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Diploma in Pharmacy 2nd Year
Hospital & Clinical Pharmacy
Experiment

To demonstrate / simulated/hands-on experience on the identification, types, use/application /administration of orthopaedic and surgical aids, such as knee cap. LS belts, abdominal belt, walker and walking sticks.

Aim:

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Reference :

‘ Dr. Gupta G.D. , Dr. Sharma Shailesh, Dr. Sharma Anshu, “Practical Manual of Hospital & Clinical Pharmacy” Published by Nirali Prakashan, Page no 19 - 28

Theory :

1) **Knee Cap :** They are also known as knee sleeves or knee braces. They are knee support and rehabilitation product that is intended to be used over the knee area. They are available in several designs, styles and types.

Types

i) **Knee Sleeves :** They are made of neoprene and slide over the knee Around the kneecap, there may be padding, a hole for the kneecap. straps, and/or a buttress. Simple sleeves provide warmth, compression, and possibly more knee support. They can be used to relieve patellofemoral discomfort or lessen edema. The

front of the knee is given additional protection when a kneepad is used. It is important to realise that knee sleeves do not increase your knee's stability after one or more surgeries, despite the fact that they may minimise swelling and provide a feeling of support after an injury.

ii) **Knee Pads :** Knee sleeves with extra padding or hard outer shells that cover the front of the knee and have straps that wrap around the leg to keep it in place are included in knee pads. In sports like volleyball, skateboarding, motorcycling, or roller skating, where there is a chance of receiving direct knee impacts, knee guards do not increase stability but may reduce the risk of injury.

iii) **Patellar Tracking Orthosis (PTO) Brace :** This brace consists of a knee sleeve with straps or buttressing around the opening and an opening for the patella. This might restrict patellar movement and lessen the chance of subluxation or dislocation. To provide even more stability, they could additionally have hinges on the sides of the knee. These braces may help some people with patellofemoral pain caused by incorrect patella tracking, while definitive evidence is still not known.

iv) **Patellar Straps (Bands) :** They are a common and visible tool used to treat anterior knee discomfort in young athletes. In order to apply pressure to the patellar tendon, which runs down the front of the knee and inserts on the lower leg, they should be placed midway between the bottom of the kneecap and the hump on the shin. This may minimise the pain brought on by patellar tendinitis and Osgood-Schlatter disease and reduce some of the stress on the tendon and its attachment to the tibia.

v) **Hinged Knee Braces :** These braces, which differ from sleeves, are made of one or two bars that have hinges along the sides of the knee and straps to keep them in place. The ligaments on the

inside or outside of the knee are supported by the various types of hinged braces, which are all intended to promote stability (medical and lateral collateral ligaments). Knee braces for prophylaxis are made to prevent against injury in sports with contact. Although they are frequently used and may lower the risk of injury in a particular group of athletes (such as football linemen), it is still unclear if these are cost-effective or applicable to other sports.

Functional and postoperative knee braces can either consist of foam liners that wrap around the upper and lower leg, metal bars along both sides of the knee, and hinges that can be adjusted to limit range of motion, or they can be a combination of both materials. They can be adjusted to allow different ranges of motion, can accommodate swelling better than casts or splints, and are simple to remove and replace for icing and re-examinations. They are most commonly worn after injury while awaiting surgical reconstruction or after surgery to protect the reconstructed knee.

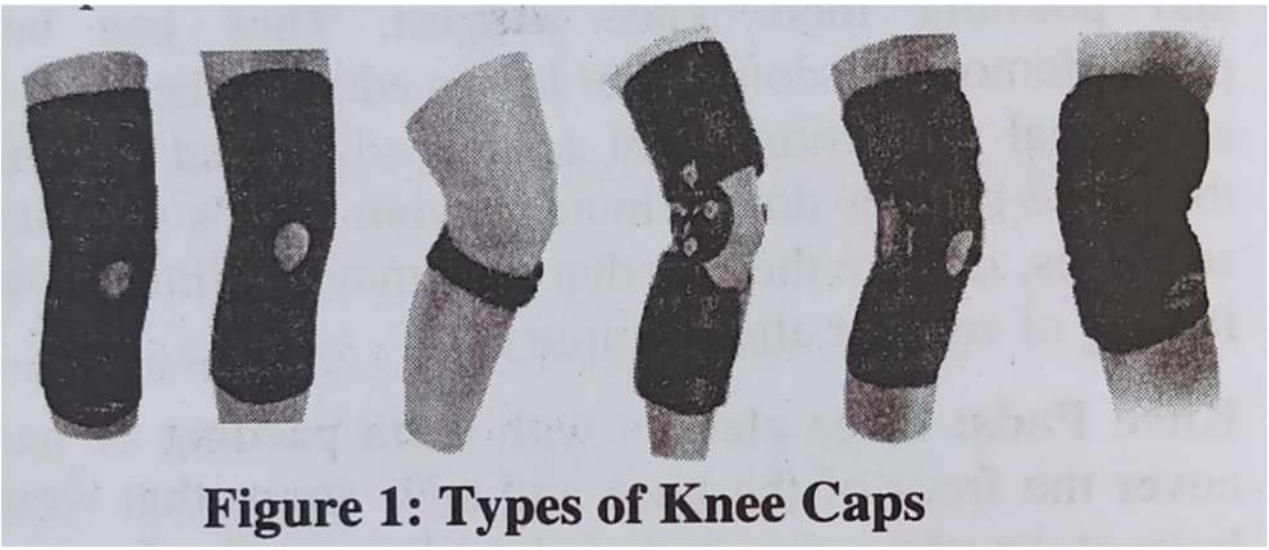


Figure 1: Types of Knee Caps

Administration of Knee Cap

i) The best type of knee brace will depend on the nature and severity of injury. Compression sleeve should not be used for mild sprains. A stronger hinged brace reinforced with metal or plastic should be used for more severe tears or fractures.

ii) Firstly, trouser leg should be rolled up such that the brace touches the skin directly.

iii) Foot should be inserted into the top of the brace (where the brace widens to fit thigh) and out through the bottom if there is slip on the brace. The brace should be slide up to the leg to place the brace on painful knee.

iv) The inside of the pad should be placed against the knee then the straps should be wound around if wrap style brace is used.

v) The majority of braces contain a small hole in the front to indicate which direction they should be proceeded.

vi) The brace is being worn properly if the kneecap can be seen via this opening. As a result, the skin beneath the brace is kept ventilated and the greatest level of comfort is provided.

vii) The brace should be aligned such that the hole does not irritate or pinch skin.

viii) It should be confirmed that the knee brace is secure before fastening it if it is not known the way to prevent it from slipping down. ix) If compression sleeve has extra straps, they should be wrapped around

ix) the back of the brace and Velcro straps should be used to secure them at the front, ensuring a snug fit.

x) The area between leg and the brace should be large enough for one or two fingers to fit. The brace should be slightly loosened if not fitted.

2) **LS Belt (Lumbar Spine Belt):** They are more flexible than lumbar braces. however they are utilised for conditions that are not as severe. The intra- abdominal region feels more pressure from a lumbar spine belt. It helps to provide stability to the spine.

People with moderate to severe pain are prescribed to use it. Belts worn on the lower back are called lumbrosacral belts. In order to support the lower back, the belt effectively covers the lumbar vertebrae (the lowest section of the spine) and the sacrum (the triangle bone below the lumbar area).

Types of LS Belt

i) **Contoured Lumbosacral Belts:** Easily moldable, optimized for human use

ii) **Non Contoured Lumbosacral Belts:** Rigid belt

Administration of LS Belt

i) The size of lumbar support belt should be examined before wearing it. The lower back region should be measured to determine the right size. If there is large mid-section, the next size should be considered to ensure comfort.

ii) If lumbar belt has two side flaps attached to it with velcro, they should be removed from the velcro and placed at the edge of the belt so that the belt is extra snugged in the last steps.

iii) The position of the belt's center is commonly indicated by a flap in the back of the belt. This tag or marker should be placed in the middle of lower back. It should be confirmed that the side seams remain parallel to the seams of pants.

iv) It should be ensured that the width of the belt is covering the lumbar (low back) and sacral (tail bone) area.

v) Before putting the belt, the stomach should not be pulled and hanged out in all the way. Comfortable position should be maintained while starting.

vi) The belt should be wrapped around to the front. Before velcroing the initial section of the belt, it should be ensured that the two surfaces are matched up and there is a solid foundation from overlap. A criss-cross pattern will cause belt to ride up and not stay in the right place.

vii) Extra support flaps that were positioned in step 2 should be used for the additional support around waist and brought to the front and velco fully.

viii) It should be ensured that the upper edge of our belt is at or below the navel to confirm proper belt positioning of belt.

ix) An ice back should be taken and placed in the lower back region and then the belt should be used on the top of the ice for relieving back pain, especially in cases of acute injuries when inflammation is present or has flared up. Using ice will cause numbing sensation and decrease inflammation, which could result a quicker recovery.

3) **Abdominal Belt:** These are wrap that is intended to be worn around midsection. They are adjustable, consist of clips and hooks, and are often one size fits all Abdominal belts, braces, and binders are comfortable support devices (often made up of stretchable fabrics) that are useful for reducing abdominal pain. They are typically used to treat a variety of ailments, such as:

i) Abdominal pain

ii) Post-pregnancy recovery

iii) Post-surgery recovery (abdominal surgery)

iv) Recovery from fractures and stress fractures

v) Back pain

Types of Abdominal Belts: The main types of abdominal belts are.

i) **Electro-Stimulation Abdominal Belts:** It is most common and possibly the most popular belt. They consist of a belt with electrodes that periodically send electrical impulses to the muscles in an effort to replicate the signal that the nerves send to cause contractions during activity. A control box can be used to change the stimulation's intensity. which increases as the session goes on.

   Physiotherapists occasionally employ this technique, known as electromyostimulation (EMS), to stimulate muscle regions that have become immobile as a result of an injury. Additionally, it can be used to aid with recovery after exercise.

ii) **Vibrating Abdominal Belts:** Vibrating or massaging belts, which are slightly less expensive, produce a vibrating massage with the goal of melting localised abdominal fat rather than strengthening muscles. They can be used as a supplement to physical activity even if their efficiency in burning fat is minimal at best.

iii) **Sweat Belts:** Here, perspiration is used with a sauna-like effect to aid weight loss and clear toxins. The reported weight loss is frequently the result of water loss, and the 88device is a supplement to a more all-encompassing strategy that includes a healthy diet and regular exercise. Wearing this kind of belt during the day or while exercising will increase its effects.

Administration of Abdominal Belt

i) **Apply the Belly Bandit to the Midsection:** The band should be taken and wrapped around the midsection until it fits snug. The band should be then adjusted and tightened until its feels tight yet comfortable. The band is made from Velcro so it should be easy to adjust it to your liking. Since the band is made of Velcro, it should be simple to adjust to.

   a) It should be confirmed that breathing is possible while wearing the Belly Bandit. The band should be loosen if pain appears.
   b) The band should not be wrapped tightly because it can lead slow healing and cause complications
   c) The band should not be wrapped loosely because it will not provide any benefits to postpartum body

ii) **Put the Belly Bandit on Under or Over the Clothes, Depending on Your Preference:** Belly Bandit should not be used over clothes because it will not provide same level of direct support as having the band pressed up against skin. Applying the band straight to skin when recovering from a C-section may help to support incision

iii) **Wear the Belly Bandit During the Day, at Night, or Both:** Belly Bandit can be used right after giving birth. It should be worn in both day and night, although,

   a) Belly Bandit should be removed before showering or swimming
   b) Before starting to wear a wrap, it should be ensured that the doctor gives his/her approval.
   c) The wrap should initially be worn for a couple of hours at a time and then for a longer duration of time when comfortable.

4) **Walker:** These are light, movable devices of metal tubing, are around waist high
figure 2), and stand on four robust, widely spaced legs.

i) A walker should be properly fitted by having the patient step inside it, keeping it steady.
ii) While holding onto the handgrips, the patient's elbow should be comfortably bending at 15-30°
iii) The top of the walker should line up with the crease on the inside of wrist when the patient relaxes his/her arms at sides.
iv) Nurse should advise the patient to not lean over the walker or walk behind it in order to avoid losing balance and falling.
v) The patient should stand up and place the injured leg on the walker's middle area. Nurse should remind the patient to not step close to the front bar, and keep the walker steady while stepping in it
vi) As the patient pulls the second leg forward, he/she should press straight down on the walker's grips. The patient should repeat moving the walker forward and stepping into it one leg at a time.
vii) The walker should be checked for worn tips or missing screws in the metal frame on a regular basis by the patient or family.

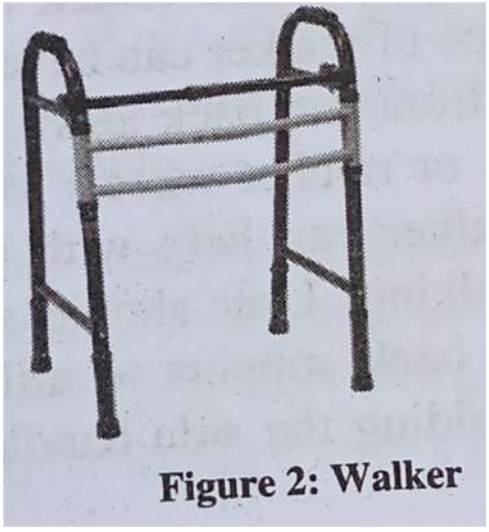


Figure 2: Walker

Fitting a Walker: When a walker fits properly, it is safest and most helpful The wrong-sized walker may be difficult to use, lead to falls, or pain and soreness. To avoid strain on the back or arms when using a walker, good posture is important To ensure a suitable fit, a physical therapist can assist in adjusting the height and width. The four legs of the walker should be of equal length.

Have the patient stand up straight to ensure the greatest fit and measure the height.

i) The height of the handgrip should be at wrist level with the arms at the sides.

ii) Arms should be bent at the elbow (20° bend in elbow) when hands are placed on the handgrip

Types of Walkers

To determine the most appropriate type of walker, a physical therapist will assess the patient. Every walker is different based on the user's needs Walkers can have one, two, or four wheels. To make daily tasks easier, many attachments can be added including seats, baskets, and pouches.

i) **Standard Walkers:** They lack wheels and have four straight legs. The height and width of the chair can be adjusted to fit the patient. The standard walker should be picked up and advanced to utilise it. Before taking a step, it is crucial to make sure that all 4 legs are firmly on the ground. Sometimes a walker's legs can be equipped with gliders or caps (glider walker). As a result, the walking pattern appears to be more natural.

ii) **Rolling Walkers (Wheeled Walkers):** In order to produce a more 1 natural stride or smoother walking pattern, wheels may be added to the front of the walker. If patients are unable to raise and move the walker, wheels may also be used. The support for rolling walkers may be in the front (anterior walker) or the back

(posterior walker) Which is ideal for the patient can be decided with the aid of a physical therapist. With the help of a physical therapist, it is possible to determine best walker for the patient.

a) **Anterior Rolling Walkers (Front Support)**: It provides support to front of the body. To increase stability for walking. the base of support is widened. This type of walker generally has four wheels and is pushed forward by the user.
b) **Posterior Rolling Walkers (Back Support):** It provides back support. This type of walker can have two (just on the front legs) or four wheels (front and back legs). The back legs are equipped with rubber tips or ratchet wheels to prevent rolling backward. This type of walker can help with posture and balance while standing and walking. User should stand in the middle of the walker with the back support to utilise it. He/she should step forward while holding the side handles to pull the walker from behind.
c) **Rollator Walkers:** It is a type of wheeled walker. It has a seat. handlebars with hand brakes, and three or four wheels. It is more natural because it can turn easily and travel more quickly. However, better coordination and balance is required for utilising it. When utilising a rollator, the user should position themselves behind the walker and push forward using the handlebars.
d) **Gait Trainers:** It is a special type of mobility support. Patients who need help with learning to walk, enhancing gait, preserving posture, or bearing body weight can use it. Gait trainers are similar to wheeled walkers. To manage particular limitations and mobility needs, they use specialised straps, supports, and positioners.

Administration of Walkers

i) User should move from the armrest of the chair or from the bed to a standing position
ii) Both sides of the walker should be firmly held with hands.
iii) The walker should be moved forward to a short distance
iv) Injured or weaker leg should be moved forward first by supporting with palm of the hands. Then, the stronger leg should be moved. The feet should be inside the boundaries of the walker

5) **Walking Sticks or Cane :** This is a tool used primarily to facilitate walking, offer postural support or stability, or help one keep good posture. Some designs can be employed for self-defense or as a fashion accessory.

i) Most common mobility aid
ii) Commonly made of wood or aluminium
iii) Transmits 20-25% of body weight
iv) Held in hand opposite the involved side
v) Compensates for muscle weakness
vi) Relieves pain

It is most popular aid for mobility and composed of wood or aluminium It can carry 20-25% of body weight and held in the opposite hand from the affected side. It compensates for weak muscle and relieve pain.

Types of Walking Sticks

i) Standard Cane :

a) They are also known as single point or straight cane.
b) They are generally made up of wood or acrylic.
c) They have half circle or t-shaped handle.
d) They and cheap in cost and fits anywhere.
e) They are not adjustable.

ii) Standard Adjustable Aluminium Cane :

a) They are similar to standard and made of aluminium. Their handle is made with a molded plastic covering.
b) Their height can be adjusted with a push button mechanism.
c) Their estimated height is about 27-38.5 inches (68-98cm).
d) They are of light and fits anywhere.
e) They are costly as compared to standard cane.

iii) Adjustable Aluminium Offset Cane :

a) The cane's proximal component is anteriorly offset, with a straight offset handle.
b) They have a plastic or rubber molded grip.
c) Pressure can be applied on the centre of the cane for increased stability.
d) They have adjustable height and are of lightweight and fit anywhere
e) They are of high cost.

iv) Tripods :

a) They are made up of aluminium alloy or steel.
b) They have three rubber tipped legs at the corner like an equilateral triangle.
c) Their handgrips are parallel to and in the same plane as the two legs closest to the patient's foot.
d) They are shaped such that the elbow is at 30° flexion.
e) They are more stable.

v) Quad Canes :

a) Canes are lightweight, easily movable devices of wood or metal, and are grasped at about waist height.
b) The single straight-legged cane and the quad cane are the two forms of canes.
c) A patient with diminished leg strength can utilise a single straight-legged cane for support and balance.

d) The patient should keep the cane on stronger side of the body.
e) To provide support, the nurse should stand on the patient's weak side.
f) When walking, the patient should move the cane forward by 6-10 inches for maximum support while maintaining the body weight on both legs.
g) The patient should shift the weight from the weaker leg to the cane by moving the weaker leg to the cane.
h) Then, the patient should move the stronger leg past the cane. allowing the cane and weaker leg to support the body weight.
i) While walking, the patient should repeat these three steps.
j) Nurse should teach the patient that at all times, two points of support (both feet or one foot and the cane) should be in contact with the ground.
k) When there is partial or complete limb paralysis or some hemiplegia. the quad cane offers maximum support.
l) Disadvantage: It has slower gait pattern. The pressure applied to handle may not be focused, which causes instability.

vi) Hemi Cane :

a) They provide a very wide base.
b) Their legs are angled to maintain floor contact in order to increase stability further away from the body.
c) The handgrip is plastic-molded.
d) They can be folded flat and is adjustable in height.
e) They are easy for travel and storage
f) They might prevent pressure from being centered.
g) They are not suitable for use on stairs
h) They requires gradual forward movement.
i) They are of high cost.

vii) **Rolling Cane :**

a) They have wide, wheeled base that enables continuous forward movement.

b) They contain contoured handgrip, height adjustments and pressure sensitive break in the handle

c) They have wheels so that the cane can be used continuously without having to be lifted and lashed forward.

d) They provide faster forward movement.

e) They require enough upper arm and grip strength for breaking mechanism.

f) They are not suitable for the patient with a propulsive gait pattern (Parkinson's)

g) They are of highly costly.

viii) **Laser Cane:** It incorporates a bright red laser line that is projected along the floor to help with walking-related frozen episodes.

Administration of Walking Stick

i. **Ask a Doctor if a Walking Stick is Right for Particular Injury :** The doctor may suggest walking stick (cane) in case of injured hip, knee, or leg. Doctors sometime suggest additional devices like walkers or crutches. If doctor recommends a cane, the patient can often get the price covered by health insurance, even though he/she will have to buy it.

ii. **Adjust Cane or Walking Stick so that it comes up to Wrist :** Arms should be hanged down at the side while maintaining standing up straight position. The height of the cane should be adjusted so that it reaches the wrist or help should be taken to adjust it. The patient will not have to hunch over to use the cane

when it is at his/her wrist but it should also be low enough so that he/she can put weight on it.

iii. **Hold the Walking Stick in the Opposite Hand of the Hurt Leg :** Many people believe that the cane should be held on the same side as your injury, but holding it on the opposite side actually works far better. The cane should be held in right hand if left leg is hurt and in left hand if right leg is hurt.

iv. **Move the Walking Stick at the Same Time as Injured Leg:** The cane should be set in front injured leg. It should be roughly 2 inches (5.1 cm) in front of you instead of being in front of user. Small step should be taken with injured leg and cane and then with healthy leg.

v. **Climb Stairs With Good Leg First:** Walking stick should always be held in the opposite hand as injured leg, as always. Handrail should be held with the other hand, if possible. Small step should be taken with healthy leg and then injured leg and the cane.

vi. **Descend Stairs Starting with the Cane:** Cane should be placed on the step below the user and then step down with the injured leg. The same step should be step down with healthy leg. Handrail should be used to provide additional support.

vii. **Remove Trip Hazards from Home:** It should be ensured that the stairs are cleared and the furniture is arranged while using a walking stick around the house so that it can be easily moved around. Electrical cords, rugs and boxes should be moved to prevent cane from being tangled.

Result :

Identification, types, use / application /administration of orthopaedic and surgical aids, such as knee cap, LS belts, abdominal belt, walker and walking sticks was demonstrated.