



SECTION 13: CARE OF THE CHILD WITH AN ORTHOPAEDIC CONDITION

13.4 Traction

13.4.1 Principles and Management of Skin Traction

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PRINCIPLES OF TRACTION MANAGEMENT

Aims ¹

- To maintain anatomical alignment of affected bones whilst fractures heal.
- To maintain joints in a functional position.
- To overcome muscle spasm and relieve pain associated with muscle spasm.
- To rest inflamed joints.
- To gradually correct deformities due to contracted soft tissue.

Definition

Traction is the application of a pulling force to a part of the body.

Counter traction is the pull or thrust in the opposite direction required for overcoming muscle spasm and preventing the patient from being pulled towards the traction pull.¹

Modes of traction ²

Manual traction

A firm steady pull with the hands to temporarily immobilise an injured part.

Skin traction

An adhesive or non adhesive material is applied to the skin surface. A traction pull is transmitted through to the underlying tissues and bone. Examples of skin traction include Bucks, Bryant's (Gallows), Thomas splint and Hamilton Russell.

Skeletal

A strong, steady, continuous pull through a bone using a sterile metal pin/wire inserted into a bone.

Key points

- Traction of any modality is only to be applied by appropriately trained staff under the direction of an orthopaedic surgeon. Refer to Orthopaedic Ward Clinical Protocols for full instruction.
- Pain management must be addressed prior to application of any type of traction.
- With the exception of children in Buck's Boots traction, perform neurovascular observations within ten minutes of applying traction and hourly thereafter for the first 24 hours.³ Reduce frequency according to the child's clinical condition or as requested by the treating orthopaedic surgeon. Refer to [PNPM 13.1](#) Neurovascular Observations.

- Routine nursing care will be attended to daily and as required and will include maintenance of skin integrity and prevention of pressure injury. Refer to CAHS [Pressure Injury Prevention and Management Guideline](#).
- Traction equipment is to be checked at least daily.³
- Encourage the child to exercise as per physiotherapist regime to minimise the risk of unaffected joints becoming stiff.

Routine nursing care

- Nurse the child in a recumbent position with one head pillow - except for meals, toileting and school work.¹ (Gallows traction and cervical traction excepted).
- Maintain the child's position in the centre of the bed.
- Monitor and maintain the child's skin integrity as per CAHS [Pressure Injury Prevention and Management Guideline](#).
- Bandages should be:
 - applied from distal to proximal, and from lateral to medial
 - non restrictive
 - wrinkle free
 - Outer heavy weight cotton crepe bandage to be reapplied daily.³
- Ensure traction will be provided by the child's body weight, the pull of the weights in the opposite direction and the elevation of the bed.
- Ensure counter traction is maintained; continuous traction with a correct line of pull and there is appropriate elevation of the foot or head of the bed appropriate to the type of traction being used.
- Bed linen will not impede the ropes.
- Ropes will run freely through pulleys.
- Ropes will not be frayed and all ends will be secured with brown leucoplast tape.
- Non-slip knots will be used.
- Weights will be as ordered and hang freely.
- Weights will not be lifted to assist the patient during repositioning.
- All nuts and bolts on the traction frame will be firmly secured.

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SKIN TRACTION

Mode of Action

Skin traction uses the patient's skin as the anchor point for the weight or force.² Application of adherent or non-adherent tapes medially and laterally to the affected limb(s) allows the force to be transmitted through the soft tissue resulting in a traction pull to the limb.

Precautions

- Adhesive skin extensions should only be used on children with intact skin and good circulation. Check for allergies to adhesives.
- Use non-adhesive extensions for children with fragile skin, impaired sensation or known allergy to Elastoplast.

Application of skin extensions:

Key points

- This procedure will only be performed and managed by staff who have been trained in the skill.
- The child's presenting diagnosis will determine whether the adhesive traction material is to be applied above or below the knee.
- Use ready-made skin traction kits wherever possible.
- This procedure requires two nurses – one to support the limb in the correct position and apply gentle traction, the other to apply the extensions.

Steps	Additional Information
<p>Application of non adhesive skin strip (leg)</p> <ul style="list-style-type: none"> • Unroll the non adhesive extensions and cut to the prescribed length – rounding the top edges. • Apply a small square of self-adhering foam pad to the medial and lateral malleoli. (Found in Traction Trolley). • Ensure the metal spreader is positioned to allow plantar flexion and dorsi flexion of the ankle. 	<p>Rounding conforms to the skin contours and will aid in the prevention of pressure injuries.</p> <p>To prevent pressure injuries developing over the bony prominences.²</p> <p>To maintain mobility of the ankle joint and prevent contractures of the Achilles tendon.</p>

Steps	Additional Information
<p>Application of adhesive skin strip (leg)</p> <ul style="list-style-type: none"> • Unroll the adhesive extensions and cut to the prescribed length – rounding the top edges. • Apply the integral foam ends of the traction kit to the medial and lateral malleoli. • Ensure the spreader is positioned to allow plantar flexion and dorsi flexion of the ankle. • Apply the skin extensions to the skin up to the required position, ensuring no wrinkles or creases form during application. • Apply the heavy weight cotton crepe bandages firmly but not too tight over the skin extensions from distal end to proximal end of limb using a simple spiral technique.³ 	<p>Rounding conforms to the skin contours and prevents peeling at the corners.</p> <p>To prevent pressure injuries developing over the bony prominences.²</p> <p>To maintain mobility of the ankle joint and prevent contractures of the Achilles tendon.</p> <p>Pressure injuries may form in the presence of creases in the adhesive.</p> <p>To keep the skin extensions in place and to transfer the forces to the skin and underlying tissues.⁷</p>
<ul style="list-style-type: none"> • Apply the prescribed mode of traction. 	

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MODES OF SKIN TRACTION

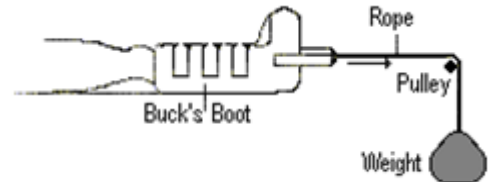
1. Buck's Boot Traction

Aims of Buck's boot traction:

- To keep the child non weight bearing.
- To rest the hip joint.

Mode of Action ²

Buck's boots are applied to both of the child's extended legs. Traction is exerted bilaterally by weights that are attached by ropes to the boots. Counter-traction is achieved by elevating the foot of the bed and the child's weight.



Steps	Additional Information
<p>Application</p> <p>Choose boots (small, medium or large) appropriate to the size/age of the child.</p>	<p>Poorly fitting boots may reduce the effectiveness of the traction.</p>
<p>Place legs snugly into the boots, ensuring the child's heel is fitted well into the heel of the boot and secure with Velcro tabs.</p>	
<p>Using a non slip knot (clove hitch) tie the rope to the rings at the distal end of the boots and thread through the pulleys. Secure the weight bags to the ropes.</p>	<p>The maximum total weight will be no more than eight pounds (8lb) -eight is divided equally between the two legs. Weight should be calculated as per Orthopaedic Ward Traction Manual</p> <p>Note: Medical staff may order alternative weights.</p>
<p>Ongoing care</p> <p>In addition to routine care:</p> <ul style="list-style-type: none"> • Remove the boots every four hours for fifteen to twenty minutes. • Whilst the child is awake encourage gentle active and passive exercises to all unaffected limbs four hourly. • If abduction of the hips is required, use the traction apparatus and/or a foam wedge to obtain the desired position. 	<p>Removal of the boots allows for skin inspection, and attention to activities of daily living.</p> <p>To preserve muscle tone and flexibility.</p> <p>Abduction will be gradually increased over time.</p>

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2. Thomas Splint

Mode of Action ⁴

The pull is exerted against a fixed point; ie. the ropes are tied to the distal end of the Thomas Splint and the leg is pulled down until the ring of the splint rests up against the ischial tuberosity, iliac crest and the adductor tendon.

Key points

- Application of a Thomas Splint will be performed and managed by staff who have been appropriately trained in the skill.
- Monitor for signs of complication eg. fat embolism. Refer to the Orthopaedic Ward protocol.
- The following cares will be performed in addition to [routine nursing care](#).

Steps	Additional Information
Ensure: <ul style="list-style-type: none"> • the ring fits snugly into the groin and up against the iliac crest. • its length allows space for plantar flexion of the foot. 	The groin provides the proximal fixed point for the traction. Plantar flexion of the foot is necessary to allow exercises and prevent complications including pressure injuries.
Ensure the slats/slings supporting the leg are: <ul style="list-style-type: none"> • smooth, with safety pins secured on the lateral posterior aspect; • supported and secured so as not to slip down the splint; • positioned well above the Achilles tendon. 	Support and maintenance of correct leg position will promote optimal conditions for healing of the bone and decrease pain caused by muscle spasms. To prevent pressure on the Achilles tendon and minimise the risk of foot drop.
Place cotton combine dressing over the full length of the slats/slings.	Provides padding to minimise discomfort for the patient.
Oil the ring thoroughly every 1-2 hours until swelling has subsided, stretching to a maximum of 2-3 hourly. Inspect skin integrity under the ring at this time.	Minimises the friction between the skin and the Thomas Splint ring, reducing the risk of a pressure injury.
Ensure lattice rope at the end of the splint is tight.	This rope provides majority of the traction and ensures the leg is kept in an optimum position for healing to occur.

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3. Hamilton Russell Traction

Mode of Action

A pull is exerted against an opposing force provided by the weight of the body when the foot of the bed is elevated.⁴ The compounding effect of the pulley positions in line with the traction pull on the leg nominally doubles the applied weight.

PROCEDURE

- Application of Hamilton Russell Traction will be performed and managed by staff who have been appropriately trained in the skill.
- The following cares will be performed in addition to routine nursing care and as required.

Steps	Additional Information
Nurse in a recumbent position with one head pillow only. Elevate the foot of the bed.	Patient may sit up in this traction, but a percentage of traction is lost. Encourage sitting only once callous is forming and patient is comfortable.
Unless otherwise specified by the doctor, place a pillow under the affected leg between the knee and above the Achilles tendon.	Aids in hip flexion, supports the lower leg and keeps the heel off the bed. ⁵ A towel or foam roll will also suffice if no suitable pillows are available
Maintain the pulley almost vertically above the patella. ⁵	The combination of the vertical and the horizontal pull produces a pull in line with the long axis of the femur. ⁵
When attending to daily re-bandaging, apply gentle manual traction to the distal limb. This requires two people. One to re-bandage and one to provide the traction.	Minimises risk of muscle spasm.
Ensure the patella/knee joint remains free of the bandage.	Allows free movement of the knee joint and prevents stiffness.
Position the sling at the knee.	Support and maintenance of correct position of the leg will promote optimal conditions for healing of the bone.
Place cotton combine between the knee and the sling.	Provides padding to minimise patient discomfort.
Inspect skin integrity under the knee sling	Ensure skin is free of pressure and integrity is not impaired. Refer to Pressure Injury Prevention and Management Guideline .

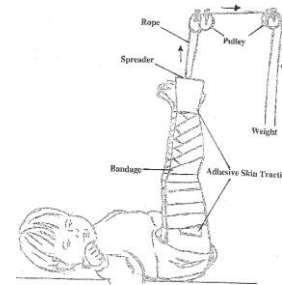
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4. Bryant's (Gallows) Traction

Mode of Action

Traction is exerted via skin extensions to both legs. The child is positioned with hips flexed to 90° and both legs are suspended vertically. The unaffected leg is always included to maintain the desired position and to facilitate toilet care.

Sufficient weight is applied to the legs so as to lift the buttocks off the bed when the child is at rest. The counter-traction is the gravity pull on the child's body.⁶



Key points

- Owing to the serious risk of ischaemia to the calf muscles, this traction is only recommended for infants/toddlers less than two years of age who weigh less than 15 kg.^{2, 7, 8}
- The risk of ischaemia increases in proportion to the distance the blood has to circulate against gravity. Therefore if the child is tall for his/her for age, this risk should also be considered with the above parameters.
- Application of Bryant's Traction will be performed and managed by staff members that have been appropriately trained in the skill.

PROCEDURE

- In addition to [routine nursing care](#), attend to the following cares daily and as required:

Steps	Additional Information
Nurse the patient on his/her back with the buttocks free of the mattress.	This position ensures counter traction is achieved. ⁷
Position the pulleys vertically above the infant's feet.	This position will maintain hip flexion of 90°. ⁷
Check the weight of the water bags daily when the child is at rest.	The weight must be sufficient to ensure the buttocks are suspended just above the surface of the bed when the child is at rest.
When attending to re-bandaging, support the distal limb. This requires two people - one to re-bandage and one to provide support of the leg.	This prevents potential skin shearing of the skin traction, allows maintenance of skin integrity and minimises risk of spasm.
Monitor the child's circulation closely.	

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5. CERVICAL TRACTION - Glisson Sling

Mode of Action

Traction is applied via the use of a specially designed halter, which fits anteriorly around the chin and posteriorly around the occiput. Traction is exerted in a straight line by means of a weight attached by a cord to a spreader on the halter. The counter traction is provided by the child's weight when the head of the bed is elevated.⁷

Key points

- Application of cervical traction will be performed and managed by staff who have been appropriately trained in the skill.
- Maintain the traction so that a constant gentle pull is exerted on the head and neck.
- If intermittent traction is prescribed, plan the child's daily activities to ensure maximum benefit is gained from the treatment. Consideration must be given to the age of the child and the reason for the traction when planning care.^{2,7}
- Children in cervical traction may also require full neurological assessments as ordered by the medical team.
- Monitor the child for complaints of jaw pain and report to the treating medical team as this may indicate too much weight is being applied to the mandible.

PROCEDURE

- In addition to [routine nursing care](#), the following procedure will be performed daily and as required:

Steps	Additional Information
Maintain the child in a recumbent position in the centre of the bed. Use a 1 inch spinal head cushion only.	A small soft neck roll may be used to achieve extension of the neck if required. ⁷
Elevate the head of the bed ² to achieve counter traction.	Precise head elevation will be determined by child's symptoms and/or doctor's orders (usually not greater than 30°).
Place sandbags either side of the head.	This will prevent rotation of the head.
If the child is to be re-positioned, support the head and neck.	Minimises the risk of flexion or rotation occurring during controlled movement.
Manage all activities so as to prevent flexion of the neck and rotation of the head.	This includes activities of daily living, recreational activities and school work.
Provide 2/24 pressure area care to the chin, earlobes, occiput and all bony prominences.	Refer to Pressure Injury Prevention and Management Guideline .


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Related policy, procedures and guidelines.
Neurovascular Observations (PNPM 13.1)
Pressure Injury Prevention and Management (CAHS policy) Pressure Injury Prevention and Management Guideline.
Fracture Care and Management (PNPM 13.2) <i>pending review</i>

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