

# Skin and Skeletal Traction

## Self Directed Learning Package for Nurses

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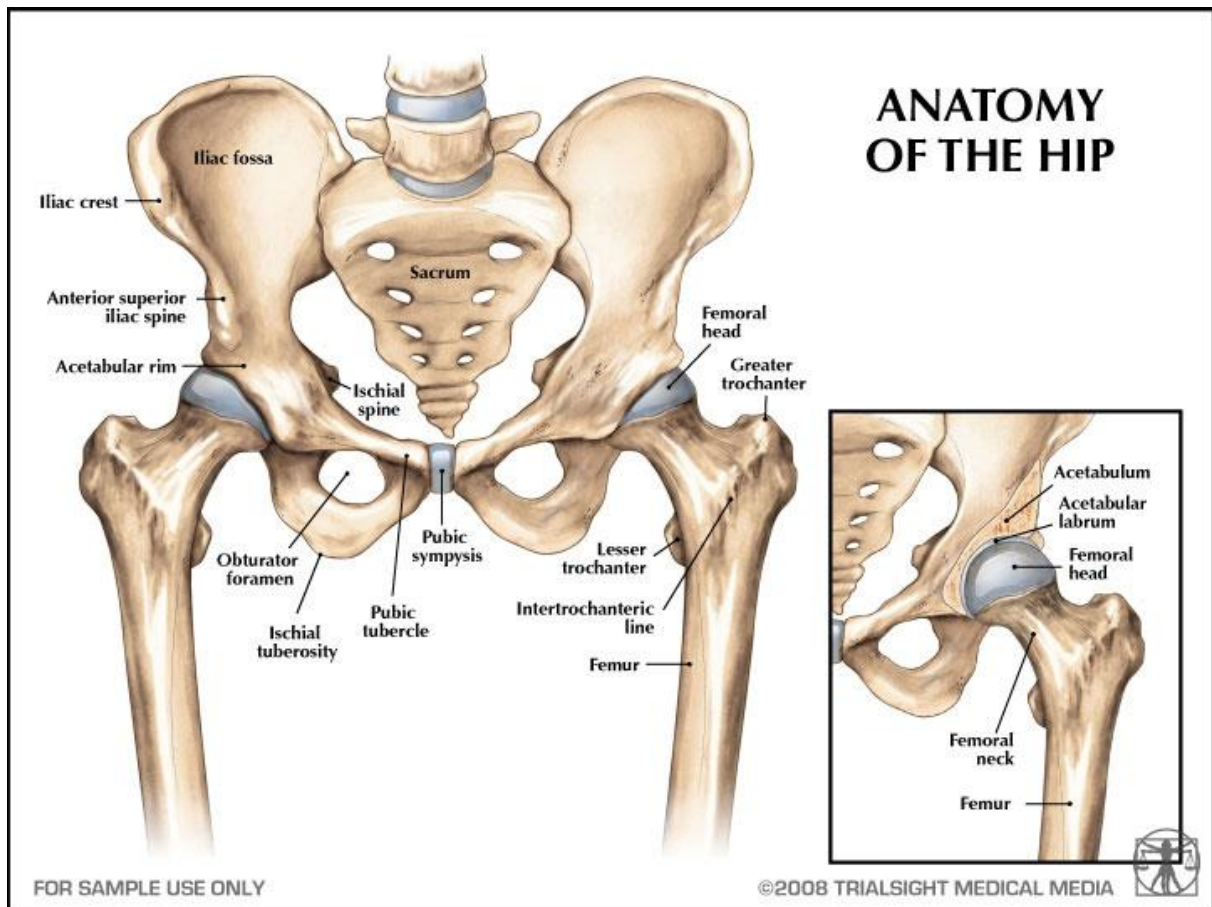
# Aims & Objectives

The aim of this self-directed learning package is to assist in further developing the knowledge and skills of nursing staff caring for the patient with straight leg or skeletal traction.

**By completing this package you should be able to:**

- Have a basic understanding of the anatomy of the hip.
- Identify and recognise indications, contraindications and precautions of traction
- Have an understanding of the different types of traction
- Have a basic understanding of how to apply straight leg traction
- Have an understanding of how to care for a patient in traction
- Provide adequate education to the patient whilst in traction.

# Anatomy of the Hip



The hip is one of the largest weight-bearing joints in the body. It is a very stable ball-and-socket joint. The femoral head at the top of the femur fits into the acetabulum. Ligaments form a capsule connecting femoral head and the acetabulum.

A layer of cartilage cushions the surface of the bones, helping the head to rotate easily in the acetabulum. Bursae cushion the area where muscles or tendons slide across bone. Synovial fluid lubricates the joint, further reducing friction and making movement easier (Zimmer, 2012).

Fractures of the hip occur mostly in people aged over 65, especially women. Most often they are as a result of osteoporosis. They are associated with mortality rates of up to 37% within the first year and an average of 50% returning to pre morbid level of function (Australian Institute of Health & Welfare, 2010). In younger patients hip/femur fractures are the result of high velocity/impact trauma (Whiting 2008).

Hip fractures often present with the leg shortened and rotated externally. They are generally classified into three major types, depending on the specific location of the fracture: femoral neck, intertrochanteric, and subtrochanteric fractures (Butler, Forte, Kane 2009).

Femoral neck fractures occur in the section of the upper femur that lies between the femoral head and trochanters. The blood supply to the femoral head is dependent upon a series of arteries that pass through the femoral neck region. Therefore, fractures of the femoral neck can disrupt the blood supply to the femoral head, resulting in increased risk of major complications such as fracture non union, or death of the bone tissue, called avascular necrosis (Butler et al 2009).

Intertrochanteric fractures occur between the greater and lesser trochanters. The trochanters are bony projections where major hip muscles attach. Unlike the complicated blood supply through the femoral neck, intertrochanteric hip fractures involve bone with good local blood supply. However, these fractures are complicated by the pull of the hip muscles on the bony muscle attachments, which can apply opposite forces against bone segments and pull them out of alignment. The healing complications for intertrochanteric fractures are therefore different from those of femoral neck fractures and are more likely to include shortening of the length of the femur or healing of the fracture in a misaligned position (Butler et al 2009).

Subtrochanteric fractures occur below the level of the lesser trochanter in the proximal portion of the femur. Subtrochanteric fractures may include only a short section of the proximal femur or may be part of a larger fracture pattern that involves both the intertrochanteric and subtrochanteric sections of the femur. The blood supply to the bone of the subtrochanteric region is not as good as the blood supply to the bone of the intertrochanteric region and therefore heals more slowly. Subtrochanteric fractures are also subject to opposite forces exerted by muscular attachments on the femur that tend to pull the fractured fragments out of alignment (Butler et al 2009.).

# What is traction?

Traction is used to manage fractures in an effort to realign broken bones; it is most often used as a temporary measure when operative fixation is not available for a period of time. It can either be applied through the skin (skin traction) or through pins inserted into bones (skeletal traction) (Bouska, Altman, Kerestzes & Wcisel 2010).

The Principles of traction are a pulling force that is applied to a part of the body, the limbs, the pelvis or the spine. Traction can be achieved via the use of the hands as in manual traction, the use of ropes, splints, pulleys and weights as in skin traction and through pins, wires and tongs inserted in bone as in skeletal traction (Byrne 1999).

Traction was very common in orthopaedic management until recent years when internal fixation became common place. The advances in surgical reduction of fractures along with research querying the effectiveness of traction have lead to a decline in its use (Butler et al. 2009).

# Indications, contraindications and precautions of Traction

Traction is used to promote rest and immobilisation and to restore and maintain alignment allowing bones and soft tissue to heal. It helps to rest inflamed joints, correct deformities, overcome muscle spasms and therefore aids in pain relief and can aid in the reduction of subluxations and dislocations (Butler et al, 2009).

Contraindications and precautions of traction are important to consider. Good skin integrity is essential prior to the application of skin traction. If the skin of the patient is broken, is tissue paper or has dermatological problems traction is contraindicated (Byrne, 1999). Other possible adverse effects of traction may include ischemia due to tight bandages; skin reactions to tapes applied to the skin; pressure areas from traction itself or from decreased bed mobility (Handoll, Queally & Parker. 2011).



# Types of Traction

1) Manual traction – a pulling force applied by a person to the effected body part via their hands. It must be a constant and gentle pull. Manual traction is used to reduce simple fractures prior to plaster application or during surgery. It is also used during traction set-up and if there is a need to temporally release the traction weight (Byrne, 1999).

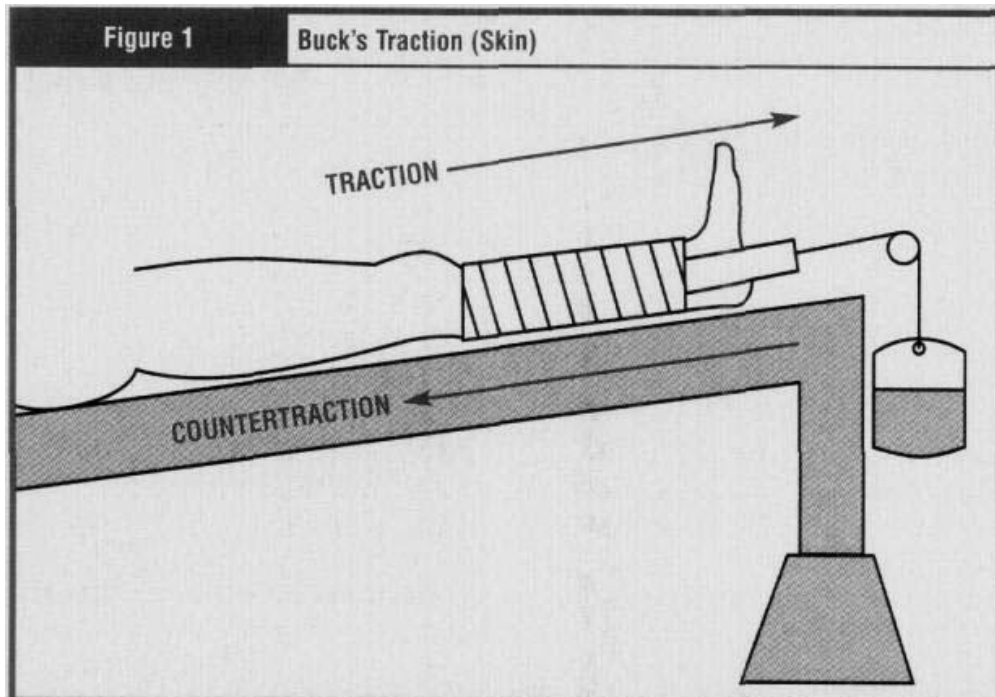
2) Skin Traction – a pulling force is applied to the skin of the affected body part with either adhesive or non adhesive skin extensions, splints, foam boots pelvic slings and cervical halters. Weight should not exceed 7-9 pounds or 3-4 kilograms. (Zimmer, 2009)

3) Skeletal Traction - a pulling force applied directly to the skeleton via pin, wires or screws which are inserted into the bone. This allows greater weight to be used (up to 30 pounds) and is often used for unstable fractures or for fractures needing long term traction (Bouska et al 2010).

Skin traction (Also called Buck's or straight leg traction) exerts a pull in one plane to the lower limb. It is often used to immobilise hip fractures prior to surgery and reduce muscle spasm. It may also be used for hip dislocations, non displaced fractures of the acetabulum and hip and knee contractures (Bouska et al, 2010).

The pt is put in a supine position with the legs straight in the natural position, which is in slight abduction. A boot or wrap is then applied and the traction force is exerted in line with the long axis of the leg, via a rope attached to a footplate of the boot/extension, passing over a pulley at the end of the bed connecting to a weight. Counter traction is achieved by elevating the foot of the bed to a level that prevents the pt being dragged off the bed (Bouska et al, 2010).

## How to apply skin traction



(Byrne, 1999)

### Equipment required

- A traction bed end with a pulley
- An adhesive traction kit containing one skin extension with a spreader plate, traction cord and a retaining bandage
- A weight bag
- Role of tape
- Scissors

Two people are needed. The footboard of the bed needs to be removed and the traction frame put in its place. The waterbag needs to be filled according to the prescribed weight.

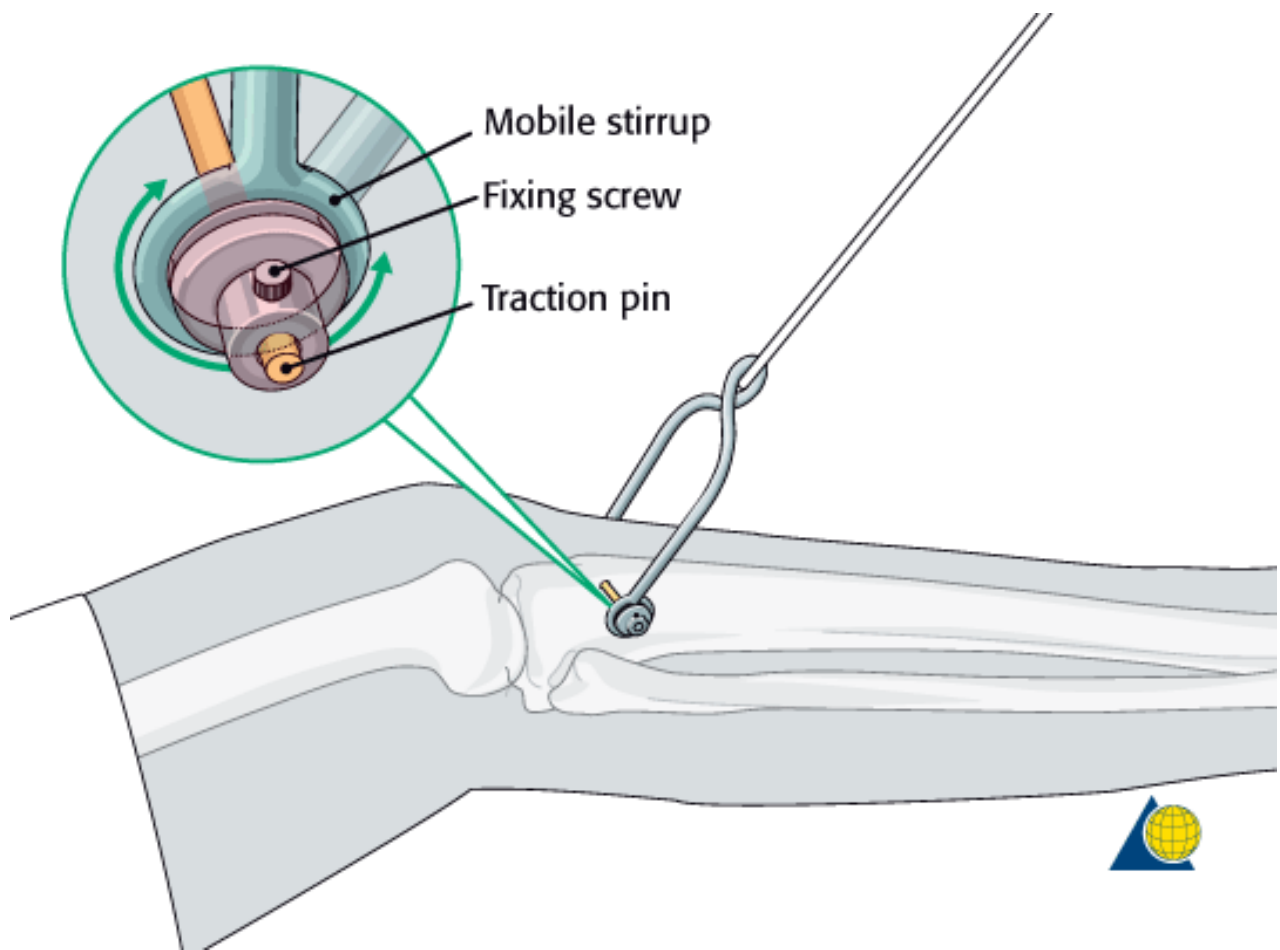
The patient should be in supine position with the legs extended in slight abduction. If the leg is internally or externally rotated as a result of the hip fracture it should not be overly manipulated to achieve the anatomical position as this can cause neurovascular damage.

Before putting on the skin traction the patient's neurovascular status should be assessed to gain baseline data. One person should now hold the affected leg, supporting the heel and applying steady manual traction. The extension is fitted around the leg leaving enough room between the sole of the foot and the spreader plate to put three fingers beside each other.

The second person now bandages over the extension, commencing two finger widths above the Achilles tendon and finishing two finger widths below the head of the fibula. The malleoli, the head of the fibula and the popliteal fossa should be avoided as these are pressure points- areas where superficial nerves pass along the skin .The end of the bandage is secured with tape.

The traction cord is passed over the pulley in line with the foot (ensuring the pulley is in the correct position) and the water-filled weight bag is attached. The end of the traction cord should be tied securely and finally the foot of the bed should be elevated to provide counter traction (Byrne, 1999; GNAH 0230, 2011).

## Skeletal traction



Skeletal traction is the application of traction directly to bone using pins, inserted in the operating theatre by the surgeon. It better immobilizes the affected bone and allows for more precise alignment of a fracture. It may also provide stronger and more consistent pull than skin traction. Skeletal traction can be used for a short-term treatment before surgery or can allow for an extended period of therapy when needed. It allows for weights of up to 20 or 30 pounds during this time. There are several types of skeletal traction, including balanced suspension traction, halo traction, external fixation, and skull tongs (Zimmer, 2009).

When skeletal traction is in use, pain management and preventing complications are major nursing interventions. The patient may experience pain during the placement of pins, when being moved, or with routine pin care (AO foundation, 2012).

## Caring for a patient in traction

Complications that occur during traction are often caused by impaired mobility. These may include respiratory complications, constipation, decreased circulation in the lower extremities, diminishing muscle strength in the affected extremity, skin breakdown, and social isolation to name a few. The patient should be encouraged to move themselves in bed as much as possible to avoid complication. If they are unable to move themselves using the monkey bar, assistance may be given to roll side to side, using a pillow between their knees to support the top leg.

Skin integrity is one of the obvious problems, especially in the elderly that have to be in traction for a long time. The skin should be inspected before application of the traction and any bony prominences need to be padded. In addition, the traction must be inspected throughout the shift to ensure the line of pull is maintained, all clamps are tightened and there are no fraying ropes or unsecured knots that could endanger the patient. Ropes must move freely over the pulleys, the line of traction should be maintained at all times. Neither weights nor ropes should touch the bed or sheets. When moving the patient the weight should not be removed. When undoing the skin extensions once per shift manual traction needs to be applied (Bouska et al, 2010).

There is also a high risk for peripheral dysfunction such as compartment syndrome or nerve paralysis. Neurovascular checks and assessment of movement should be done before applying traction then hourly for the first twenty-four hours and if all is well four-hourly there after. Too much weight can lead to tissue damage and the traction consequently needs to be removed once per shift to check the integrity of the skin. Patients should be encouraged to move themselves around the bed (Bouska et al, 2010).

Traction weights should never touch the floor, drag on bed parts or touch other weight systems. These conditions can reduce the applied force and cause the traction apparatus not to perform as intended. Do not allow traction weights to hang over any part of the patient. Traction cord does occasionally slip or break so it is important not to allow the traction weight to strike and injure the patient. A bed cradle may be necessary to avoid the bed clothes interfering with the traction (Zimmer, 2009).

## **Skeletal traction pin site care.**

1. Wash hands and set up equipment.
2. Remove any crusts/scabs and/or sloughy areas around pin sites by cleaning with normal saline for irrigation and gauze. Swab from the pin site outwards then discard swab.
3. Assess for signs of infection/inflammation, pain and/or skin tension.
4. Observe for signs of tenting and push skin off pins if necessary, using forceps from dressing pack to push skin back.
5. Apply Sof-Wick dressing around the pin site if discharge present.
6. Pin site care is to be attended at least daily and more frequently as required.
7. Attend and record patient's temperature as per HNE Policy Compliance Procedure Vital Signs Observations 16 Years and Over and report to MO if febrile or there are signs of infection (GNAH 0232, 2011).

# Associated Procedures & Guidelines

Access via the Policy, Procedure, Guideline portal on the Intranet

Step 1: Go to the Intranet Page on computer desktop

Step 2: Click on Policy, Procedures and Guidelines

Step 3: Type in traction in the search space and click on “search all fields”

Step 4: Scroll down and open document you require

GNAH – Application of Hamilton Russell Traction & Nursing Care GNAH\_0231

GNAH – Application of Pelvic Suspension Traction GNAH\_0235

GNAH – Application of Skeletal Traction and Nursing Care GNAH\_0232

GNAH – Application of Straight Leg Traction – Buck’s Traction GNAH\_0230

GNAH – Nursing Management of Patient in Pelvic Traction GNAH\_0236

GNAH – Pin Site Care GNAH \_ 0233

GNAH – Removal of Skeletal Traction Pin GNAH\_0234



# Learning Activity

1. What two components make up the hip joint?

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2. What are the 3 main types of hip fractures and where on the femur do they occur?

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3. Name at least 5 reasons for traction

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4. When bandaging the traction, what areas should be avoided and why?

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5. What observations should be attended on a patient with traction?

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6. Name the risks associated with a patient in traction?

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7. What are 3 key points to educate patients in traction on during their treatment?

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## Answers

1. Femoral head & acetabulum
2. Femoral neck, intertrochanteric & subtrochanteric
3. rest, immobilisation, analgesia, correct deformities and maintain alignment
4. Malleoli, fibula head and popliteal fossa
5. Before applying traction then hourly for the first twenty-four hours and if all is well four-hourly there after. General routine observations.
6. Pressure areas, constipation, compartment syndrome, infection (skeletal), immobility, decrease in function, respiratory dysfunction.
7. Reasons for traction; the need for regular movement in the bed & pressure area care; frequency of observations and the need to notify staff of any change in sensation as soon as possible.

# REFERENCES

- Bell, A, Leader, M, Lloyd, H. (2008). Care of pin sites. *Nursing Standard*. 22, 33, 44-48.
- Bouska, Altman, G; Kerestzes, P & Wcisel, M. (2010.). *FUNDAMENTAL & ADVANCED NURSING SKILLS* (3rd Ed.). Chapter 10. Immobilisation and support. Access via statref.com
- Butler M, Forte M, Kane RL, et al. Treatment of Common Hip Fractures. Rockville (MD): Agency for Healthcare Research and Quality (US); 2009 Aug. (Evidence Reports/Technology Assessments, No. 184.) Accessed via Cochrane review.
- Byrne, T. (1999). The setup and care of a patient in Buck's traction. *Orthopaedic Nursing*. 18, 2, 79-83. .
- GNAH\_0230: Local Clinical procedure: Application straight leg skin traction. *GNAH Patient Safety and Clinical Risk Committee*. Reviewed 2011.
- GNAH\_0232: Local clinical procedure: Application skeletal traction and nursing care. *GNAH Patient Safety and Clinical Risk Committee*. Reviewed 2011.
- McKenzie, L. L. (1999). In search of a standard for pin site care. *Orthopaedic Nursing*. 18, 2, 73-78.
- Patterson, M.M. (2005). Multicenter Pin Case Study. *Orthopaedic Nursing*. 24, 5, 349-360.
- [http://www.trialsightmedia.com/exhibit\\_store/index.php?main\\_page=product\\_info&products\\_id=4](http://www.trialsightmedia.com/exhibit_store/index.php?main_page=product_info&products_id=4)
- Walker, J.A. (2007). Evidence for skeletal pin site care. *Nursing Standard*. 21, 45, 70-76.
- Whiteing, N.L. (2008). Fractures: Pathophysiology, treatment and nursing care. *Nursing Standard*.

- Zimmer Traction Handbook: A Complete Reference Guide to the Basics of Traction, 9<sup>th</sup> Edition. (2009).