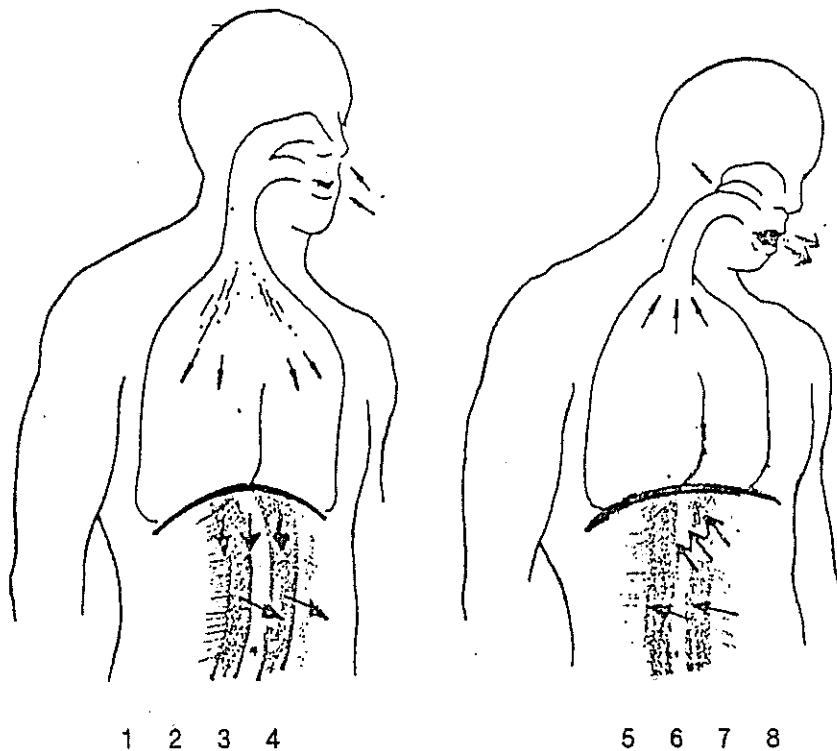


A cough is when air is forced out of the lungs very fast.

A cough is the body's way to remove something from the respiratory system (water, food, smoke, etc).

The normal sequence for a cough:

1. A person takes a deep breath pulling air into the lungs.
2. After the air is in, the trachea closes at the top.
3. With the trachea closed, the air cannot leave.
4. Pressure increases in the lungs.
5. The abdominal muscles contract hard and fast.
6. The trachea is opened.
7. The air is quickly PUSHED OUT of the lungs.
8. Anything that is loose in the airtubes will be carried out by this rush of air.



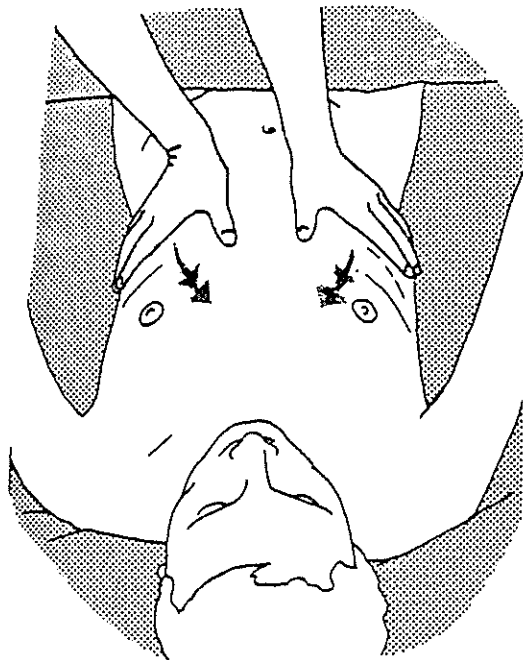
Activity:

Review the eight main steps in a cough. Practice coughing and try to identify each of the eight steps as they happen.

Put your hand on the abdominal area. Try coughing without any abdominal muscles. Describe what happened.

Assisted coughing for weak patients

If the patient is not strong enough to remove secretions with his cough, the PTA can help the patient by pushing upward and inward on the ribs.

f) Suction

Suction is a very specialized technique that is done only in hospitals with the correct equipment.

In this technique, a tube is put into the airways for a very short time to try to pull the secretions out.

One end of the tube is attached to a suction machine; the other end is put into the airways of the patient.

F. EVALUATION AND TREATMENT OF CHILDREN WITH RESPIRATORY PROBLEMS

The same principles of evaluation and treatment for adult respiratory problems can be applied to children.

Because a child is much smaller, and is not able to follow directions, modifications of techniques are needed.

1. EVALUATION OF CHILDREN WITH RESPIRATORY PROBLEMS

The same guidelines for adult evaluation applies to children. See page 10 for details.

2. TREATMENT OF CHILDREN WITH RESPIRATORY PROBLEMS

Children that need respiratory treatments are children with SECRETIONS.

Similar to adult treatment (pages 26-35), secretions can be removed by:

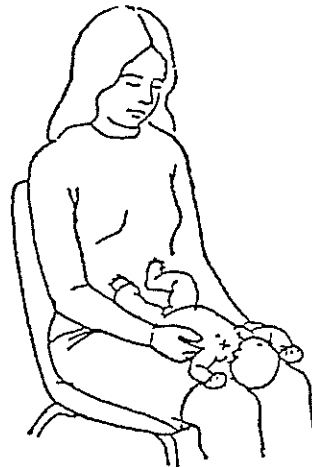
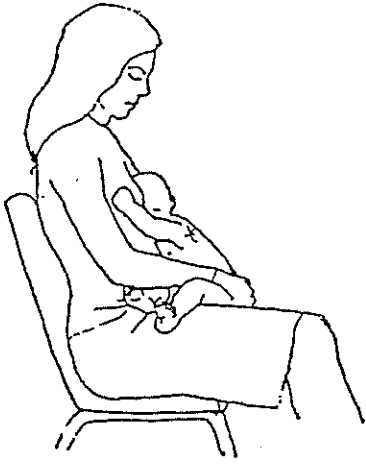
- a) positioning
- b) breathing steam
- c) vibration/clapping
- d) assisted expiration
- e) cough reflex

a) Positioning

Different positions for the baby will help remove secretions from different parts of the lungs.

To help the baby remain in these positions it is recommended that the baby be held on the mother's lap or the PTA's lap.

On the next page are pictures demonstrating different positions to help remove secretions from a baby's lungs.



b) Breathing Steam

As with adults, breathing steam can help make secretions more liquid so they can move easier.

CAUTION

BE CAREFUL THAT THE STEAM IS NOT TOO HOT AND DOES NOT BURN
THE CHILD

c) Vibration/Clapping

The same principle of vibration and clapping (pages 30-32) apply to children.

The application of these techniques will change because of the small size of the child.

* Vibration

Vibrations are given during expiration.

* One hand is on one side of the chest making the vibrations when the baby is exhaling.

* The other hand is on the opposite side of the chest - not moving. This hand is to support the baby and help the vibrations be more effective in staying inside the baby.



* Clapping

Because a child is so small, clapping must be gentle and clapping cannot be given with the whole hand.

Modifications can be:

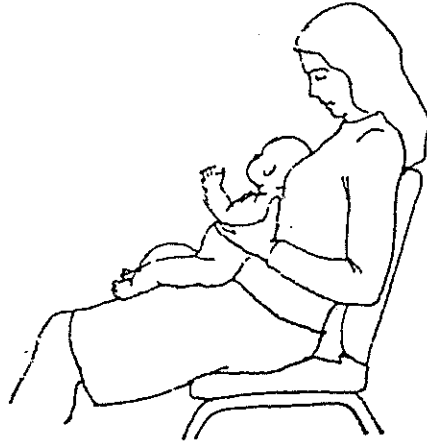
- a. to make gentle clapping with 3 fingers placed close together.

- b. to remove the end of a stethoscope and use this to contact the baby's chest.

d) Assisted expiration

The PTA can help the baby remove air from the lungs so that expiration is deeper and more new air can enter into the lungs.

The PTA will place one hand on each side of the chest and when the baby exhales, the PTA will push downward and inward to help remove the air from the lungs.



Remember, the baby's bones are not strong and these movements must be gentle.

The PTA must follow the breathing rhythm of the baby and not go against the baby's breathing.

e) Cough reflex

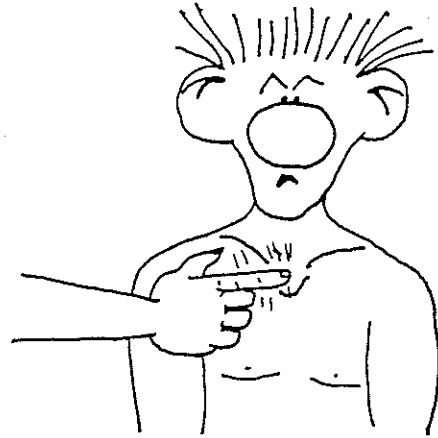
Because we cannot ask the baby to cough, we must stimulate a reflex (page 41) to cause the baby to cough automatically.

If the child has secretions in the big air tubes, he can be able to remove them by coughing.

To stimulate the reflex, the PTA must put his finger over the top of the sternum and move it gently.

Moving this area gently with the finger will cause the baby to cough

DO NOT PUSH VERY HARD ON THESE AREAS.



SUMMARY

- Respiratory techniques used for children must be adapted because:
 1. children are very small
 2. children cannot follow directions
- For best results, the child must be calm - not crying or upset.
- Respiratory treatments are best before feeding because of the chance that these movements may cause vomiting if it is too soon after eating.
- The baby should be put in all of the suggested positions to make sure all lung areas can be cleared of secretions. The baby should be in each position for about 5 minutes.
- If the baby has a big problem to breathe in any of these positions, stop it.
- Follow advice of the medic; he can tell you when treatments are dangerous for the baby.

G. CHAPTER SUMMARY

There are six main places that the air must pass to go in and out of the body. These are: the nose or mouth, trachea, bronchii, bronchioles, and alveoli.

Breathing (respiration) is air moving in and out of the body.

Air is pulled into the lungs by:

1. diaphragm contracts and pulls inferior part of lungs downward
2. rib muscles contract bringing ribs up and out
3. abdominal muscles relax to allow room for air in the lungs

Physical Therapy can help respiratory patients by:

1. positioning the patient for comfortable breathing
2. teaching the patient how to pull more air into the lungs
3. teaching the patient how to keep air in the lungs longer
4. helping the patient to remove secretions from the lungs

Specific techniques for patient positioning, breathing exercises, vibrations, clapping, and coughing are given in this chapter.

Breathing exercises should be used in the treatment of ALL respiratory problems.

Expiration should be longer than inspiration.

Change of position is good for moving secretions and preparing for them to come out.

Breathing NOT clapping is the most important.

0

RANGE OF MOTION



RANGE OF MOTION (ROM) is moving a limb to help maintain the movement at a joint.

OBJECTIVES

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

1. describe the difference between ROM and stretching techniques.
2. identify when to use passive ROM, active assistive ROM and active ROM.
3. demonstrate appropriate hand and body position when making ROM.

CHAPTER CONTENT

- A. WHAT IS RANGE OF MOTION?
- B. WHO NEEDS RANGE OF MOTION?
- C. WHEN NOT TO MAKE RANGE OF MOTION
- D. TYPES OF RANGE OF MOTION
- E. GUIDELINES FOR MAKING RANGE OF MOTION
- F. PICTURES OF PASSIVE ROM TECHNIQUES
- G. CHAPTER SUMMARY

A. WHAT IS RANGE OF MOTION?

In ARTHROLOGY chapter, Volume 1, we described range of motion (ROM) as the amount of movement at a joint.

Range of motion is also moving the limb to help maintain the movement at a joint.

Questions:

1. A doctor asks, "What is the ROM at the shoulder?"
In your own words, what is this doctor asking?

2. A doctor asks to "make ROM for the shoulder". What does this mean?

Range of motion is moving the limb to MAINTAIN the movement at a joint.

If a patient has tightness or stiffness at a joint, the PTA will use a STRETCHING technique to try to increase the amount of movement. (See STRETCHING chapter, Volume 2.)

Range of motion is moving the limb to prevent stiffness. After a joint is stiff, the PTA must make stretching to try to increase the movement.

Question:

In your own words, describe the difference between ROM and stretching.

B. WHO NEEDS RANGE OF MOTION?

People who need special care to maintain joint movement are:

- * people who are unconscious
- * people who cannot move their limbs without help
- * people who are afraid of pain with joint movement
- * people who are bedridden (see BEDRIDDEN PATIENTS chapter, Volume 3)

Questions:

1. A 10 year old boy is active and has no problem. Will you make range of motion for this boy?

Yes _____ No _____

Explain your answer.

Questions: (continued)

2. A bedridden patient needs special care to help maintain joint movement. Explain why.

The goal of ROM is to maintain normal joint movement. If a person is unable to make these movements or has little activity in a day, special care should be given to prevent joint stiffness.

C. WHEN NOT TO MAKE RANGE OF MOTION

Range of motion is not made when joint movement will injure a part of the body.

Examples:

- directly after a skin graft that crosses a joint
- directly after injury to a muscle, tendon, or ligament
- directly after surgery for tendons, ligaments, muscles, skin
- near a broken bone that is not immobilized

D. TYPES OF RANGE OF MOTION

Range of motion can be made 3 ways:

1. PASSIVE RANGE OF MOTION
2. ACTIVE RANGE OF MOTION
3. ACTIVE-ASSISTIVE RANGE OF MOTION

1. PASSIVE RANGE OF MOTION

Passive ROM means that the part of the body being moved does not help at all to complete the movement.

The part of the body being moved is passive (it makes no work).

Examples

Passive ROM of the left elbow means that the left elbow muscles make no work to complete the movement.

Passive ROM of the right hip means that the muscles of the right hip make no work to complete the movement.

Passive ROM of the left lower limb means that the muscles of the left hip, knee, ankle, foot and toes make no work to complete the movement.

There are 2 ways to make passive ROM:

- a. the PTA makes all the work
- b. the patient makes all the work with another part of the body.

a. PTA makes ALL the work to move the joint

For patients that are unable to move a limb at all and unable to help move this limb with another part of their body, the PTA or a family member must do all the work to move the joint.

Examples

* A patient is in a coma and cannot move any part of the body. The PTA must make Passive ROM for all joints because the patient cannot help at all.

* A patient cannot move his legs and has very weak arms. The PTA must make Passive ROM for both lower limbs because the patient cannot help at all.

b. the patient makes ALL the work (with another part of the body) to move the joint

For patients that are unable to move a limb, but are able to move this limb through complete ROM with another part of the body, the patient will make self-ROM.

Examples

* A patient cannot move his left hand at all. This patient can use his right hand to make passive ROM for his left hand.

* A patient cannot move her legs at all. Both of her arms are very strong. She is able to use her arms to make Passive ROM for her lower limbs.

Summary of Passive ROM

Passive ROM means that the part of the body being moved does not help at all.

- A PTA must make all of the movement for the patient.

OR

- The patient must use a strong part of his body to make the movement for this part (Self-ROM).

2. ACTIVE RANGE OF MOTION

Active ROM means that the part of the body being moved is making all of the work to complete the movement.

The part of the body is strong enough to make the complete ROM without help.

Examples

- * Active ROM is the left elbow means that the left elbow muscles make all the work. The muscles are the left elbow are strong enough to make complete ROM without help.
- * Active ROM is the right hip means that the muscles of the right hip make all the work. The muscles of the right hip are strong enough to make complete ROM without help.
- * Active ROM of the left lower limb means that the muscles of the left hip, knee, ankle, foot and toes make all the work. The muscles of the left hip, knee, ankle, foot and toes are strong enough to make complete ROM without help.

Summary of Active ROM

Active ROM means that the part of the body being moved is making all of the work to complete the movement.

The patient can make complete ROM of this joint without help.

The PTA only supervises the patient and gives MOTIVATION for the patient to continue to make ROM by himself.

2. ACTIVE/ASSISTIVE RANGE OF MOTION

Active/Assistive ROM means that the part of the body being moved makes some work, but needs help to complete the movement.

Examples

- * Active/Assistive ROM of the left elbow means that the left elbow muscles work, but need help to make the complete ROM.

- * Active/Assistive ROM of the right hip means that the muscles of the right hip work, but need help to make the complete ROM.

- * Active/Assistive ROM of the left lower limb means that the muscles of the left hip, knee, ankle, foot and toes make work, but they need help to make the complete ROM.

There are 2 ways to make Active/Assistive ROM.

- a. the PTA gives some help to complete the movement

- b. the patient helps to complete the movement by using another part of the body

- a. the PTA gives some help to complete the movement

For patients that are able to make a part of the ROM but unable to make the complete ROM, the PTA must give some help.

Example

- * A patient is recovering from malnutrition. She can move all parts of the body a little. The PTA will ask the patient to make as much of the movement as she can and the PTA will give help to complete the movement when it is needed.

- b. the patient helps to complete the movement by using another part of the body.

Example

- * A patient has left elbow flexors that are very weak. The right are is normal. The patient makes as much movement as possible with the left elbow flexors and, when needed, will complete the movement with the help of the right arm.

Summary of Active/Assistive ROM

Active/Assistive ROM means that the part of the body being moved makes some work, but needs help to make complete ROM

- A PTA can give help to make the complete movement.

OR

- The patient can use a strong part of his body to help make the movement for this part.

Questions:

1. The patient has very weak muscles of both upper limbs. What type of ROM exercises would you recommend for this patient (passive, active, or active/assistive)?

2. A patient has good strength in all muscles of the lower limbs. What type of ROM exercises would you recommend for this patient (passive, active, active/assistive)?

3. A patient has no movement in the left upper limb and severe weakness in the left lower limb. What type of ROM exercises would you recommend for this patient (passive, active, active assistive)?

Questions: (continued)

4. In your own words, describe self-ROM.

5. Describe the difference between active ROM and active assistive ROM.

E. GUIDELINES FOR MAKING RANGE OF MOTION

There are some general guidelines to remember about ROM that will help to make ROM exercises successful.

1. Encourage all patients to make as much active movement as possible; the PTA should help the patient when he needs help. Active movement (muscle contraction) will improve blood circulation much more than passive movement.
2. LOOK AT THE PATIENT when helping to make ROM!!! This helps to see if the patient has pain and helps to show the patient that you are interested in him/her.

3. The patient should be positioned so that he/she is comfortable and the part can be moved through the full ROM.
4. Move the part slowly through the complete pain-free ROM; 5 - 10 times.
5. When moving a limb, the joints should be supported. (Hold the patient's limb on or near the joints.)
6. The range of motion movement can be:
 - . in one direction only
 - . at one joint only
 - . a combination of directions
 - . at many joints at the same time.

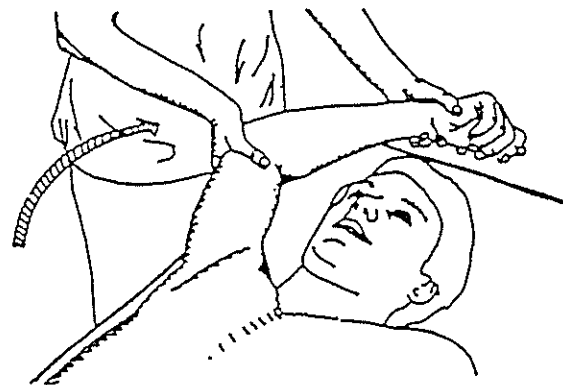
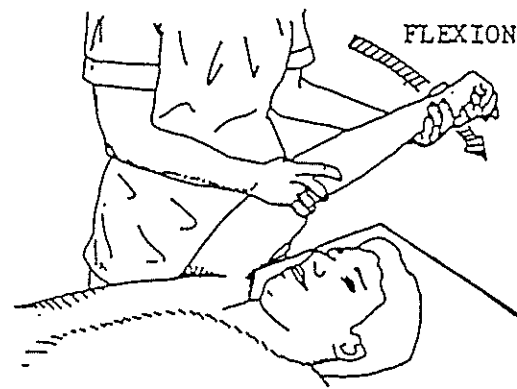
F. PICTURES OF ROM TECHNIQUES

On the following pages are pictures of ROM techniques.

These are ideas of how to move a limb to help maintain the movement at a joint.

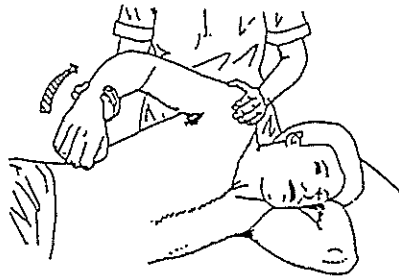
The PTA should practice these techniques and develop more ideas to help make ROM interesting and useful.

THE SHOULDER



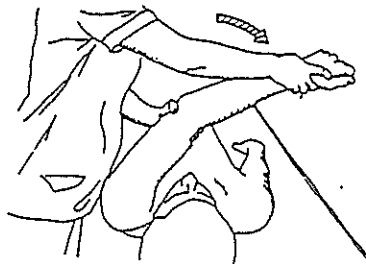
ABDUCTION

THE SHOULDER

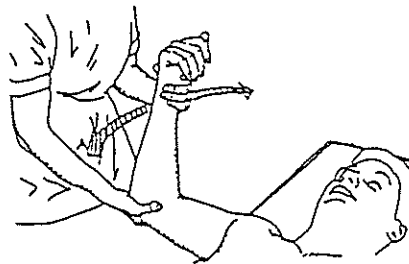


EXTENSION*

(* May modify this position to see the patient.)

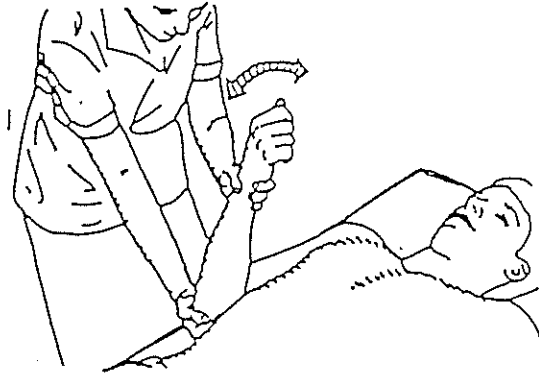


ADDUCTION



INTERNAL AND EXTERNAL ROTATION

ELBOW



FLEXION AND EXTENSION

FOREARM



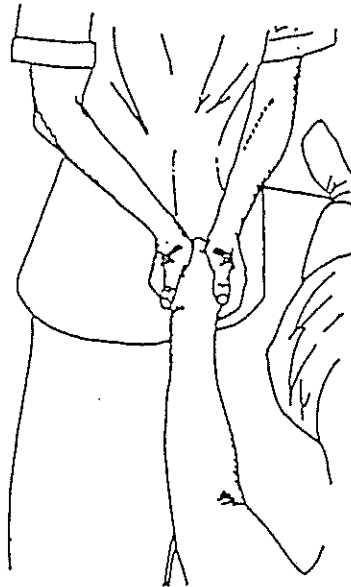
PRONATION AND
SUPINATION

WRIST



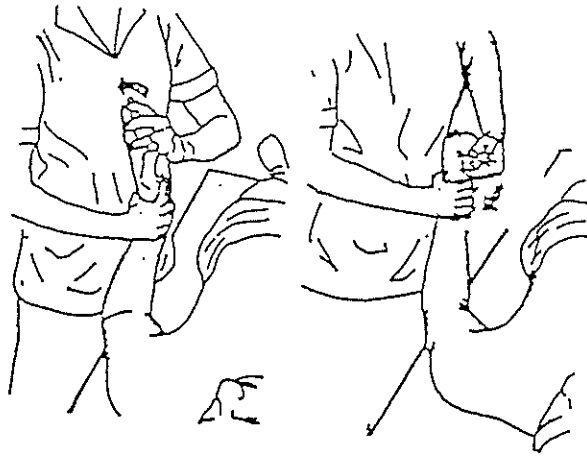
FLEXION
EXTENSION
ABDUCTION
ADDUCTION

THE HAND



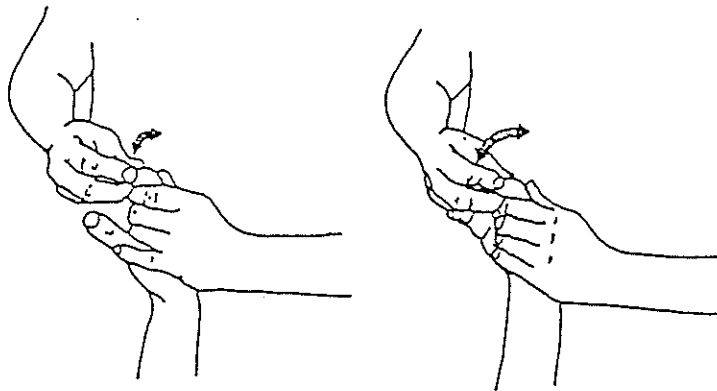
STRETCHING THE ARCH

THE HAND

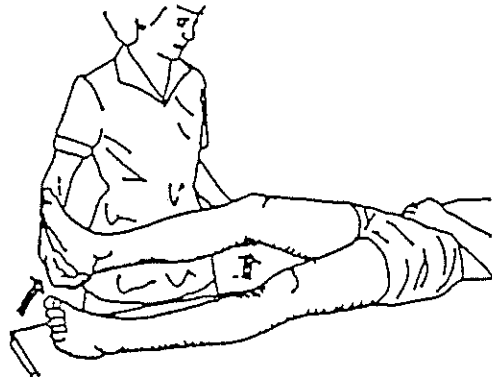


FINGER FLEXION
AND EXTENSION

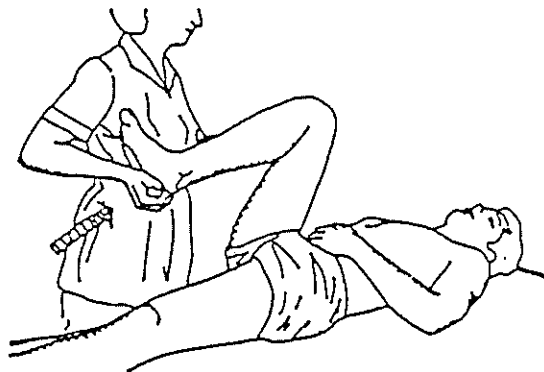
FINGER FLEXION AND EXTENSION



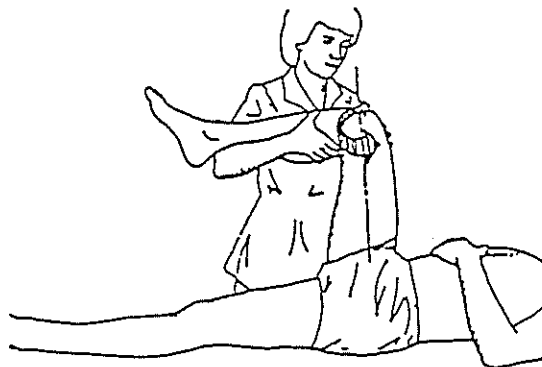
THE HIP



FLEXION →

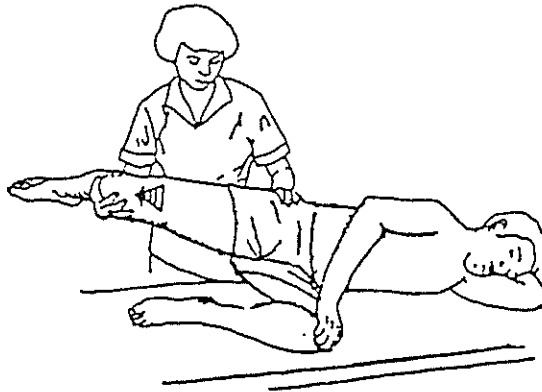


(* May modify this position to prevent the opposite leg from lifting.)

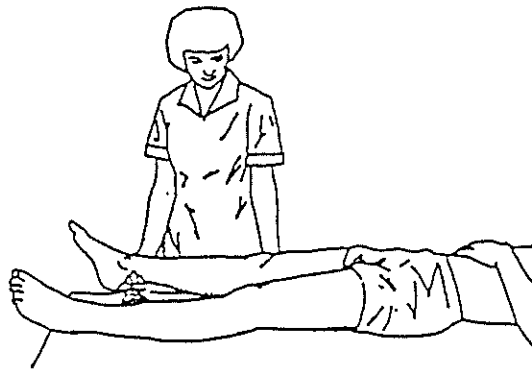


INTERNAL AND EXTERNAL ROTATION

THE HIP



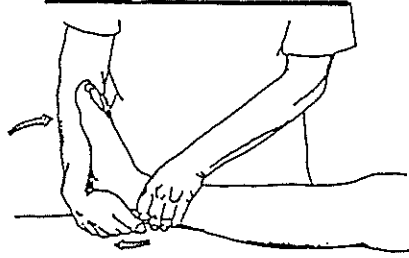
EXTENSION



ABDUCTION AND ADDUCTION*

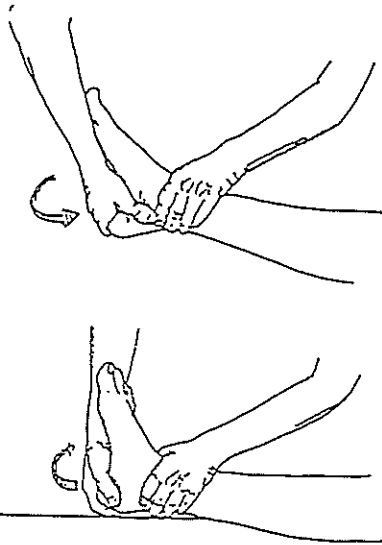
(* May modify this position to prevent the opposite leg from moving inward.)

ANKLE

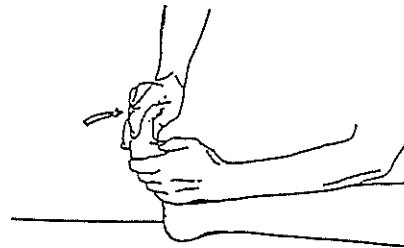


DORSIFLEXION AND PLANTARFLEXION

THE FOOT



FOOT INVERSION AND EVERSION



TOE FLEXION AND EXTENSION

G. CHAPTER SUMMARY

Range of motion is moving a limb to help maintain the movement at a joint.

There are 3 types of range of motion

PASSIVE ROM

The part of the body being moved does not help at all.

The PTA must make all the movement for the patient

OR

The patient makes all the movement using another part of the body (self-ROM).

ACTIVE ROM

The part of the body being moved makes all the work.

The part of the body is strong enough to make complete ROM without help.

ACTIVE/ASSISTIVE ROM

The part of the body being moved makes some work, but needs help to make complete ROM.

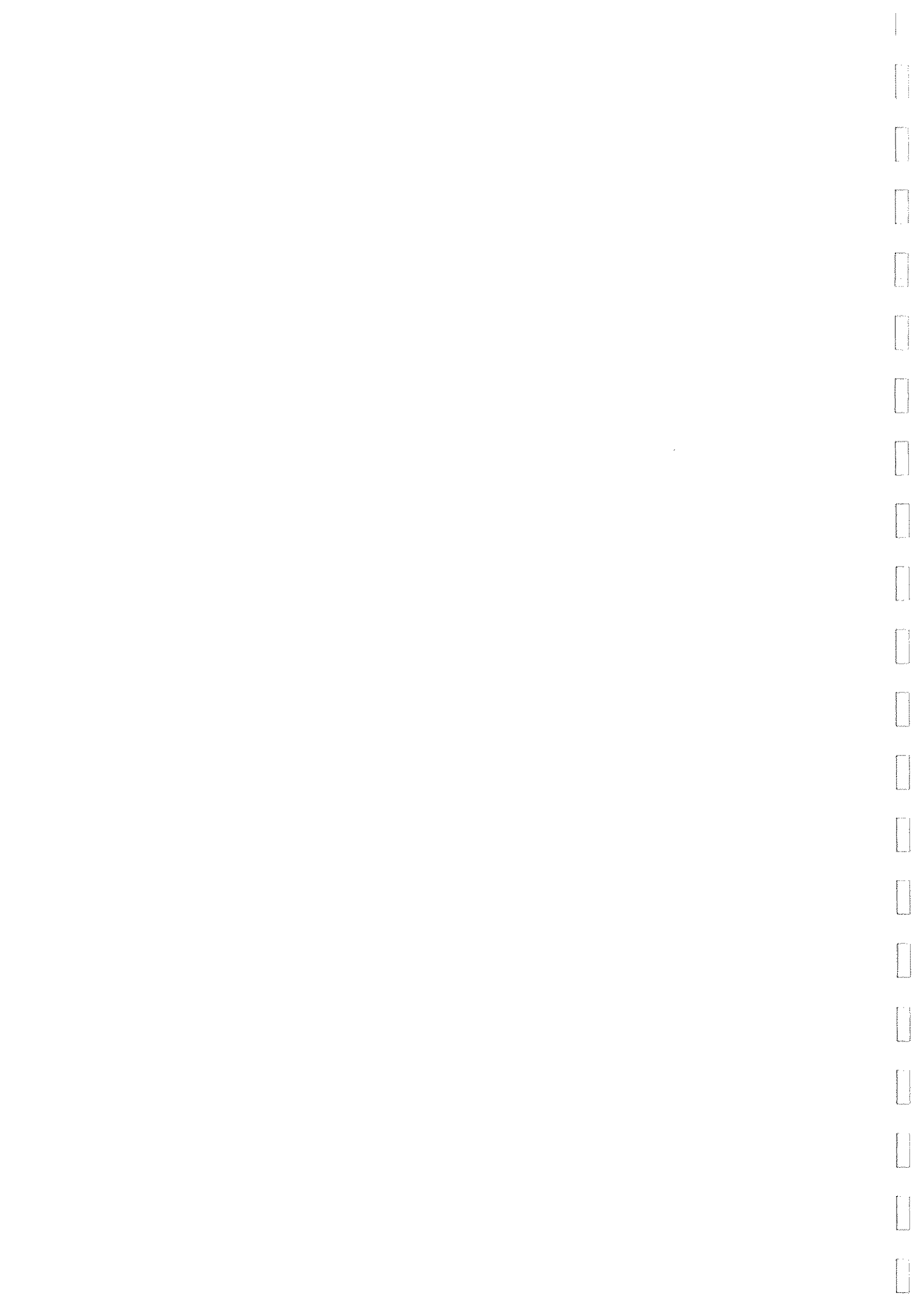
The PTA can help to complete the movement

OR

The patient can use a part of his of his body to complete the movement.

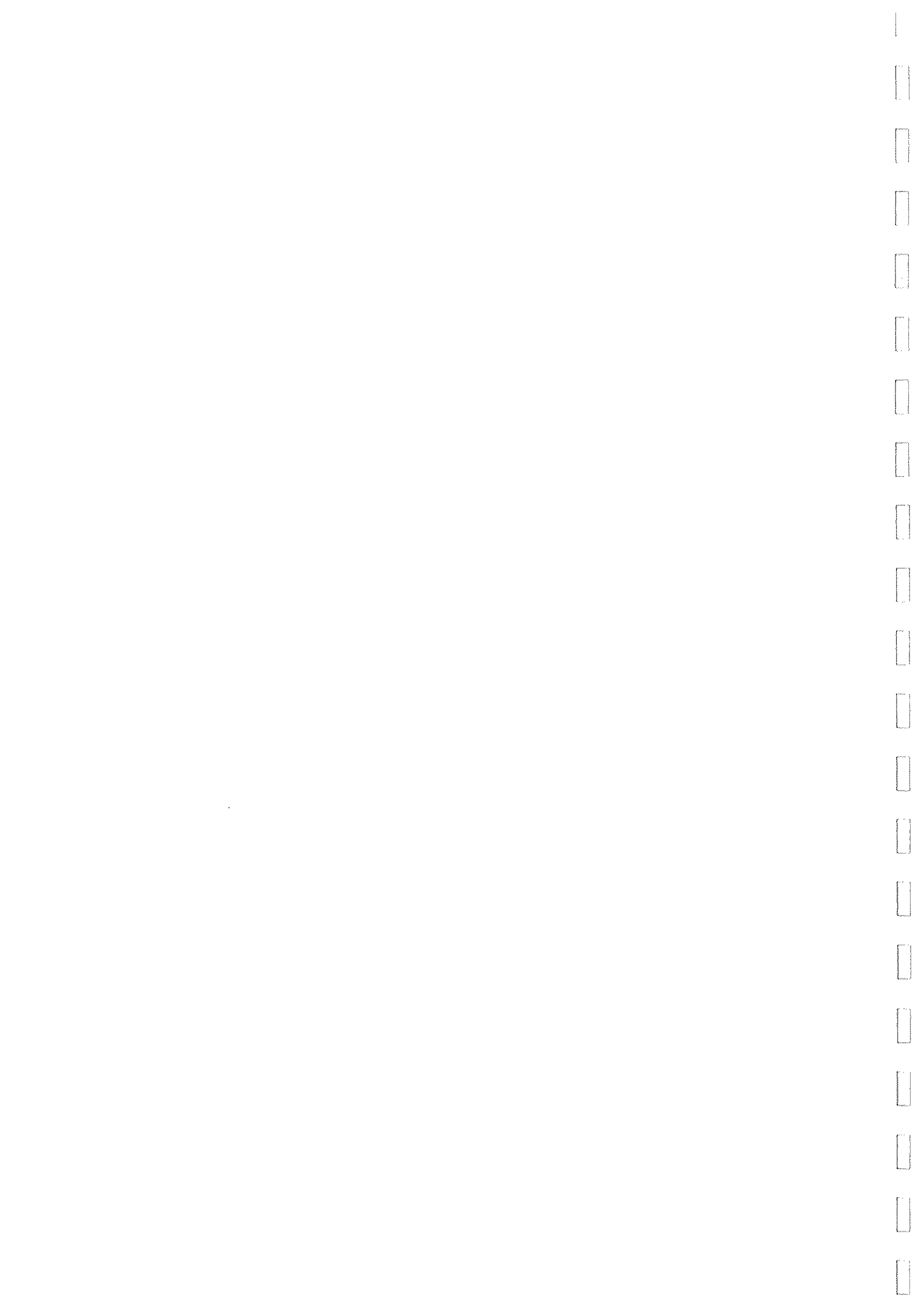
Guidelines for making ROM are:

- Encourage the patient to make as much active movement as possible.
- LOOK AT THE PATIENT when helping to make ROM.
- Support the distal joints, move slowly, and make sure the patient is positioned for comfort.
- Joint movement can be made at one joint only, or at many joints at the same time.
- Joint movement can be in one direction only, or using a combination of directions.
- Pictures are included for guidance and to stimulate thinking for making additional ROM activities.



Amesbury, Mass.
Amesbury, Mass.
1928

STRETCHING



STRETCHING is a technique to lengthen shortened soft tissues and increase range of motion.

OBJECTIVES

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

1. compare active and passive stretching techniques.
2. describe at least 5 general rules of passive stretching techniques.
3. given a patient problem, demonstrate appropriate stretching techniques.

CHAPTER CONTENTS

- A. WHAT IS STRETCHING?
- B. WHEN AND WHY TO STRETCH
- C. WHEN NOT TO DO STRETCHING
- D. TYPES OF STRETCHING TECHNIQUES
- E. STRETCHING MUSCLES THAT CROSS TWO JOINTS
- F. GENERAL RULES FOR PASSTIVE STRETCHING TECHNQUES
- G. PICTURES OF PASSIVE STRETCHING POSITIONS
- H. CHAPTER SUMMARY

A. WHAT IS STRETCHING?

STRETCHING is a technique to lengthen shortened soft tissues and increase range of motion.

Soft tissues may be muscles, ligaments, joint capsules, or skin.)

B. WHEN AND WHY TO DO STRETCHING

STRETCHING (WHEN)	STRETCHING (WHY)
<ol style="list-style-type: none"> 1. When ROM is limited because of contractures, scar tissue, or joint tightness. 2. Before physical activities and sports. 3. Before strengthening weak muscles that have tight opposing muscles. 	<ol style="list-style-type: none"> 1. To recover normal ROM of joints and soft tissue that surrounds the joint. 2. To prevent muscle injuries. 3. Lengthen tight muscles before strengthening weak muscles.
<p><u>Example:</u></p> <ul style="list-style-type: none"> * finger flexors are tight * finger extensors are weak 	<ul style="list-style-type: none"> * stretch finger flexors before strengthening finger extensors

C. WHEN NOT TO DO STRETCHING

A PTA should not do stretching in the following cases:

- a) when a bone limits joint movement
- b) after a recent fracture
- c) when a patient has hot, swollen, and painful joints
- d) when contractures can be functional

Questions:

1. Why do you not give stretching after a recent fracture?

2. A patient fractured her ankle many years ago. On x-ray you can see that the bones of the ankle have grown together. The ankle has limited ROM and is very stiff. Will you try to stretch the ankle?

Yes _____

No _____

Explain your answer.

D. TYPES OF STRETCHING TECHNIQUES

There are two types of stretching techniques:

1. ACTIVE STRETCHING
2. PASSIVE STRETCHING

1. ACTIVE STRETCHING

When there is muscle tightness, the patient can participate by inhibiting the tight muscle.

Three methods to inhibit a tight muscle are:

- i) contract - relax
- ii) contract - relax - contract
- iii) inhibition by contracting the opposite muscle

- i) contract - relax

The guidelines for this stretching technique are as follows:

- a. the tight muscle is put in a lengthened position.
- b. patient isometrically contracts the tight muscle in this position against resistance for 5-10 seconds.
- c. patient relaxes.
- d. PTA passively moves the joint toward increased range of motion.
- e. rest a few seconds and repeat.

Activity:

Form groups of 2 students in each group. One student will have muscle tightness and one student will be the PTA.

Review "contract - relax" stretching technique.

Apply this technique to a tight elbow flexor (biceps) muscle.

- a. put the elbow flexor in a "lengthened" position (remember, this muscle has tightness!)
- b. isometrically contract the biceps against resistance 5-10 seconds
- c. relax
- d. the "PTA" passively moves the joint toward extension
- e. rest; and repeat

For more practice, apply contract - relax technique to tight elbow extensors, tight knee flexors, and tight knee extensors.

ii) contract - relax - contract

The guidelines for this stretching technique are as follows:

- a. the tight muscle is put in a lengthened position.
- b. patient isometrically contracts the tight muscle in this position against resistance for 5-10 seconds.
- c. patient relaxes.
- d. the patient contracts the muscle opposite to the tight muscle and actively moves the joint toward increased range of motion.
- e. rest a few seconds and repeat.

Activity:

Form groups of 2 students in each group. One student will have muscle tightness and one student will be the PTA.

Review "contract - relax - contract" stretching technique.

Apply this technique to a tight elbow flexor (biceps) muscle.

- a. put the elbow flexor in a "lengthened" position (remember, this muscle has tightness!)
- b. isometrically contract the biceps against resistance 5-10 seconds
- c. relax
- d. contract the elbow extension (triceps) to move the joint toward extension
- e. rest; and repeat

For more practice, apply contract - relax - contract technique to tight elbow extensors, tight knee flexors, and tight knee extensors.

iii) inhibition by contracting the opposite muscle

The guidelines for this stretching technique are as follows:

- a. the tight muscle is put in a lengthened position.
- b. patient concentrically contracts the opposite muscle against some resistance.
- c. as the opposite muscle contracts, the tight muscle is inhibited and stretched as the joint moves.
- d. rest a few seconds and repeat.

Activity:

Form groups of 2 students in each group. One student will have muscle tightness and one student will be the PTA.

Review "inhibition by contracting the opposite muscle" technique.

Apply this technique to a tight elbow flexor (biceps) muscle.

- a. put the elbow flexor in a "lengthened" position (remember, this muscle has tightness!)
- b. concentrically contract the biceps against some resistance
- c. the elbow flexor may relax and allow more joint movement
- d. rest; and repeat

For more practice, apply "inhibition by contracting the opposite muscle" technique to tight elbow extensors, tight knee flexors, and tight knee extensors.

2. PASSIVE STRETCHING

The patient is relaxed, and an external force is applied to lengthen soft tissues. Passive stretching technique can be used for any soft tissue tightness.

There are three methods to apply a passive stretch:

- i) manual stretch
- ii) mechanical stretch
- iii) self stretch

Questions:

1. What is the difference between a passive stretching technique and an active stretching technique?

2. A patient has a joint limitation because of retracted skin. What type of stretch is better to use with this patient (active or passive)?

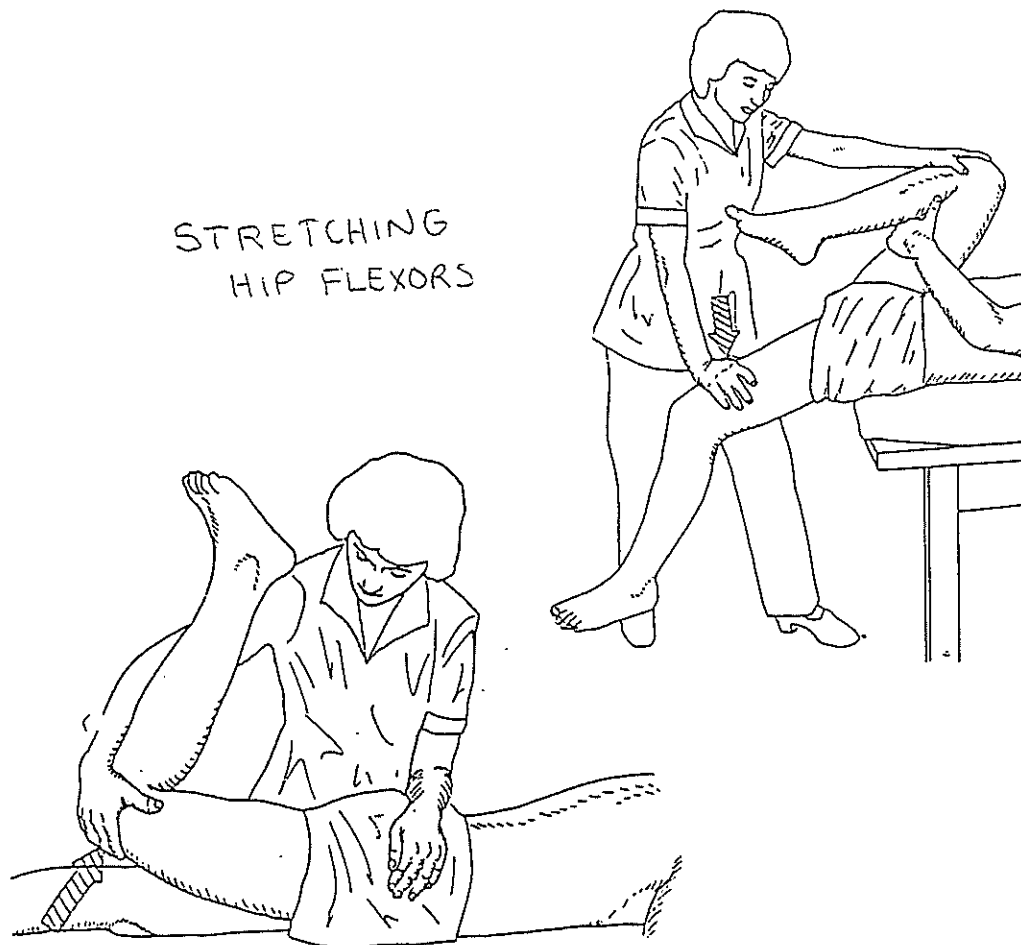
Explain your answer.

i) manual stretch

This type of stretching technique is given by the PTA.

- a. the PTA controls the direction, speed, intensity and duration of the stretch.
- b. the stretch is applied for at least 15-30 seconds.
- c. this is repeated several times.
- d. patient and PTA positioning are seen at the end of the chapter.

EXAMPLES OF DIFFERENT MANUAL STRETCH METHODS



ii) mechanical stretch

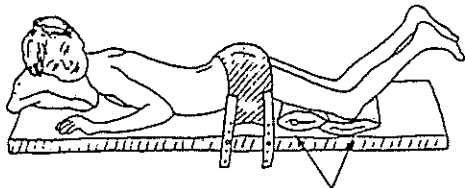
This type of stretching technique is given with equipment.

Weights, splints, and plaster are often used with this technique.

A mechanical stretch is a very long stretch.

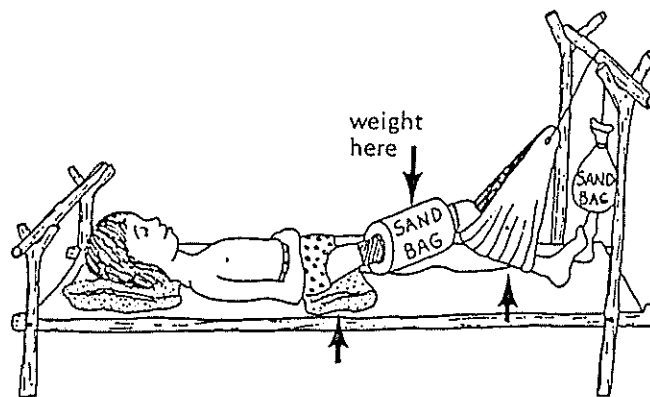
The minimum is 15-30 minutes; this stretch can be hours, days, or weeks depending on the technique.

EXAMPLES OF DIFFERENT MECHANICAL STRETCH METHODS



cushion under thighs
(Avoid pressure on knees)

STRETCHING
TIGHT HIP FLEXORS



STRETCHING TIGHT
KNEE FLEXORS

iii) self stretch

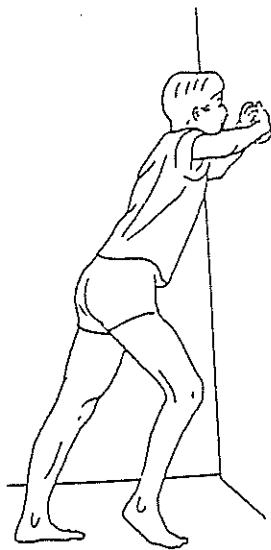
This type of stretching technique is given by the patient

The patient will put his body into a specific position.

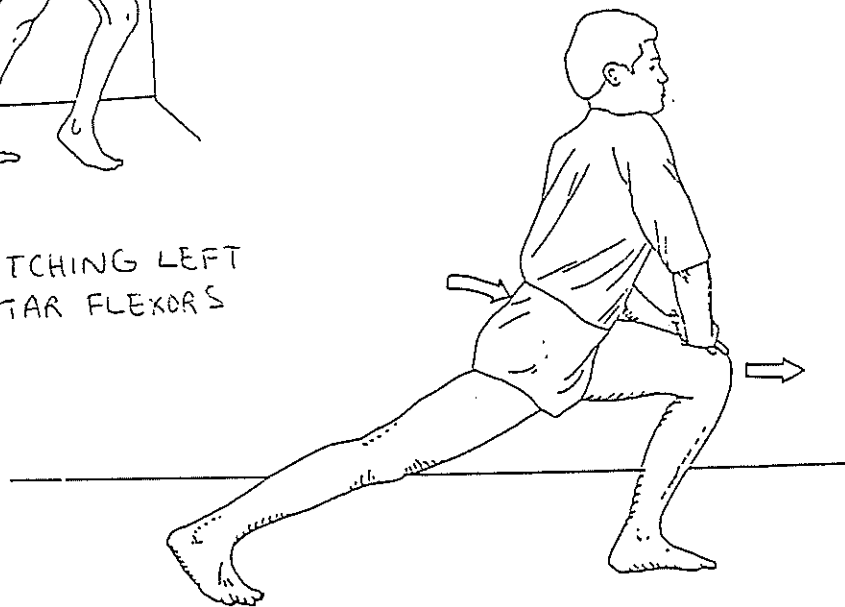
Next, the patient will put some body weight on this area.

The weight of the patient's body will help to stretch soft tissues.

EXAMPLES OF DIFFERENT SELF STRETCH POSITIONS



STRETCHING LEFT
PLANTAR FLEXORS



STRETCHING RIGHT HIP FLEXORS

E. STRETCHING MUSCLES THAT CROSS TWO JOINTS

In MYOLOGY chapter, Volume 1, we discussed muscles that cross two joints.

We have said that when these two joint muscles contract, they may cause movement at two joints.

If both joints are moved in the same direction that the muscle wants, the muscle is in the shortest position.

Questions:

1. A muscle attaches to the distal femur and the calcaneus. This muscle passes posterior to the knee and posterior to the ankle.
When this muscle contracts, what 2 movements could happen?

Knee: (flexion or extension) _____

Ankle: (dorsiflexion or plantar flexion) _____

This is the shortest position of this muscle.

2. A muscle attaches to the ischium and the proximal part of the tibia. This muscle passes posterior to the hip and posterior to the knee.
When this muscle contracts, what 2 movements could happen?

Hip: (flexion or extension) _____

Knee: (flexion or extension) _____

This is the shortest position of this muscle.

3. A muscle attaches to the anterior part of the iliac bone and superior part of the tibia. This muscle passes anterior to the hip and anterior to the knee.
When this muscle contracts, what 2 movements could happen?

Hip: (flexion or extension) _____

Knee: (flexion or extension) _____

This is the shortest position of this muscle.

Questions: (contined)

4. A muscle attaches to the distal part of the humerus and distal phalanges of the fingers. This muscle passes anterior to the wrist and anterior to the phalanges. When this muscle contracts, what 2 movements could happen?

Wrist: (flexion or extension) _____

Fingers: flexion or extension) _____

This is the shortest position of this muscle.

5. A muscle attaches to the distal part of the humerus and distal phalanges of the fingers. This muscle passes posterior to the wrist and posterior to the phalanges. When this muscle contracts, what 2 movements could happen?

Wrist: (flexion or extension) _____

Fingers: flexion or extension) _____

This is the shortest position of this muscle.

If ONE joint is moved in the opposite direction than what the muscle wants, there is a small stretch (lengthening) of the muscle.

If BOTH joints are moved in the opposite direction than what the muscle wants, there is a big stretch (lengthening of the muscles.)

Questions:

1. A muscle attaches to the distal femur and the calcaneus. This muscle passes posterior to the knee and posterior to the ankle. What joint movements together will put the biggest stretch on this muscle?

Knee: (flexion or extension) _____

Ankle: (dorsiflexion or plantar flexion) _____

Questions: (continued)

2. A muscle attaches to the ischium and the proximal part of the tibia. This muscle passes posterior to the hip and posterior to the knee.

What joint movements together will put the biggest stretch on this muscle?

Hip: (flexion or extension) _____

Knee: (flexion or extension) _____

3. A muscle attaches to the anterior part of the iliac bone and superior part of the tibia. This muscle passes anterior to the hip and anterior to the knee.

What joint movements together will put the biggest stretch on this muscle?

Hip: (flexion or extension) _____

Knee: (flexion or extension) _____

4. A muscle attaches to the distal part of the humerus and distal phalanges of the fingers. This muscle passes anterior to the wrist and anterior to the phalanges.

What joint movements together will put the biggest stretch on this muscle?

Wrist: (flexion or extension) _____

Fingers: flexion or extension) _____

5. A muscle attaches to the distal part of the humerus and distal phalanges of the fingers. This muscle passes posterior to the wrist and posterior to the phalanges.

What joint movements together will put the biggest stretch on this muscle?

Wrist: (flexion or extension) _____

Fingers: flexion or extension) _____

When applying a stretch to 2 joint muscles, it must be remembered to position BOTH joints so that the muscle can be in the longest position as possible.

Activity:

Review the muscles in questions #1-5. These are important 2 joint muscles to remember in the body.

Form groups of 2 people in each group. One student will apply a passive stretch with the muscle.

- a) in its shortest position
(both joints positioned as the muscle would like)
- b) in a small lengthened position
(one joint positioned opposite to what the muscle would like)
- c) in its most lengthened position
(both joints positioned opposite to what the muscle would like)

Compare the difference that you felt with each change in the in the joint position. Discuss this with your class.

In most patients, a maximal muscle stretch is what you would like.

The exception to this would be for some specific patient problems where muscle tightness is useful. (See SPINAL CORD INJURIES chapter, Volume 3, for details.)

F. GENERAL RULES FOR PASSIVE STRETCHING TECHNIQUES

1. Patient needs to be as relaxed as possible.
2. Heat may be applied (10-20 minutes) to soft tissues before stretching.
3. Stabilize proximal parts of the area with belts or hands to prevent compensation (extra movements).
4. Hold proximal and distal to the joint where the motion should occur. (Only one joint between the PTA's hands.)
5. Slowly move the limb until the area of tightness and move a little more and hold in that position.
6. Do not bounce! This causes the muscle to contract, not relax!
7. In the stretched position the patient should feel a pulling tightness, not pain.
8. Hold in stretched position 15-30 seconds or longer.
9. Slowly release the stretch force.
10. Relax a few seconds and repeat the stretch.

IMPORTANT

Increasing range of motion is a slow process.

Do not expect full range of motion after two treatments!

It may take weeks of treatment before you reach your goal.

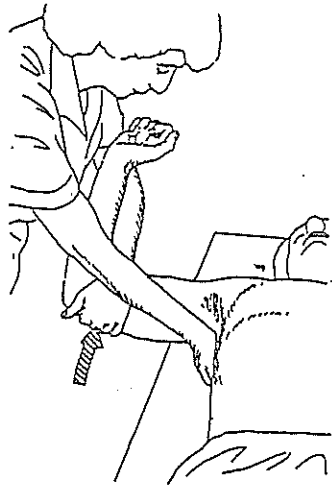
G. PICTURE OF PASSIVE STRETCHING POSITIONS

On the following pages are pictures of passive stretching techniques.

These are general suggestions for positioning of the PTA and patient. They may be modified to individual patient needs.

SHOULDER

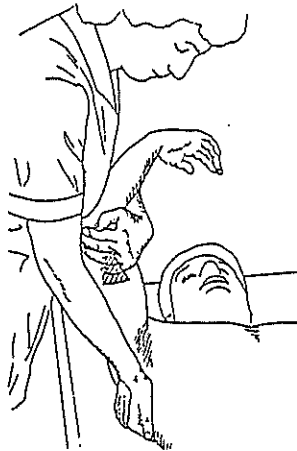
A



STRETCHING SHOULDER
ADDUCTORS

Direction of movement:

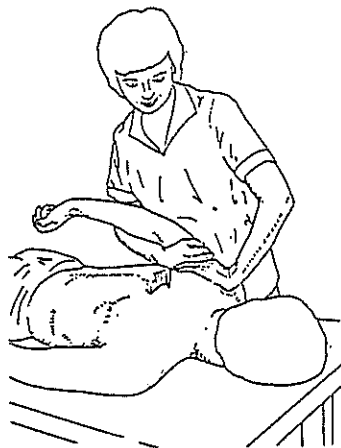
B



STRETCHING SHOULDER
EXTENSORS

Direction of movement:

C



STRETCHING SHOULDER
FLEXORS

Direction of movement:

SHOULDER

D



STRETCHING SHOULDER
EXTERNAL ROTATORS

Direction of movement:



E



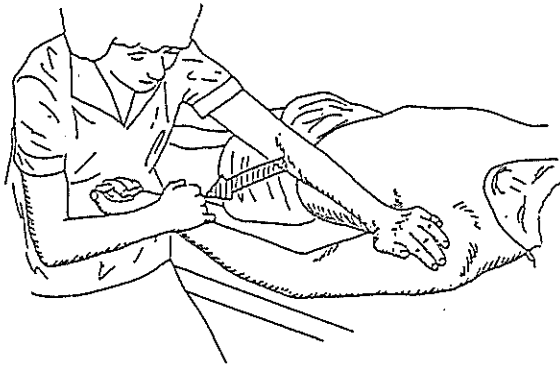
STRETCHING SHOULDER
INTERNAL ROTATORS

Direction of movement:



ELBOW

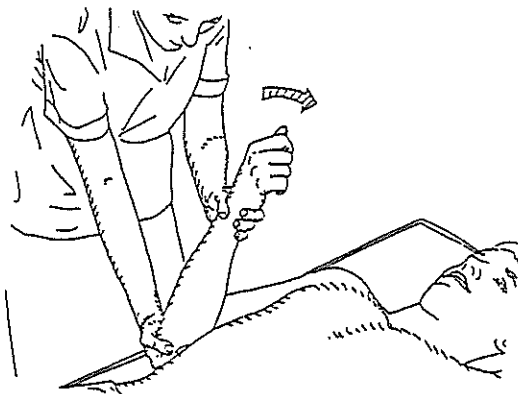
A



STRETCHING
ELBOW FLEXORS

Direction of movement:

B

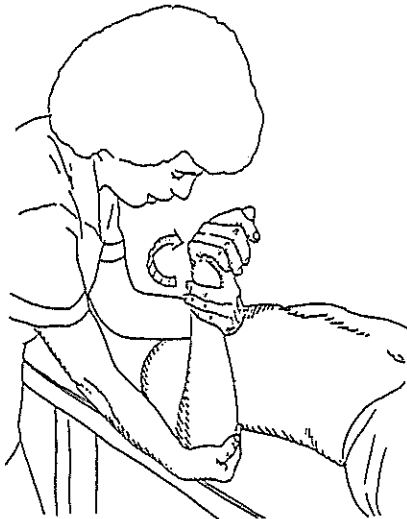


STRETCHING
ELBOW EXTENSORS

Direction of movement:

FOREARM

A

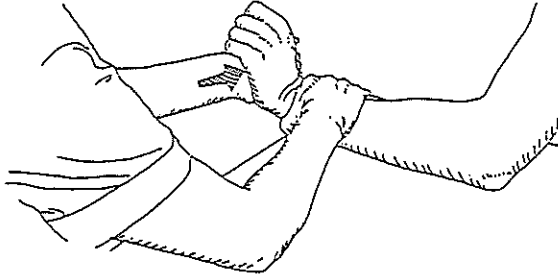


STRETCHING FOREARM
SUPINATORS

Direction of movement:

WRIST

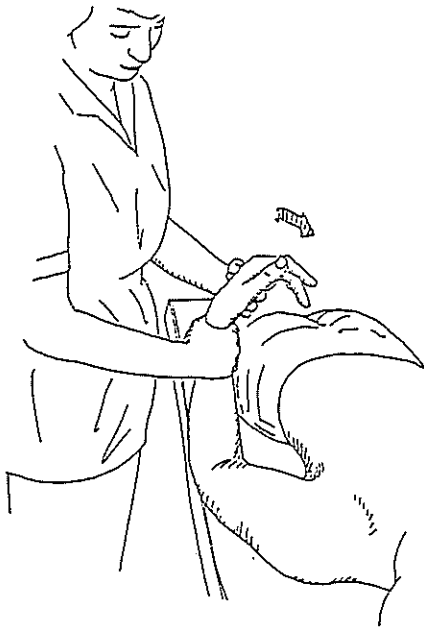
A



STRETCHING
WRIST FLEXORS

Direction of movement:

B

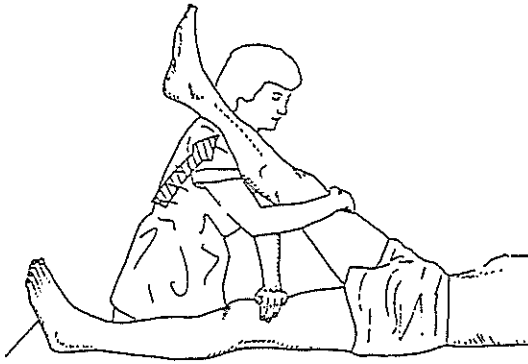


STRETCHING
WRIST EXTENSORS

Direction of movement:

HIP

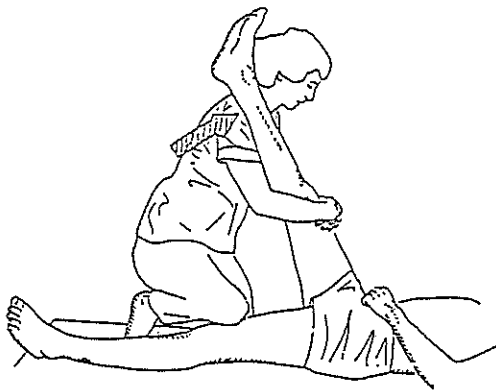
A



STRETCHING
HAMSTRINGS

Direction of movement:

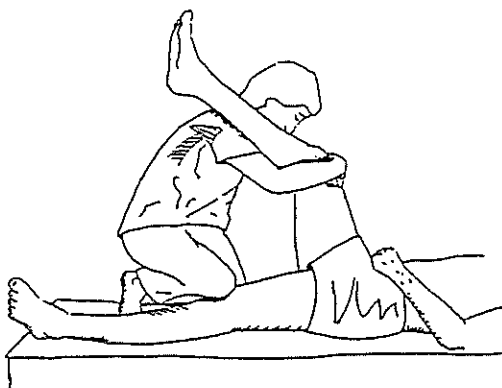
B



STRETCHING
HAMSTRINGS

Direction of movement:

C

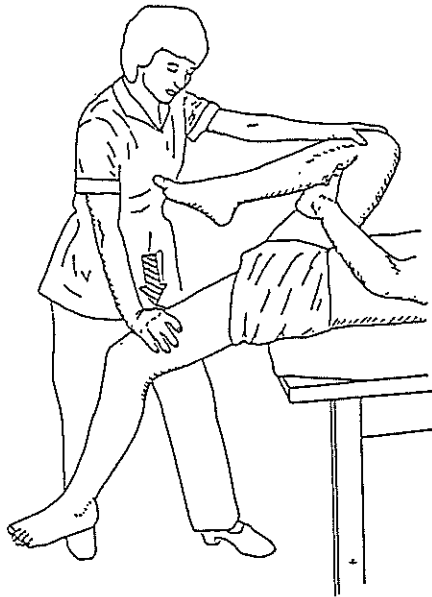


STRETCHING
HIP EXTENSORS

Direction of movement:

HIP

D



STRETCHING HIP
FLEXORS

Direction of movement:

E

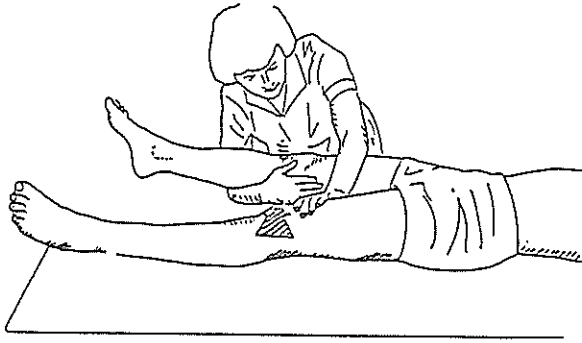


STRETCHING HIP
FLEXORS

Direction of movement:

HIP

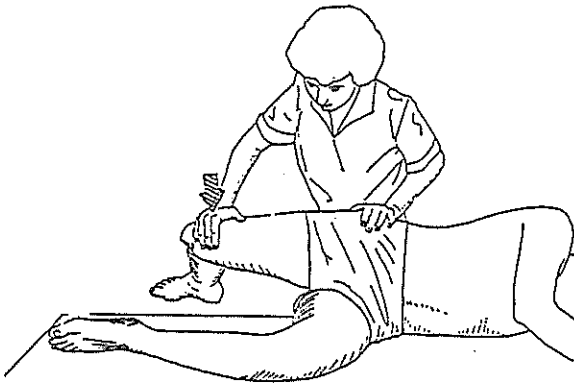
F



STRETCHING HIP
ADDUCTORS

Direction of movement:

G



STRETCHING HIP
ABDUCTORS

Direction of movement:

H

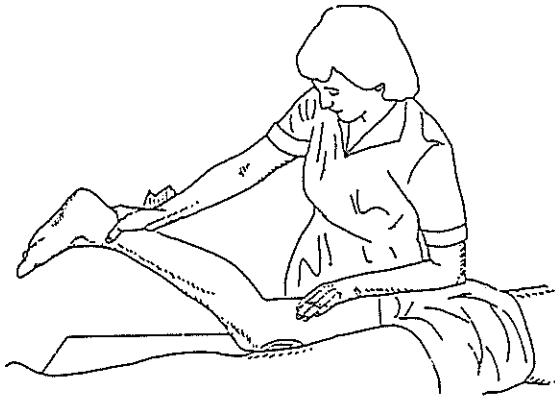


STRETCHING HIP
INTERNAL ROTATORS

Direction of movement:

KNEE

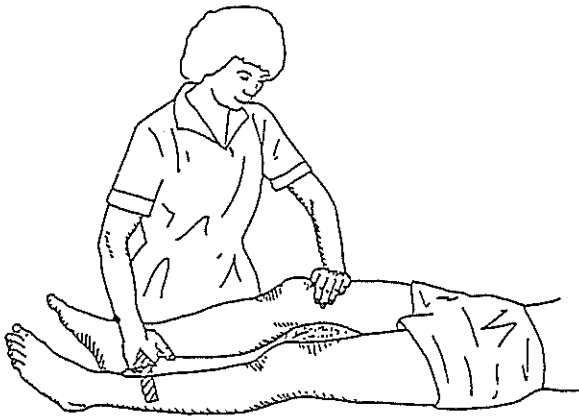
A



STRETCHING
KNEE FLEXORS

Direction of movement:

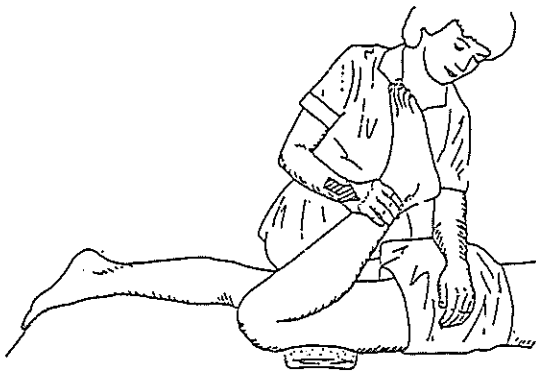
B



STRETCHING
KNEE FLEXORS

Direction of movement:

C

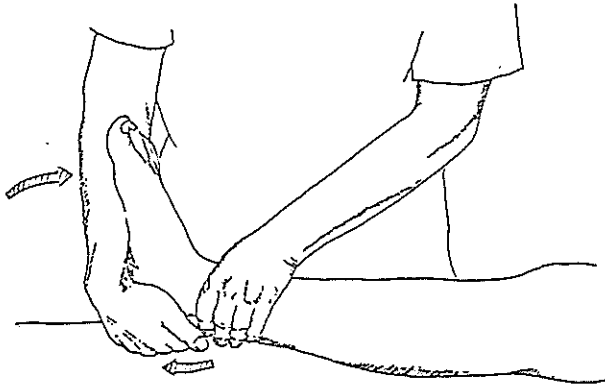


STRETCHING
KNEE EXTENSORS

Direction of movement:

ANKLE

A

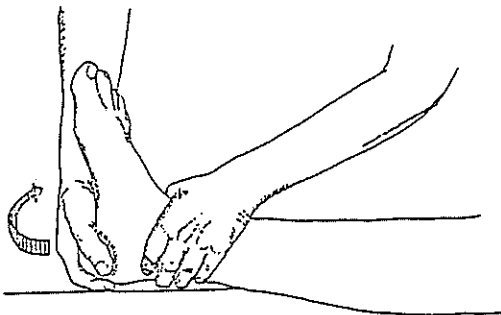


STRETCHING ANKLE
PLANTAR FLEXORS

Direction of movement:

FOOT

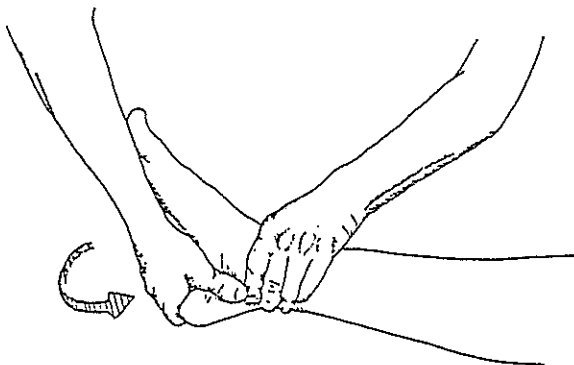
A



STRETCHING
FOOT INVERTORS

Direction of movement:

B



STRETCHING
FOOT EVERTORS

Direction of movement:

H. CHAPTER SUMMARY

Stretching is a technique to lengthen shortened soft tissues and increase range of motion.

Stretching should not be done :

- . when a bone limits joint movement
- . after a recent fracture
- . when a patient has hot, swollen joints
- . when contractures can be functional

There are two types of stretching techniques:

ACTIVE STRETCHING: patient participates
(good for stretching tight muscles)

PASSIVE STRETCHING: patient relaxes
(good for stretching any soft tissue)

General rules and pictures for passive stretching techniques are given.

The PTA must remember that increasing range of motion is a slow process.



12.

STRENGTHENING



STRENGTHENING is a technique used to make muscles stronger.

OBJECTIVES

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

1. identify patients that need strengthening and apply appropriate strengthening techniques.
2. describe 2 ways to progress a strengthening exercise.
3. demonstrate muscle strengthening using 3 different types of muscle contractions.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. PATIENTS THAT NEED STRENGTHENING
- C. WHAT MUSCLES TO STRENGTHEN
- D. HOW TO STRENGTHEN MUSCLES
- E. STRENGTHENING AND TYPES OF MUSCLE CONTRACTIONS
- F. POINTS TO REMEMBER ABOUT STRENGTHENING
- G. SPORTS
- H. PICTURES OF DIFFERENT MUSCLE STRENGTHENING EXERCISES
- I. CHAPTER SUMMARY

A. INTRODUCTION

Strengthening is a technique used to make muscles stronger.

For the PTA to better understand this chapter, please review MYOLOGY chapter, Volume 1.

The questions given below are to help with myology review.

Questions:

1. What is the function of a muscle?

2. A muscle fiber is the working part of a muscle. What happens to the muscle fibers when a muscle becomes stronger (muscle fibers increase in size, or muscle fibers increase in number)?

3. In your own words, please describe muscle atrophy.

4. A muscle passes anterior to the elbow joint. When this muscle contracts (gets shorter), what movement will happen at the elbow (elbow flexion or elbow extension)?

5. A muscle passes posterior to the knee joint. When this muscle contracts (gets shorter), what movement will happen at the knee (knee flexion or knee extension)?

To be independent in everyday activities (walking, standing, eating, brushing the teeth, dressing ...), a person needs to be able to move.

Muscles make movement! If muscles are weak a person cannot move their body as they would like and then everyday activities (walking, standing ...) may be limited.

Example:

A patient has very weak hip extensor and knee extensor muscles. This patient is unable to stand up without help. Standing is limited by weak muscles.

Strengthening is important to help prepare the person to move as independently as possible.

B. PATIENTS THAT NEED STRENGTHENING

Patients may have weak muscles for many different reasons.

Question:

Think about the different patients that you have seen that have muscle weakness. What are 3 main reasons why a patient may have weak muscles?

General reasons for muscle weakness include:

* not using the muscle

- patients with immobilization
(See FRACTURES chapter, Volume 3)
- patients who are in bed for a long time
(See BEDRIDDEN chapter Volume 3)
- patients with painful joints
(See ARTHRITIS chapter, Volume 3)

* nerve damage from trauma

- patients with spinal cord injury
(See SPINAL CORD INJURIES chapter, Volume 3)
- patients with peripheral nerve injuries
(See PERIPHERAL NERVE INJURIES chapter, Volume 3)

* nerve damage from disease

- patients with Leprosy
(See LEPROSY chapter, Volume 3)
- patients with Polio
(See POLIO chapter, Volume 3)

* muscle injury

- patients with muscles cut
(See AMPUTATIONS chapter, Volume 3)

C. WHAT MUSCLES TO STRENGTHEN

In deciding what muscles to strengthen, the PTA must consider:

1. specific muscles that are weak
2. general functional muscles of the body

1. SPECIFIC MUSCLES THAT ARE WEAK

After the PTA evaluates a patient, he will have identified muscles or body areas that are weak and need special attention to increase their strength.

Question:

Describe how a PTA will evaluate what areas are weak or strong.

2. GENERAL FUNCTIONAL MUSCLES OF THE BODY

The PTA must always remember to treat the whole patient.

Some patients may have weakness in one area, but the whole body needs to have good strength for the patient to be able to function well.

General functional muscles for standing/walking are:

- * hip extensors
- * knee extensors
- * dorsiflexors/plantar flexors
- * hip abductors
- * elbow extensors (if patient uses walking aid)

Questions:

1. A patient has been in bed for 2 months. The PTA has been working on hip flexion and elbow flexion exercises with this patient.
Do you agree with this treatment? Yes No

Explain your answer.

2. A patient wants to stand but his muscles are too weak to help him. What muscles need to be strengthened in the lower limbs?

3. A patient has very weak knee extensor muscles of the right leg and needs crutches to walk.
Describe the muscles that you will strengthen for this patient.

Remember, specific muscles will need to be strengthened, but general muscles of the body (especially functional muscles) must not be forgotten.

D. HOW TO STRENGTHEN MUSCLES

If a muscle is weak, the PTA must work with the patient to help make the muscle strong. To strengthen a muscle, the muscle must work as much as it can.

The 2 ways to increase the strength of a working muscle are:

1. adjust the number of muscle contractions
2. adjust the resistance to the muscle contraction

Again, the PTA must carefully evaluate the patient to know how to adjust the number of contractions and the amount of resistance so that the patient can have the best result.

1. ADJUST THE NUMBER OF MUSCLE CONTRACTIONS

As a general guideline **, the number of muscle contractions used to increase the strength of a muscle is:

10 muscle contractions

REST

10 muscle contractions

REST

10 muscle contractions

****Note:** These numbers are a general guideline and must be adjusted depending on the patient's strength.

2. ADJUST THE RESISTANCE TO THE MUSCLE CONTRACTION

Resistance is a force that tries to pull the joint in the opposite direction of the muscle contraction.

As we have said before, to strengthen a muscle, the muscle must work as much as it can.

Different patients have different muscle strengths and thus need different levels of resistance to strengthen the muscles.

Different levels of resistance include:

- * no resistance
- * gravity as resistance
- * gravity plus another force (PTA or weights)

The level of resistance must be adjusted to fit the patient's needs.

The resistance should not be so much that the patient cannot do the exercise, but must be enough so that the muscle will work as much as it can.

In summary, the PTA can change the number of contractions, the amount of resistance, or a combination of these 2 ideas to have the muscle work as much as it can to become stronger.

Please answer the following questions and then discuss them with the entire class.

Questions:

1. A patient can flex his elbow against gravity but it is difficult. You would like to strengthen the elbow flexors. Please describe how many times you will make the exercises and with what type of resistance.

2. A patient has very weak hip extensors. You ask him to lay in prone position and extend his hip against gravity. If this is too difficult, please describe how you will adjust the level of resistance.

If this this too easy, describe how you will adjust the level of resistance.

3. A patient has very weak finger flexors and extensors. You make passive Range of Motion for this patient. Does this treatment help to strengthen the finger flexors and extensors?

_____Yes _____No

Explain your answer.

E. STRENGTHENING AND TYPES OF MUSCLE CONTRACTIONS

In MYOLOGY chapter (Volume 1) we learned about 3 different types of muscle contractions. As a review of this information, please answer the questions given below.

Questions:

1. In your own words, please describe an ISOMETRIC muscle contraction.

2. In an ECCENTRIC contraction is the muscle shortening or lengthening?

3. A man is sitting on a chair. Both hips and knees are flexed at 90 . The man lifts his leg upward until there is complete knee extension. What type of muscle contraction was made (concentric, eccentric or isometric)?

Explain your answer.

The 3 different types of muscle contractions we will discuss in this section include:

1. isometric contraction
2. concentric contraction
3. eccentric contraction

1. ISOMETRIC CONTRACTIONS

An isometric muscle contraction is the muscle working, but there is no joint movement.

Isometric muscle contraction is also called isometric exercise.

Generally, isometric exercises are used with patients with a joint that cannot move because of immobilization, contracture, or pain.

Isometric exercises can be done in any joint position, but are often limited by the position of the patient.

Example:

A patient has a plaster cast from his thigh to his ankle. The knee joint is immobilized by the plaster. The PTA can instruct the patient to make isometric exercises of the knee extensor and flexor muscles.

2. CONCENTRIC CONTRACTIONS

A concentric muscle contraction is the muscle working and the ends of the muscle are coming closer together causing the joint to move.

Concentric muscle contraction is also called concentric exercise.

Concentric exercises are the most common type of exercise.

Concentric muscles generally begin with the muscle in a lengthened position. The PTA must ask the patient to contract the muscle to move the joint through the range of motion.

3. ECCENTRIC CONTRACTIONS

An eccentric muscle contraction is the muscle working and the ends of the muscle are moving farther apart in the direction of the resistance. The muscle controls or allows the joint to move in the same direction as the resistance.

Eccentric muscle contraction is also called eccentric exercise.

Generally, eccentric exercises are good for muscles that are very weak. The muscle must work as much as it can to help control the movement of the joint.

In summary, the 3 different types of muscle contractions can also be included in a strengthening program. As was mentioned in Section D, the number of contractions and the amount of resistance to the muscle contractions can be modified to help progress the patient.

F. POINTS TO REMEMBER ABOUT STRENGTHENING

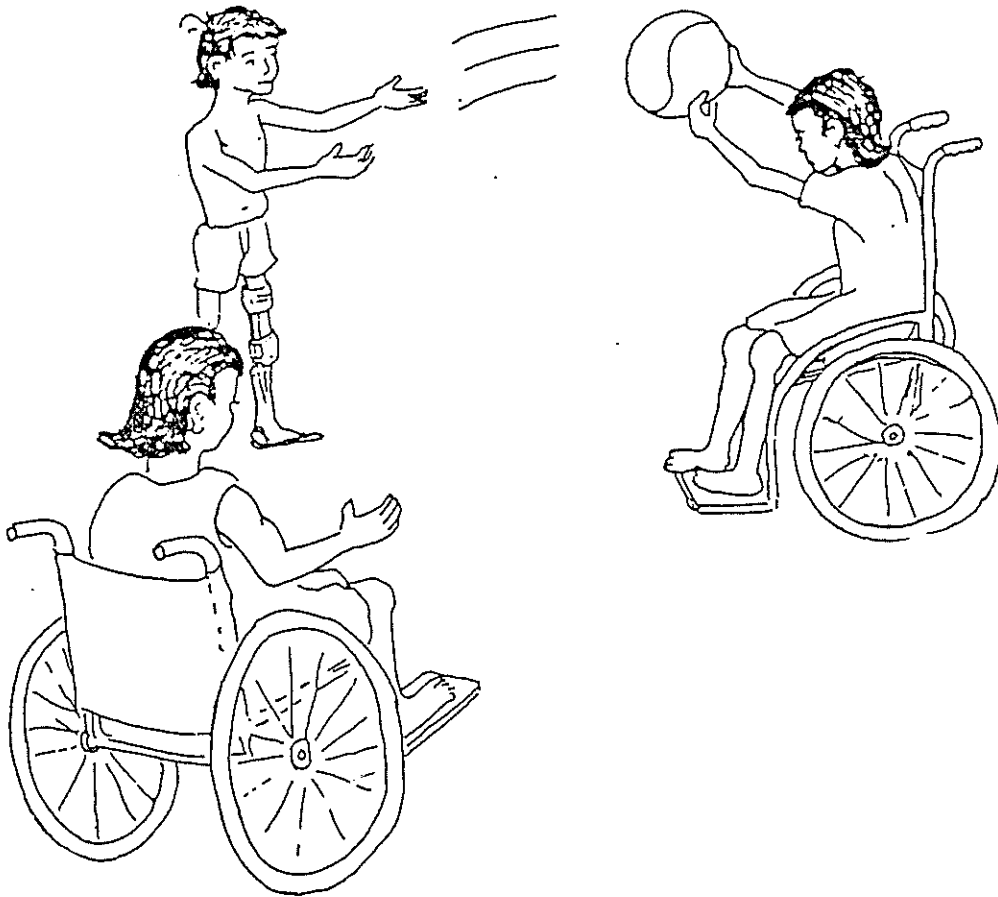
The general points to remember about strengthening exercises for all patients include:

- * evaluate the strength of the muscles to know the type and amount of strengthening that is needed
- * motivate the patient to contract the muscle as much as he can (good eye contact, lots of verbal encouragement)
- * support the body to avoid compensation when strengthening specific muscles
- * whenever possible, use functional activities as part of the exercise
- * progress the strengthening exercise (make the exercise more difficult) as the patient improves
- * NEVER MUSCLE TEST OR STRENGTHEN BODY PARTS THAT HAVE LOST CONTROL BECAUSE OF BRAIN DAMAGE.
These patients need practice on controlling movements, not on strengthening exercises.

G. SPORTS

As we mentioned earlier, it is important to strengthen weak muscles AND work on improving or maintaining the general strength of the body.

Sports are a very good way to use the many muscles of the body and help to motivate the patient in a positive way.

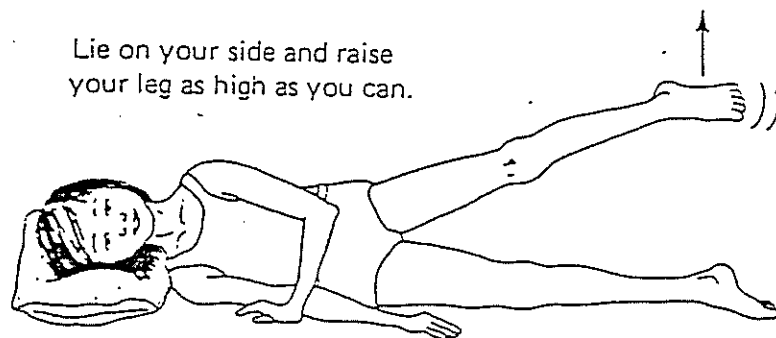


H. PICTURES OF DIFFERENT MUSCLE STRENGTHENING EXERCISES

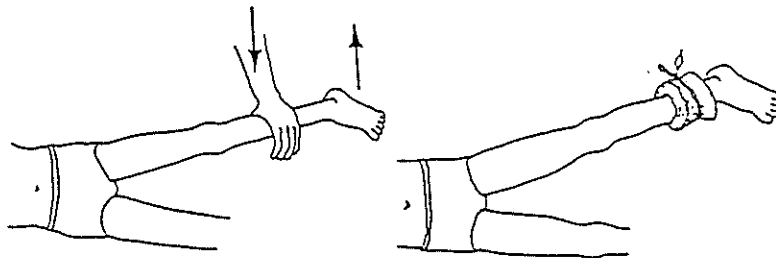
On the following pages are examples of different muscle strengthening ideas.

These pictures are given to help stimulate the PTA to develop other strengthening exercises.

The PTA and the patient must work together to find the strengthening program that best suits the patient.

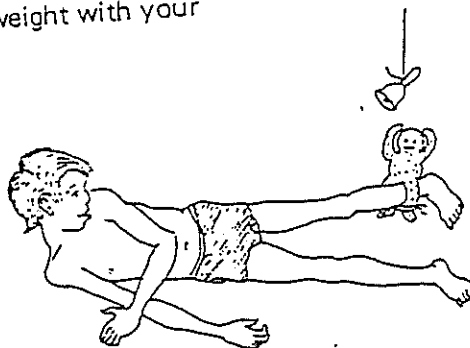


Keep your leg up until you get so tired that it falls by itself.

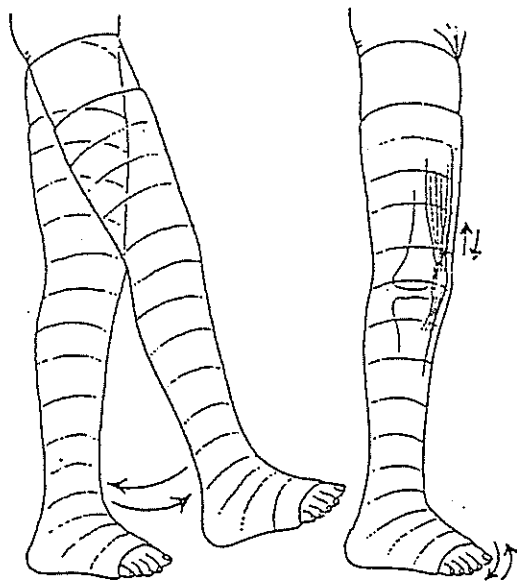
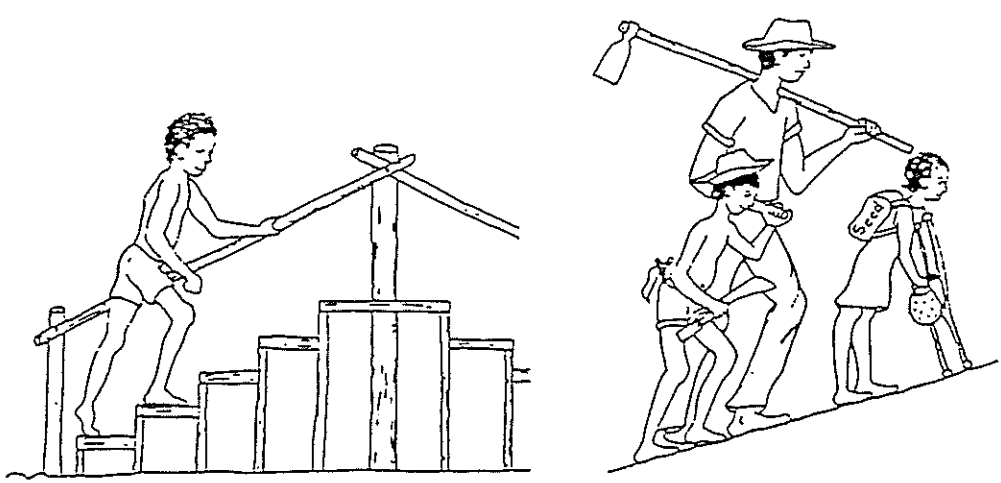
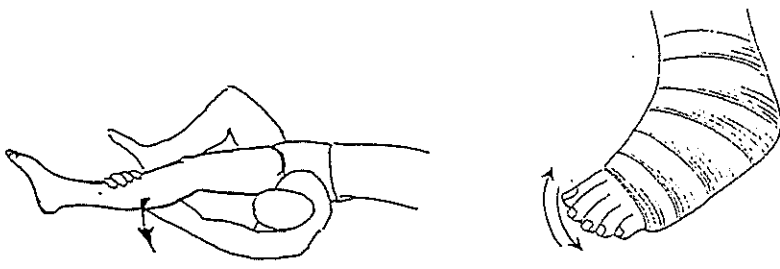


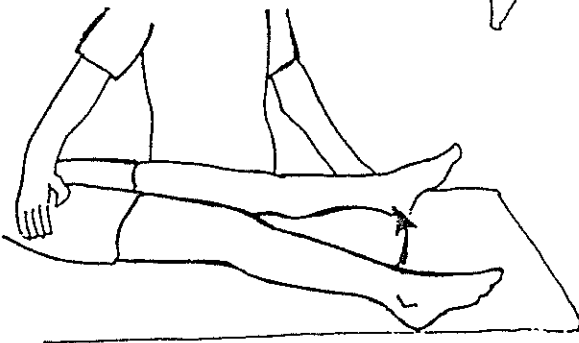
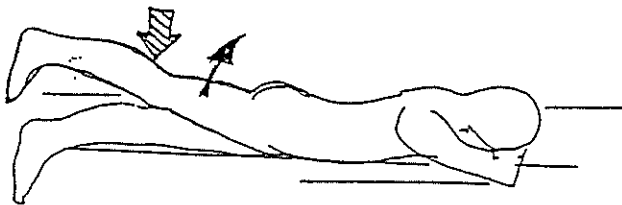
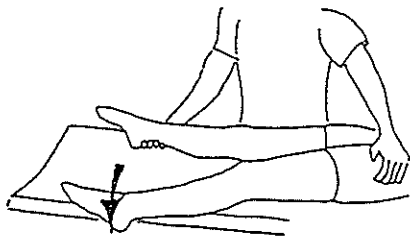
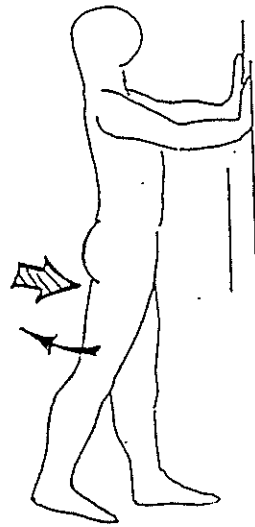
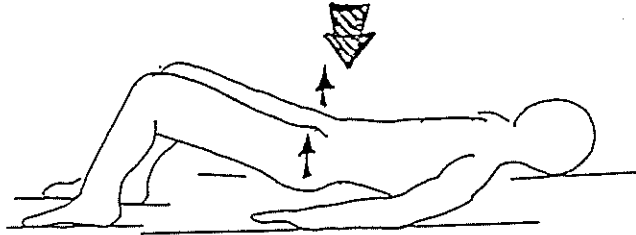
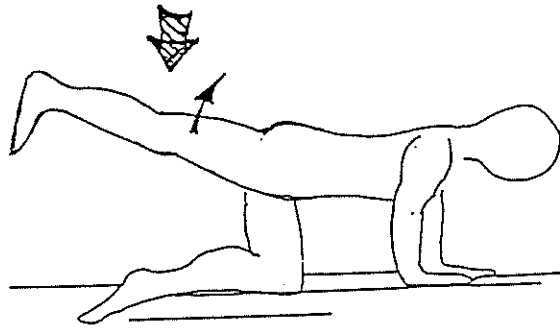
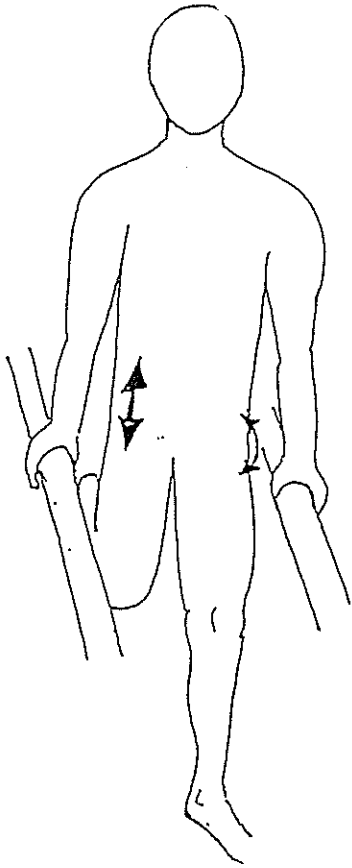
If the child can raise her leg easily, add weight with your hand,

or with a little bag of sand.



Think of ways to make the exercises fun.





I. CHAPTER SUMMARY

Strengthening is a technique used to make muscles stronger.

The goal of strengthening is to help prepare the person to move and function as independently as possible.

General reasons for muscle weakness are:

- . not using the muscle
- . nerve damage from trauma or disease
- . muscle injury

The PTA must understand that specific muscles and general functional muscles should both be included in all exercise programs.

Muscles can be strengthened by the muscle actively contracting as much as it can.

The patient can be progressed by adjusting the number of contractions and by adjusting the amount of resistance.

Isometric, concentric and eccentric exercises can all be used to help strengthen a muscle.

Points to remember about muscle strengthening:

- . evaluate the patient's needs
- . motivate the patient to work!
- . support the body to avoid compensation
- . progress the patient as he improves
- . never "strengthen" muscles that have weakness or decreased control because of brain damage

Sports are a fun and creative way to encourage whole body strengthening.



TRANSFERS



A TRANSFER is moving from one area to another.

OBJECTIVES

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

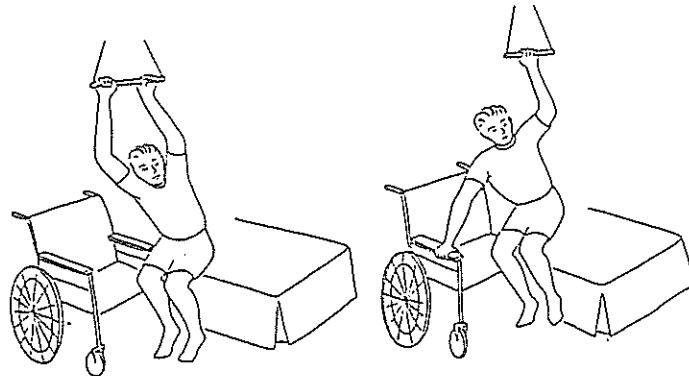
1. demonstrate a 3 - person transfer.
2. demonstrate a 2 - person transfer.
3. demonstrate a 1 - person transfer.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. GENERAL RULES FOR ALL TRANSFERS
- C. TYPES OF TRANSFERS
- D. WHEELCHAIR TRANSFERS
- E. CHAPTER SUMMARY

A. INTRODUCTION

A transfer is moving from one area to another.



BED TO CHAIR TRANSFER

Some patients are able to do this without help, other patients may need some help or may need a lot of help to transfer.

There are many different types of transfers. The type of transfer that is used will depend on the patient's ability.

The PTA must evaluate the patient to know how much and what kind of assistance the patient will need.

Question:

You see a patient lying in bed. The nurse asks you to help this patient move from his bed to the chair.

What are 4 things you need to know about this patient before deciding how to best help this patient transfer?

The information that a PTA should know before deciding how to best help a patient with a transfer includes:

- * patient's strength (lower limbs, trunk, upper limbs)
- * balance
- * any uncontrolled movements
- * special medical conditions that will limit the patient's movement

In all transfers, the patient should be encouraged to participate as much as possible. If the patient can help with a transfer, let him help.

AVOID MAKING THE PATIENT DEPENDENT!

B. GENERAL RULES FOR ALL TRANSFERS

There are general rules that a PTA should remember to apply with ALL transfers.

1. transfer to and from stable surfaces
2. tell the patient what is to be done
3. transfer toward the strong side of the patient
4. safety of the patient
5. safety of the PTA

1. TRANSFER TO AND FROM STABLE SURFACES

Stable surfaces are places that will not move when the patient transfers.

Question:

A PTA will help a patient move from his wheelchair to the bed. The PTA begins to help the patient stand. The wheelchair moves. The patient falls to the floor. How could this accident have been prevented?

The PTA is responsible to make sure that the areas where the patient is transferring from and transferring to are both stable.

2. TELL THE PATIENT WHAT IS TO BE DONE

Before the PTA helps a patient transfer, he must tell the patient:

- * what the PTA will do
- * what the patient is expected to do
- * what will be the result
- * when the transfer will begin

3. TRANSFER TOWARD THE STRONG SIDE OF THE PATIENT

If the patient has one side that is stronger than the other, it is safest if the patient transfers in the same direction as the strong side of the body.

4. SAFETY OF THE PATIENT

In all transfers the PTA must remember that the safety of the patient is very important.

The PTA can help make sure that a transfer is safe by doing the following:

- * check to see that both transfer surfaces are stable
- * prepare the area so that transfer surfaces are close and there are no obstacles to cause problems with the transfer
- * correctly instruct the patient about what is to be done
- * hold the patient securely so that he will not fall

5. SAFETY OF THE PTA

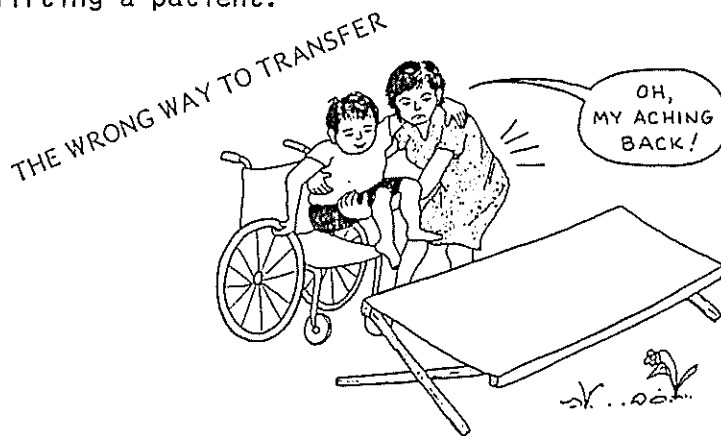
The main rule for the PTA to remember when helping a patient transfer is to use the muscles of the hip and thigh and not the muscles of the back.

Activity:

1. Sit as straight as possible and feel the trunk extensor muscles on the left side and right side of the vertebral column.
2. Now feel the muscles of the thigh (knee flexors and extensors) and hip (hip extensors).

What muscles feel bigger (back muscles, or muscles of the lower limb)?

Remember, the muscles of the back are smaller and weaker than the muscles of the hip or thigh. The PTA must remember to protect his back when lifting a patient.



General good lifting technique includes:

- * bending the hips and knees (not the back!) and LIFT with the movements of knee extension and hip extension (NOT back extension)
- * feet are positioned so that they are in the same direction as the transfer

C. TYPES OF TRANSFERS

As we have said in the beginning, the type of transfer used will depend on the patient's ability.

Question:

There are two patients that need help with a transfer. Patient "A" has weak legs, but all other parts are normal. Patient "B" cannot move his arms and legs at all and has no trunk control.

What patient will need more help to transfer (patient "A" or patient "B")?

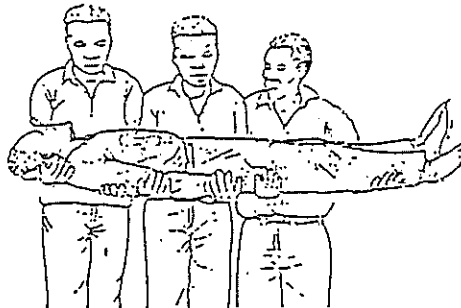
Explain your answer.

The different transfers given in this section describe how many people are needed to help the patient transfer.

Transfers include:

1. 3 - person transfer
2. 2 - person transfer
3. 1 - person transfer
4. supervised transfer
5. patient alone (needs no help)

1. 3 - PERSON TRANSFER



In a 3 person transfer all three "lifters" will be on one side of the patient's body with arms under the patient.

- * one person will support the head and upper trunk
- * one person will support the hip area
- * one person will support the legs

These 3 lifters will lift the patient TOGETHER AT THE SAME TIME. The person at the head of the patient will check to see if the other lifters are ready and then direct all lifters to lift at the same time.

After the patient has been lifted, all lifters will flex their elbows a little which will cause the patient to be rolled toward them.

(This rolling brings the patient closer to the lifter's bodies this makes for easier carrying and helps prevent the patient from being dropped.)

The lifters will walk and move TOGETHER. When the lifters arrive at the other transfer surface, they will place the patient on this surface and then remove their arms.

PATIENTS NEEDING 3 PERSON TRANSFER

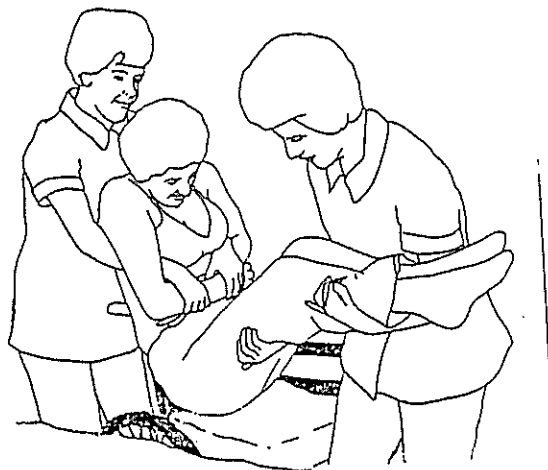
Patients that need the vertebral column immobilized - no movement of the vertebral column.

Activity:

Form groups of 4 people in each group and practice the 3 - person transfer technique.

Remember to use your hip and thigh muscles to help lift the patient protect your back!

2. 2 - PERSON TRANSFER



In a 2 person transfer one person will support the trunk while the other will support the lower limbs.

The person lifting the trunk will be behind the patient. He will reach under the patient's arms and hold the opposite wrist of the patient. (Lifter's right hand will hold the wrist of the patient's left hand.)

The person holding the legs will hold the patient under the knees and ankles.

The lifter supporting the trunk will give the command so that both lifters work at the same time.

PATIENTS NEEDING 2 PERSON TRANSFER

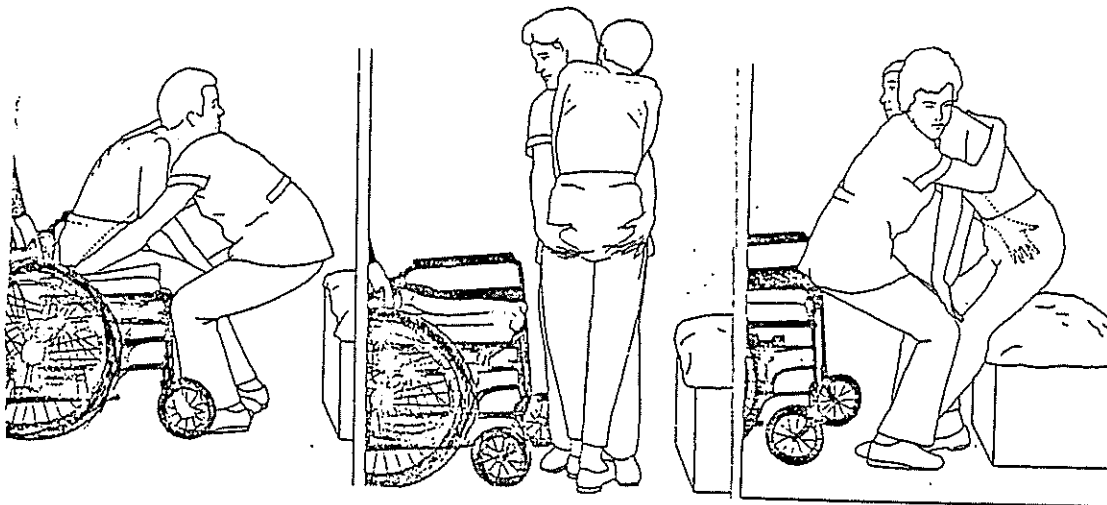
Patients that have no movement in the arms, trunk, or legs.

Activity:

Form groups of 3 people in each group and practice the 2 - person transfer technique.

Remember to use your hip and thigh muscles to help lift the patient protect your back!

3. 1 - PERSON TRANSFER



For a 1 person transfer, the patient will have his feet flat on the floor, be positioned forward in the wheelchair, and have his arms around the PTA's upper back.

The PTA will put his feet and knees on the outside of the patient's feet and knees. The PTA's hands are put under the patient's buttocks.

The PTA will prepare the patient for the time when the transfer will begin by counting, "1", "2", "3", - "up".

The PTA must lean his body weight backward and straighten the hips and knees to help lift the patient.

When the patient is up high enough to transfer to a different surface, the PTA will turn the patient to the new area and slowly return the patient to a sitting position.

NOTE: This transfer is the maximum amount of help that one PTA can give to the patient. For patients that have increased strength or control, the PTA can decrease the amount of support needed for the transfer.

PATIENTS NEEDING 1 PERSON TRANSFER

Patients that can put weight on the legs, but are not able to transfer without some level of help.

Activity:

Form groups of 2 people in each group and practice the 1 - person transfer technique.

Practice this technique with different levels of patient ability and different levels of support from the PTA.

Remember to use your hip and thigh muscles to help lift the patient protect your back!

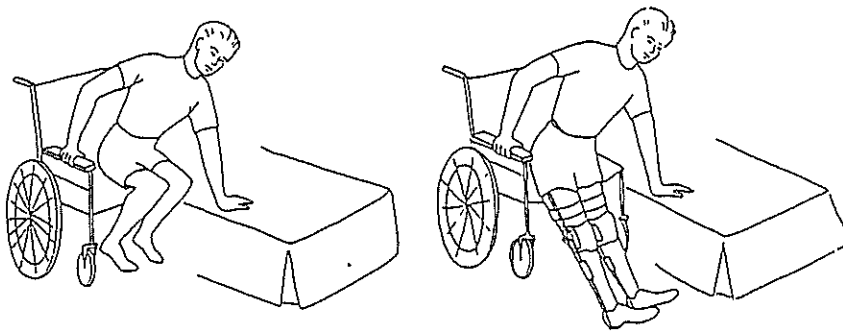
4. SUPERVISED TRANSFER

In a supervised transfer the PTA does no work, but is there to give encouragement and advice and to prevent the patient from falling if he needs it.

PATIENTS NEEDING SUPERVISED TRANSFER

Patients that are able to transfer by themselves but are not completely safe, or they need psychological support to help make the transfer.

5. PATIENT ALONE (NEEDS NO HELP)



A patient transferring alone without help or supervision has made an independent transfer.

Independent transfers can be made by using different types of equipment or devices.

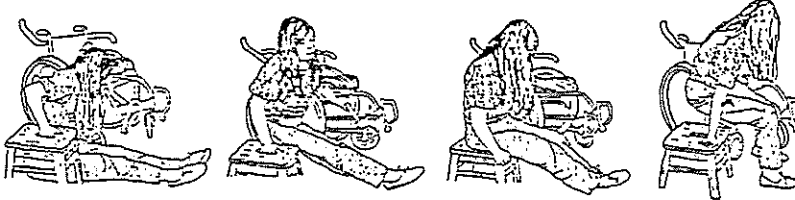
The patient uses these alone and is safe and independent in the transfer.

D. WHEELCHAIR TRANSFERS

On the following pages are pictures to help illustrate different wheelchair transfer techniques.

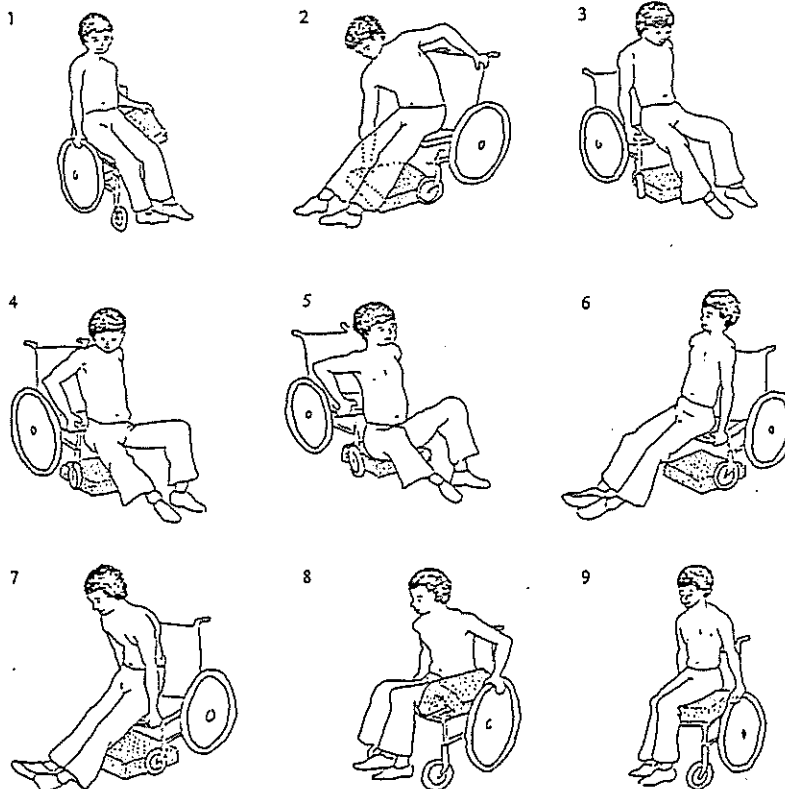
These are just ideas for transfers. The PTA must work closely with the patient to find the transfer technique that works best for him.

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.

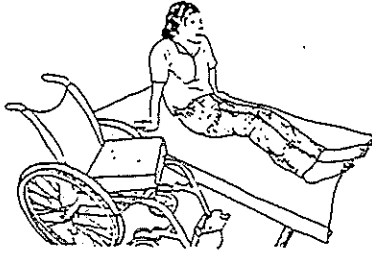
Transfer from wheelchair to floor — and back again — without help of a stool



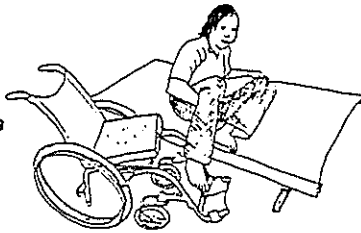
Transfer from cot or bed to wheelchair without armrests

CAUTION: Make sure brakes are 'on' and footrests are 'up' out of the way.

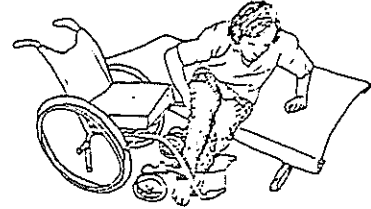
To transfer from the wheelchair to the cot, follow the same steps in reverse.



1. Push yourself to a sitting position.

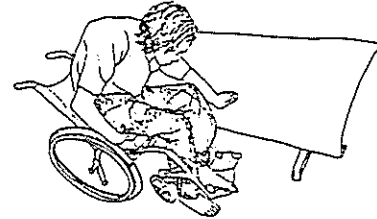
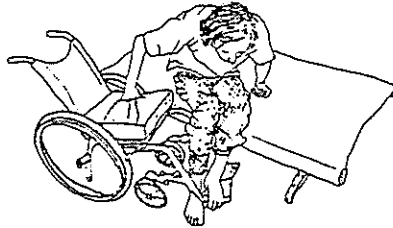


2. Reach under knees one at a time.



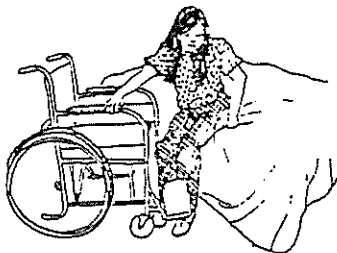
3. Move legs so that feet are on the floor.

4. Make sure brakes are locked. Then push up on arms while leaning forward with head facing down. Weight should be over knees.

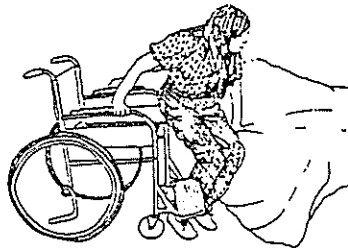


5. Move body into wheelchair.

Transfer from cot or bed to wheelchair with armrests



1. Position your wheelchair so that you can swing body past armrests.

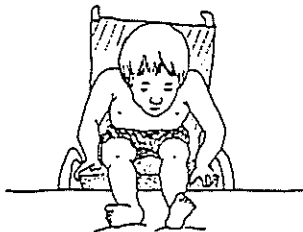


2. Place one hand on bed and one on the far armrest. Push yourself up while leaning forward with head down, weight over knees.

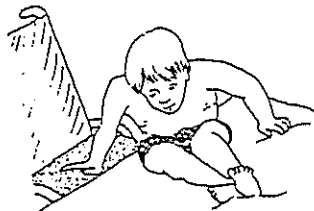


3. Swing body into wheelchair.

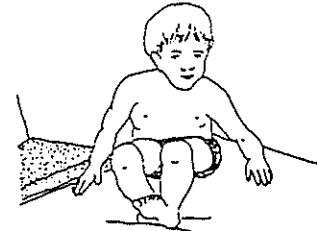
Transfer forward from wheelchair to cot or bed (often works well for children)



1. Lift feet onto bed and wheel the chair forward against bed. Put on brakes. Then bend forward and lift butt forward on chair.



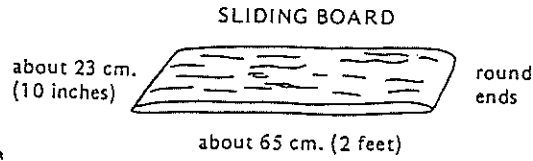
2. With one hand on the cushion and one on the bed, lift the body sideways onto the bed.



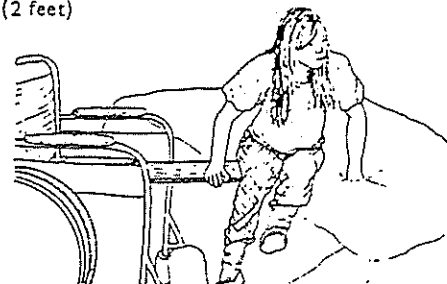
3. Repeated lifts and lifting of legs may be needed.

Transfer with sliding board—without help

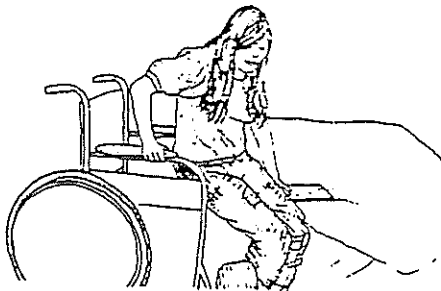
For getting into and out of bed, a car, etc.



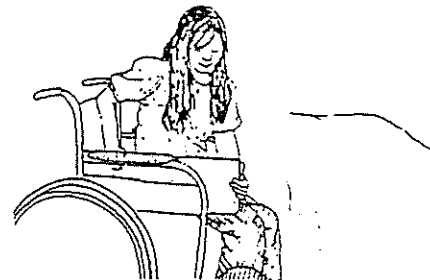
1. Place board under hip by leaning to opposite side or by pulling up leg.



2. Lean forward, with your head and weight over knees.

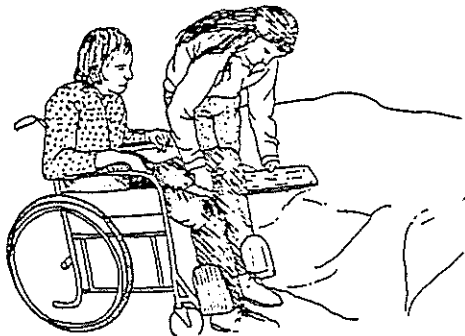


3. Push yourself along the board.

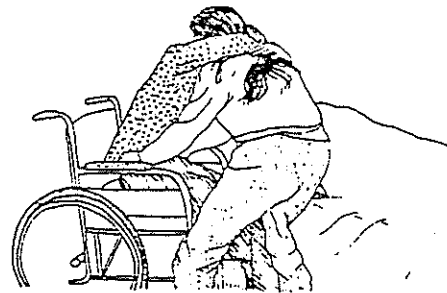


4. When you are in the chair, remove the board and put it where you can easily get it.

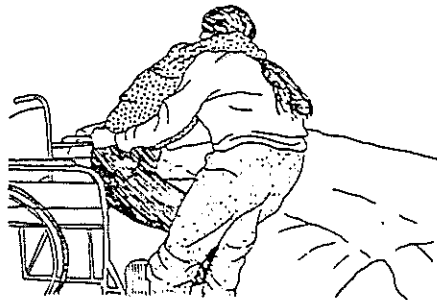
Transfer with sliding board—with help



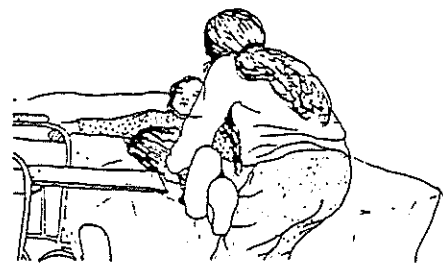
1. Lift leg and put board under hip.



2. Have person put arms around neck (if possible) while you put your hands under his *butt*, or grab his pants.



3. Slide the person along board to bed.



4. Lift legs onto bed.

E. CHAPTER SUMMARY

A transfer is moving from one area to another.

Different patients will need different kinds of help with a transfer depending on the patient's

- . strength (lower limbs, trunk, upper limbs)
- . balance
- . uncontrolled movements
- . special medical conditions that may limit the patient

In all transfers the patient should participate as much as possible
..... do not make the patient more dependent than he is!

General rules for all transfers include:

- . transfer to and from stable surfaces
- . tell the patient what is to be done
- . transfer toward the strong side of the patient
- . always remember the safety of the patient
- . PTA must use the muscles of the hip and thigh ...
protect the back!

Examples of the following types of transfers are given in this chapter:

- . 3 - person transfer
- . 2 - person transfer
- . 1 - person transfer
- . a variety of wheelchair transfers



4

STANDING UP



STANDING UP is the process of moving from chair or floor to an upright position.

OBJECTIVES

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

1. describe the sitting position of a person prepared to stand up.
2. identify 4 important body movements that help a person to stand up.
3. demonstrate how to physically and verbally help a patient to stand up.
4. identify good standing positions.
5. demonstrate floor \longrightarrow standing and standing \longrightarrow floor techniques.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. NORMAL BODY POSITION TO PREPARE TO STAND UP
- C. NORMAL BODY MOVEMENTS IN STANDING UP
- D. PTA HELPING THE PATIENT TO STAND UP
- E. GOOD STANDING POSITION
- F. FLOOR \longrightarrow STANDING, AND STANDING \longrightarrow FLOOR TECHNIQUES
- G. CHAPTER SUMMARY

A. INTRODUCTION

For a patient to walk, he must first be able to stand up.

The PTA must know the normal way to stand up for two reasons:

1. to identify specific problems a patient may have to stand up.
2. to correctly teach the patient how to stand up.

Activity:

Stand up and sit down three times. Think about the many small movements you make to help the body stand up. List at least two different movements that you made to prepare your body to stand up.

B. NORMAL BODY POSITION TO PREPARE TO STAND UP

Activity:

1. Sit with your back straight and your hands on your lap. Try to stand up without moving your shoulders forward. Describe what happened.

Activity: (continued)

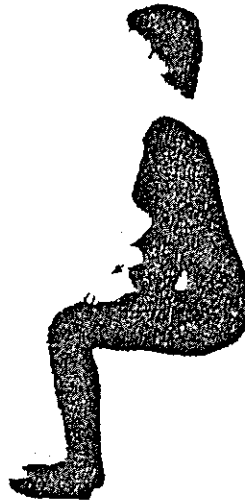
2. Sit with your back in one position. After you are in this position do not move your back. Stand up. Describe what movements you made to stand up.

3. Sit with your left foot in front of you and your right foot under your chair. Stand up. Which foot did the work of holding the body - right or left?

4. You have pain in your right foot and can put no weight on it. Demonstrate how you will stand with this problem. What foot was under your body - right or left?

To prepare for sitting → standing, the body position will be:

- * head looking forward
- * back straight
- * sitting near the edge of the chair
- * shoulders forward
- * feet under the body, a bit apart, and toes are forward.

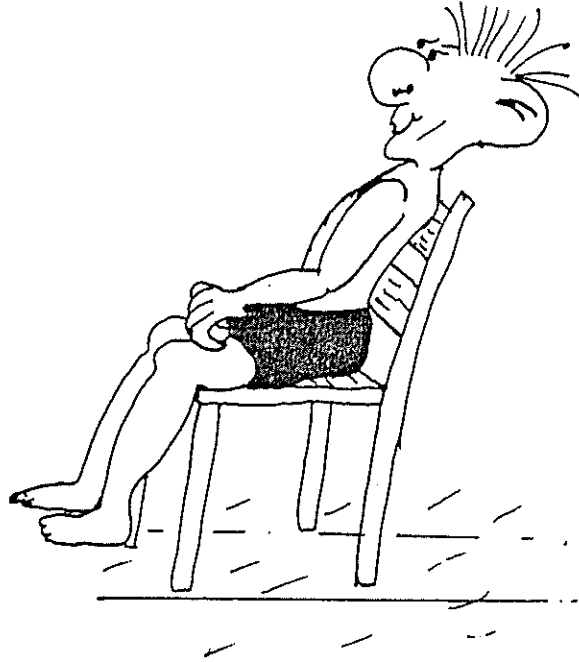


Question:

1. Think about your experience from the activity on page 2. What two preparations are most important in helping the body to stand up? (Select from the list on page 3.)

Activity:

Look at the picture given below.



Is this person prepared to stand up?

_____Yes

_____No

Explain your answer.

C. NORMAL BODY MOVEMENTS IN STANDING UP

After the body is in a good position, a person will:

1. MOVE THE SHOULDERS MORE FORWARD

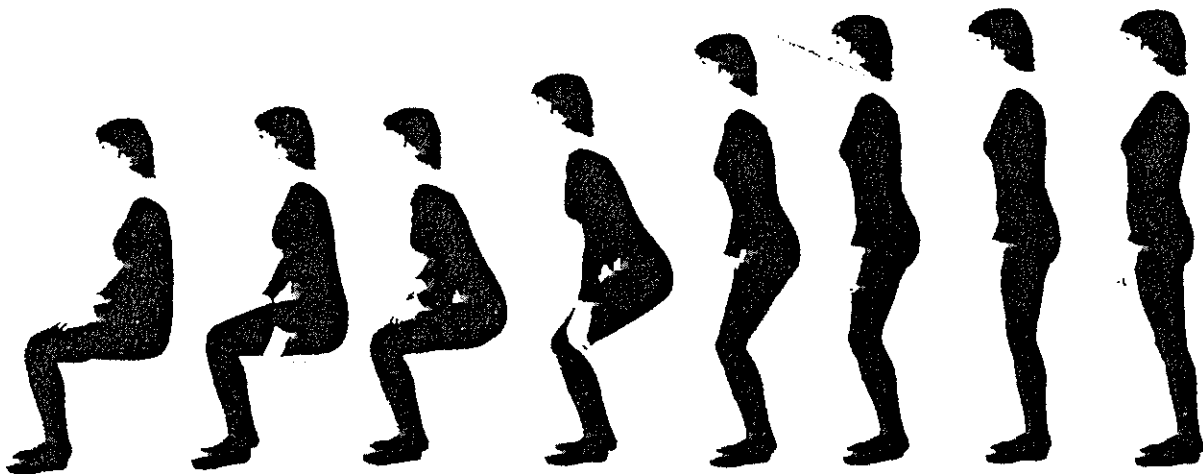
- the hips lift from the chair

- the weight of the body is directly over the feet

2. EXTEND THE HIPS AND KNEES

3. TRUNK REMAINS STRAIGHT

4. HEAD REMAINS LOOKING FORWARD



D. PTA HELPING THE PATIENT TO STAND UP

Questions:

1. What specific instructions will you give to a patient to prepare him to stand up?

2. The patient has a very weak and painful left leg. Describe how the patient should position her feet to stand up.

There are three ways that a PTA can help a patient stand up:

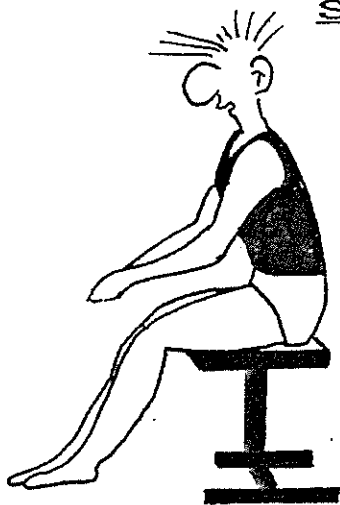
1. teach the patient how to stand up
2. verbally instruct the patient
3. physically help the patient

1. **TEACH THE PATIENT HOW TO STAND UP**

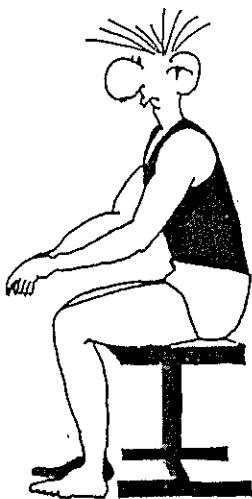
The PTA should teach the patient the important positions and movements that will help the patient stand up.

Next, the patient should practice different parts of standing up.

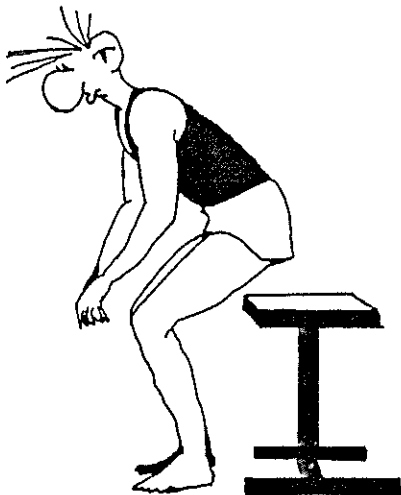
SIT → STAND



a. practice putting the feet in a good position under the body.



b. practice forward bending with the head forward and back straight.

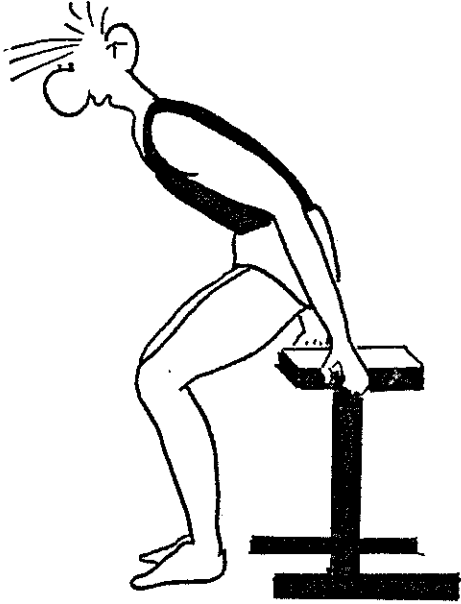


c. practice half-standing (forward trunk movement until the butt is off the chair and body weight is over the legs; then slowly sit down).

d. practice complete standing.

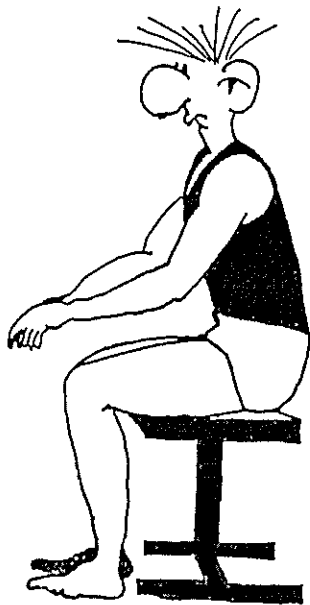
STAND -> SIT

- a. practice controlled movement; do not "fall into the chair".



- b. patient must bend the hips and knees, head forward, trunk straight, and feet close to the chair.

- c. some patients may reach back for the chair with their hand before sitting.



- d. sitting down is the reverse movement of standing up.

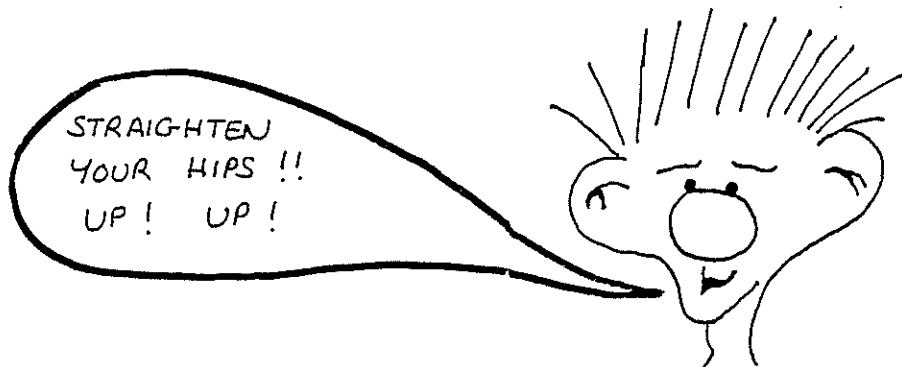
2. VERBALLY INSTRUCT THE PATIENT

The PTA can help guide the patient's movement by giving careful instruction and feedback.

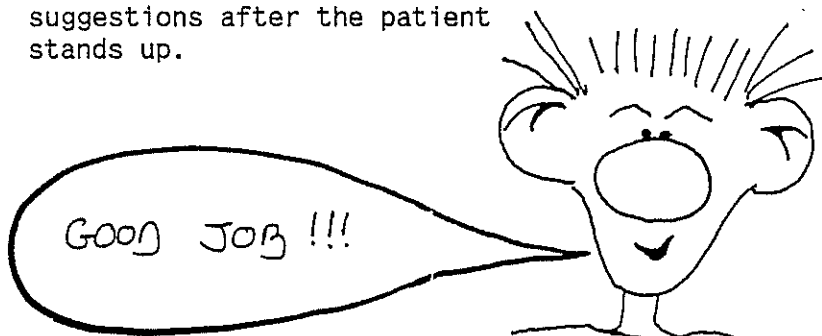
The PTA can instruct the patient before the patient stands up.



The PTA can give feedback and instructions at the same time the patient stands up.



The PTA can give feedback and suggestions after the patient stands up.



Questions:

1. A patient prepares to stand. What will you tell her to help stand correctly?

2. What is feedback?

Why is feedback important for a patient?

3. A patient has just finished standing and the PTA gives feedback saying, "That was terrible". Give 2 reasons why this is NOT a good way to give feedback.

3. PHYSICALLY HELP THE PATIENT

The PTA can physically help the patient by:

- a. supporting the patient's upper limbs
 - * patient can rest arm on PTA's shoulders
- b. lifting the patient's hips forward
 - * so the body weight is over the legs
- c. stabilizing the patient's legs
 - * PTA holds patient's knee(s) between the PTA's knees



NOTE

never pull on a patient's arms to help him stand up!

E. GOOD STANDING POSITION

Standing positions should be evaluated from three views:

anterior view posterior view lateral view

GOOD STANDING IS:

- * head looking forward
- * trunk is straight
(no lateral bending or
forward/backward bending)
- * normal curves of the
vertebral column
- * all limbs in neutral position
- * equal weight bearing on
both legs
- * feet are flat on the floor
and shoulder-width apart
- * toes are pointing forward



Question:

Anatomical position and good standing position are almost the same. Please describe one difference between anatomical position and good standing position.

F. FLOOR → STANDING, AND STANDING → FLOOR TECHNIQUES

Question:

Why is it important for patients to be able to go down to the floor and be able to get up from the floor?

Activity:

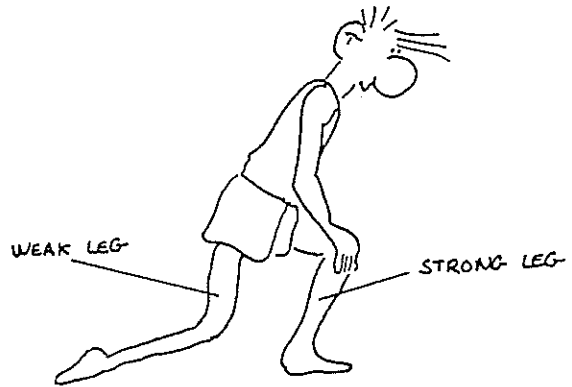
A. Start in a standing position. Slowly move from standing position to sit on the floor. Describe the movements that you made, and then compare with others in your class.

A. Start in sitting position. Slowly move from sitting position to a standing position. Describe the movements that you made, and then compare with others in your class.

Note: Every person may move from floor → standing differently. On the following pages are general floor → standing techniques that may work well for your patient. Experiment to find the ways that is safest and easiest for your patient.

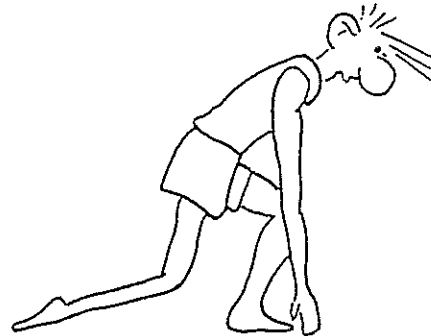
STANDING → FLOOR

1. strong leg holds body weight



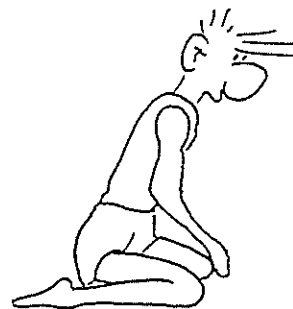
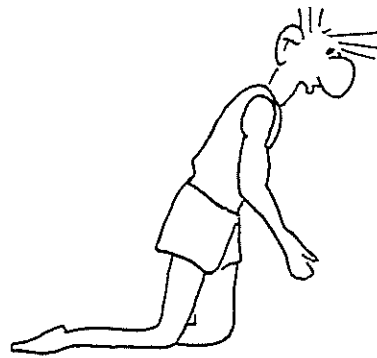
2. weak leg bends and the knee is lowered to the floor

3. patient's arms can touch the floor for balance



4. both legs in kneeling

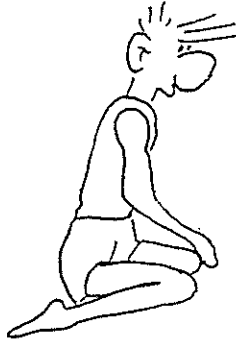
5. sit toward strong side



FLOOR -> STANDING

(Floor -> standing is the reverse movements of standing -> floor.)

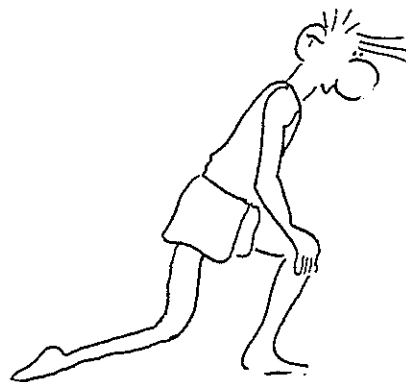
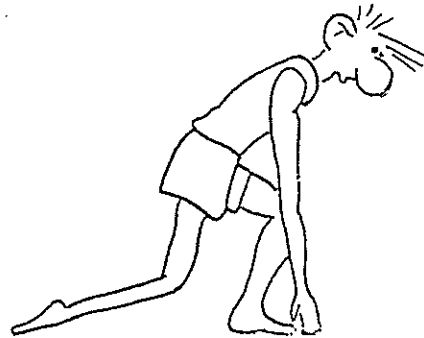
1. both legs in kneeling



2. patient brings strong leg forward

3. patient puts weight over the strong leg and stands up

(* it is useful if a patient can hold a chair or stable object for better balance and safety)



15.

GAT TRAINING



G. CHAPTER SUMMARY

Standing up is the process of moving from chair or floor to an upright position.

Normal body position to prepare to stand up includes:

- . head looking forward
- . back straight
- . sitting near edge of chair
- . shoulders forward
- . feet under body, a bit apart, toes forward

Normal body movements to stand up are::

- . move the shoulders more forward
- . extend the hips and knees
- . trunk remains straight
- . head remains look forward

The PTA can help a patient stand up by:

- . teaching the patient how to stand
- . verbally giving feedback
- . physically helping the patient

Ways to physically help a patient:

- . support the patient's upper limbs
- . lift the patient's hips forward so the body weight is over the legs
- . stabilize the patient's legs
- . never pull on a patient's arms to help him stand up!

Good standing position is:

- . head looking forward
- . trunk straight
- . normal curves of vertebral column
- . all limbs in neutral position
- . equal weight bearing on both legs
- . feet are flat on the floor and shoulder width apart
- . toes are pointing forward

Techniques for floor ----> standing, and standing ----> floor are given in this chapter.

GAIT TRAINING is the process of teaching someone to walk as well as possible.

OBJECTIVES

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

1. describe normal gait (phases of gait, step information, weight shifting, trunk and upper limb movements).
2. identify the three most important muscles used in walking.
3. demonstrate three standing activities that prepare a patient for walking.
4. identify abnormal gait patterns and suggest how to correct them.

CHAPTER CONTENTS

- A. WHAT IS GAIT TRAINING?
- B. NORMAL GAIT
- C. IMPORTANT MUSCLES USED IN GAIT
- D. RANGE OF MOTION NEEDED FOR GAIT
- E. GAIT PREPARATION
- F. GAIT PRACTICE
- G. ADVANCED GAIT ACTIVITIES
- H. GAIT PROBLEMS AND HOW TO HELP THEM
- I. CHAPTER SUMMARY

A. WHAT IS GAIT TRAINING?

Gait training is the process of teaching the patient to walk as well as possible.

Gait training is given for all patients that have problems with one or both legs, coordination, or balance.

This chapter can be used as a general guideline for evaluating gait and training all patients to walk.

Some patients have special problems that need special gait training. The PTA must first understand basic gait training; special cases will be discussed in detail in the specific pathology chapters.

B. NORMAL GAIT

Questions:

1. Why is it important for a person to walk normally?

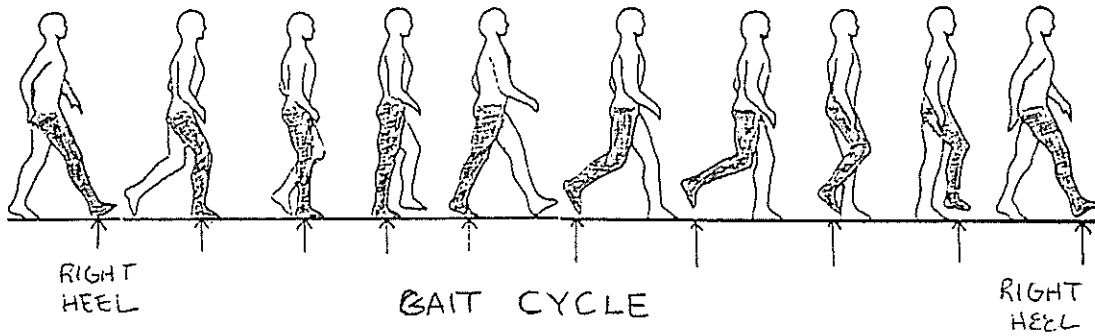
2. List two reasons why the PTA must know about normal gait.

To describe normal gait, the following topics must be included:

1. gait cycle (phases of gait)
2. step information
3. weight shifting
4. trunk rotation
5. upper limb movement

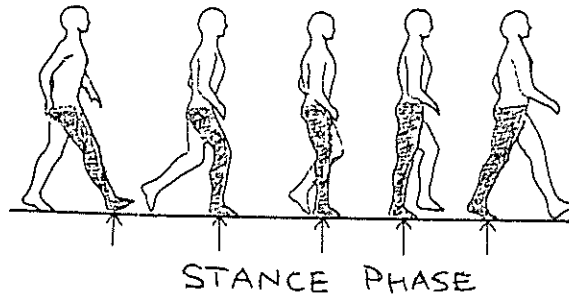
1. gait cycle (phases of gait)

A gait cycle starts when one foot contacts the ground and ends when the same foot contacts the ground again.

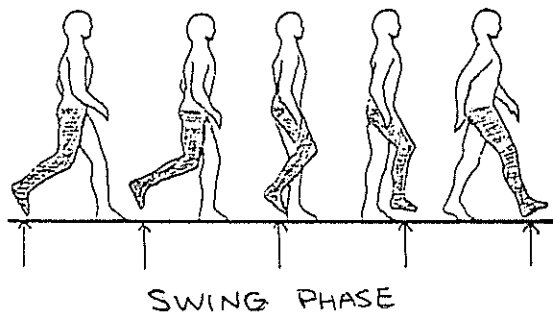


There are two phases in a gait cycle:

- a. STANCE PHASE = when the lower limb is contacting the ground.



- b. SWING PHASE = when the lower limb is not contacting the ground.



Activity:

Walk around the room. When you walk, identify:
swing phase, stance phase and a gait cycle.

1. When your left leg is in swing phase, what phase is the right leg in?

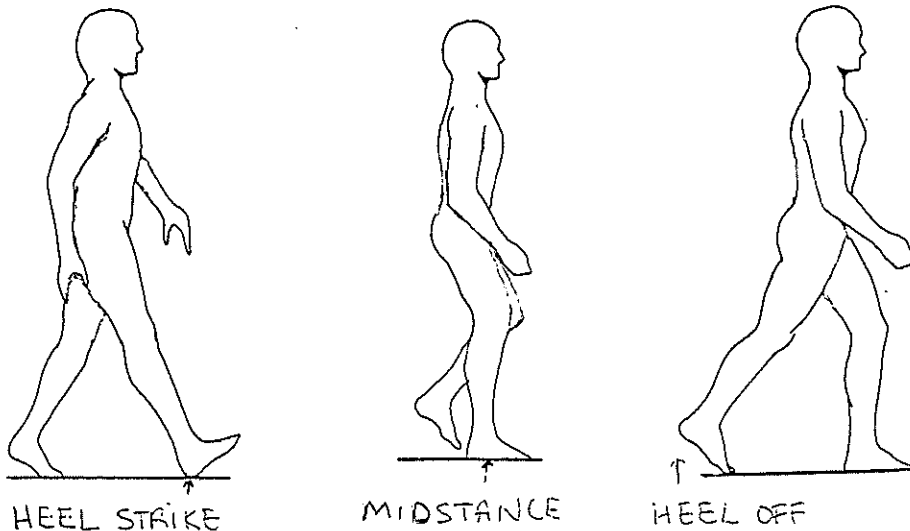
2. When is the lower limb weight bearing (during stance phase or swing phase)?

STANCE PHASE and SWING PHASE each have specific parts.

These parts will be identified in the next section.

STANCE PHASE

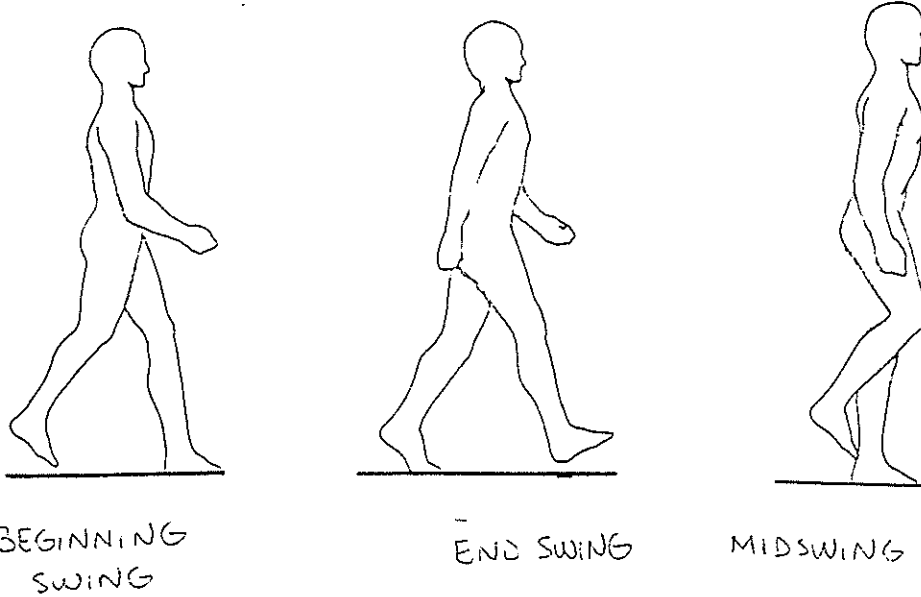
There are three different parts of stance phase. These are:



- a. HEEL STRIKE - when the heel contacts the floor
- b. MIDSTANCE - when the patient has weight directly over the foot
- c. HEEL OFF - when the heel lifts off the floor

SWING PHASE

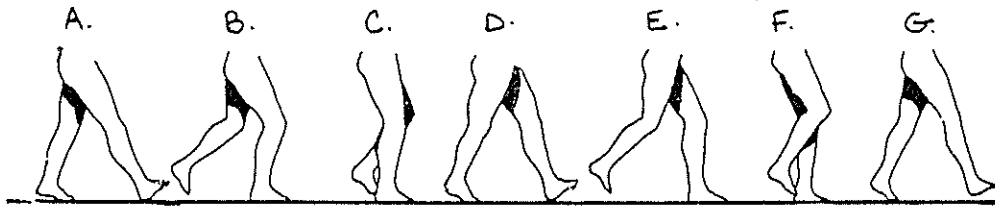
There are three different parts of swing phase. These are:



- a. BEGINNING SWING - when the leg is behind the body
- b. MIDSWING - when the leg is equal with the other leg
- c. END SWING - when the leg moves in front of the body.

Activity:

Look at the pictures below to answer the following questions.



1. In picture "C" what is the specific name of the phase for:
the right foot

the left foot

2. In what picture(s) do you see both legs in stance phase
at the same time?

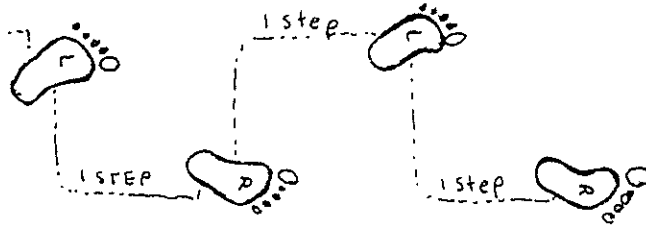
3. For the left leg, what part of swing phase is missing?

4. What picture shows the left leg in midstance?

5. When the right leg is in heel strike, what is the position
of the left leg?

2. step information

One "step" is when the opposite foot contacts the ground.



Question:

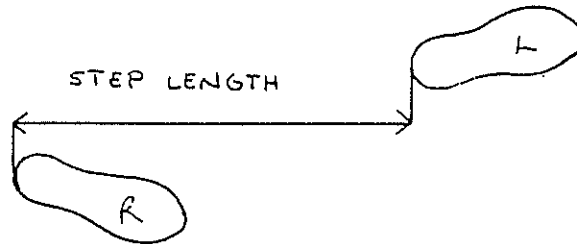
How many steps are in one gait cycle? _____

The PTA must observe three things about steps:

- a. step length
- b. step width
- c. step time

a. step length

Step length is the distance between the heel strike of one foot and the heel strike of the opposite foot.



Activity:

A. Practice walking with equal step lengths.

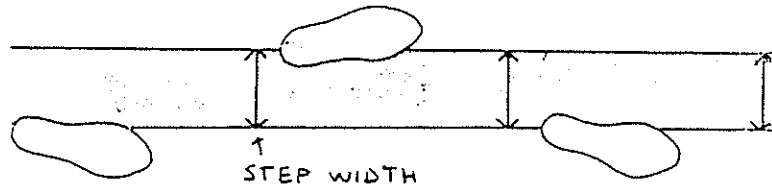
B. Now take a long step with the right foot and a short step with the left foot. Continue this for 30 seconds.

With the type of walk in activity "B", what leg would have the problem (right or left)? _____

Explain your answer. _____

b. step width

Step width is the distance between the feet.



Activity:

- A. Practice walking with a very small step width (walking along a straight line).
- B. Practice walking with a very big step width.
- 1. Many old people walk with a big step width. Why do you think old people walk like this?

c. step time

Step time is the amount of time it takes to complete one step.

Normally, the amount of time is equal for both sides.

Activity:

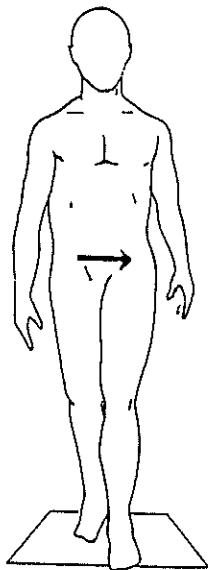
- A. Practice walking normally (equal time for both sides).
- B. Practice walking with short time for the right step and long time for the left step.

In activity "B", what leg has the problem, right or left?

Activity: (continued)

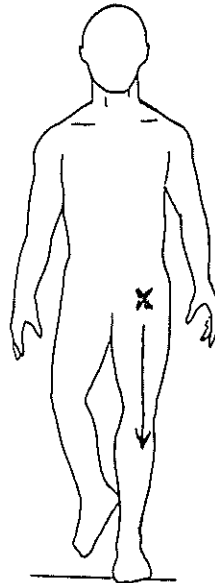
Explain your answer.

3. weight shifting



HEEL STRIKE

In the beginning of stance phase, the patient must shift his weight so the other leg can leave the ground.



MIDSTANCE

At midstance all of the patient's body weight should be over the leg.

During weight shift, the upper body remains straight.

There is NO LATERAL BENDING of the trunk during normal weight shift.

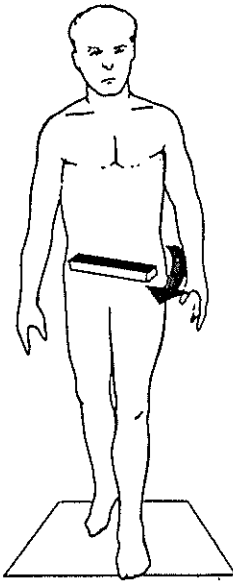
Question:

You observe a patient walking. Every time his left leg is in stance phase, his trunk bends to the left. When his right leg is in stance phase, his trunk remains straight.

What side is normal (left or right)?

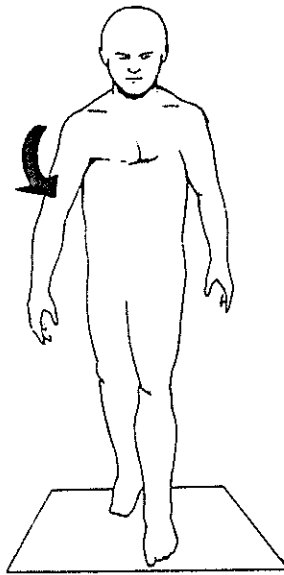
Explain your answer.

4. trunk rotation



(A)

When a person steps forward the hip of the same side moves forward. Hip forward increases step length.



(B)

When a person steps forward, the opposite shoulder also moves forward at the same time.

Trunk rotation is good to prevent extra body movement.

The movement of the shoulder and the hip counterbalance each other.

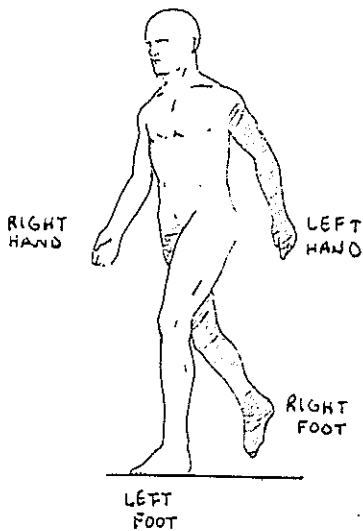
Trunk rotation is a part of normal gait.

Activity:

Practice walking normally and think about trunk rotation.

Next, walk with NO TRUNK ROTATION. (The shoulder and hip of the same side move forward together.

Which type of walking (with or without trunk rotation) uses more energy?



5. upper limb movement

Normally the opposite hand and foot will move together.

The arm follows the movement of the shoulder and also helps to balance body movements in walking.

Question:

A patient steps forward with her right foot. What hand should be moving forward at the same time, right or left?

C. IMPORTANT MUSCLES USED IN GAIT

The table (on the following page) is a summary of the important walking muscles and their main functions during the gait cycle.

MUSCLE NAME	MAIN FUNCTION(S) DURING GAIT CYCLE
HIP EXTENSOR	* KEEPS THE HIP MOVING FORWARD DURING STANCE PHASE.
HIP ABDUCTOR	* PREVENTS THE HIP FROM MOVING OUTWARD DURING MIDSTANCE.
HIP FLEXOR	* USED IN BEGINNING SWING PHASE.
HIP ADDUCTOR	* PULLS BODY OVER WEIGHT-BEARING LEG IN EARLY STANCE PHASE. * KEEPS LEG TOWARD MIDLINE
KNEE EXTENSOR	* EXTENDS KNEE TO PREPARE FOR HEELSTRIKE. * HELPS STABILIZE KNEE DURING STANCE PHASE.
KNEE FLEXOR	* BENDS KNEE TO START SWING PHASE.
ANKLE DORSIFLEXOR	* KEEPS FOOT UP DURING SWING PHASE. * KEEPS FOOT UP SO HEEL CONTACTS THE GROUND FIRST.
ANKLE PLANTAR FLEXOR	* HELPS TO PUSH BODY FORWARD AT HEEL OFF.
TRUNK MUSCLES	* KEEP UPPER BODY IN ERECT POSITION AND CONTROL ROTATION DURING GAIT.

Remember: This table is a very general summary of muscles in gait.

Questions:

To answer these questions, please look at the table on the previous page.

1. A patient has no dorsiflexors in the right ankle.
Describe what you will see during:
 - a) right swing phase _____
 - b) right heel strike _____

2. A patient has no knee extensor in the left knee.
Describe what you will see during:
 - a) left stance phase _____
 - b) left swing phase _____

3. During right stance phase, the patient's right hip moves outward uncontrollably. What muscle is weak in this patient?

4. A patient has very little trunk strength or control.
Describe how this patient walks.

5. A patient has very weak hip abductors on the left side.
Describe the gait problem that you will see when this patient walks.

D. RANGE OF MOTION NEEDED FOR GAIT

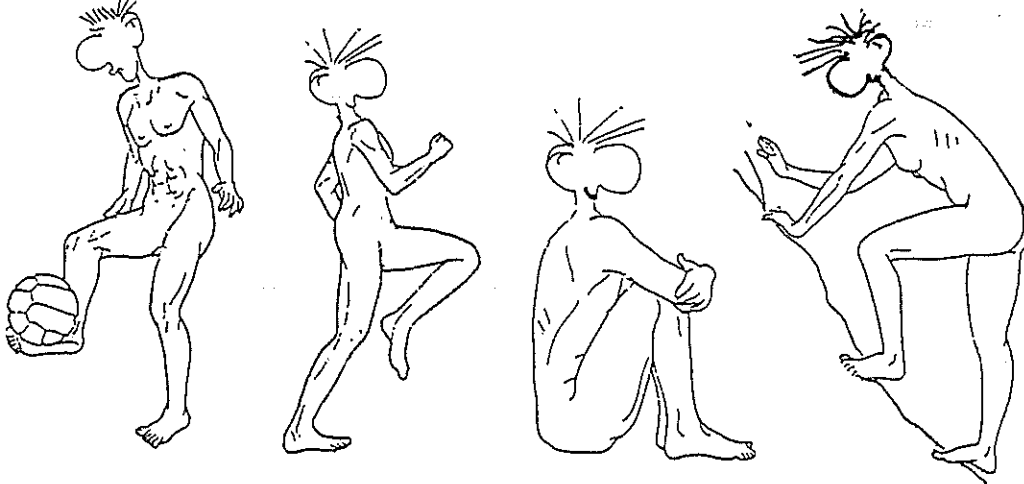
For a person to be able to walk normally, he must have enough range of motion in the lower limbs.

The table below gives a summary of the ROM needed for walking.

JOINT	MINIMUM ROM NEEDED FOR NORMAL WALKING	
HIP	10 extension	30 flexion
KNEE	0 extension	60 flexion
ANKLE	0 neutral	20 plantar flexion

Remember, these numbers are the minimum ROM needed for walking.

The patient will need more range of motion in the lower limbs for activities like running, sports, going up and down stairs, and sitting.



Activity:

Select one student to come to the front of the class.
This student will demonstrate normal walking.

(It would be best if this student is wearing short pants
to be able to see the lower limbs clearly.)

The class will observe this student's gait carefully and
answer the following questions.

1. When is the ankle in the most plantar flexion?

2. Is the knee completely extended during midstance?

Yes _____ No _____

If no, describe the position of the knee during
midstance.

3. What is the position of the right hip during right swing
phase, flexion or extension?

4. Why is it good to have the ankle in neutral position
during swing stance?

E. GAIT PREPARATION

Before learning to walk, the patient must have:

- * good standing balance
- * appropriate ROM in the joints of the lower limb
- * strength and control of the important muscles in gait
- * devices (prosthesis, brace) if needed.

Questions:

1. A patient has ankle ROM of 10 - 20 plantar flexion only.
Is this ROM enough for normal walking?
Yes _____ No _____

Explain your answer.

2. Explain why a patient needs good standing balance before learning to walk.

3. What are the five most important muscles used in walking?

Describe the function of these three muscles.

F. GAIT PRACTICE

There are three important steps that a PTA should follow when trying to teach a patient to walk. These steps are:

1. Keep the Patient Safe
2. Keep the Training Simple
3. Evaluate the Complete Gait

1. Keep the Patient Safe

The patient may need help to have safe and stable walking.

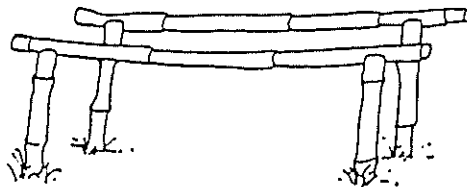
In the beginning, two ways to give help to the patient are:

- a) parallel bars
- b) manual support

- a) parallel bars

Parallel bars are two very long poles that are strong enough to hold the patient's weight.

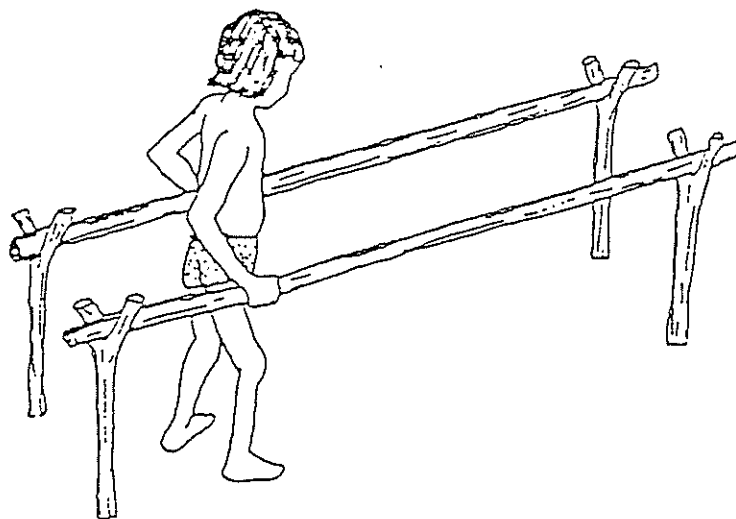
These poles are stabilized by other poles attached to the ground.



simple, non-adjustable bars
(bamboo, wood, or metal)

Generally, parallel bars should be:

- * as high as the patient's hip
- * wide enough to walk through
- * long enough for the patient to make 5-7 gait cycles.



ALL gait training should begin in the parallel bars.

In the beginning, the patient may hold the bars for support. As the patient feels more stable, he should hold the bars less and less.

Some patients may need walking aids after the parallel bars for safe and stable walking. Please see WALKING AIDS chapter, Volume 2.

b) manual support

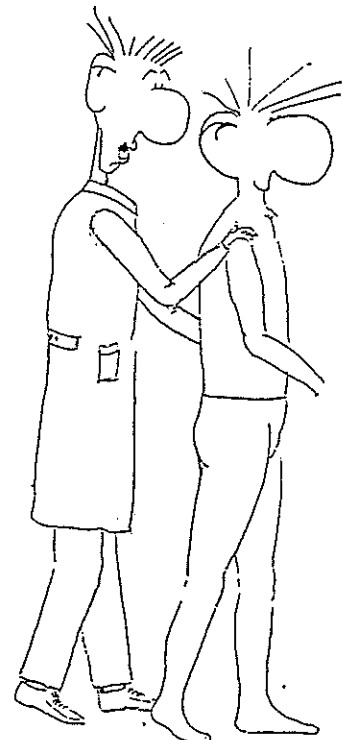
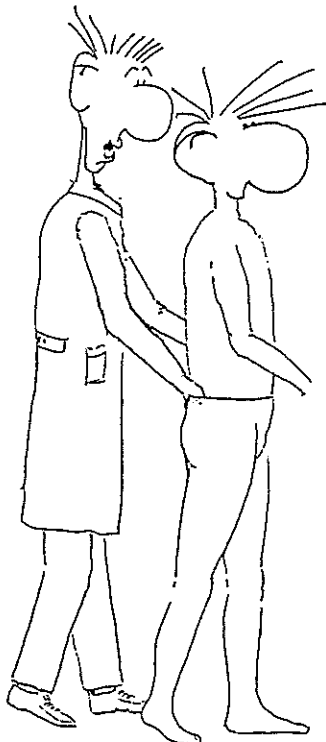
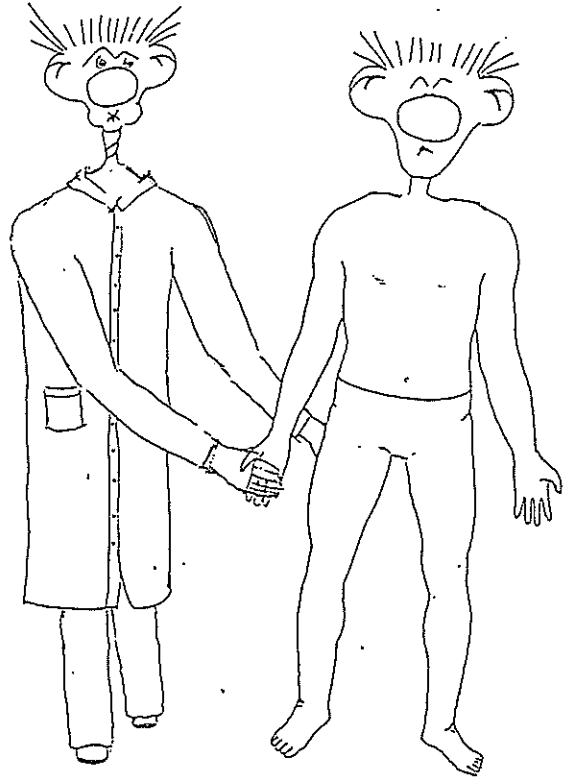
Manual support is hand contact from the PTA.

This support is to give the patient stability and prevent falling.

Manual support can be given inside the parallel bars and outside of the parallel bars.

Generally, manual support is given from BEHIND the patient or on the patient's WEAK or DAMAGED SIDE.

Examples of different types of manual support are given on this page.

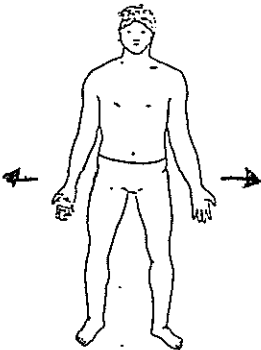
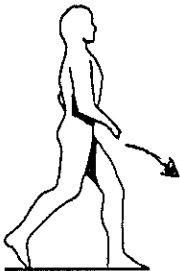



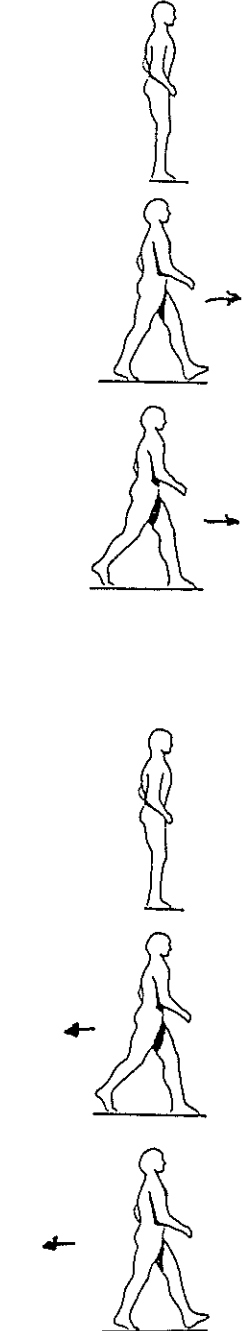
2. Keep the Training Simple

At first, the patient should practice the simple parts of gait.

In this way, the patient can feel the different parts of gait and the PTA can identify what parts the patient needs help with.

Below are the simple parts of gait and what the PTA must check.

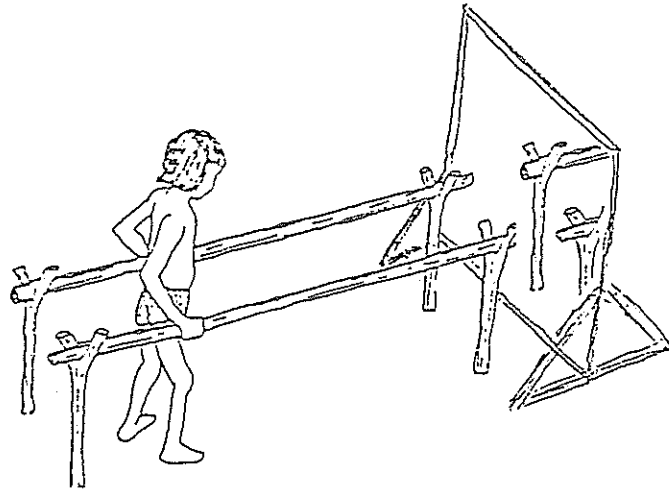
SIMPLE PART OF GAIT	WHAT THE PTA MUST CHECK
<p>weight - shifting (side to side)</p> 	<ul style="list-style-type: none"> * good knee control (no hyperextension) * weight shifting with the <u>hips</u> ... (no lateral trunk bending) * complete weight shifting * good patient posture (head up, back straight)
<p>weight - shifting (forward and backward)</p>  	<p><u>weight shift forward</u></p> <ul style="list-style-type: none"> * front foot flat * posterior foot in heel off position * posterior foot helps push body forward * good posture, hips straight <p><u>weight shift backward</u></p> <ul style="list-style-type: none"> * posterior foot flat * front foot in heel strike position * good posture, hips straight

SIMPLE PART OF GAIT	WHAT THE PTA MUST CHECK
<p data-bbox="284 331 635 394">stepping (forward and backward)</p> 	<p data-bbox="683 331 944 362"><u>stepping forward</u></p> <ul data-bbox="683 398 1331 878" style="list-style-type: none"> * both feet equal * weight shift with the hips to one leg * step forward with the other leg * good posture, hips straight * good swing phase * no lateral bending * good heel strike and foot position * begin to weight shift on the other leg <p data-bbox="683 972 954 1003"><u>stepping backward</u></p> <ul data-bbox="683 1039 1331 1550" style="list-style-type: none"> * both feet equal * weight shift with the hips to one leg * step backward with the other leg * good posture, hips straight * no lateral bending * toes contact the ground first followed by heel contact * weight shift to this leg * heel off with the opposite foot <p data-bbox="692 1706 1241 1738">(then <u>combine</u> these two movements)</p>

3. Evaluate the Complete Gait

After controlling the simple parts of gait, the patient must be able to put all of the parts together to walk normally.

A mirror can be put in front of the patient so that the patient can independently see and correct her posture as she walks.



The PTA must closely evaluate the patient's gait. If there is a problem, the PTA can give verbal feedback to help correct this problem.

If the problem continues, the PTA can give physical help OR can again practice the simple parts of gait.

DIFFERENT PARTS OF GAIT TO EVALUATE
* weight shifting
* arm swing
* posture (trunk straight)
* trunk rotation
* step width
* step length
* step duration

G. ADVANCED GAIT ACTIVITIES

After the patient can correctly demonstrate the basic gait cycle, there are many other walking activities to be practiced.

REMEMBER !!

All advanced gait activities should first be practiced in the parallel bars.

Suggestions for advanced gait activities include:

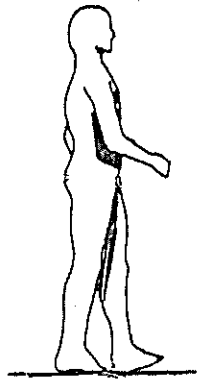
1. side - stepping to the left side
side - stepping to the right side
2. walking with different speeds
3. walking backwards
4. walking toe to toe
5. walking in a straight line
6. cross - stepping anteriorly
cross - stepping posteriorly
7. step over objects
8. stairs/ramps
9. pick something up from the floor
10. walking on uneven surfaces
11. obstacle course

On the following pages are pictures of different advanced gait activities.

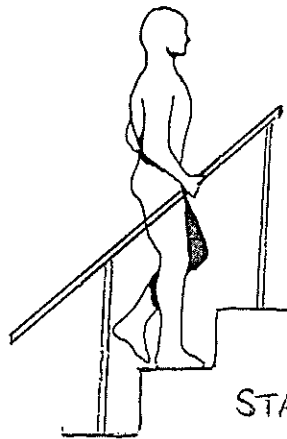
These are only suggestions, The PTA and patient can work together to find other activities that are challenging and fun.

ADVANCED GAIT ACTIVITIES

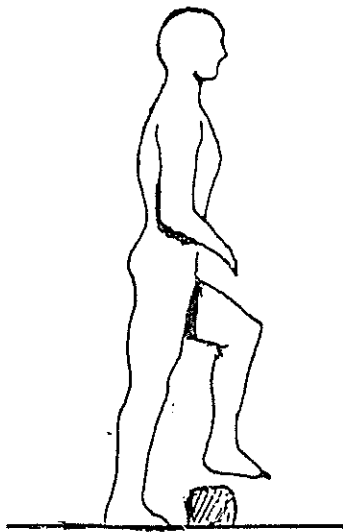
Remember: Patients should have close supervision when doing these activities.



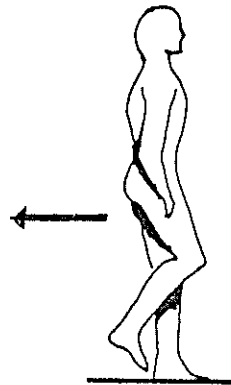
TOE TO TOE



STAIRS



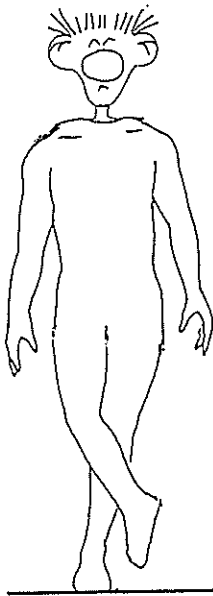
STEP OVER OBJECT



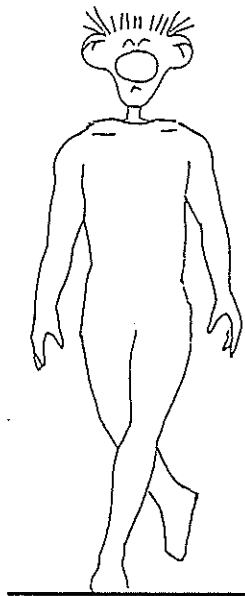
WALKING
BACKWARDS

ADVANCED GAIT ACTIVITIES

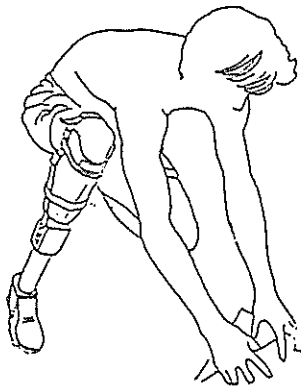
Remember: Patients should have close supervision when doing these activities.



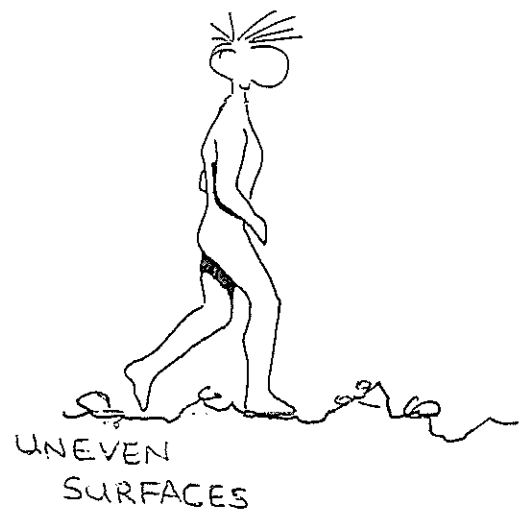
CROSS -
STEPPING
ANTERIORLY



CROSS-STEPPING
POSTERIORLY



PICK SOMETHING UP
FROM THE FLOOR



UNEVEN
SURFACES

Questions:

1. A patient goes up the stairs. Is it more safe to go up with the good leg first or the weak leg first?

Explain your answer.

2. When a patient goes down stairs, is it more safe to go down with the good leg first or the weak leg first?

Explain your answer.

3. A patient walks well in the parallel bars. Why is it important for the patient to practice advanced gait activities?

4. Explain two reasons why the patient should practice simple parts of gait before walking normally.

H. GAIT PROBLEMS AND HOW TO HELP THEM

A person who walks abnormally has a "gait problem".

There are three main reasons for gait problems:

1. PHYSICAL CAUSES
2. POOR FIT OF DEVICE
3. PSYCHOLOGICAL CAUSES

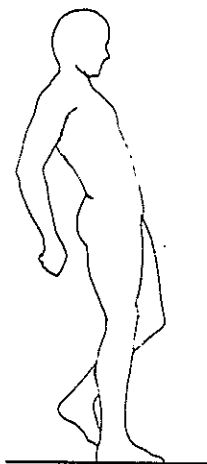
1. PHYSICAL CAUSES

Physical causes of gait problems are from problems with the patient's body.

A patient can have muscle weakness, joint stiffness, pain, or other problems with the body that will change how the patient walks.

It is important for the PTA to be able to identify physical problems and give suggestions about how to correct these problems.

On the following pages are examples of common gait problems and possible physical causes.

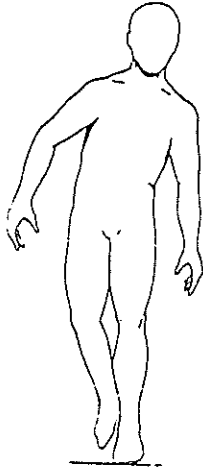


PARALYSIS OR WEAKNESS OF HIP EXTENSORS

Patient will bend body posteriorly to help the hip stay in extension.

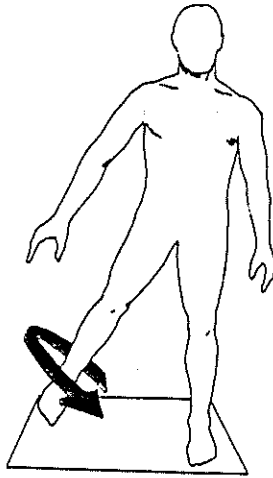
(picture: weakness of right hip extensor)

PARALYSIS OR WEAKNESS OF HIP ABDUCTORS



Patient will bend toward the weak side to help the hip stay in a straight position.

(picture: weakness of left hip abductor)



KNEE FLEXION IS LIMITED

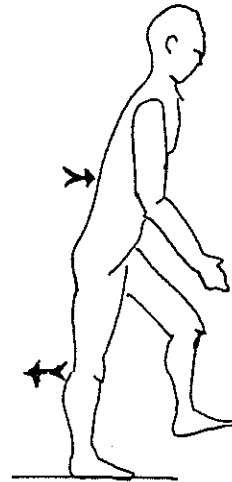
Patient will bring the leg to the outside to help the foot lift off the floor.

(picture: stiffness of the right knee)

PARALYSIS OR WEAKNESS OF KNEE EXTENSORS

Patient will bend forward during stance phase to put body weight in front of the knee to keep it in extension/hyper-extension.

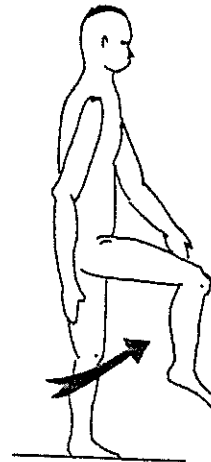
(picture: weakness of left knee extensor)

PARALYSIS OR WEAKNESS OF ANKLE DORSIFLEXORS

Patient will have high stepping gait to lift the foot off the floor.

Patient will have no heel strike; the foot will contact the ground all at the same time.

(picture: paralysis of left dorsiflexors)



For all physical gait problems, the PTA can try to strengthen the weak muscles. If the muscles are paralysed, a brace may be needed to help the patient walk as well as possible.

2. POOR FIT OF DEVICE

The PTA should know how to check the fitting for:

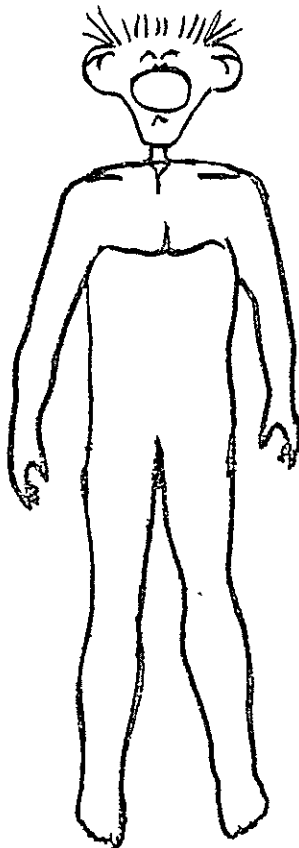
- crutches and other walking aids
- prostheses
- braces

(See WALKING AIDS chapter, Volume 2, and AMPUTATIONS chapter, Volume 3.)

If there is a problem with how a device fits the patient, a technician should be consulted to help solve this problem.

3. PSYCHOLOGICAL CAUSES

How a person feels can be seen in how he walks.



Remember: Psychology can sometimes direct how a patient walks.

I. CHAPTER SUMMARY

Gait training is the process of teaching someone to walk.

A normal gait cycle has 2 phases:

- . STANCE PHASE (leg contacting the ground)
- . SWING PHASE (leg moving through the air)

Important parts of normal gait are:

- . complete weight shift on leg contacting the ground
- . equal step length and step time
- . small step width
- . trunk straight (no lateral bending)
- . trunk rotation
- . upper limb movement (opposite hand and foot together)

Important muscles for walking are:

HIP ABDUCTOR KNEE EXTENSOR ANKLE DORSIFLEXOR

Before learning to walk, the patient must have:

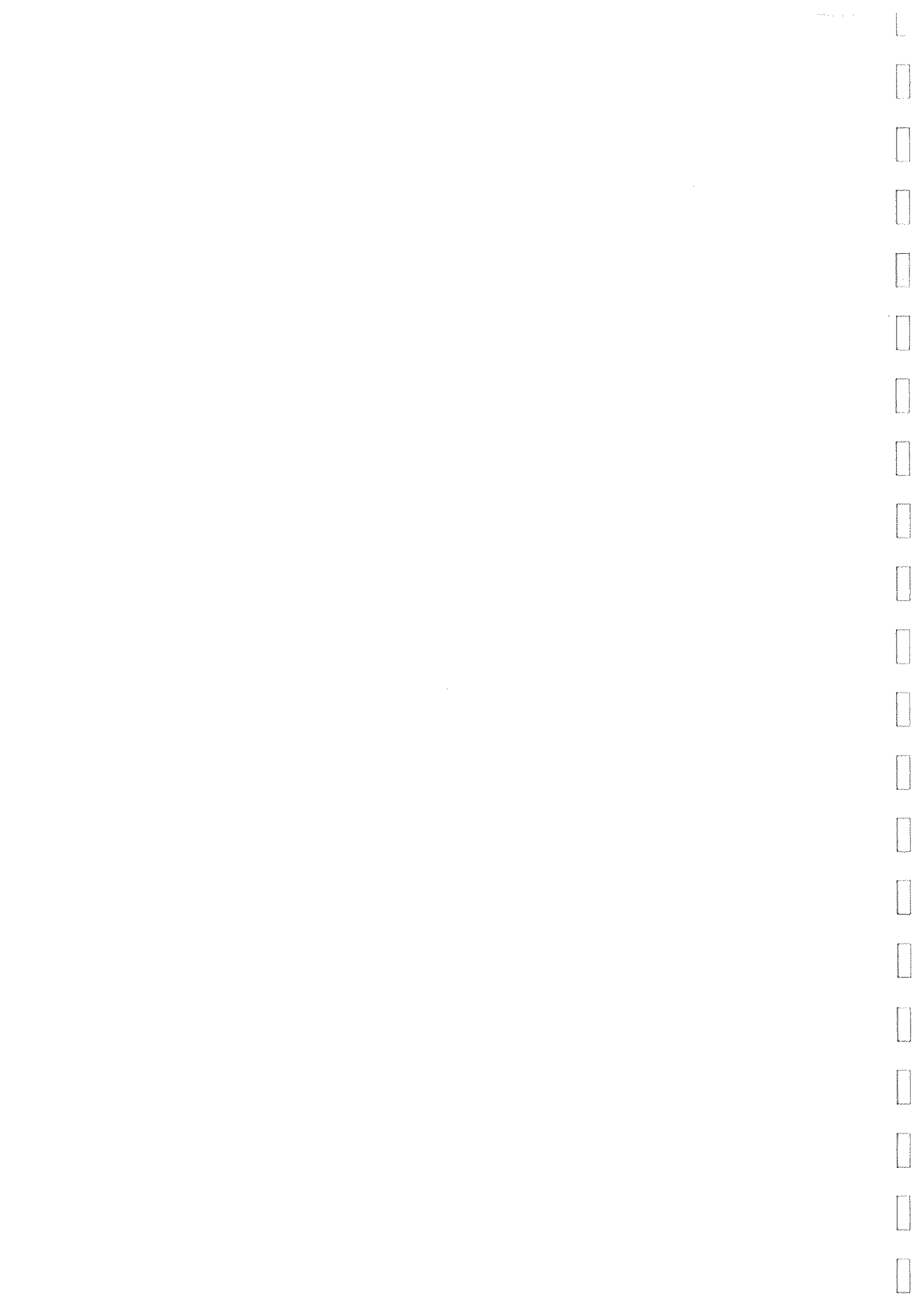
- . good standing balance
- . appropriate ROM in the joints of the lower limb
- . strength and control of the important gait muscles
- . devices (prosthesis, brace) if needed

All gait training should begin in the parallel bars.

Simple parts of gait are:

- . weight shifting (side to side)
- . weight shifting (forward and backward)
- . stepping (forward and backward)

Examples of common gait problems are given in this chapter.



16.

WALKING AIDS



WALKING AIDS are equipment used to help a person walk.

OBJECTIVES

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

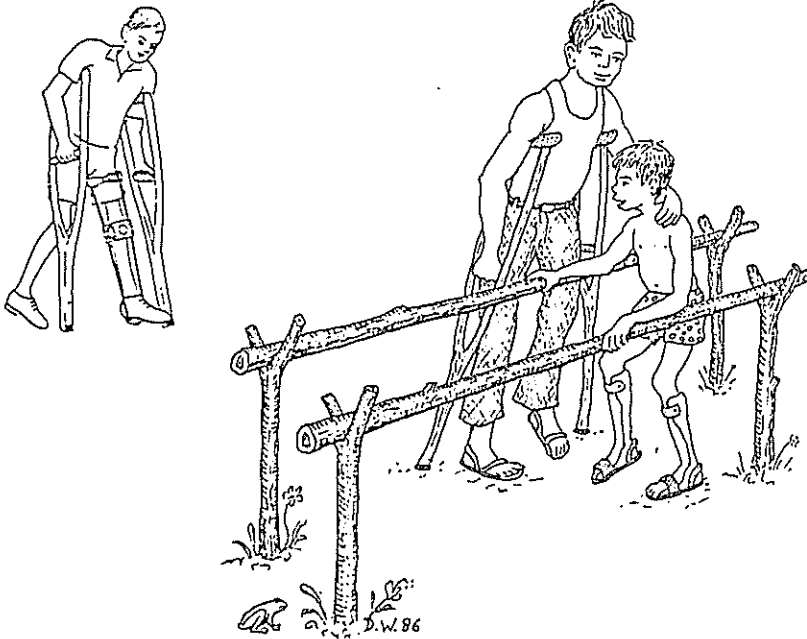
1. given a patient problem, select the appropriate equipment needed to help a patient walk.
2. identify correct fitting for all walking aids.
3. given a patient problem, demonstrate the appropriate gait pattern that this patient should use.
4. describe four basic rules for going up and down stairs with walking aids.

CHAPTER CONTENTS

- A. WHAT ARE WALKING AIDS?
- B. PEOPLE THAT NEED WALKING AIDS
- C. TYPES OF WALKING AIDS
- D. MEASUREMENT AND FIT OF WALKING AIDS
- E. GAIT PATTERNS USED WITH WALKING AIDS
- F. STAIRS
- G. CHAPTER SUMMARY

A. WHAT ARE WALKING AIDS?

Walking aids are equipment used to help a person walk.



B. PEOPLE THAT NEED WALKING AIDS

People that may need walking aids are people that:

- * cannot control the joints/muscles of the lower limb.
- * have poor balance.
- * cannot or may not put all of their weight on the lower limbs.

C. TYPES OF WALKING AIDS

Walking aids are used by the upper limbs.

Walking aids used have two main functions:

- * increase a patient's balance
- * allow weight bearing on the arms

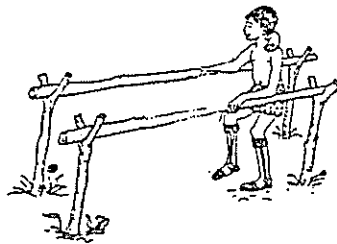
The most common walking aids are:

1. PARALLEL BARS (most stable)
2. WALKERS
3. CRUTCHES
4. CANES (WALKING STICKS) (least stable)

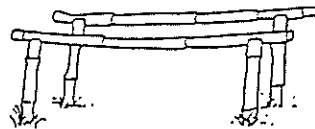


1. PARALLEL BARS

- * immovable bars
- * very stable

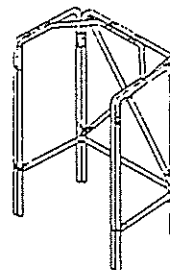


- * all patients should begin any walking training in the parallel bars



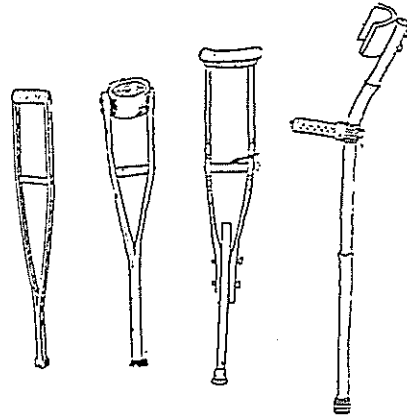
2. WALKERS

- * stable but slow
- * contacts the ground in 3-4 places at the same time
- * good for balance and weight bearing on the upper limbs



3. CRUTCHES

- * less stable but more fast
- * good for weight bearing through the upper limbs
- * can begin to use crutches inside the parallel bars



4. CANES (WALKING STICKS)

- * least stable
- * normally canes are used to help with balance
- * good for psychological support
- * can begin to use a cane inside the parallel bars
- * normally, canes are used on the opposite side of the weak leg



Questions:

1. Look at the pictures of the different walking aids. From these pictures describe the difference between a crutch and a cane.

Questions: (continued)

2. A 10 year old boy has a fractured femur. The doctor orders no weight bearing on the left leg. The PTA gives this boy a cane to help him walk. Do you agree with this choice of walking aid?

Yes _____ No _____

Explain your answer.

3. An 80 year old man has problems with balance when he walks. What type of walking aid could be useful to help this man?

Explain your answer.

After the patient receives a walking aid, the PTA must:

- a. check to see that it is the correct height for the patient.
- b. teach the patient how to walk with the walking aid.
- c. observe if the walking aid is appropriate for the patient (does it help?)

AND AVOID THIS.....

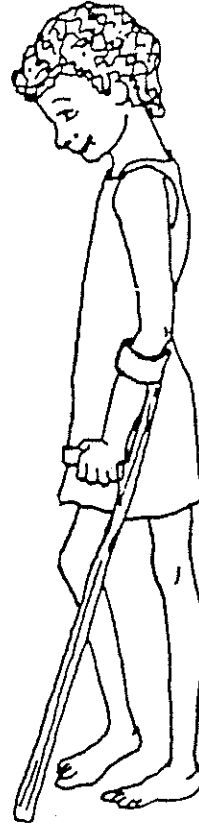


D. MEASUREMENT AND FIT OF WALKING AIDS

Below are general rules for checking the fit of walking aids.

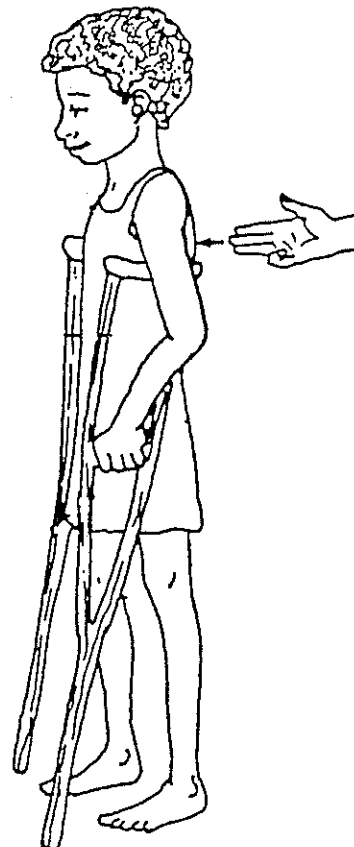
- * for all aids the elbow should be a little flexed when the hand is resting on the grip

- * when the patient is standing and the walking aid is on the ground the hand grip should be at wrist level



- * when the patient is in bed, the height of the hand grip is measured from the bottom of the foot to the wrist.

- * for underarm crutches, the top of the crutch should be three fingers width below the arm pit.



Question:



(patient hanging on crutches)

There are many nerves and blood vessels that pass the arm pit area.

Explain what can happen to a patient that "hangs" on his crutches.

E. GAIT PATTERNS USED WITH WALKING AIDS

Patients using walking aids can walk in many different ways.

The PTA can decide what type of gait pattern the patient should use.

To make a decision about gait, the PTA must know if the patient has:

1. two legs can weight bear and move independent of each other.
2. only one leg can weight bear OR two legs that move together.

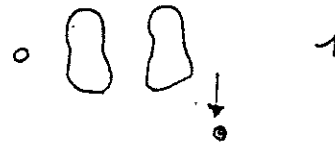
1. Gait patterns for patients that have two legs that can hold weight and move separately.

There are three types of gait patterns than can be used:

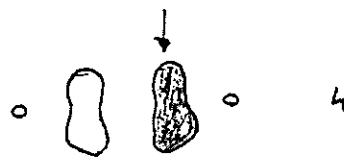
- a. 4 - point gait
- b. 3 - point gait
- c. 2 - point gait



- a. 4 - point gait



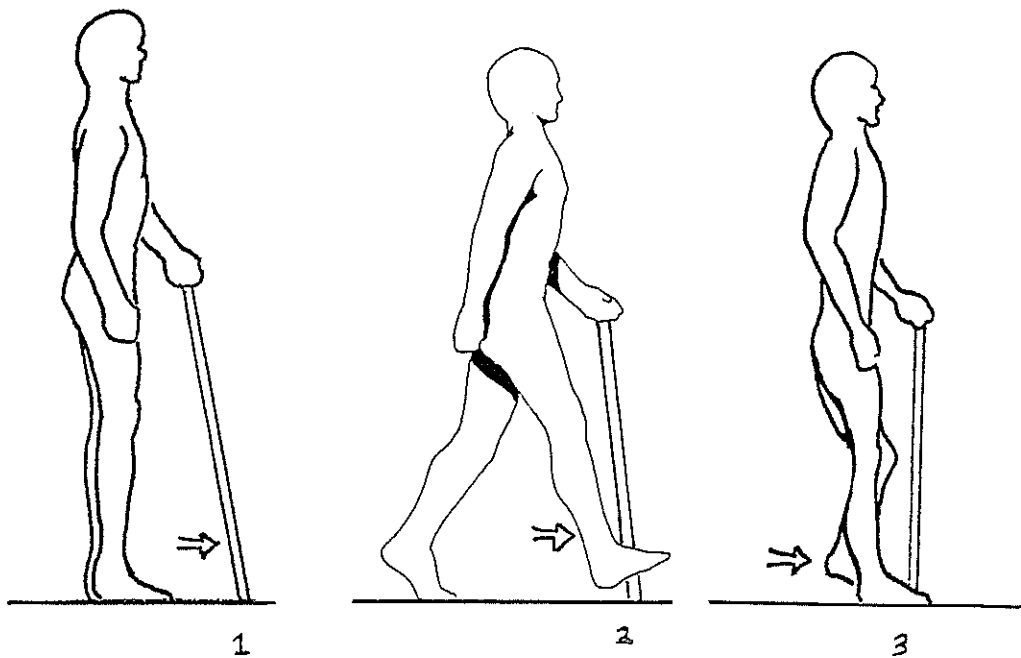
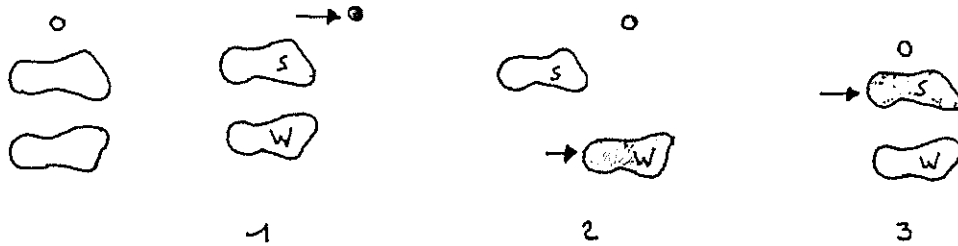
1. one walking aid forward
2. opposite foot forward
3. other walking aid forward
4. opposite foot forward



- * very stable gait
- * very slow gait
- * can only be used with parallel bars, two crutches, or two canes.

b. 3 - point gait

1. walking aid forward
2. weak leg forward
3. strong leg forward

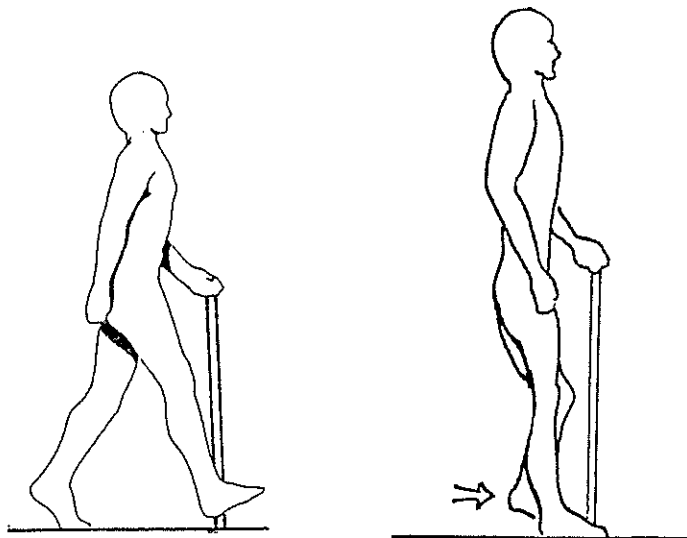
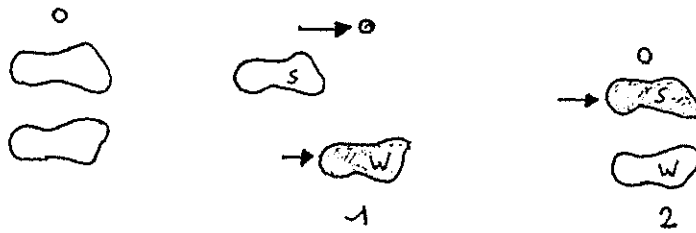


- * stable gait, slow
- * good for partial weight bearing patients
- * can be used with parallel bars, walker, two crutches

(one cane be used if the patient can put a lot of weight on both legs)

c. 2 - point gait

1. walking aid and weak leg go forward at the same time
2. strong leg forward



- * stable gait
- * faster than 3 - point gait
- * can be used with parallel bars, walker, two crutches, one crutch, or one cane.

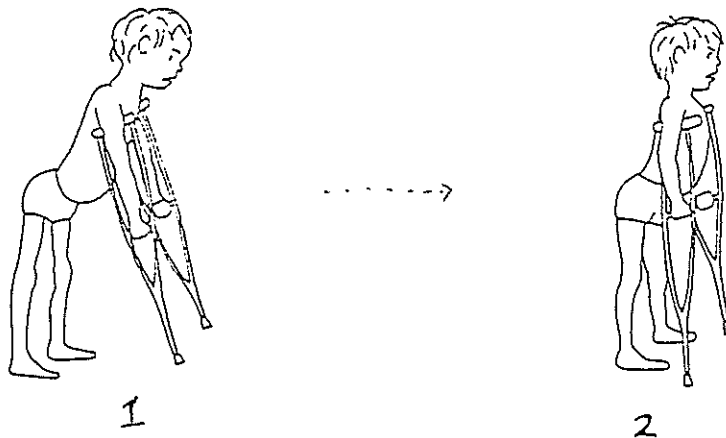
2. Gait patterns for patients that have only one leg that can hold weight OR patients that have two legs that must move together.

There are two types of gait patterns that can be used:

- a. swing-to gait
- b. swing-through gait

a. swing-to gait

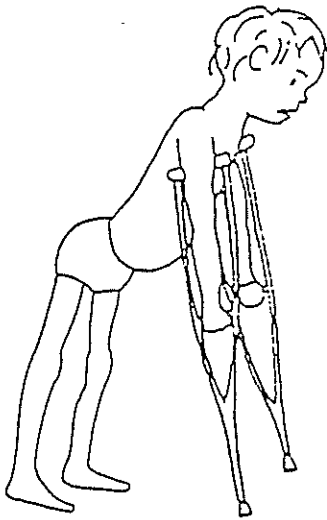
1. walking aid forward
2. leg(s) move to the area just behind walking aid



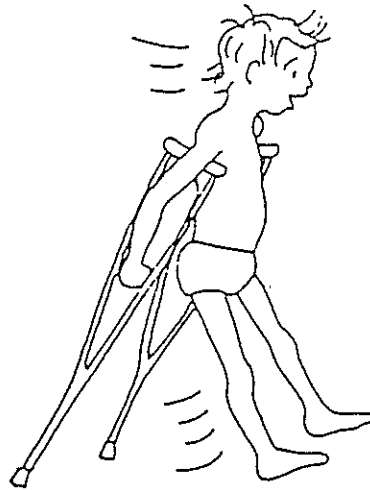
- * very stable gait
- * slow gait
- * can be used with parallel bars, walker, or two crutches

b. swing-through gait

1. walking aid forward
2. leg(s) move to the area in front of walking aid



1



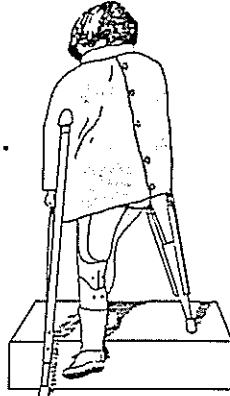
2

- * less stable gait
- * fast gait
- * can be used only with parallel bars or two crutches

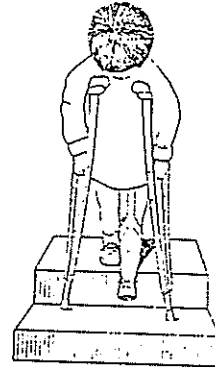
F. STAIRS

5 rules to follow when going up and down stairs with walking aids:

1. Patient should step up with the strong leg first.

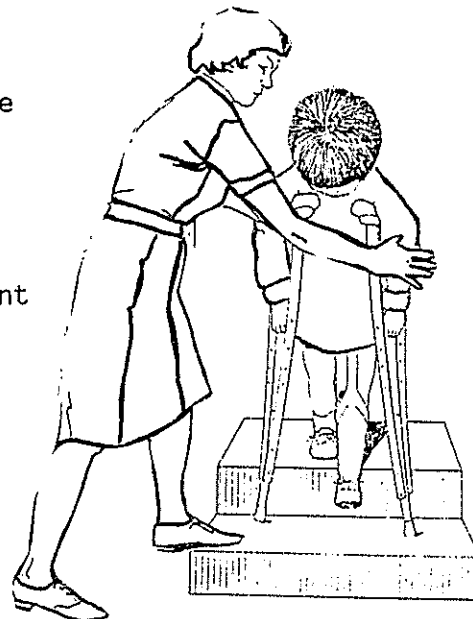


2. Patient should step down with the weak leg first.

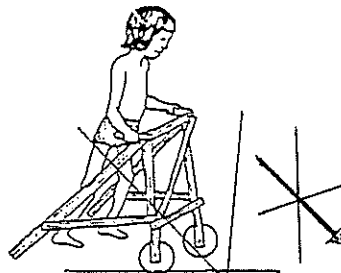


3. The PTA should always stay on the down-stair side of the patient.

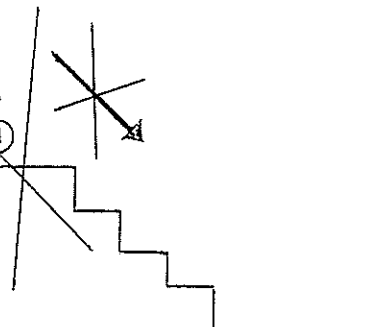
This will help protect the patient from falling.



4. Crutches always follow the bad leg



5. Walkers should never be used on stairs



Questions:

1. A patient has paralyzed knee extensors in the left leg. What leg will be first when this patient goes up stairs right or left?

2. A patient has a fractured left tibia. He uses two crutches to walk. When he goes up stairs, he steps up with his right leg first and then brings the left leg and crutches.

Is this correct?

Yes _____ No _____

Describe how the patient will go down stairs.

3. The PTA is teaching the patient how to go up the stairs. The PTA is one step above the patient to help pull him up. Is this a good idea?

Yes _____ No _____

Explain your answer.

Questions: (continued)

4. Describe in your own words by walkers are not used on the stairs.

5. The patient is a 74 year old woman. She cannot put weight on her left leg. What type of walking aid will you give her?

What type of gait pattern will she use?

Why?

6. The patient is a 25 year old man. He is a right AK amputee. What walking aid will you give this man?

What type of gait pattern will he use?


Why?

G. CHAPTER SUMMARY

Walking aids are equipment used to help a person walk.

Walking aids are used by the upper limb to increase balance and allow weight bearing on the upper limbs.

Types of walking aids are:

- . parallel bars (most stable)
 - . walkers
 - . crutches
 - . canes (least stable)
- 

General rules for measuring walking aids:

- . elbow a little flexed with hand on the grip
- . hand grip is at wrist level when patient is standing
- . underarm crutches should be three fingers width below the armpit

Gait patterns described in the chapter include:

- . 4 - point gait
- . 3 - point gait
- . 2 - point gait
- . swing-to gait
- . swing-through gait

Rules to follow when going up and down stairs with walking aids

- . patient step up with strong leg first
- . patient step down with weak leg first
- . crutches always in the same place as the weak leg
- . walkers are never used on stairs

7

BRACES



A BRACE helps to support or control a joint.

OBJECTIVES

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

1. describe the advantages and disadvantages of braces.
2. evaluate the fit of above knee and below knee braces.
3. given a patient problem, identify the type of brace that can best help the patient.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. SPECIFIC INFORMATION ABOUT BRACES
- C. PATIENTS THAT NEED BRACES
- D. POINTS TO REMEMBER WHEN GIVING A BRACE
- E. CHAPTER SUMMARY

A. INTRODUCTION

A brace helps to support or control a joint.

If a joint is unstable or if the patient cannot control the movement of a joint, a brace may be needed to help the patient use this joint as well as possible.

Questions:

1. What is the name of the body part that connects bone to bone?

2. If this part is stretched, will the joint be more stable or less stable?

Explain your answer.

3. A motor nerve is destroyed. Will this cause a problem with joint movement?

_____Yes

_____No

Explain your answer.

There are different braces that can help support or control any joint in the body.

In this chapter we will discuss braces that help support or control the ankle and the knee.

B. SPECIFIC INFORMATION ABOUT BRACES

Information given in this section includes:

1. materials used in making braces
2. brace anatomy
3. fit of brace

1. MATERIALS USED IN MAKING BRACES

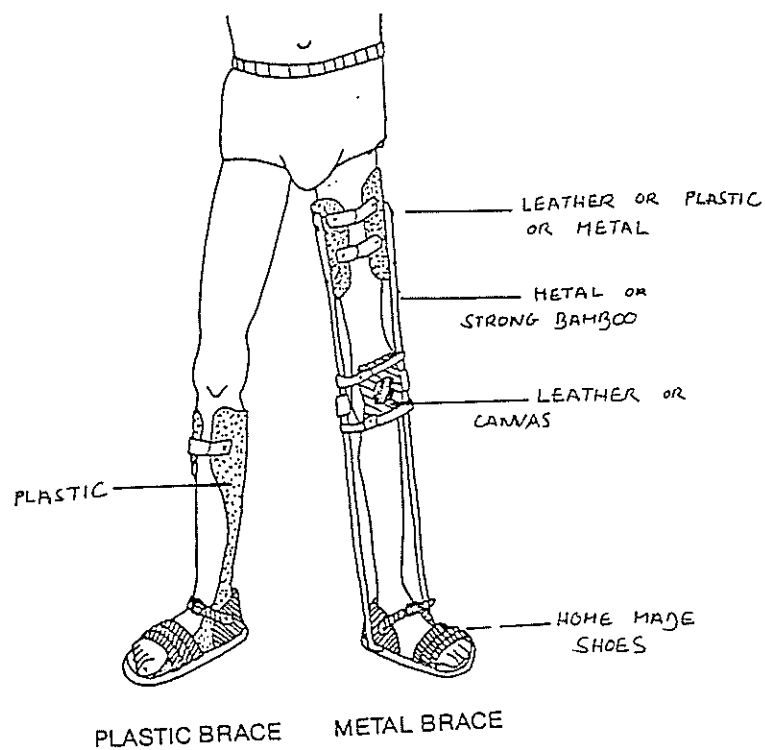
Because the lower limbs hold the weight of the body, the braces that support or control these parts must be strong.

The type of material used will depend on local materials, patient need, and the skill of the technician.

Braces can be made out of:

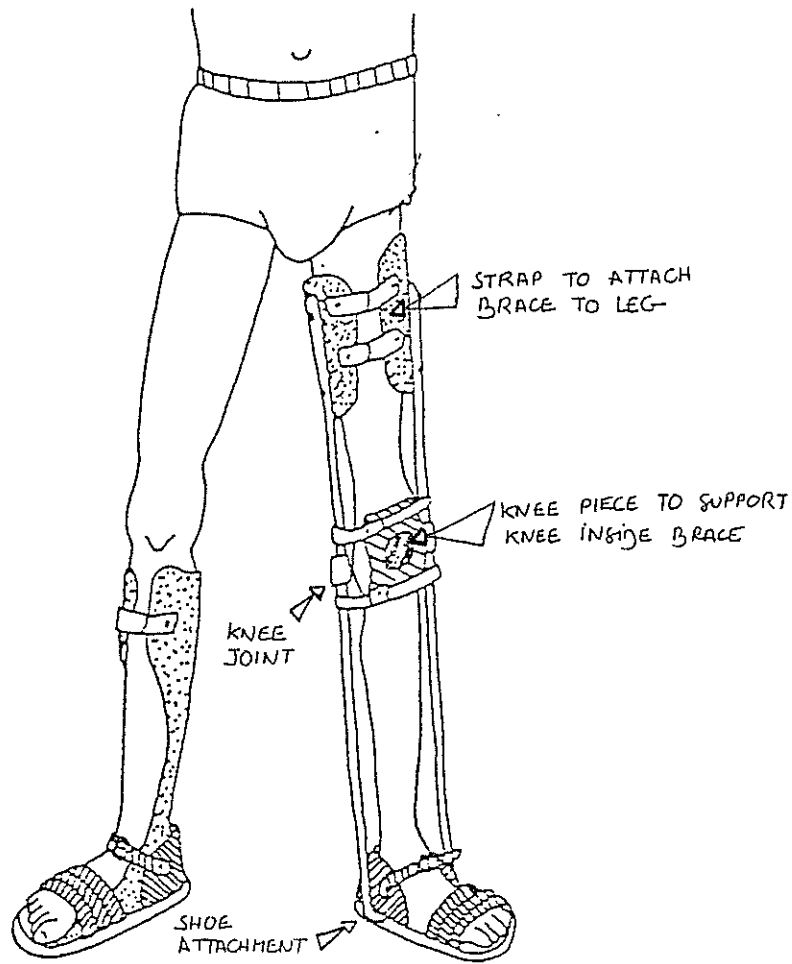
- * metal (or strong bamboo)

- * plastic



2. BRACE ANATOMY

Below is a picture of a metal above knee brace (long leg brace) and a picture of a plastic below knee brace (short leg brace).

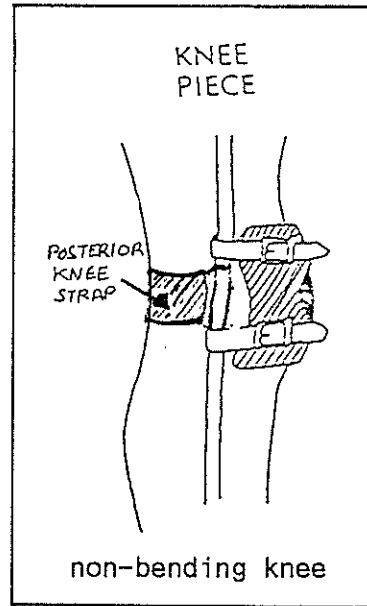
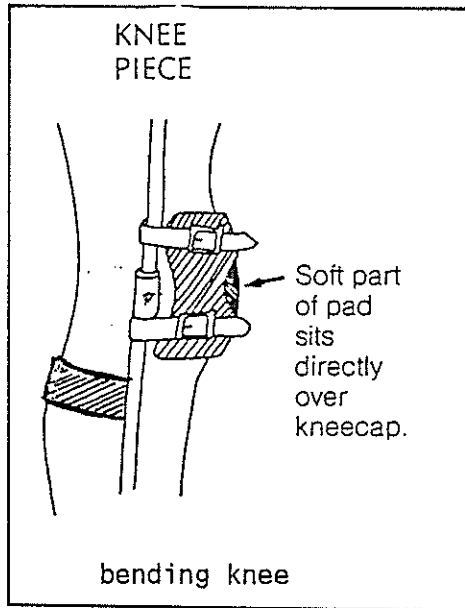


PLASTIC BRACE

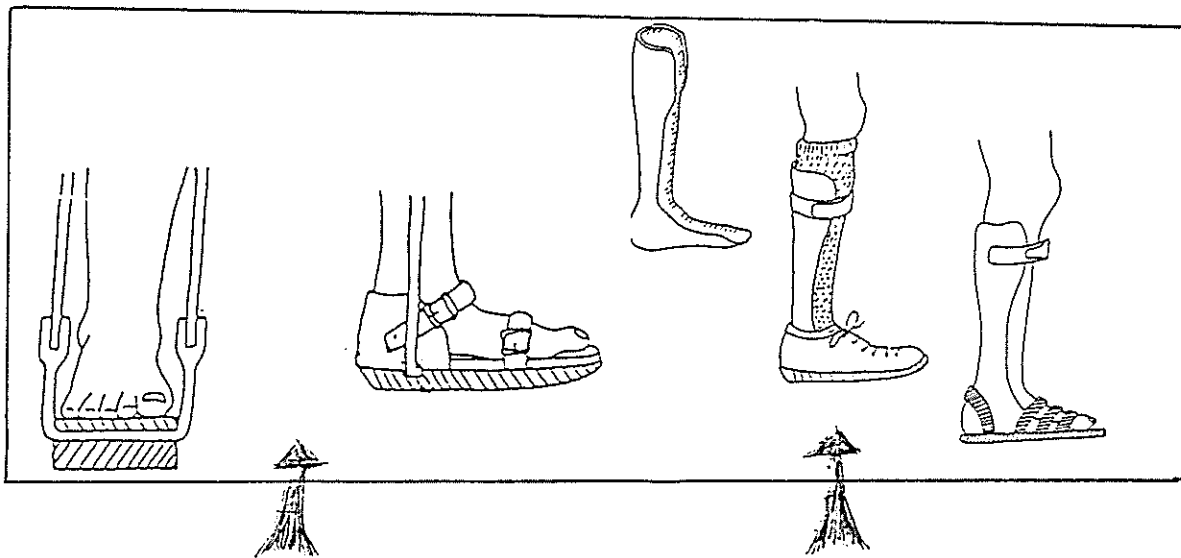
METAL BRACE

Below are pictures of knee and ankle parts of a brace.

KNEE



ANKLE



Metal braces:

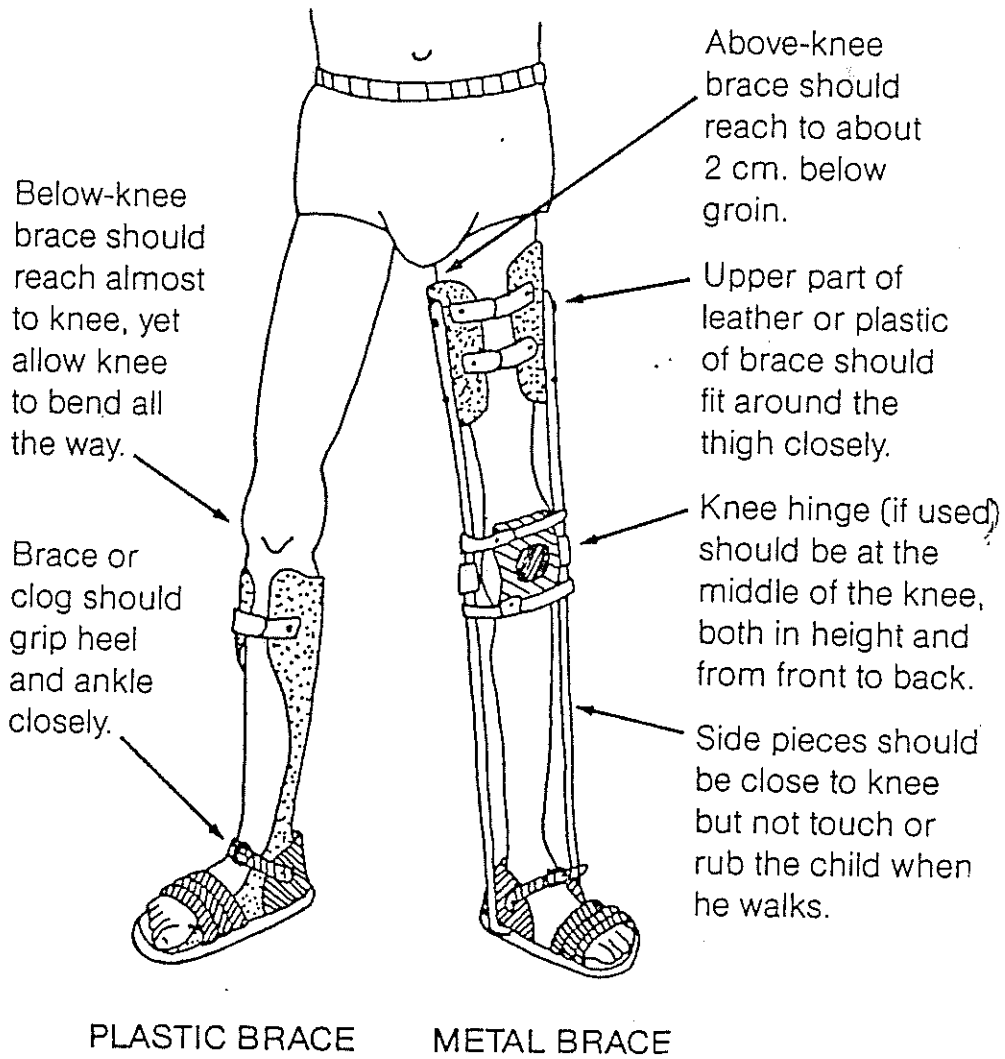
- . can have ankle joint
- . side bars attached the shoe

Plastic braces:

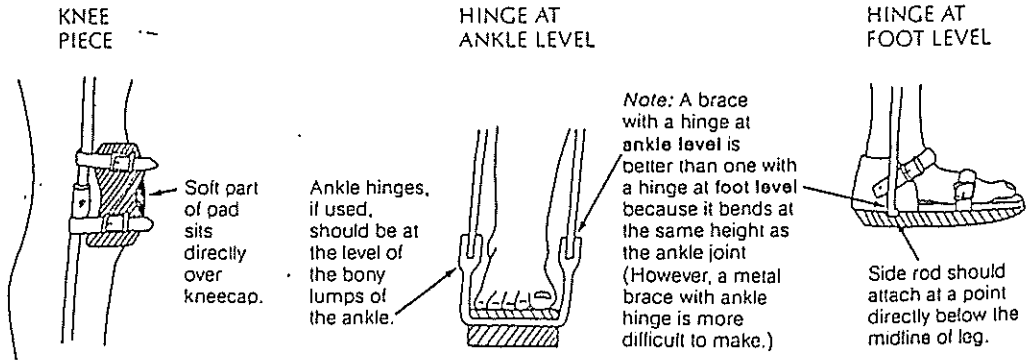
- . no ankle joint
- . worn on the inside of a shoe

3. FIT OF BRACE

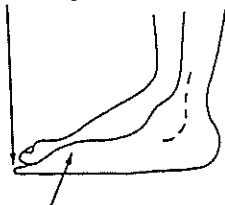
Below are details of the correct fit for long leg brace and short leg brace.



Below are details of the fit for knee pad, ankle joints, and plastic brace.

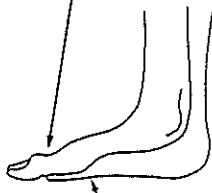


The sole of the brace can end at the ends of the toes (or slightly beyond to allow for growth).



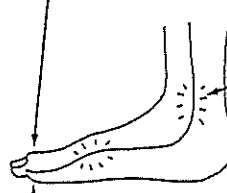
The side of the brace at the foot can extend to the toes if necessary for support.

Or the sole can end at the base of the toes.



For better comfort and shoe fit, the side can dip down around the base of the big toe.

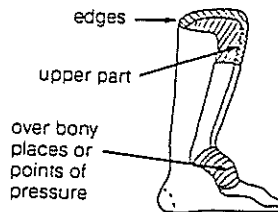
AVOID brace edges that stop at middle of toes.



Avoid an edge that curves in (better to heat it and bend it out a little).

AVOID brace edges that pass across the middle of bony bumps. The edge should be either behind or in front of the bump.

Soft padding inside the brace can make it more comfortable. Places that may need to be padded are:



C. PATIENTS THAT NEED BRACES

The two main problems we will discuss in the section are:

1. patients that need help to support or control the ankle
2. patients that need help to support or control the knee

1. PATIENTS THAT NEED HELP TO SUPPORT OR CONTROL THE ANKLE

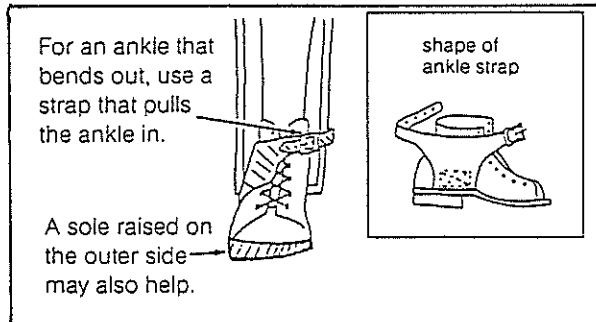
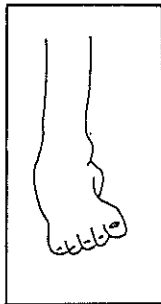
Patients that have problems at the ankle will need a short leg brace.

The type of short leg brace will depend on the patient's problem.
(See information below.)

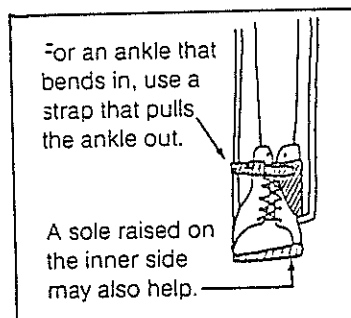
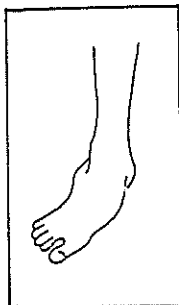
Patient problem

Brace adaptation

- * ankle bends outwards
(inversion of the foot)



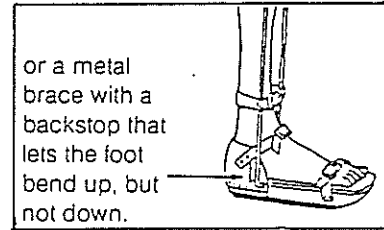
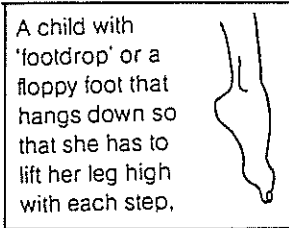
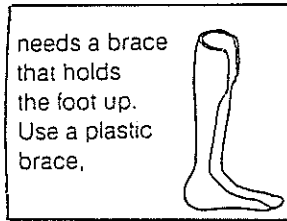
- * ankle bends inward
(eversion of the foot)



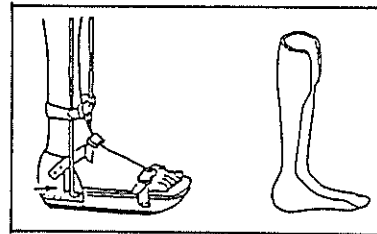
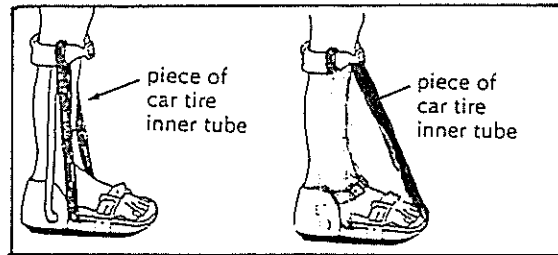
Patient problem

Brace adaptation

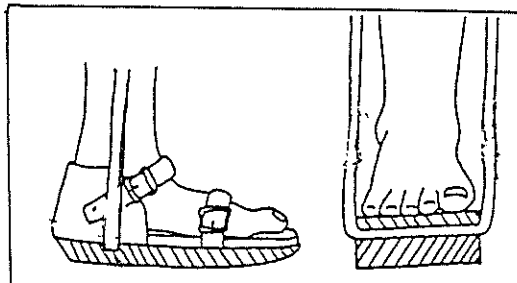
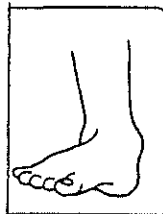
- * paralysis or weakness of dorsiflexors (patient cannot make active dorsiflexion)



- * paralysis of dorsiflexors and plantar flexors



- * paralysis of plantar flexors only



2. PATIENTS THAT NEED HELP TO SUPPORT OR CONTROL THE KNEE

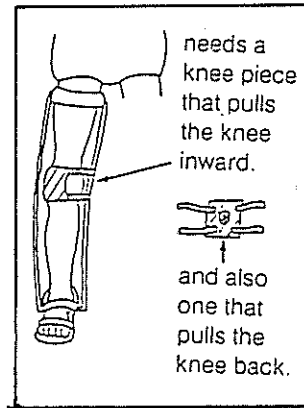
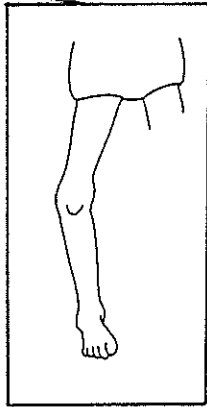
Patients that have problems with movement or control of the knee will need a long leg brace.

The type of long leg brace will depend on the patient's problem. (See information on the following pages.)

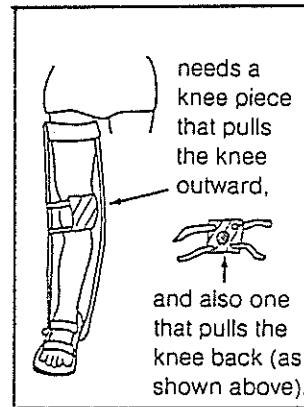
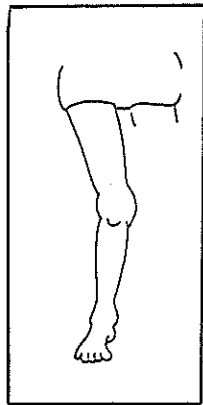
Patient problem

Brace adaptation

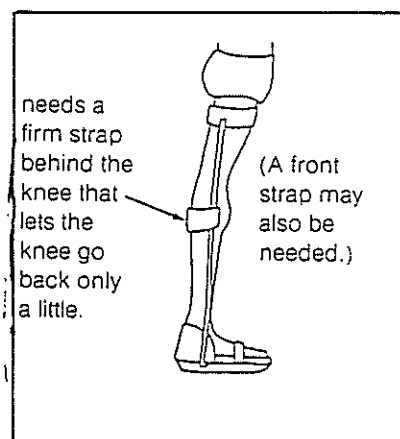
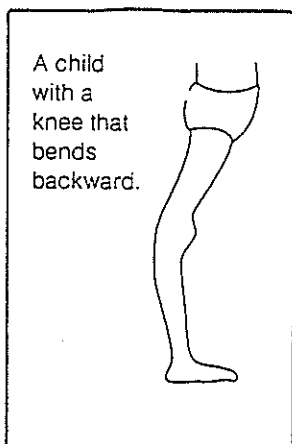
* knee moves outward



* knee moves inward

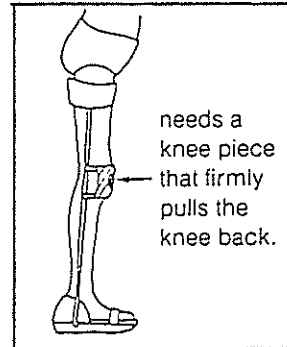
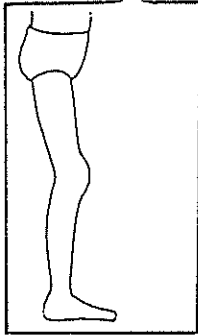


* knee moves posteriorly (hyperextension)

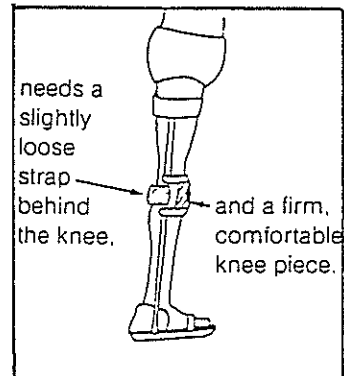
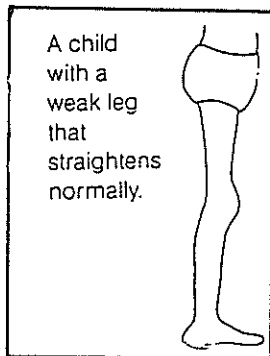


Patient problemBrace adaptation

- * paralysis of knee extensors
(knee flexors are working)



- * paralysis of knee extensors and knee flexors.

Questions:

1. A patient has muscle paralysis of the foot evertors (the invertors continue to work). What will be the position of the foot (inversion or eversion)?

What direction will the ankle move (outward or inward)?

The PTA thinks that an ankle strap will help control the ankle. Where does this strap cross the ankle (on the internal or external side)?

Questions: (continued)

To what bar does this strap attach (internal bar or external bar)?

What is the function of this ankle strap?

2. A patient has paralyzed dorsiflexor muscle of the left ankle. The plantar flexors are working. The PTA gives the patient a plastic short leg brace. What are 2 functions of this brace?

3. A patient has paralyzed left knee extensors and normal strength left knee flexors. What type of brace will this patient need (a long leg brace or a short leg brace)?

Explain your answer.

4. A patient has a long leg brace and a knee strap that passes on the medial side of the knee. Describe this patient's problem.

Questions: (continued)

5. A patient has paralysis of all the muscles of the knee and ankle. What type of brace will you give to this patient (long leg brace or short leg brace)?

Describe this brace.

D. POINTS TO REMEMBER WHEN GIVING A BRACE

- * Not all patients will want or need equipment! Carefully evaluate all patients before deciding on a brace.
- * A brace should only be used if it helps the patient to move better and be more independent.
- * Let the patient do what he can and support what he cannot do.
- * Braces should be as light as possible so that the patient can function better.
- * Evaluate a patient with his brace when he is doing functional activities (walking, going up and down stairs, dressing).
- * Remember, braces are given to help increase a patient's function.

E. CHAPTER SUMMARY

A brace helps to support or control a joint.

Materials used to make braces will depend on local resources and the skill of the technician. (Metal, plastic, and strong bamboo are common.)

Specific parts of braces and their function are given in this chapter.

A PTA must evaluate the fit of the brace when the patient is sitting, standing, and doing functional activities.

Specific brace ideas were discussed for patients that need help to support the ankle and for patients that need help to support or control the knee.

The PTA must carefully evaluate IF a patient needs a brace, WHAT TYPE of brace is best for the patient, and how the brace FITS.

Remember: do not make the patient too dependent on equipment; let the patient do what he can and support what he cannot do.

WHEELCHAIRS



WHEELCHAIRS are chairs with wheels that help a person move from one place to another.

OBJECTIVES

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

1. identify the types of patients that need wheelchairs.
2. measure a patient for correct fit of wheelchair.
3. select appropriate wheelchair adaptations for different patient problems.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. PATIENTS THAT NEED WHEELCHAIRS
- C. TYPES OF WHEELCHAIRS
- D. WHEELCHAIR MEASUREMENT FOR CORRECT FIT
- E. WHEELCHAIR ADAPTATIONS
- F. INDEPENDENCE WITH A WHEELCHAIR
- G. HOUSE ADAPTATIONS
- H. CHAPTER SUMMARY

A. INTRODUCTION

Wheelchairs are chairs with wheels that help a person move from one place to another.

The PTA must know some basic information about wheelchairs so that the patient will receive a correct fitting wheelchair and be able to use this wheelchair as independently as possible.

B. PATIENTS THAT NEED WHEELCHAIRS

People that need wheelchairs are people that are unable to use their legs for walking, people that cannot walk for long distances, people that have severe balance problems and cannot walk safely, or people who have doctor's instructions to rest after surgery or illness.

Question:

Try to remember all of the patients that you have seen in a wheelchair.

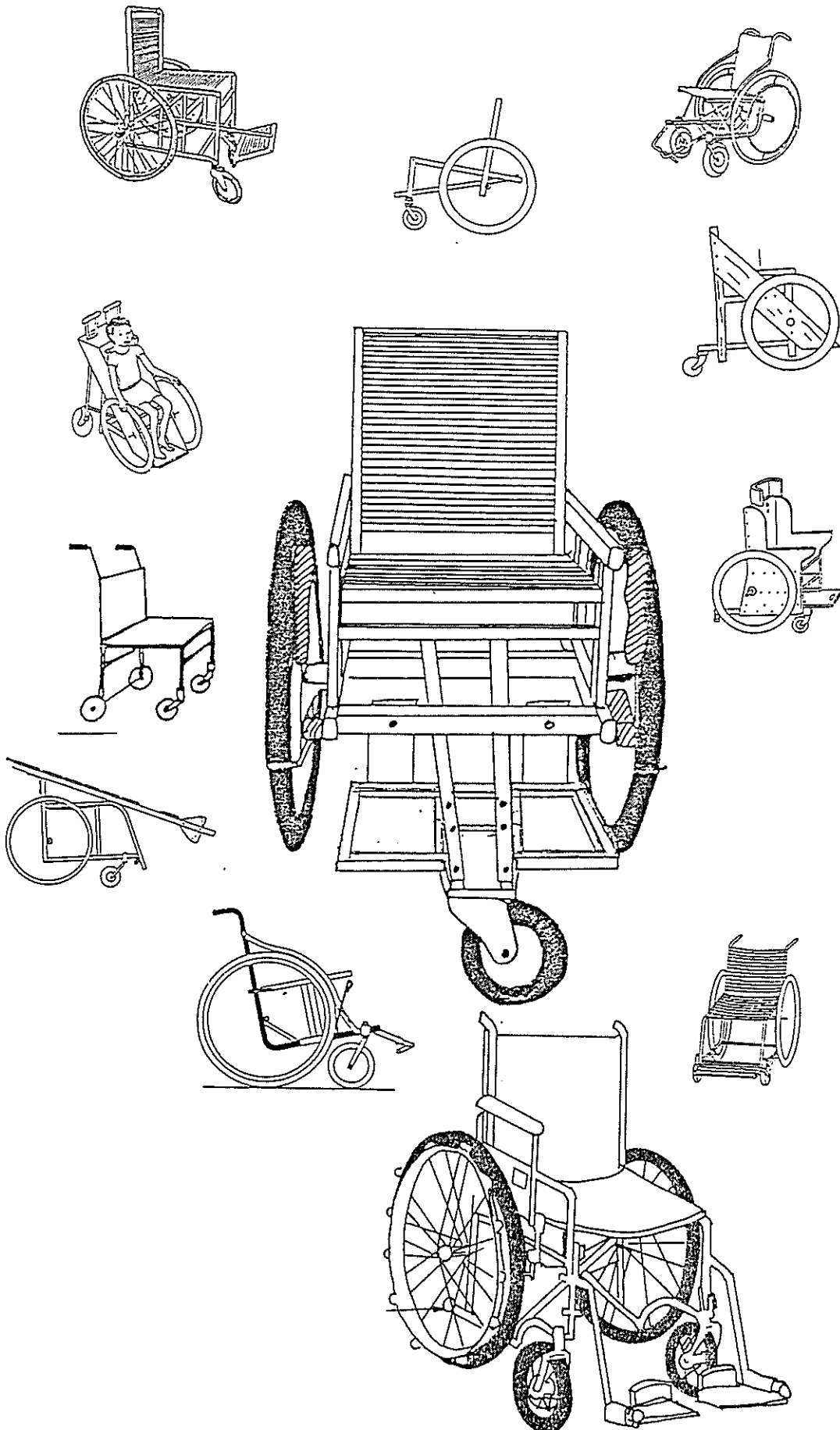
Describe what problems these people had that caused them to be in a wheelchair.

C. TYPES OF WHEELCHAIRS

There are many different types of wheelchairs!

The materials, shapes, and designs will change depending on the materials available in the country and the skill of the technician making the wheelchair.

Below are pictures of just some of the different wheelchairs that are made.



D. WHEELCHAIR MEASUREMENT

It is important that the chair is made to fit the patient.

If the chair is too big it will not support the patient, and the patient may not be able to move the chair.

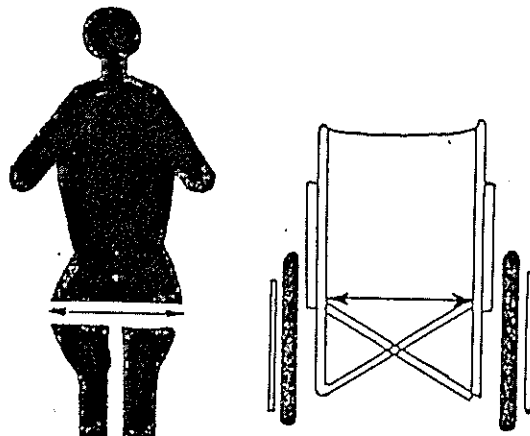
If the chair is too small, it can put pressure on the patient's skin and cause wounds.

The parts of the chair that need to fit the patient are:

1. seat width
2. seat depth
3. leg rest length
4. arm rest height
5. back height (standard)

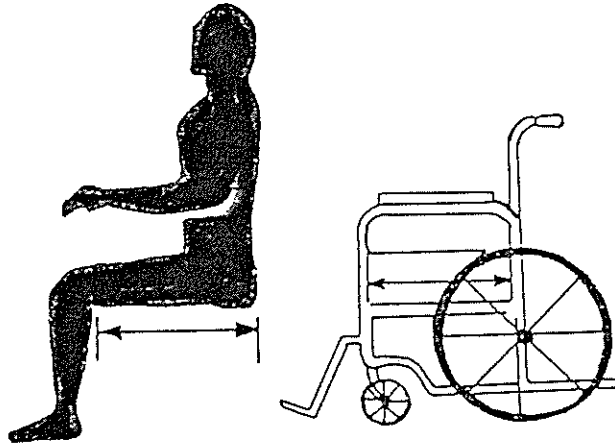
1. SEAT WIDTH

Measure across the patients hips or thighs (whichever is wider). Add 1 cm to both sides for seat width.



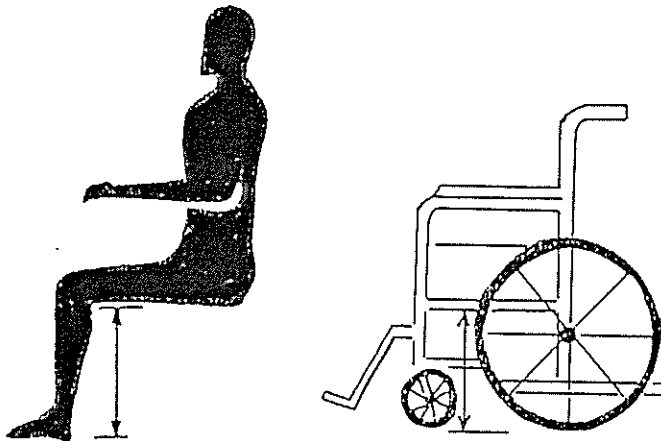
2. SEAT DEPTH

Measure from the posterior knee to the posterior hip. May decrease this by 1 cm so that the chair seat does not press on the posterior knee area.



3. LEG REST LENGTH

Measure from the posterior knee to the inferior calcaneus. (Remember to include the space used by a cushion.)

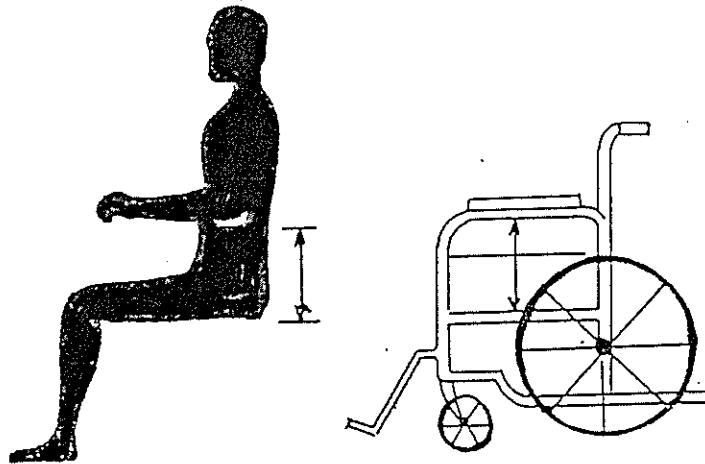


4. ARM REST LENGTH

Measure with the patient in sitting position and elbow in 90 flexion.

The distance to measure is between the inferior elbow and the surface that the patient is sitting on.

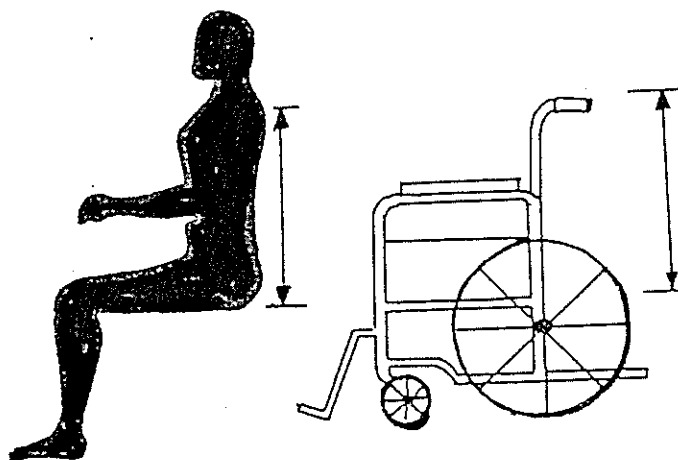
(Remember to include the space used by a cushion.)



5. BACK HEIGHT (STANDARD)

Measure with the patient in sitting position from armpit to inferior side of the hip.

(Note that the back height can be adjusted to help meet the needs of the patient.)



E. WHEELCHAIR ADAPTATIONS

We have discussed the standard fit of the wheelchair for different patients.

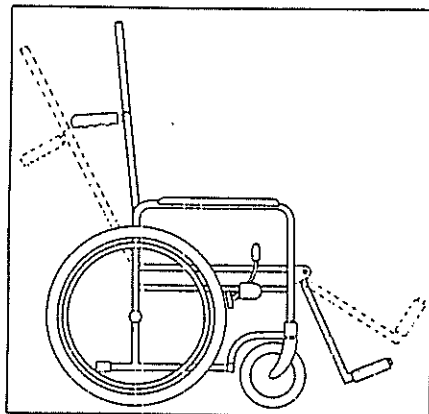
For some patients, a standard wheelchair is not enough to meet their needs. For these patients the wheelchair may need special changes or adaptations.

Different wheelchair adaptations are:

1. back height
2. lateral trunk support
3. wheel handles
4. seat cushion
5. arm rest
6. foot leg
7. leg rest

1. BACK HEIGHT/INCLINATION

According to the strength and control of the patients trunk and neck, the seat back may be increased or slightly reclined to help support the patient.

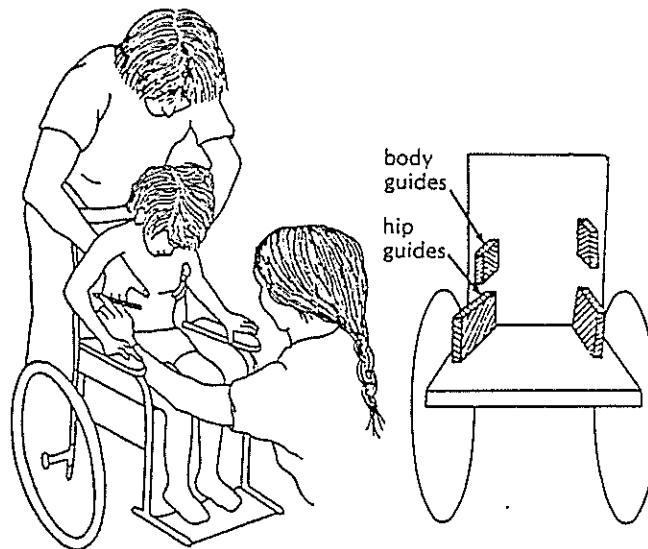


Question:

A patient has trunk extensor muscles that do not work. What are two wheelchair adaptations that may help prevent this patient from falling forward?

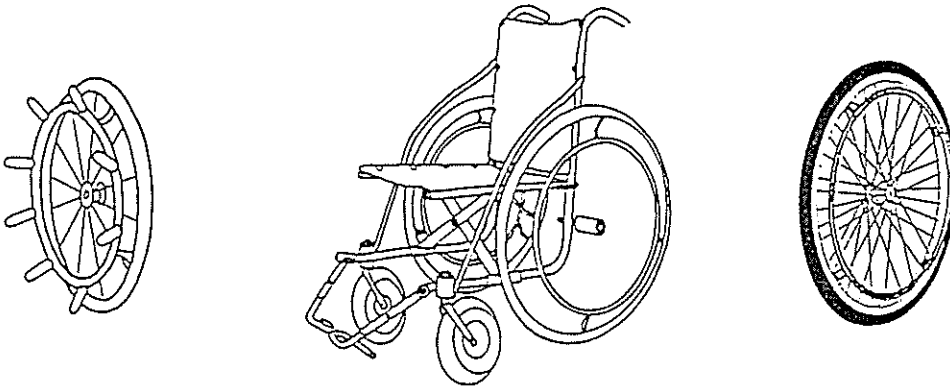
2. LATERAL TRUNK SUPPORT

If the patient cannot control the trunk muscles at all and cannot sit straight without support, lateral trunk supporters may be needed.



3. WHEEL HANDLES

If a patient cannot use his hands to hold the wheel, special handles or sticks can be attached to help the patient push the wheelchair.

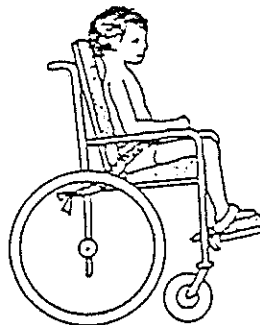


4. SEAT CUSHION

If some wheelchairs are made of wood or bamboo, the seats may be very hard and cause pressure on the patient's skin.

For patients that have normal feeling, they will change their position when an area becomes painful. Patients that do not have feeling will not change their position and may develop pressure sores.

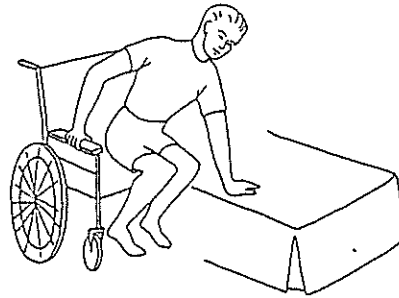
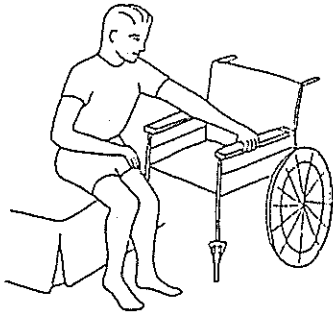
To help decrease the chance of pressure sores the seat can be adapted to have padding or be made out of canvas.



5. ARM REST

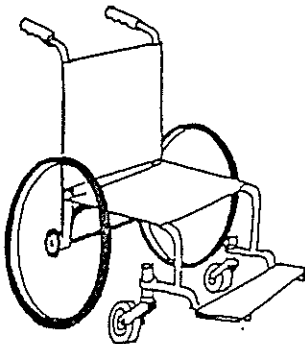
To help with transfers, it is best if the arm rest is removable so that the patient can slide from the wheelchair seat to another surface without problems.

If the arm rest cannot be removed, a cushion may be added to lift the patient a bit higher.



6. FOOT REST

For patients that are able to stand when transferring, it is useful to have removable foot rests to avoid problems when standing.

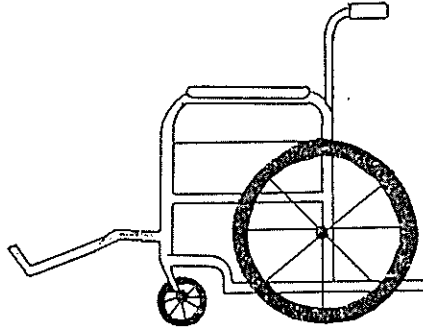


No footrests



7. LEG REST

For patients that have no movement in the lower limbs, a leg rest is useful to prevent swelling in the feet. If the leg rests are up, the blood can more easily return to the heart.



F. INDEPENDENCE WITH A WHEELCHAIR

Note: It is highly recommended that the students actively practice each of the activities listed in this chapter.

The goal of giving a wheelchair to a patient is to help him move about as easily and as independently as possible.

To be as independent as possible, the patient must learn how to use his wheelchair.

The different activities that a patient needs to learn with the wheelchair are:

1. transfers to and from the wheelchair
2. pressure relief
3. pushing the wheelchair
4. turning the wheelchair
5. going over obstacles

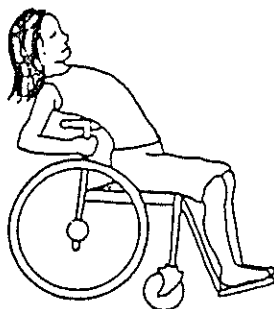
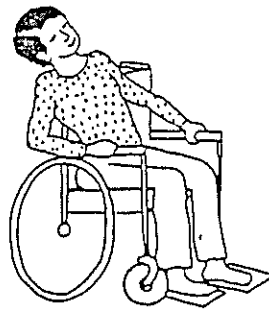
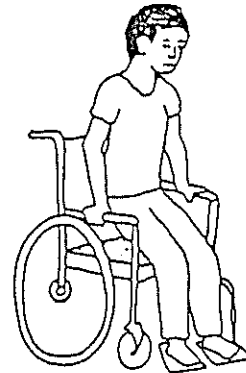
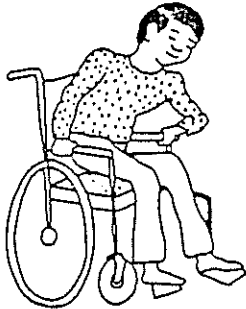
1. TRANSFERS TO AND FROM THE WHEELCHAIR

For details on specific transfer techniques, please see TRANSFERS chapter, Volume 2, for details.

2. PRESSURE RELIEF

Every 15 minutes the patient should change his sitting position so that blood can come to all areas of the skin.

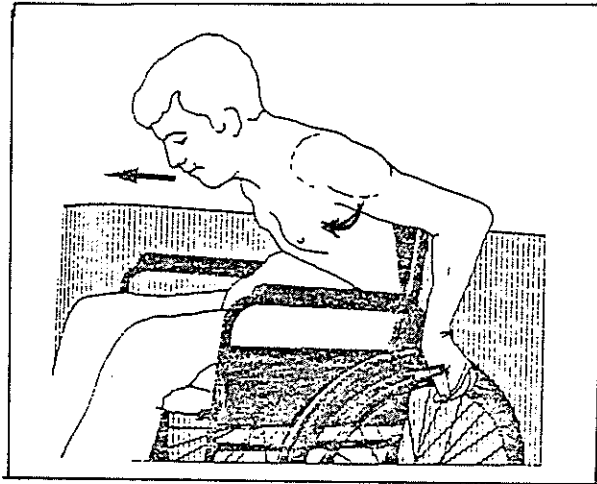
The different ways to help change positions include leaning left, right, forward or backward, or lifting the body off the chair.



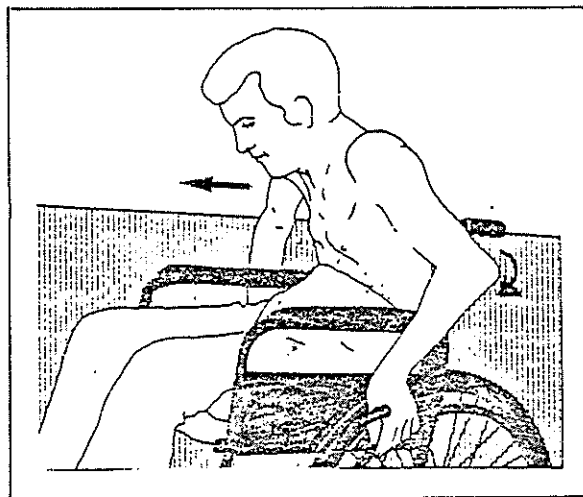
3. PUSHING THE WHEELCHAIR

The patient can use 2 general techniques to push a wheelchair.
patients.

- a) elbow flexors and shoulder flexors (for patients that do not have elbow extensor muscles that work.



- b) elbow extensors (this is the most common method used)

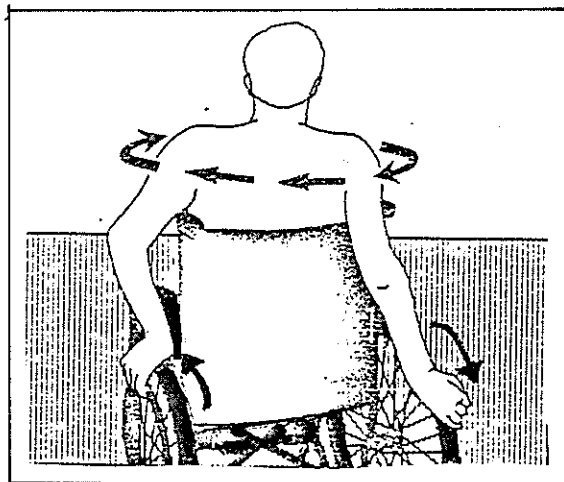


4. TURNING THE WHEELCHAIR

To turn a wheelchair most easily, one arm will pull backward on a wheel while the other arm pushes forward on the opposite wheel.

Example:

To turn toward the right, the right arm pulls backward on the wheel and the left arm pushes forward on the wheel.



(end position of the turn)

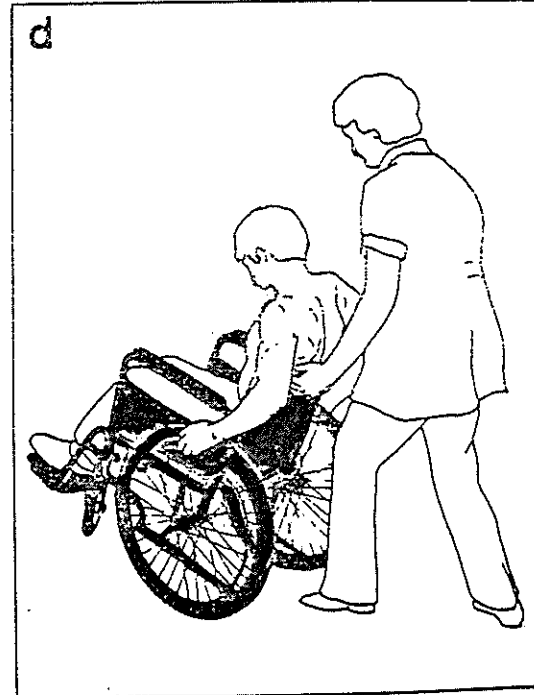
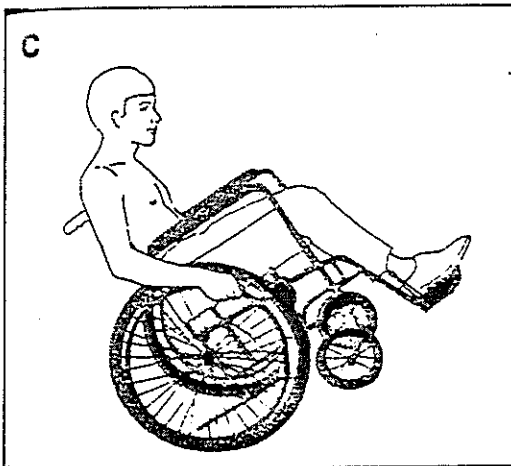
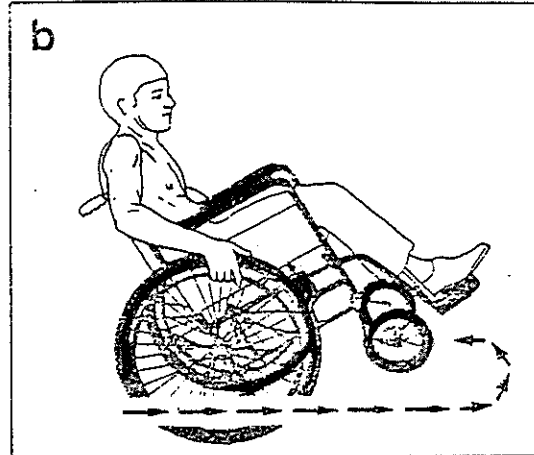
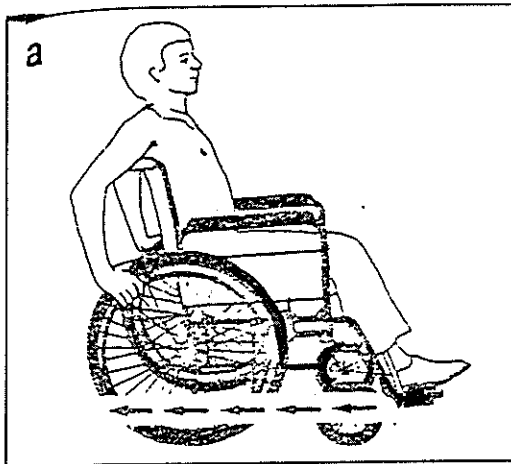
5. GOING OVER OBSTACLES

Obstacles are any uneven surfaces that make pushing a wheelchair very difficult.

To go over an obstacle, the patient should be able to lift the front wheels off the ground.

The method to lift the front wheel is:

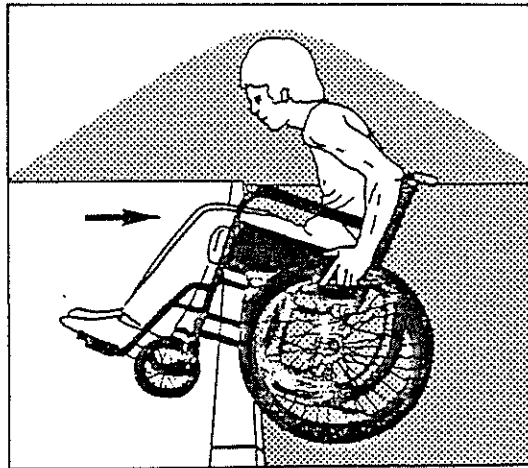
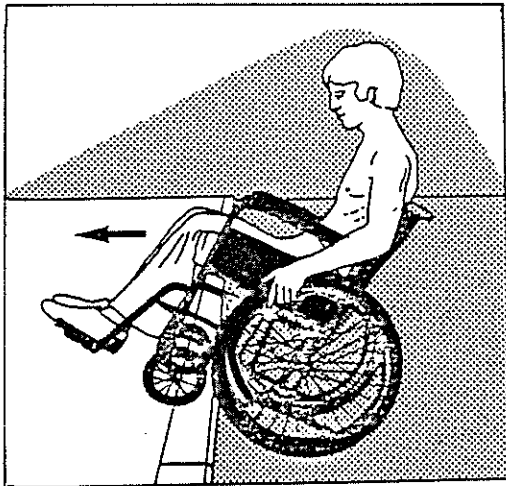
- a) patient pulls the wheel backward
- b) the patient gives a QUICK push forward
- c) patient will keep the chair balanced
- d) the PTA should be behind the patient when the patient practices; this is to prevent the patient from falling backward



Up and down curbs

UP: the patient will put the front wheel up first, lean his body weight forward, and then pull the rear wheels forward on to the curb

DOWN: the patient will put the rear wheels down first (leaning forward as much as possible) and then turn the wheelchair to bring the front wheels down off the curb



G. HOUSE ADAPTATIONS

The PTA and the patient must remember that the patient's home may need some small changes so that the patient can use his wheelchair inside the house and continue to be independent.

Please see HOUSE ADAPTATIONS chapter, Volume 2.

H. CHAPTER SUMMARY

Wheelchairs are chairs with wheels that help a person move from one place to another.

The type of people that need wheelchairs are:

- . people unable to use their legs for walking
- . people that cannot walk long distances
- . people that have severe balance problems and cannot walk safely
- . people with doctor's orders to use a wheelchair

Different wheelchair parts that need to be measured include:

- . seat width
- . seat depth
- . leg rest length
- . arm rest height
- . back height

Some patients may need special wheelchair adaptations to help them function more independently and safely. Examples of different adaptations are given in the chapter.

The patient must also practice different activities to be able to control the wheelchair as well as possible.

House adaptations to fit a wheelchair into the home should not be forgotten.



9

SLINGS



**A SLING is a soft material
used to support the upper limb.**

OBJECTIVES

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

1. describe the 3 main functions of slings.
2. make and apply the slings recommended in this section.

CHAPTER CONTENTS

- A. WHAT IS A SLING?
- B. FUNCTIONS OF A SLING
- C. PATIENTS THAT NEED SLINGS
- D. TYPES OF SLINGS
- E. CHAPTER SUMMARY

A. WHAT IS A SLING?

A sling is a soft material that is put around a limb to hold it in a good position.

Slings are used to support the upper limbs only.

All PTA's should know how to make and use slings.

B. FUNCTIONS OF A SLING

The three main functions of a sling are:

1. SUPPORT A WEAK OR
DAMAGED SHOULDER JOINT

(A sling will support the weight of the arm; this prevents the arm from pulling on the shoulder joint.)

2. PROVIDE SOME
IMMOBILIZATION

(When a patient is in a sling, the upper limb will have decreased movement.)

3. DECREASE SWELLING IN
THE DISTAL FOREARM AND HAND

(The blood can return to the heart more easily when the hand is higher than the elbow. Fluids can move with gravity.)

D. TYPES OF SLINGS

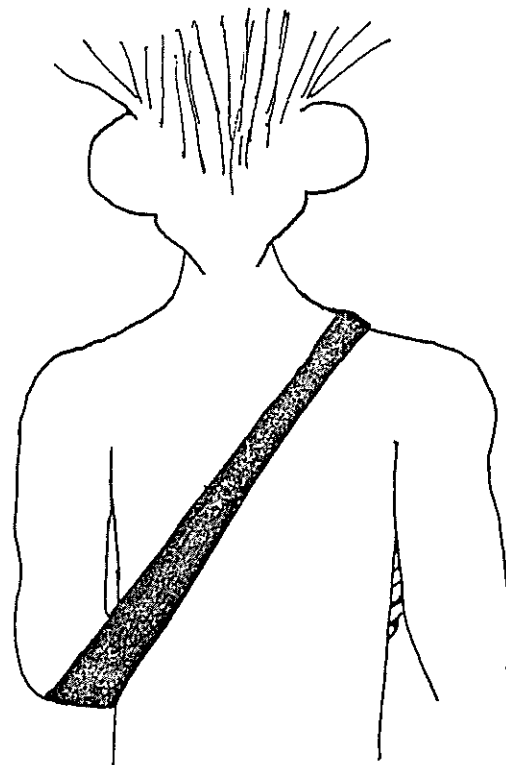
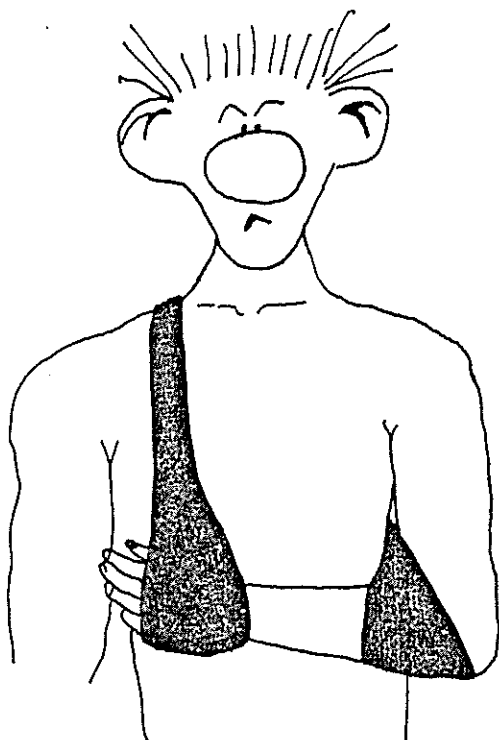
Three types of slings will be presented in this manual:

1. simple sling (highly recommended for general use)
2. figure of 8 sling (for clavicle fractures)
3. common sling (common, but not the best)

1. Simple Sling

Question:

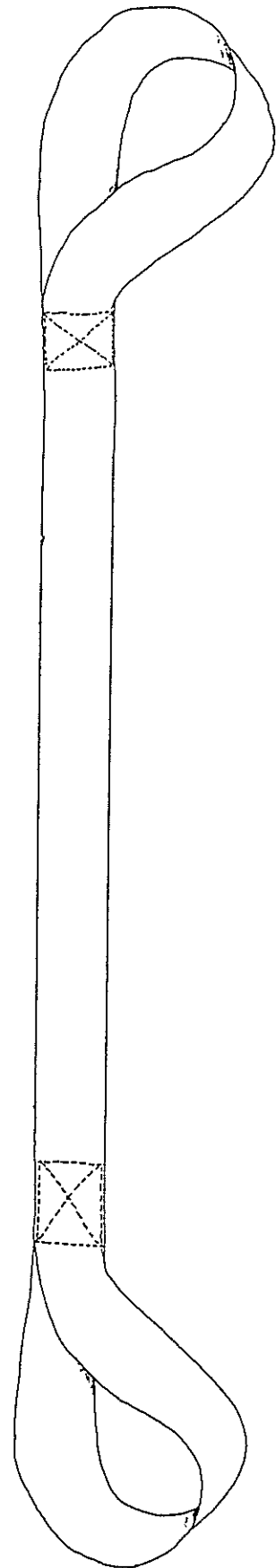
What are the 3 main functions of a sling?



Method to make and apply a simple sling:

- a) Cut a piece of material
(100 - 125 cm x 15 cm)
- b) Attach each end so that
it makes a loop.
(Sew, pin, or tie it together)
- c) Put one loop around the
weakened forearm (just
distal to the elbow).
- d) Bring the material behind
the back and over the opposite
shoulder.
- e) Put the other loop around
the forearm.
- f) Adjust the sling so that
it's comfortable.
- g) After adjustment, the hand
should be higher than the elbow
(at least the same level).

If the hand is below the elbow,
the sling is too long.



Activity:

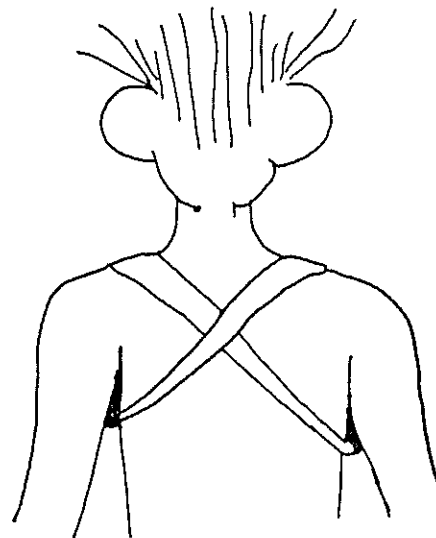
Different people may need different lengths of slings. Each student should take a long piece of material and measure how much material they need for a sling that fits well.

Describe how you find the measurement.

2. Figure of 8 sling

This type of sling is used for clavicle fractures. (See FRACTURES chapter, Volume 3.)

An elastic bandage is good to use for this type of sling.



Method to apply a figure of 8 sling:

- a) Put the bandage on the posterior side of the undamaged shoulder.
- b) Wrap the bandage around the anterior part of the shoulder and then under the arm.
- c) Cross the back and go over the opposite shoulder.
- d) Wrap the bandage around the anterior part of this shoulder and then under the arm.
- e) Cross the back and the begin step "b)" again.
- f) Continue this wrapping until the bandage is finished.

NOTE

If the patient begins to have decreased feeling in the arms and hands, the bandage is too tight and must be removed.

(See BANDAGING chapter, Volume 2, for general guidelines.)

3. Common sling

The most common slings are attached around the neck and under the arm.

This method is not the best because the weight of the arm will pull on the patient's neck.

This pulling force may cause neck pain or damage to the neck.



E. CHAPTER SUMMARY

A sling is a soft material wrapped around the upper limb to hold it in a good position.

The functions of a sling are to:

- . support a weak or damaged shoulder joint
- . provide some immobilization
- . decrease swelling in the distal forearm and hand

Patients that may need slings:

- . patients with flaccid hemiplegia
- . patients that have injured the shoulder
- . patients with a POP on the upper limb
- . patients that have a fractured clavicle

Types of slings presented in this chapter:

- . simple sling (highly recommended)
- . figure of 8 sling (specific for clavicle fractures)
- . common sling (not the best)



20.

BANDAGING



BANDAGING is the action of wrapping material (elastic) around a body part.

OBJECTIVES

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

1. explain the function of bandaging.
2. describe general rules in bandaging.
3. demonstrate appropriate bandaging technique for a selected body part.

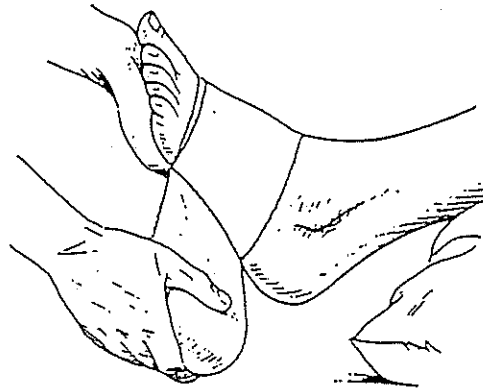
CHAPTER CONTENTS

- A. WHAT IS BANDAGING?
- B. THE GOALS OF BANDAGING
- C. TYPES OF PATIENTS THAT NEED BANDAGING
- D. GENERAL RULES IN BANDAGING
- E. PICTURES AND EXAMPLES OF BANDAGING FOR DIFFERENT AREAS.
- F. CHAPTER SUMMARY

A. WHAT IS BANDAGING?

Bandaging is the action of wrapping material around a body part.

Elastic material (elastic bandages) can stretch and recoil and are best for bandaging.



B. THE GOALS OF BANDAGING

When an elastic bandage is wrapped around a part, it will put inward pressure on this part.

Inward pressure from an elastic bandage can:

- * decrease swelling
- * give support to a joint

If this inward pressure is too much, the limb can be damaged!!

C. TYPES OF PATIENTS THAT NEED BANDAGING

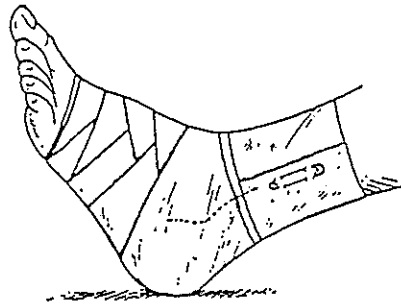
Patients that may need bandaging are patients that have:

- * amputations.
- * swelling in distal joints.
- * small instability or pain in a joint.
- * a need for psychological support for joint protection.

D. GENERAL RULES IN BANDAGING

1. Bandaging should be made in figures of 8's.

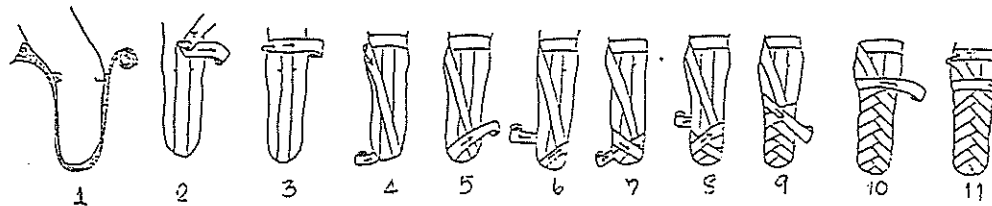
Circular bandaging is bad because it will stop blood circulation.



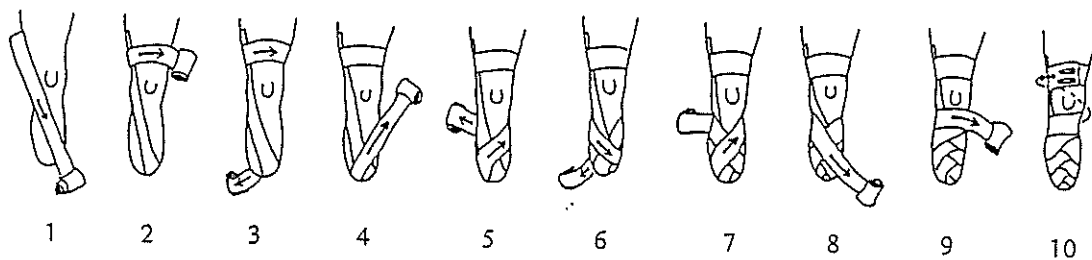
2. Distal part of the bandage should be tighter than the proximal part of the bandage.
3. Immediately remove the bandage if the area distal to the bandage begins to have decreased feeling or turns blue!

E. PICTURES AND EXAMPLES OF BANDAGING FOR DIFFERENT AREAS

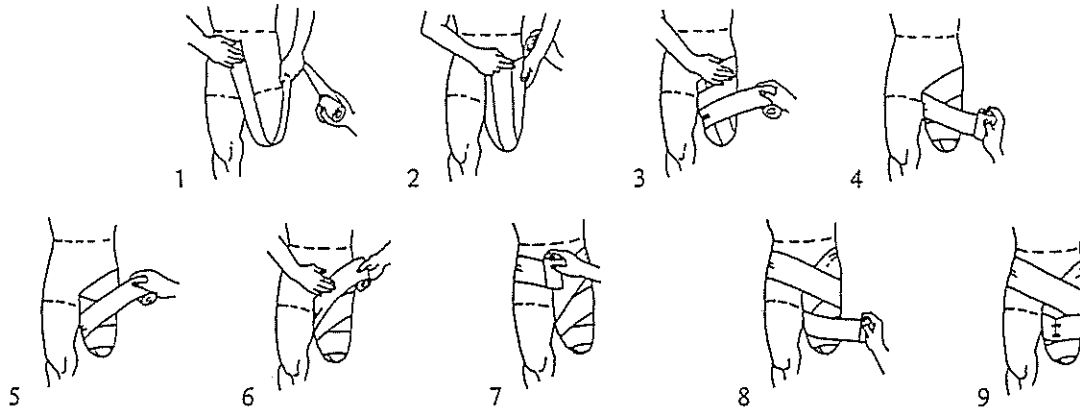
BELOW KNEE AMPUTEE



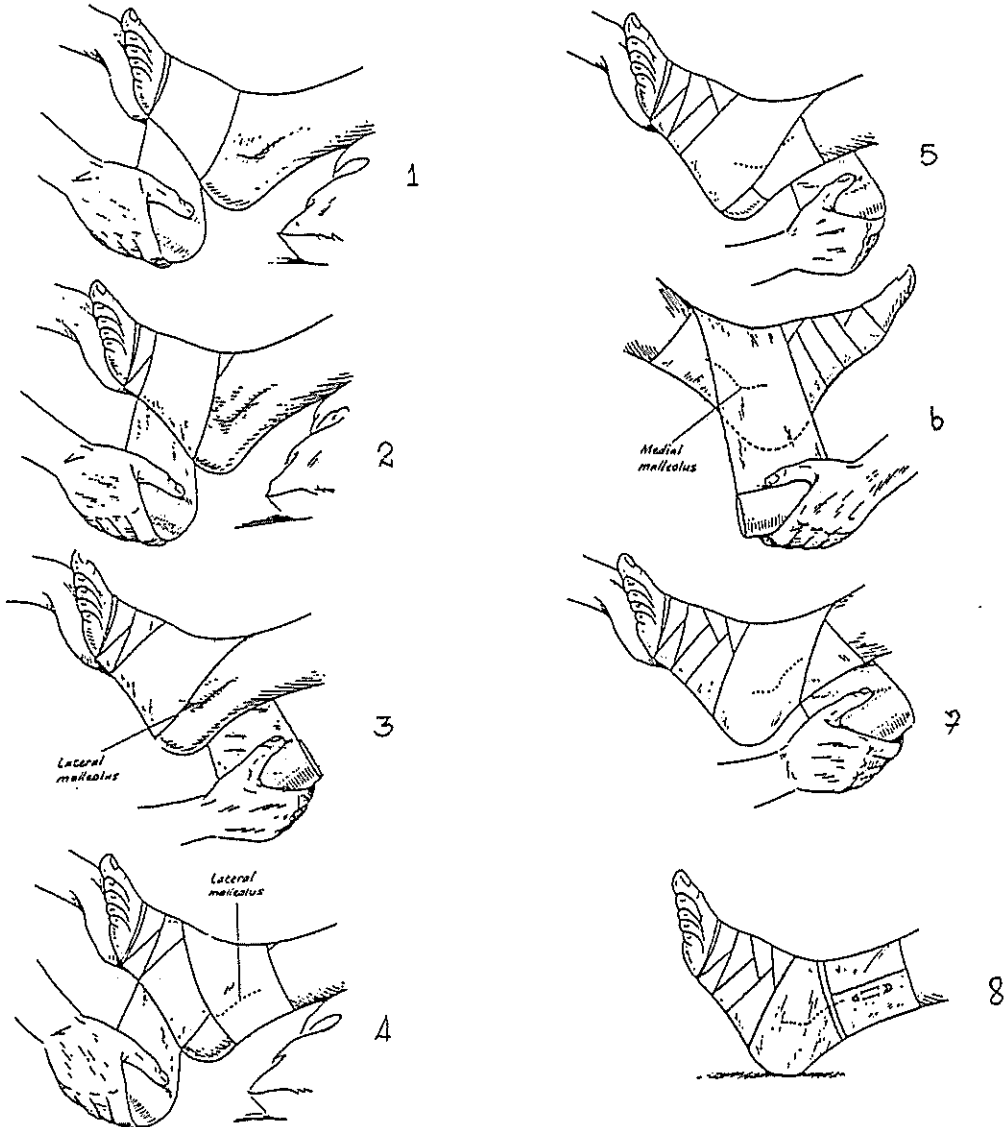
OR



ABOVE KNEE AMPUTEE



SWELLING OF THE FOOT/ANKLE



Questions:

1. Describe how a limb could be damaged if the bandaging is too tight.

2. Describe why circular bandaging will stop blood circulation and why figure of 8 bandaging will not stop blood circulation.

3. What are two ways to know if the bandaging is too tight.

4. An above knee amputee wraps a bandage very tight around his thigh and very loose around the end of the stump. Is this correct bandaging technique?

Yes ____ No ____

Explain 2 problems this patient could have because of this technique.

F. CHAPTER SUMMARY

Bandaging is the action of wrapping material around a body part. Elastic material is best for bandaging.

The goals of bandaging are to decrease swelling and give support to a joint.

General rules in bandaging are:

- . bandaging should be made in figure of 8's.
- . distal part of the bandage should be tighter than the proximal part of the bandage.
- . if the area distal to the bandage begins to have decreased feeling or turns blue, immediately remove the bandage.

2.

PLASTER



PLASTER is a hard and fast drying material that helps to immobilize a joint.

OBJECTIVES

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

1. list 2 reasons why padding is used under plaster casts.
2. identify areas that need special padding in the upper limbs and lower limbs.
3. explain what you will teach the patient or family about a plaster cast and why this is important.
4. describe the common signs/symptoms that mean a cast should be removed immediately.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. PLASTER AND PATIENTS THAT NEED IT
- C. HOW TO MAKE PLASTER BANDAGES
- D. STEPS TO APPLY PLASTER
- E. FUNCTIONAL POSITIONS AND PLACES TO PAD
- F. PLASTER REMOVAL
- G. RULES TO REMEMBER ABOUT PLASTER
- H. CHAPTER SUMMARY

A. INTRODUCTION

This chapter is written to provide guidelines about plaster use and application.

Plaster can be helpful if it is applied correctly; plaster can be harmful and cause serious injury to the patient if it is applied incorrectly.

If the PTA must use plaster with a patient, he must make sure to apply plaster correctly, teach the patient and family about possible problems and plaster care, and carefully monitor the patient with plaster.

REMEMBER

POORLY APPLIED PLASTER CAN CAUSE
WOUNDS, JOINT DAMAGE, AND TISSUE DEATH.

B. PLASTER AND PATIENTS THAT NEED IT

We have said that plaster is a hard and fast drying material that helps to immobilize a joint.

In this section more details will be given about

1. plaster
2. patients that need plaster

1. plaster

The complete name for plaster is Plaster of Paris.

Plaster of Paris is a white powder.

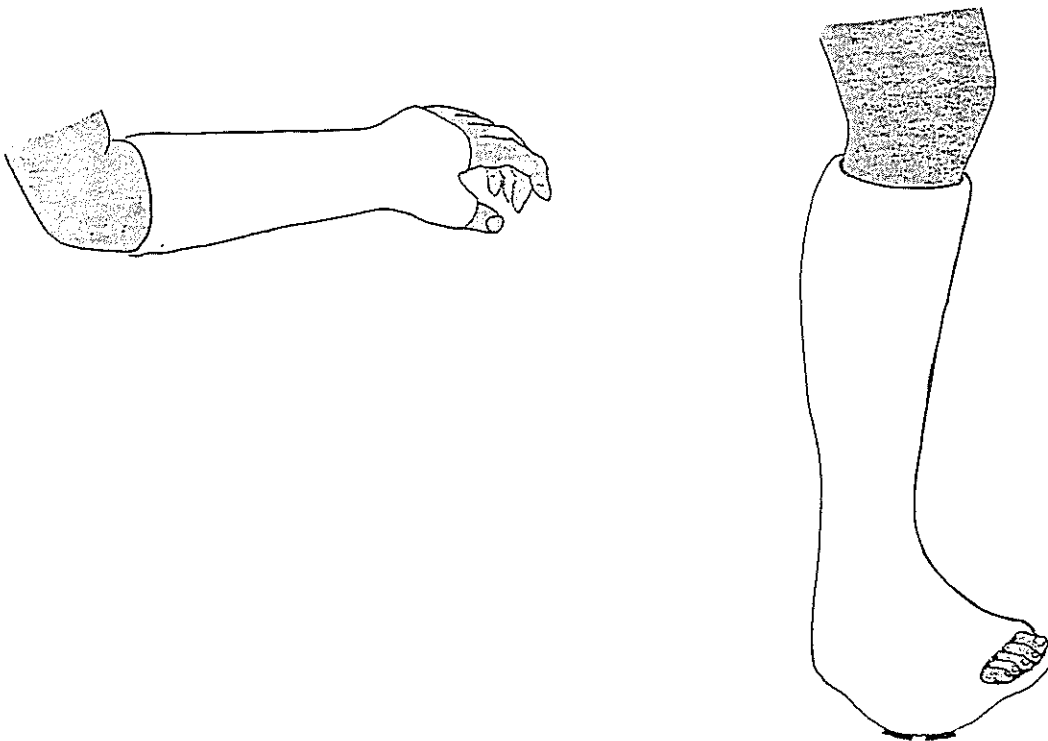
When water is added to this plaster it makes a thick paste.

When this paste dries (very fast) it is very hard.

Plaster that is applied to a part of the body may be called a:

- * POP (Plaster of Paris)
- * cast
- * plaster cast

All of these names have the same meaning.



Questions:

1. A patient has a POP on his ankle. In your own words, explain what this means.

2. Is there a difference between a POP and a cast?

Yes _____ No _____
Explain your answer.

2. Patients that need plaster

As we have said before, plaster is a hard and fast drying material that helps to immobilize a joint.

IMMOBILIZE means to prevent movement. When a body part is immobilized, it cannot move.

Questions:

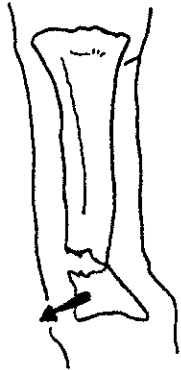
- 1A. A woman has both elbows immobilized in extension. What does this mean?

Questions: (continued)

1B. Explain why this woman will have problems with eating, dressing, or brushing her hair.

Patients that may need immobilization with plaster are:

- * patients with
BROKEN BONES
(see FRACTURES
chapter, Volume 3)

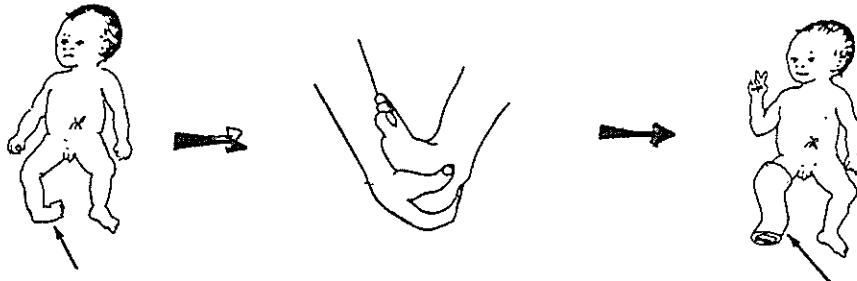


- immobilization with plaster may prevent movement of the broken bone; with no movement, the bone can heal faster.



- * patient with
severe CLUB FOOT
(see CLUB FOOT
chapter, Volume 3)

- for babies with club foot that is very difficult to correct, immobilization with plaster can help to hold the foot in a specific position between each treatment.



C. HOW TO MAKE PLASTER BANDAGES

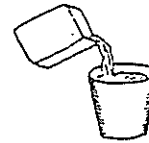
A plaster bandage is a type of gauze bandage that has plaster powder attached to it.

Bandages made by big companies are often the best, but they are also very expensive.

In this section we will suggest one method that can be used (and modified!) to make your own plaster bandages.

Materials needed

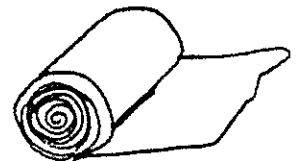
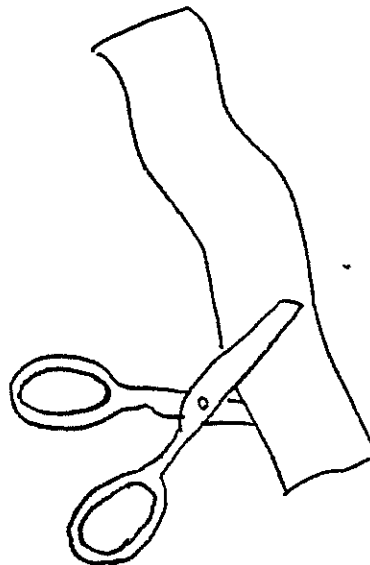
- * Plaster of Paris powder
- * gauze bandage
- * scissors
- * water
- * storage container (air tight can or plastic bag)



Method to make plaster bandages

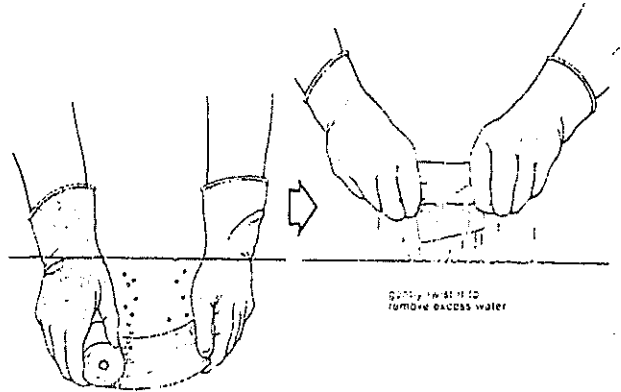
STEP 1 CUTTING THE GAUZE

If the gauze bandage is not the length or width that you want, you must cut it to be as you like and then roll it into a roll.



STEP 2 WETTING THE GAUZE

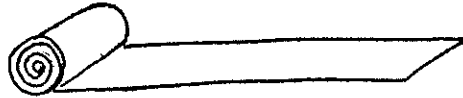
Put the roll of gauze bandage in water, remove it, and then squeeze it as dry as you can.



(A bandage that is a LITTLE wet will hold the plaster powder better than a dry bandage.)

STEP 3 APPLYING PLASTER POWDER

Unroll a part of the wet gauze bandage so that it is flat.

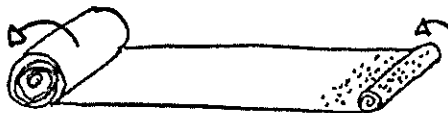


Sprinkle it with plaster powder until there is a thin layer of plaster over the gauze.



STEP 4 ROLLING THE BANDAGE

After plaster has been applied to a small area, roll this part into a roll (not too tight!)



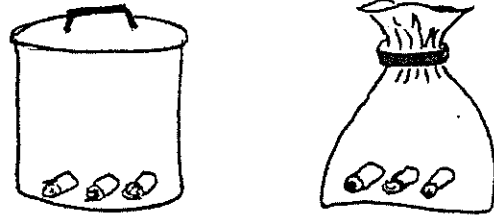
Repeat Step 3 and Step 4 until the whole bandage has been "plastered" and "rolled".



STEP 5 STORAGE

After making a plaster bandage, it must be kept in a container that will help keep it dry.

A metal container with a good fitting lid, or a plastic bag can be used.



Questions:

1. A gauze bandage must be a little wet to help the plaster attach to it. Describe the problem if the gauze bandage is too wet.

2. After applying plaster powder to the bandage you must roll the bandage into a roll. Describe the problem if this bandage is rolled too tight.

3. After a PTA made a bandage he did not put it in a good container and the bandage became wet. Why is this a problem?

D. STEPS TO APPLY PLASTER

If plaster is NOT correctly applied, a POP can cause skin damage, tissue death and joint deformities.

Plaster application procedures are very important!

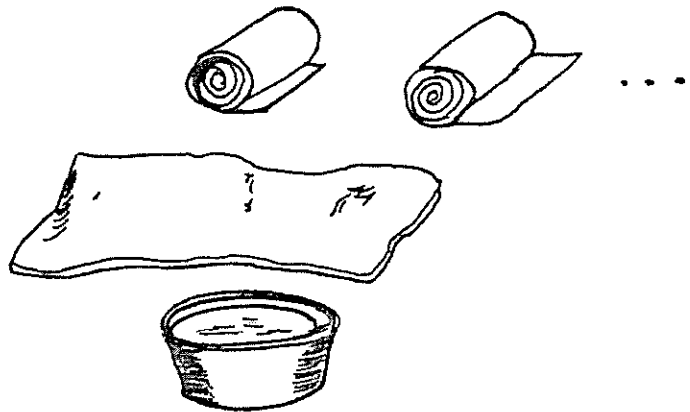
Below are steps that will help guide the PTA toward applying plaster correctly.

STEP 1 MATERIAL PREPARATION

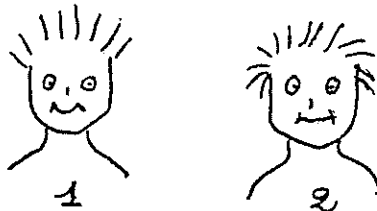
Before starting, the PTA must prepare materials needed for plaster application.

Materials needed are:

- plaster bandages (as many as you will need)
- padding (to cover the limb and bony areas)
- a bucket of water (warm water causes fast drying plaster) (cool water allows plaster to dry more slowly)



It is also recommended that two people work to help apply the plaster.



STEP 2 PATIENT PREPARATION

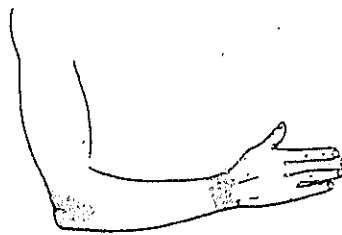
a) joint positioning

put the patients joints in the position that you want them to be immobilized in. (See "Functional Positions", page 15.)

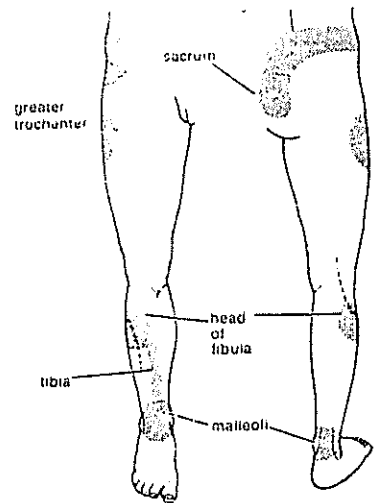
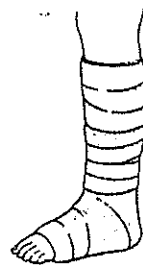


b) padding

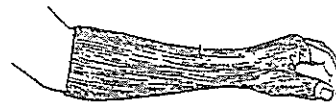
* add thick padding over bony areas of the body to prevent the hard plaster from pressing on these areas. (See "Padding", page 15.)



* cover the entire area (including a little above and below where the plaster will end) with about 1 cm of padding; this will protect the body when plaster is removed.



Try to keep this padding as smooth as possible without folds or bumps.



* Do not put so much padding that the joint can move inside the plaster!

STEP 3 WET THE PLASTER BANDAGE

- a) hold the plaster bandage in the pan of water for ~ 5 seconds (or until the bubbles have stopped rising).

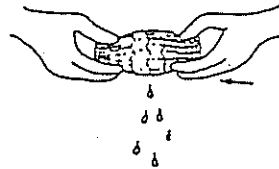


This time allows the water to reach all areas of the bandage.

- b) remove the plaster bandage by holding each end.



Gently twist the plaster bandage to remove excess water.

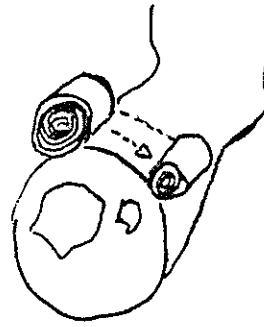


(Note: Do not squeeze the bandage because you will lose a lot of plaster with the water.)

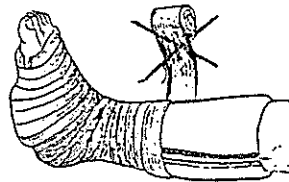
(Do not remove too much water because the bandage will be too dry to make a good cast.)

STEP 4 APPLYING THE PLASTER BANDAGE

- a) put the end of the wet bandage on the limb (the remaining part of the roll should be on top of this part to unroll easily.

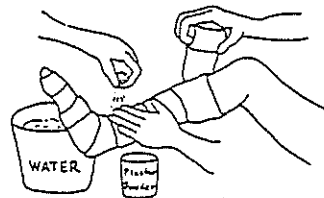


- b) unroll the bandage in a circular direction around the limb.



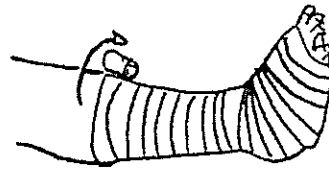
Do not lift the bandage or pull it tight..... just unroll it keeping and equal pressure on the bandage.

- c) As you unroll the bandage the external side of your thumb should smooth over it - pushing out the air bubbles.



An assistant can also help to smooth the surface of the plaster so that it attaches well together.

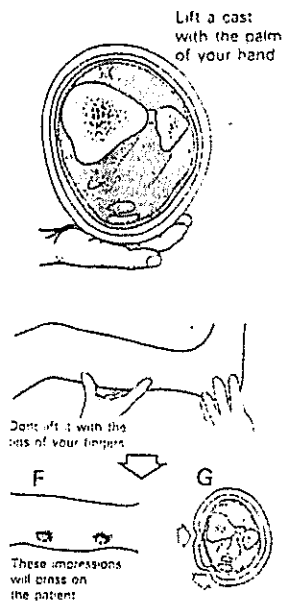
- d) continue bandaging in a circular direction from one end of the limb to the other end. When one bandage is finished, the next bandage should be ready to be applied. (Assistant can help with this.)



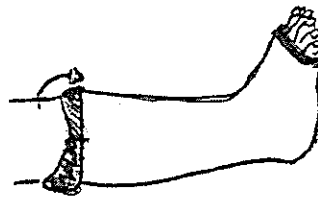
Continue applying plaster until you feel the thickness is enough to immobilize the part.

- e) Always hold the POP with the palm of your hand to prevent pressure in one small area.

Never use your finger tips when holding the POP. This will make small pressure bumps inside the plaster.



- f) At the ends of the cast you can fold the extra padding over the plaster and cover it with the last few turns of the bandage.



STEP 5 PATIENT/FAMILY TEACHING

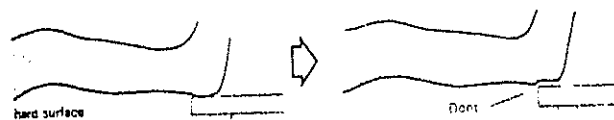
- * The patient or family must be told why the POP was applied and when it will be removed.
- * The patient or family must be told to check regularly (especially the first 1-2 days) for WARNING SIGNS that mean that the patient should return immediately and have the plaster removed).

WARNING SIGNS indicating immediate plaster removal are:

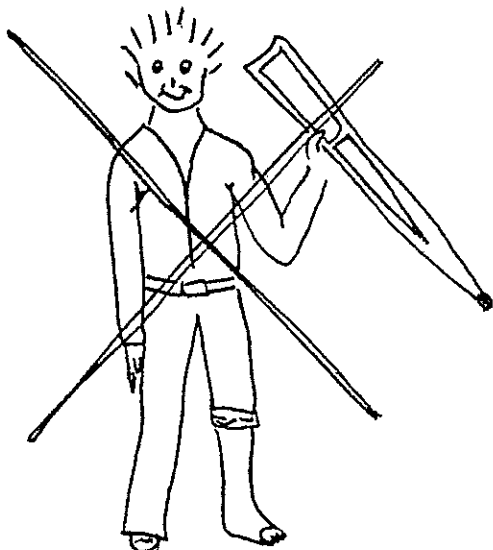
- pain (in the area distal to the plaster or in an area under the plaster caused from too much pressure)
- decreased feeling or movement in the body parts distal to the plaster
- if the parts distal to the fracture become swollen, cold, or turn blue.

These warning signs mean that there is no enough padding under the plaster or that the plaster is too tight. The POP must be removed as soon as possible to prevent skin damage, nerve damage, or tissue death.

- * The patient or family must be told how to take care of the cast. No weight bearing or pressure on the cast until it is hard and dry (~ 48 hours). Do not put water on the cast because it will become soft and start to smell bad. Use a plastic bag to cover the cast when bathing.



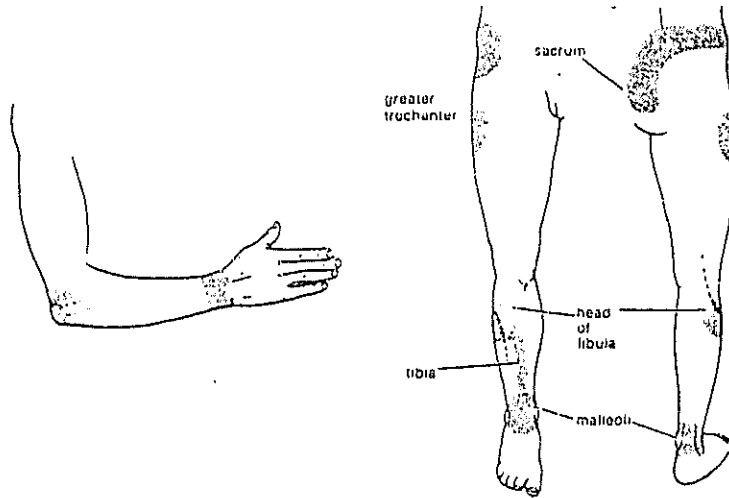
NO FOR 48 HOURS !!!



E. FUNCTIONAL POSITIONS AND PLACES TO PAD

In the last section we discussed application of plaster. Important parts of "patient preparation" are joint positioning and padding bony areas.

- * Functional positions are joint positions that are most useful if the joint is stiff. (See FRACTURES chapter, Volume 3).
- * The diagram below shows the areas that need special padding.



F. PLASTER REMOVAL

Removal of a plaster cast can sometimes be painful. Explain to the patient and family what you are doing and, if appropriate, let the patient help you remove the plaster.

Plaster can be removed by:

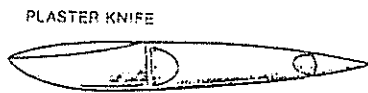
1. cutting the plaster
2. soaking the plaster in water

1. cutting the plaster

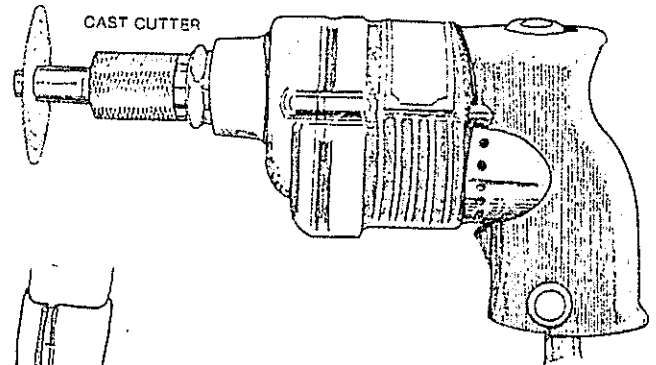
Plaster can be cut with strong scissors. Start at one end of the cast and put the scissor blade on top of the padding and parallel to the skin. (Try to prevent the scissor blade from cutting into the skin!)

Avoid cutting the cast near bony areas.

For the upper limb, a good place to cut the cast is along the midline of the anterior surface of the arm.

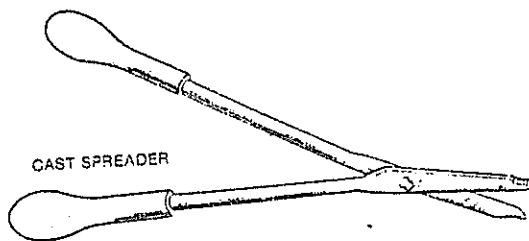
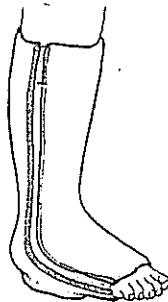


PLASTER KNIFE

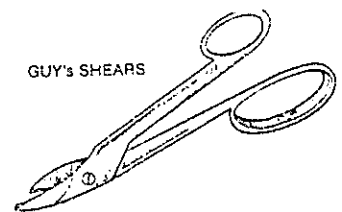


CAST CUTTER

For the lower limb, a good place to cut the cast is along the external side of the leg in the area between the heel and the external malleolus.



CAST SPREADER



GUY'S SHEARS

If scissors are not available or strong enough, a knife can be used to cut the plaster. (Be careful not to cut into the patient's skin!)

A technique to make the plaster softer in areas you want to cut is to put some drops of vinegar on the plaster area and wait a few minutes so it can become soft.

G. IMPORTANT RULES TO REMEMBER ABOUT PLASTER

Below is a summary of the guidelines that are important to remember about plaster.

WETTING PLASTER

- hold it in water for 5 seconds (or until the bubbles stop)
- remove it holding both ends, gently twist to remove extra water (do not squeeze it because you will lose a lot of plaster and the bandage will also be too dry)

APPLYING PLASTER

- carefully pad all bony areas well, and then pad the rest of the limb (1 cm thick)
- keep the bandage on the limb and never pull the bandage tight
- smooth over the plaster with your hand to help remove air bubbles and help the bandage be strong
- circular wraps with no folds or bends from one end of the limb to another.
- never put pressure on one small area of the plaster before it is dry - this may cause pressure over the skin and cause a wound.

PATIENT/FAMILY TEACHING

Warning signs to remove the POP as soon as possible are:

1. pain (in distal parts or under the plaster)
2. decreased feeling or movement in distal parts
3. distal parts becomes swollen, cold, or blue

REMOVAL OF THE CAST

Cutting - avoid bony areas (can cut on the anterior side of the arm and lateral side of the leg)

Soaking - may be good method for children

H. CHAPTER SUMMARY

Plaster is hard and fast drying material that helps immobilize a joint.

Other names for plaster are Plaster or Paris (POP), cast, or plaster cast.

Immobilization prevents movement.

A method to make plaster bandages was given in the chapter.

Steps in applying plaster are:

1. Preparing materials (water, plaster bandages, padding)
2. Preparing the patient (padding bony areas, good positioning)
3. Wetting the plaster bandage (don't squeeze it!)
4. Applying the plaster bandage (smooth surface, circular wrapping, no bubbles, don't pull tightly)
5. Patient/family teaching (warning signs to remove cast, cast care)

Warning signs that tell you there is not enough padding or the cast is too tight include:

- pain (in distal parts or under the plaster from pressure in one area)
- decreased feeling or movement in parts distal to the plaster
- parts distal to the plaster become swollen, cold, or blue

If the patient has any of these signs, the POP must be removed immediately!

Plaster can be removed by cutting it or soaking it in water and then unwrapping it.

REMEMBER: Some patients can be helped by good application of plaster and many patients can be hurt by poor application of plaster.
Applying plaster is serious, and should be done correctly.



22.

DEVICES FOR
AUTONOMY



DEVICES FOR AUTONOMY are equipment (and ideas) to help a person be more independent in eating, dressing, and bathing.

OBJECTIVES

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

1. given a patient problem recommend devices that may help the person to be more independent in eating, dressing, or bathing.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. DEVICES FOR AUTONOMY IN EATING/DRINKING
- C. DEVICES FOR AUTONOMY IN DRESSING
- D. DEVICES FOR AUTONOMY IN BATHING
- E. CHAPTER SUMMARY

A. INTRODUCTION

A person that has a physical limitation may need special equipment to help him to be more independent in taking care of himself.

Devices for autonomy are equipment (and ideas) to help a person be more independent in eating, dressing and bathing.

Question:

A person that has a physical limitation may need special equipment to help him to be more independent in taking care of himself.

A PTA teaches a patient how to use different devices for autonomy. What type of treatment is this (curative, preventative, or adaptive)?

Explain your answer.

Remember: As part of the REHABILITATION process, Physical Therapy treatment helps a person to have as much strength and movement as possible.

If the patient will always have a physical limitation (paralysis, limb loss, deformity), devices for autonomy can help him to have a more independent life.

Question:

Devices for autonomy can help a person be more independent in taking care of himself.

Please list 2 reasons why it is important for a person to be as independent as possible in eating, dressing or bathing.

In the following sections, different devices will be presented. Remember that these are only examples.

Together with the patient and family, the PTA can make new and different devices that can help the patient in the same way.

B. DEVICES FOR AUTONOMY IN EATING

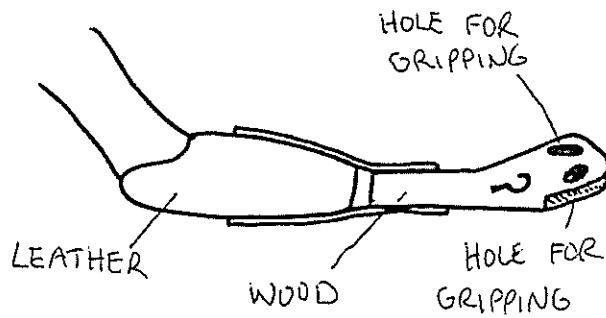
Ideas given in this section include:

1. devices to prevent plate/bowl movement
2. eating devices for patients with weak or deformed hands
3. eating devices for patients with weak arms
4. eating devices for patients with no arms
5. drinking devices

4. eating devices for patients without arms

- a. prosthetic attachment with an end part made of rubber

3 holes in different directions to hold handles in different position.



- b. Ways to eat using the mouth only

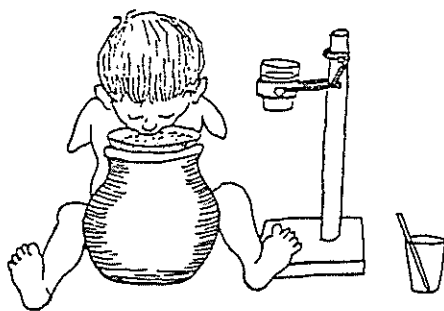
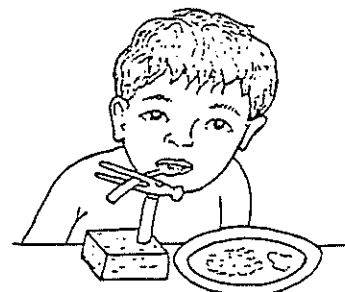
Pick up food holding spoon in mouth.



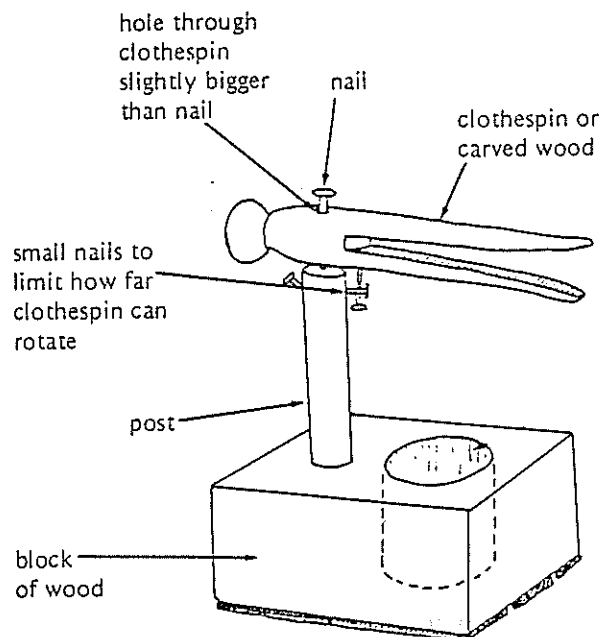
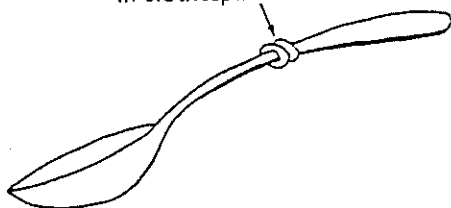
Slip spoon into clothespin.



With the lips, turn clothespin so that spoon enters mouth.

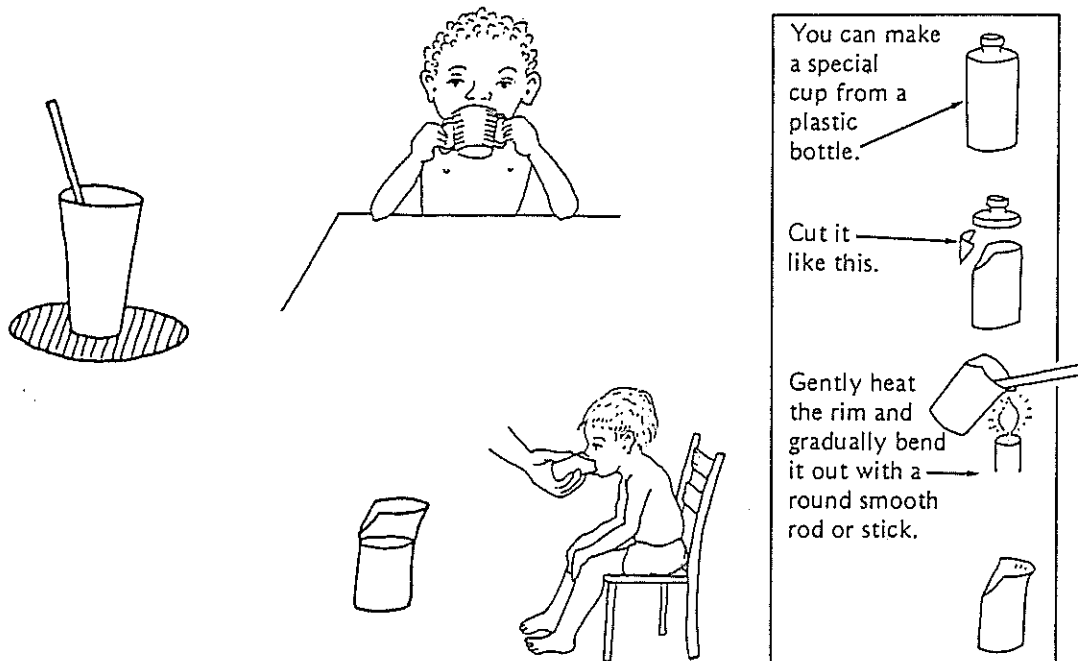


Put a rubber band or clip on the spoon handle to keep spoon from slipping in clothespin.



5. drinking devices

Below are pictures of many different ways to adapt cups or glasses for drinking.



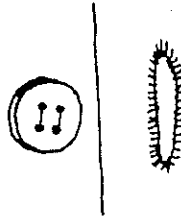
C. DEVICES FOR AUTONOMY IN DRESSING

Ideas given in this section include:

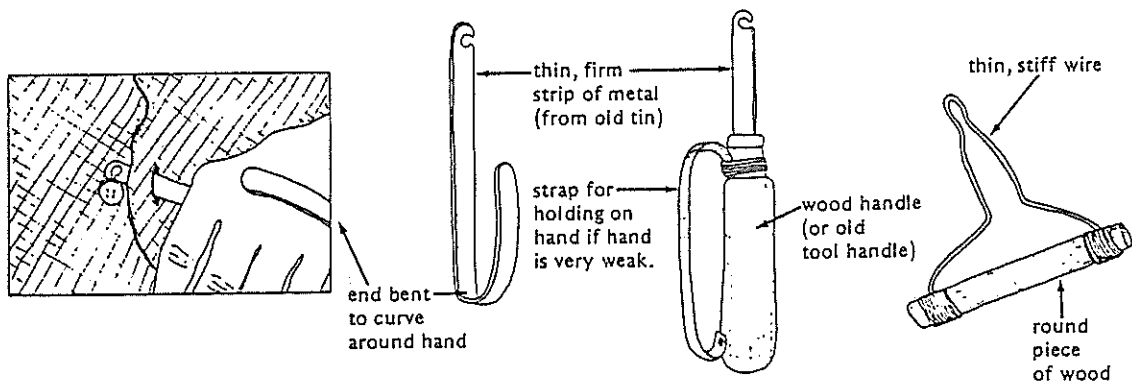
1. clothing suggestions
2. devices for closing buttons

2. devices for closing buttons

If buttons are used, the buttons should be large and the button holes big.



A device that can help pull the button through the button hole is seen below.

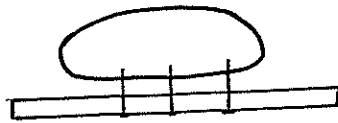
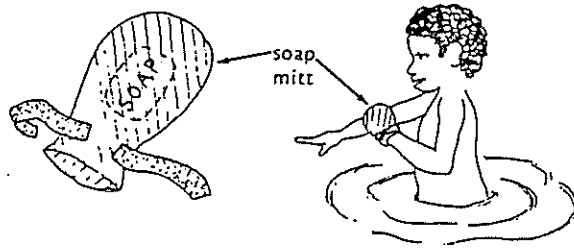


D. DEVICES FOR AUTONOMY IN BATHING

1. soap holders
2. body reacher

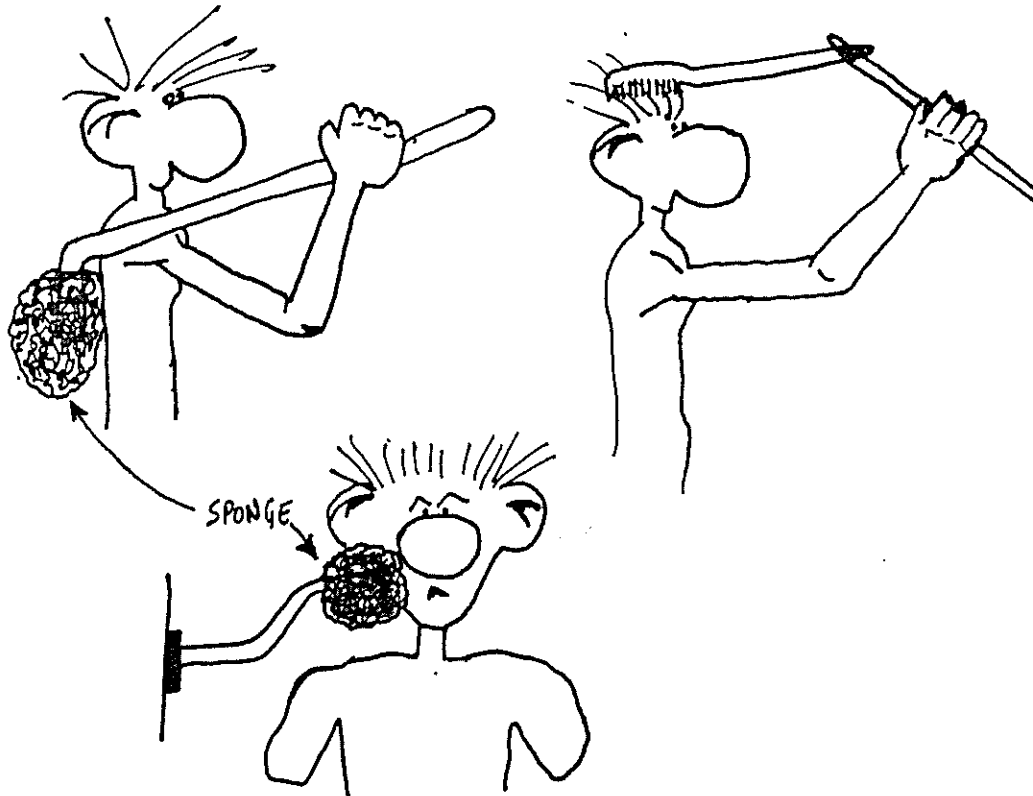
1. soap holders

There are many different ways of making soap easy to hold and use.



2. body reacher

A brush or cloth can be attached to the end of a stick to help patients wash areas that may be difficult to reach.



E. CHAPTER SUMMARY

Devices for autonomy are reequipment (and ideas) to help a person be more independent in eating, dressing and bathing.

This chapter provided only a small introduction of what can be made to help a patient help himself.

The PTA can use these ideas, but must work closely with the patient and family to experiment and find ways that will help a patient be as independent as possible.

23.

HOUSE ADAPTATIONS



HOUSE ADAPTATIONS are changes made on the inside or outside of a house.

OBJECTIVES

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

1. given a patient problem identify house changes needed to help a patient be more independent in the home.

CHAPTER CONTENTS

- A. INTRODUCTION
- B. HOUSE ADAPTATIONS FOR PEOPLE IN WHEELCHAIRS
- C. HOUSE ADAPTATIONS FOR PEOPLE WITH POOR BALANCE
- D. OTHER HOUSE ADAPTATIONS
- E. CHAPTER SUMMARY

A. INTRODUCTION

House adaptations are changes made on the inside or outside of the house.

In this chapter we will discuss specific house changes that can help a person with a limitation (a handicapped person) be more independent in the home.

At the home the PTA can work together with the patient and the family to help identify changes that can help the patient be more independent and ways to make these changes.

Remember, house adaptations and social integration are a part of the rehabilitation process.

Once the patient leaves the hospital he must NOT be forgotten!

B. HOUSE ADAPTATIONS FOR PEOPLE IN WHEELCHAIRS

Activity:

If possible, the PTA should experience life from a wheelchair for 2-3 hours.

During this time, the PTA should travel in the community and inside a house. The PTA does not leave the wheelchair during this time.

After many PTAs have made this activity, there should be a class discussion to include:

- problems with travelling in the community
- problems with moving in the home
- how the PTA felt (physically, emotionally)

Wheelchairs are given to help the patient move from one place to another. If areas are not adapted for wheelchairs, the patient will be more limited rather than more mobile.

Examples of problems for wheelchairs are stairs, doors that are too small, no place to turn, and tables that are too small. There are many other examples, but we will not mention them here.

In deciding house adaptations needed for wheelchairs, the PTA, patient, and family must consider the following areas:

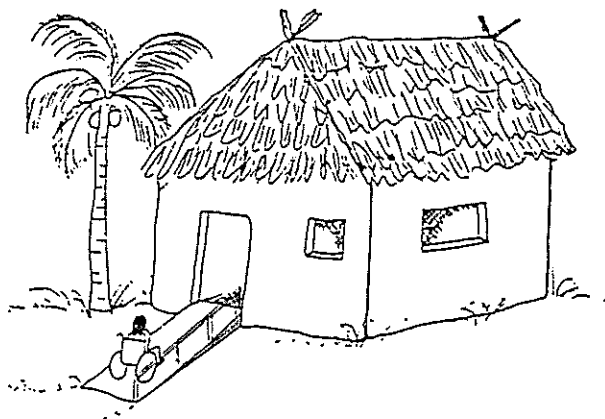
1. outside of the home
2. doorways
3. space to move
4. transfer surfaces
5. tables to use
6. bathroom

Again, this chapter presents only SOME ideas for some adaptations. The PTA, patient and family must work together to identify what the patient needs and how to meet these needs through small changes in the house.

1. outside of the house

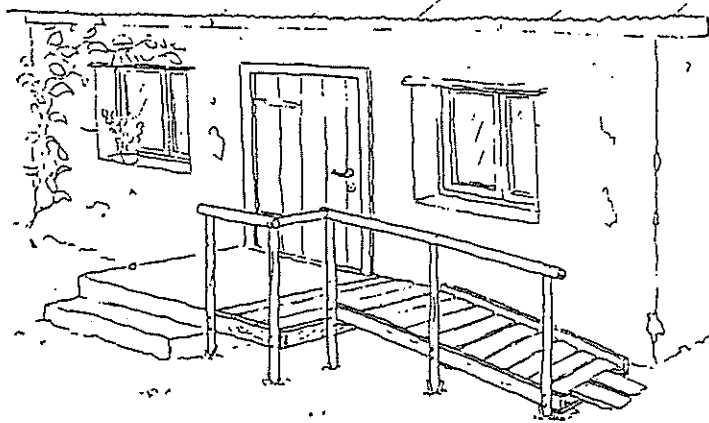
The question to ask and answer is, "How will the patient arrive at the door?"

For houses that are on the ground, arriving at the door may be no problem or a small ramp with handrails may be useful.



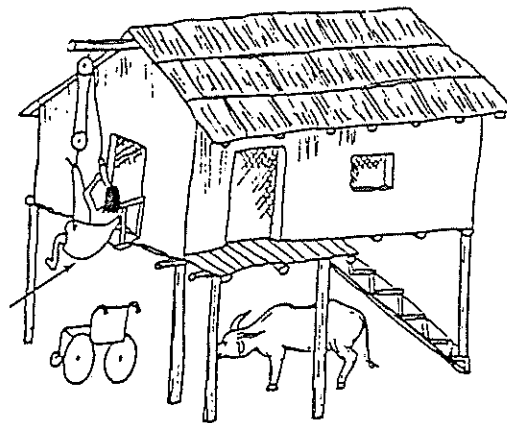
For houses that are off the ground, stairs with a handrail may be useful (a).

(a)



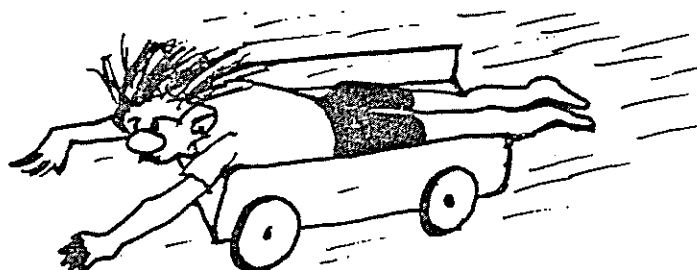
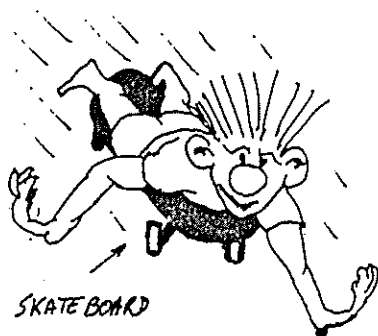
or a pulley system to help lift the patient into the house may be needed (b).

(b)



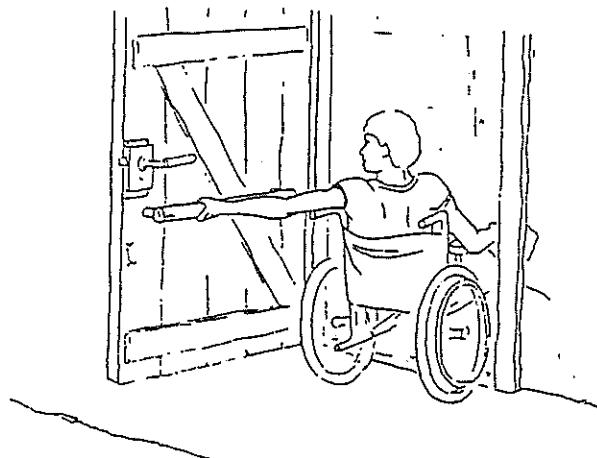
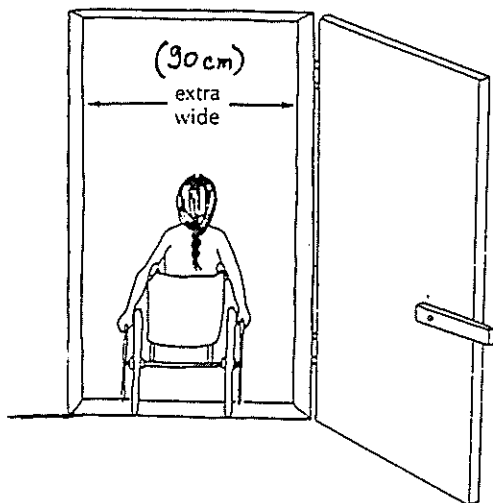
In these cases, the patient and family must decide if the patient needs the wheelchair in the house.

Sometimes the wheelchair can remain outside of the house and an adapted wheeled device can be made to help the patient move easily within the house.



2. doorways

For patients using a wheelchair inside the house, the doorway must be wide enough for the wheelchair to pass.



D. OTHER HOUSE ADAPTATIONS

Again, the PTA working with the patient and the family must identify the patient's needs and find ways to help the patient function as independently as possible.

The answers will not be found in this chapter, the answers of how best to adapt a house will be found working together with the patient and family and EXPERIMENTING with different ideas.

Other suggestions for house adaptations are for the bed. Examples of some bed adaptations are given below. Again, these are only ideas ...

E. CHAPTER SUMMARY

House adaptations are changes made on the inside and outside of a house.

For a handicapped person (a person with a limitation), changes about the house can help increase their independence.

The PTA must work together with the patient and the patient's family to identify some house changes that could greatly help the patient.

This chapter gives some ideas for house adaptations. These ideas include suggestions for:

- * doorways
- * space in the house
- * transfer surfaces
- * table height
- * bathroom
- * rails in the house
- * the bed

House adaptations and social integration are important parts of the rehabilitation process and must not be forgotten.

