

TRACTION

Key Terms

Traction

Closed reduction

Open reduction

Reduction traction

Bryant's traction

Russell's traction

Skeletal traction

Pelvic traction

Gallows' traction

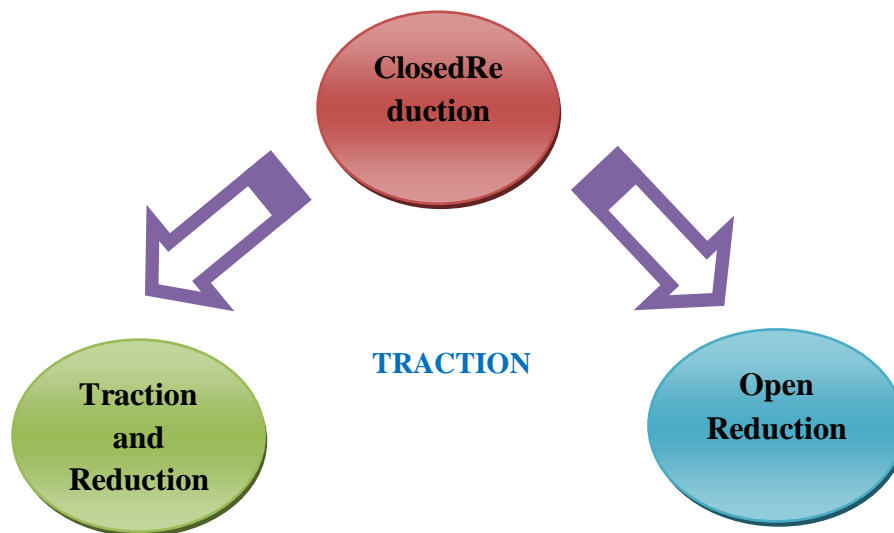
Thomaspilntraction

TRACTION**INTRODUCTION:**

The goals of treatment of fracture are to restore an injured part for its maximum functioning to prevent complications and to obtain the best possible cosmetic result. Most fractures are treated by reduction and immobilization. Traction is one method of reducing a fractured bone. Fracture reduction performed in an attempt to restore the injured bone's normal anatomic alignment, position and length in order to bring the fracture fragments into close approximation so that healing could be promoted. Traction has been used since HIPPOCRATIC times for the reduction of fractures and Dislocation.

DEFINITION:

Is the application of a pulling force, especially as a means of counteracting the natural tension in the tissues surrounding the broken bone.

FRACTURES MAY BE REDUCED IN THREE WAYS:

- ✓ By manipulation (closed reduction)
- ✓ By operative procedures (open reduction)
- ✓ By traction reduction (traction and reduction)

CLOSED REDUCTION:

Closed reduction (manipulation) is performed by manually applying the traction to lock the ends of the fragments together and thus restore the normal bone alignment. The three basic manoeuvres used during manipulations are traction and counter traction, angulation and rotation.

OPENREDUCTION:

Open reduction is performed under surgical asepsis. After making an incision, the fractured bones are reduced under direct vision. Various internal fixation devices are applied to the bone to maintain the normal alignment. These devices consist of metallic screws and plates, pins, wires, nails or rods.

REDUCTION TRACTION:

Reduction traction means the restoration of a displaced bony part to its normal alignment, position and length. It is used to bring the displaced fragments of the broken bone into close approximation to one another and to maintain proper alignment until the healing take place completely.

PURPOSE OF TRACTION:

- To restore and maintain the proper alignment of the broken bones, in a fractured site.
- To relieve pain caused by muscle spasm.
- To prevent deformities
- To correct deformities.
- To treat dislocations and spinal cord compressions due to prolapsed intervertebral disc.
- To immobilize a part.

METHODS OF TRACTION

Traction is applied by a system of ropes and pulleys. The weights are attached to a fixed point below the area of injury or disease.

There are different types of tractions:

● SKIN TRACTION

Skin traction is achieved by clinging wide bands of adhesives directly to the skin and applying weights to these bands. The pull of the weight is transmitted indirectly to the involved bone. Buck's extension, Bryant's traction and Russell traction are the three most common forms of skin traction used in injury to the lower extremities.

● SKELETAL TRACTION

In skeletal traction, the traction is applied directly to the bone. Under strict aseptic precautions, a rustless pin or wire (e.g., steinmenn pin or kirschner wire) is inserted through the bone fragment distal to fracture and out through the skin on the opposite side of the limb. A metal U-shaped spreader is then attached to the wire or pin and the weights are attached to the spreader. Skeletal traction can be used for the fracture of the femur, tibia, humerus and cervical spine. In case of cervical spine, the traction is achieved by the use of crutch field tongs applied to the skull.

● SPECIFIC TYPES OF TRactions

Pelvic traction, head halter traction are the examples.

● BRYANT'S TRACTION (GALLOW'S TRACTION)



Picture: Gallow's Traction

Bryant's traction which is a skin traction applied to both lower limbs can be used to reduce fractures of the femur in children under 6 years. Both legs are suspended vertically with the hip flexed at 90 degree and the knees are extended. The buttocks are slightly elevated from the mattress. Therefore, the body weight is used to provide the counter traction.

Bryant's traction is preferred to buck's extension in children under 6 years. Children do not have enough body weight to provide effective counter traction to the horizontal pull of the Buck's extension. However, the Bryant's traction is not used for children above 6 years because the counter traction provided by the weight of the trunk is not sufficient and also the position assumed in Bryant's traction reduces the arterial circulation to the feet.

● RUSSELL'S TRACTION

Russell's traction may be used in the treatment of fracture of the shaft of the femur. It may be applied as either skin or skeletal traction. Russell's traction creates a forward and upward pull on the leg by applying vertical traction at the knee, at the same time a horizontal force is exerted on the tibia and fibula as in a Buck's extension. The knee joint is bent and the client can move about with relative ease with Russell's traction.

The traction is applied as in Buck's extension and a sling passes below the knee. A cord is attached to the sling and passes up vertically to a pulley on the overhead beam and then passed over several pulleys and back to the pulley at the foot end of the bed on which the weight is added. A foot support with a sling is provided to prevent foot drop.

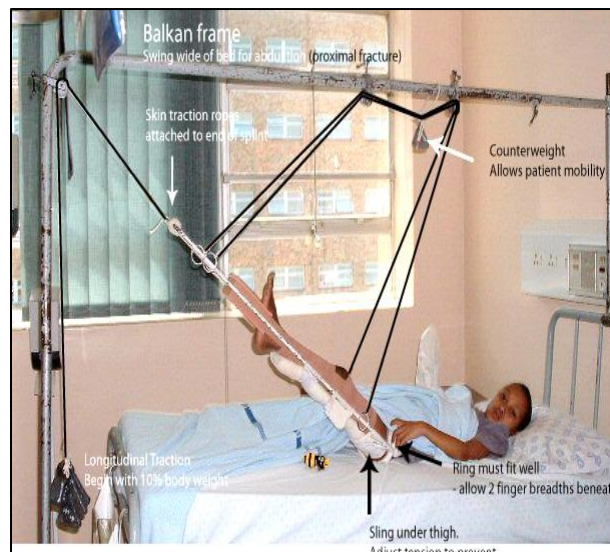
SKELETAL TRACTION

Skeletal traction is accomplished by introducing a metal wire (Kirschner wire) or metal pins (Steinmann pins) or metal tongs (crutch / field tongs used in skull traction) under strict aseptic

technique through the bones beneath the fracture. A traction bow (stirrups or calipers) is then attached to the wire or pin and the traction force is applied to this bow.

Bone traction may develop with skeletal traction and it can be avoided by:

- a) Preparing the skin for any orthopaedic surgeries.
- b) Inserting the pins under strict aseptic techniques.
- c) Avoiding an area that is already infected.
- d) Daily observation of the skin around the site of insertion of pins and detecting the signs of infection such as redness, drainage, bad odour etc.



-----**Picture: Thomas splint traction**

- e) Daily cleaning of the areas around the pins with spirit.
- f) Protecting the wound at the pins with sterile dressings and changing the dressings as and when needed.
- g) Instructing the client who has skeletal traction not to touch the skin around the insertion of wires or pins.

When caring for a client with skeletal traction, the nurses should keep in mind all the precautions as for skintraction. In addition, she has to take care to prevent infection introduced into the bones. The sharp ends of the wires and pins that extend beyond the bow

should be covered with corks and dressings to prevent bed linens from catching on the sharp points and to prevent scratching the client's skin or that of persons giving care. Loose wires or pins should be reported to the doctor immediately.

The skeletal traction provides a better traction because:

- a) It can be used for relatively longer period of time
- b) It applies traction directly to the bone
- c) It can be user with heavier weights
- d) It is highly effective in treating fractures in bones surrounded by large muscle masses and in reducing unstable fractures/dislocations
- e) Since the traction is applied with a Thomas splint, the entire leg is supported and therefore it is comfortable for the client.
- f) Since it allows a slight flexion of the knee joint, the skeletal traction is comfortable for the client.

NURSE'S RESPONSIBILITY IN THE APPLICATION OF BUCK'S EXTENSION (SKIN TRACTION)

NURSING ASSESSMENT:

- Check the client's name, bed number and other identifying data.
- Check the nature of the client's injury and the general condition of the Patient.
- Check the purpose of the traction.
- Check the doctor's orders for the type of traction to be applied.
- Check for any specific instructions regarding the application of traction, duration of traction, movements and positions allowed and not allowed etc.
- Check the client's abilities and limitations
- Check the client's consciousness and the ability to follow instructions.
- Assess the potential complications associated with use of traction and the preventive measures.
- Check the integrity of skin where the traction is to be applied.
- Check the articles available in the client's unit.

ARTICLES REQUIRED:

- Adhesive plaster
- Scissors
- Tr. Benzoin
- Spreader (rectangular wooden piece)
- Roller bandages
- Traction ropes
- Cotton balls in a container
- Kidney tray and paper bag
- Cross bars and clamps {used to fix pulleys in position}
- Pulleys {used to apply traction freely in the direction as desired}
- Bed blocks {used to apply counter traction}
- Measuring tape
- Weights as ordered
- Balkan frame with trapeze bar {used to suspend the cross bars}
- Thomas splint {if ordered}

PREPARATION OF THE CLIENT AND ENVIRONMENT

- Explain the procedure to the client and his relatives and the reasons for applying the traction.
- Inform the client for the movements allowed and the movements contra-indicated. Explain him that moving in the contraindicated positions will foil the purpose of traction.
- Reassure the client that the initial discomfort caused by the traction will disappear soon and he will be more comfortable when the muscles are relaxed by the traction. (Pain is due to muscle spasm).
- Inform the client how long the traction will be maintained.
- Explain to the client how he will be cared in traction and how he can meet his personal needs.

- Prepare the skin for the application of skin traction. The skin is shaved to remove the hairs; otherwise removal of the adhesive strips will be painful for the client. Clean the area with soap and water, dry well and apply Tr.benzoin.
- Examine the area for any cuts or skin lesions.
- Place the client on a firm mattress with fracture boards under it.
- Fix a balken frame to the bed which will be helpful for the client to raise his body without interfering with the traction during the use of bedpans etc. The client will have confidence to raise his body. Fix the cross bar and pulleys on the balken frame or on the foot end of the bed.
- Arrange all articles needed for the traction on the bedside table conveniently, both for the doctor and the nurse.
- Remove un-necessary articles from the client's unit that may obstruct the passage.
- Provide privacy and remove the garments from the affected limb and cover the client, with a sheet or a bath blanket
- Keep the client on centre of the bed in good body alignment. The feet of the client should not touch the foot end of the bed.
- Remove the back rest and pillows kept under the client. Pillows are allowed only if desired by the doctor.

PROCEDURE:

S.NO NURSING ACTION

RATIONALE

- | | | |
|----|---|--|
| 1. | Wash and dry hands. | To prevent cross infection. |
| 2. | Measure the length of the tape (adhesive) needed. Measure the length 4 inches above the knee to the malleolus and add 10 inches to extend beyond the foot and to cover the spreader and then double it to cover the opposite side of the leg. | Correct length of the tape helps in the correct application of the traction, and prevents wastage of the adhesive plaster. |
| 3. | In the center of the strip, at the sole of the foot, place the spreader. Use a spreader of | The spreader prevents pressure along the sides of the foot. If the spreader is too |

- correct width.
4. The spreader is held in place by a second strip of adhesive which should extend 10 to 12 inches on each side of the wood to prevent adhesion to the malleoli. narrow, the traction tapes will rub against the areas of the skin over the malleoli. If the spreader is too wide, it will pull the traction strips away from the skin. The second strip fixed to the adhesive surface of the strip will prevent the plaster from wrinkling.
 5. Apply the adhesive strips smoothly without wrinkles on the lateral and medial aspect of the thigh and the lower leg. The crest of the tibia and the patella are not covered with the strapping. Wrinkles can cause pressure on the skin and cause pressure sores. Care should be taken to protect the bony prominences.
 6. Secure the adhesive strips in place by bandaging the leg. Bandages must be applied firmly, but not so tightly to interfere with the blood or nerve supply to the limb. Unless fixed with the bandages, the traction strips will be pulled away from the skin when the weight is applied.
 7. Thread the traction rope to center of the spreader and pass it through pulleys and apply the weight as ordered. The height of the pulley should be adjusted with the center of the spreader to keep the ropes and pulleys in straight alignment.
 8. Raise the foot end of the bed on bed blocks. To obtain counter traction.

- **CHECK THE WHOLE SYSTEM OF TRACTION FOR ITS WORKING ORDER:**

- a) The ropes and the pulleys are unobstructed, freely movable and in straight alignment.
- b) The weights are neither pulled against the pulleys nor rested on the floor. See that the weights hang freely without touching the bed, bedding, and the body of the client.

- c) There should be no knots obstructing the free movement of the rope through the pulleys.
 - d) The knots are secure and are not easily slipped off.
 - e) The traction will not be obstructed by passers-by.
 - f) The bony prominences are protected.
 - g) The knees are slightly flexed to prevent hyperextension.
 - h) If the sand bags are used as weight, mark it with the amount of weight.
 - i) The client is in a good body alignment.
 - j) The client is placed in the centre of the bed and the feet are not supported against the foot end of the bed.
 - k) No unnecessary pillow under the limbs except that is permitted by the doctor (a small knee pillow).
 - l) The bed clothes are not hanging over the traction ropes.
 - m) The bandages are neither too tight nor too loose. There is no swelling and discolouration of the limbs distal to the bandaged limb.
 - n) The toes are freely movable.
 - o) No discomfort experienced by the client after the traction is applied.
- Watch for the early signs of complications developing due to traction. Investigate all the symptoms indicative of developing complications and all complaints stated by the client in traction. If symptoms of neuro-vascular damage appear in an extremity that is in traction, immediately remove the weight, unwrap the bandages and inform the doctor immediately.
 - Frequent skin care and care of the pressure points are necessary to prevent skin breakdown.
 - Any alteration in the amount of weight, height of the elevating blocks, position of the client in bed etc. Should be done only with the permission of the doctor.
 - Give recreational and diversional therapy to the client.
 - Encourage self-care as much as possible.
 - Encourage exercise of all joints especially the joint above and below the fractures.
 - Record the type of traction applied with date and time on the nurse's record.

- Frequent visits to the client should be made to observe the client and to make him feel that he is not neglected.
- If the client is to be transferred from one department to another, the weights should be steadied and kept swinging while the client is transferred. If the weights are removed, the whole purpose of the traction is foiled.
- When the clients are removed from traction after they are immobilized for few weeks, they find themselves quite weak due to the immobility of the muscles. They also feel unsteady due to orthostatic hypotension especially if the client was in a head lowered position. So these clients are helped to assume upright position very slowly. Crutches may be provided for a short while to support them in walking.
- When the traction is removed, it should be entered on the nurse's record with date and time. Record the response of the client to activity.

COMPLICATIONS

- Infection of pin tracts in skeletal traction.
 - Skin breakdown and dermatitis under skin traction.
- Complications of immobility
- Stasis pneumonia
 - Thrombophlebitis
 - Pressure ulcers
 - Urinary infection and calculi
 - Constipation

DOCUMENTATION:

- Document the steps of procedure
- Document the physician's order for traction
- Document the response of the client to activity.

- Document the signs of complications developing due to traction
- Inform an unusual occurrence to the physician.

**PATIENT FAMILY EDUCATION:**

Educate the patient and family regarding,

- the significance of traction for fracture cases.
- the types of traction and the application..
- the importance of mobilisation after the removal of traction.
- the symptoms of immobilisation like muscle atrophy, orthostatic hypotension and preventive measures.
- the use of crutch walking.
- the significance of rehabilitation after traction procedure.

