

Traumatic Orthopedic Injuries and Therapy Implications

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Objectives

- You will learn some basic traumatic orthopedic injuries, weight bearing precautions and possible surgical fixations that patients may sustain.
- You will learn how traumatic orthopedic injuries can affect adls and self care mobility.
- You will learn the different DME, and adaptive equipment needs for adls after sustaining traumatic orthopedic injuries to be as independent as possible.

Disclosure

- I have no financial benefits from this presentation.

Common Mechanisms of Injuries

Motor vehicle Accident

Motorcycle crash

Falls

Gun shot wounds

Ped vs Car

Assault

Type of Fractures

Stable fracture-
bones line up and
not significantly
out of place.

Compound
fracture-when the
bone pierces the
skin.

Transverse
fracture-horizional
fracture across
the bone.

Oblique fracture-
fracture at an
angle of bone.

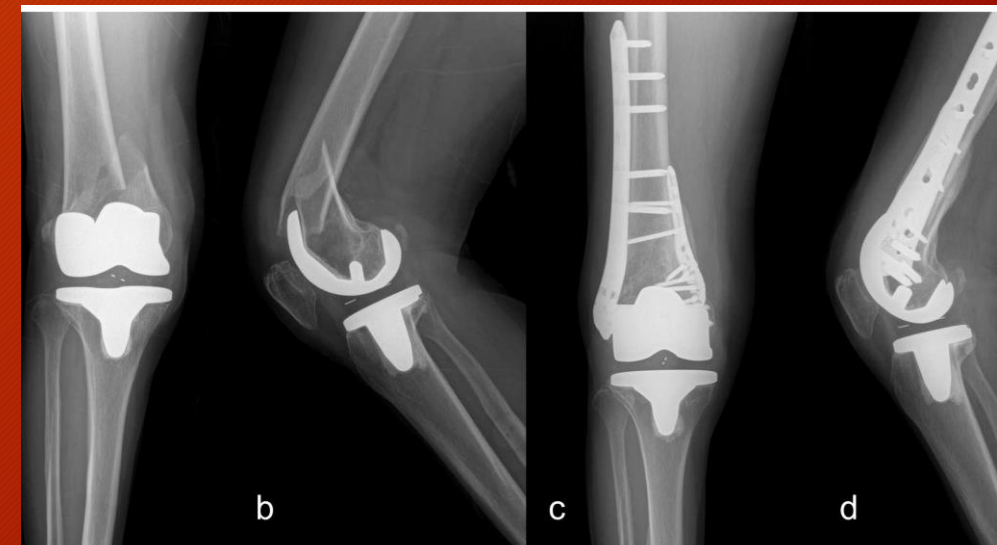
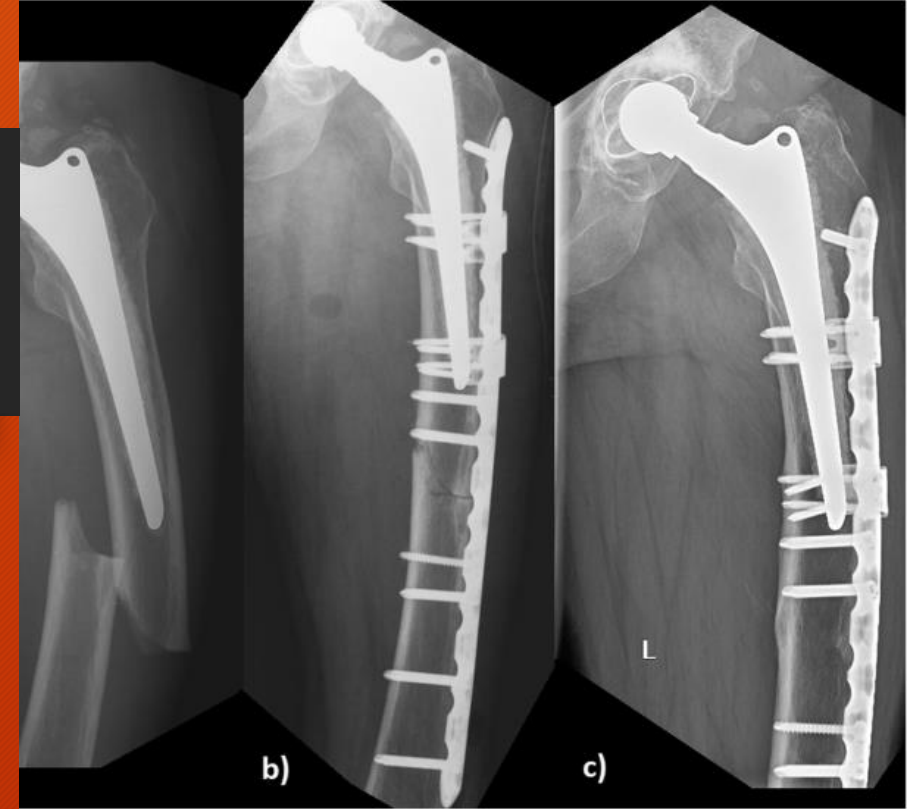
Pathological
fracture-fracture
caused by
weakened bone.

Spiral fracture-
bone is twisted at
the site of the
fracture.

Comminuted
fracture-bone
breaks into
multiple pieces.

Periprosthetic Fractures

- Periprosthetic fractures are fractures that occur in association with an orthopaedic implant, most often used for joint arthroplasty or previous ORIF.



Fixations

- External fixation
- Traction
- Open Reduction Internal Fixation(ORIF)
- Intramedullary nailing (IMN)
- Orthotic devices
- Casting/splinting

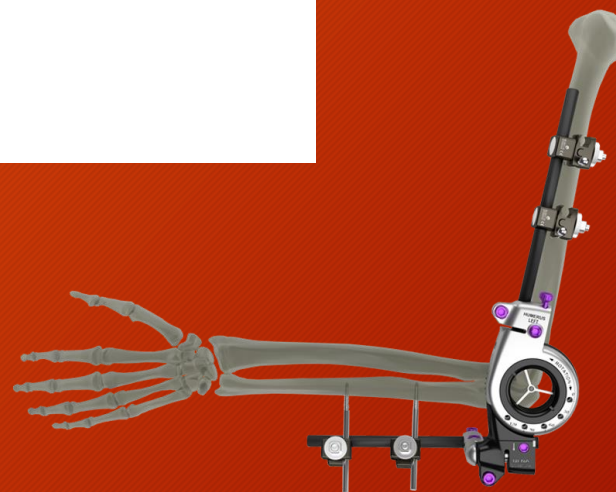
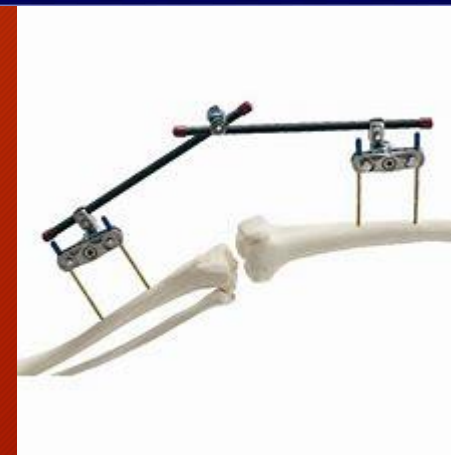
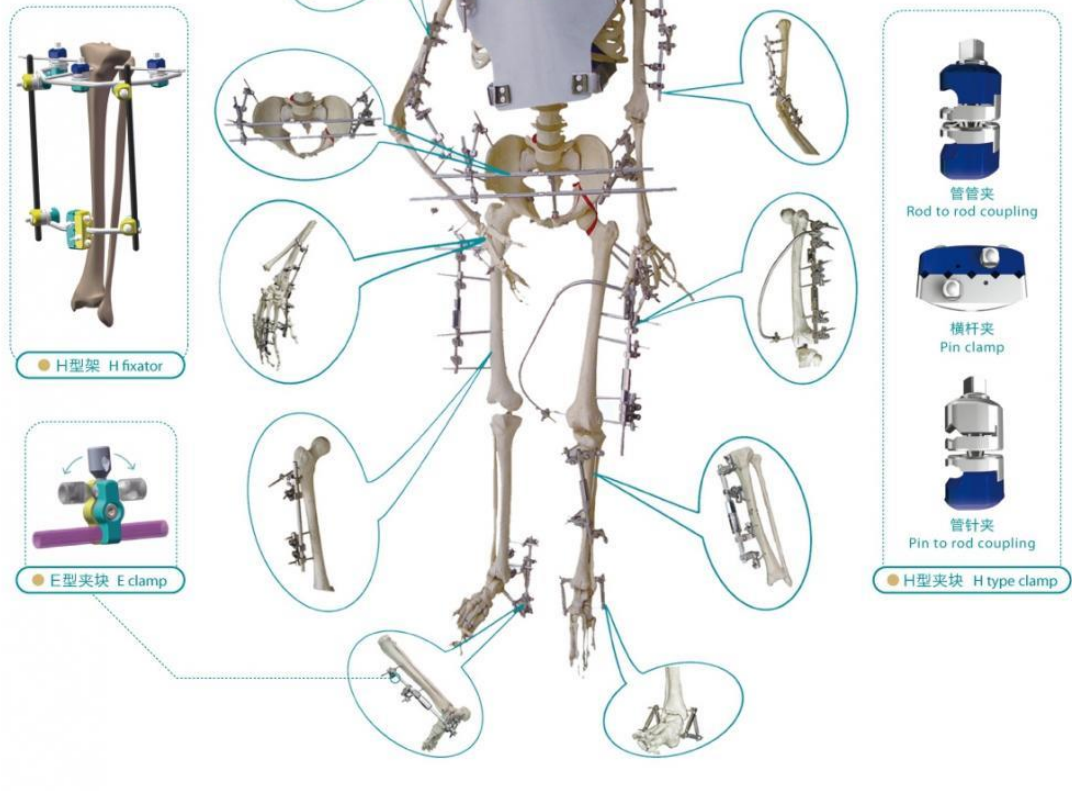
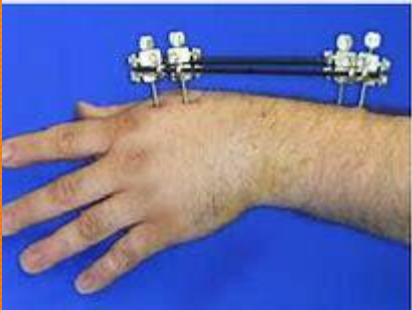
External Fixation

- External fixators are often used in severe traumatic injuries. It is an immediate stabilization while allowing access to soft tissues that may also need treating. Such as; significant damage to skin, muscle, nerves, or blood vessels.
- Temporary stabilization until swelling goes down and can be surgically repaired.
- You can ex fix any bony part of your body
- Lift from the bars except for pelvic ex fix. You could further displace the fracture.
- Encourage patients to lift the ex fix them selves.
- Usually, NWB of the extremity. Some occasional WB
- ROM limited unless they have a Dynamic ex fix-usually elbow

External Fixation

- Less chance of infection except at pin site
- Daily checks for possible definitive fixation. Patients can dc and then return for ORIF if medically stable.
- Elevate, ice, and movement(prevent DVTs) so they can do final fixation. Skin needs to be “wrinkled” to be ready for surgery. Usually, 1-2 weeks before surgery
- Sometimes it’s the definitive fixation if risk of surgery is high.
- They should not be on bedrest!

Spanning External Fixation





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Alex Smith-Football Player

<https://youtu.be/bmGHyyDXW-I>

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R tib/fib compound fracture and complications of infections.

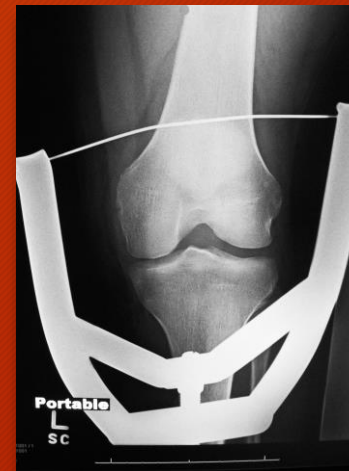


Traction

- Traction is a technique for realigning a broken bone or dislocated part of the body using weights, pulleys, and ropes to gently apply pressure and pull the bone or injured body part back into position.
- After a fracture, traction can restore the position of a bone during the early stage of healing or temporarily ease the pain while you are waiting for further corrective surgery.
- There are two main types of traction:
 - Skeletal traction
 - Skin traction

Skeletal Traction

- Skeletal traction is used for fractures of the femur, pelvis, hip, and certain upper arm fractures. It involves inserting a pin or wire directly into the bone, then attaching weights through pulleys or ropes to it that control the amount of pressure applied.
- Skeletal traction is used for fractures that require a high amount of force applied directly to the bone, as it allows more weight to be added with less risk of damaging the surrounding soft tissues.
- If you need skeletal traction, it will be done with an anesthetic, so you don't experience too much pain.



Skin Traction-Buck's Traction

- Skin traction is less invasive than skeletal traction and uses splints, bandages, and adhesive tapes positioned on the limb near the fracture and is applied directly to the skin.
 - Femoral neck fracture
 - Nondisplaced acetabulum fracture
 - After reduction of hip dislocation
- Weights and pulleys are attached, and pressure is applied. When a bone breaks, the muscles and tendons can pull the extremity into a shortened or bent position.
- The traction can hold the fractured bone or dislocated joint in place. This can cause painful movement at the fracture site and muscle cramping.

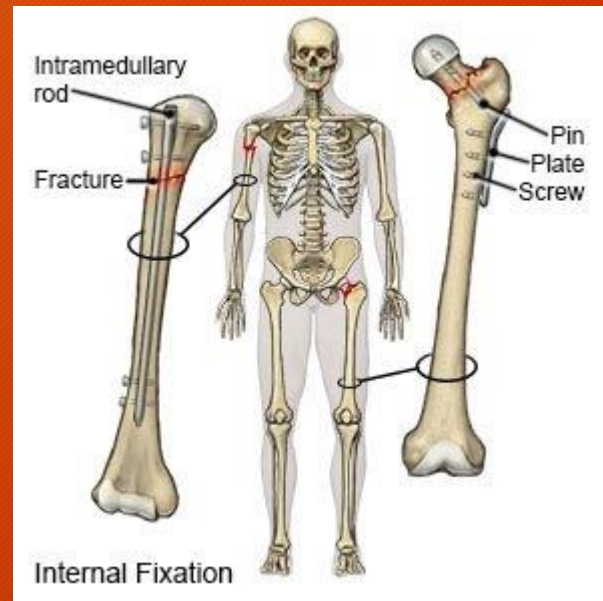


Traction Issues

- The prolonged immobility can cause several potential issues including:
 - Bedsores
 - Possible respiratory problems
 - Circulatory problems-DVTs

Intramedullary nailing (IMN)

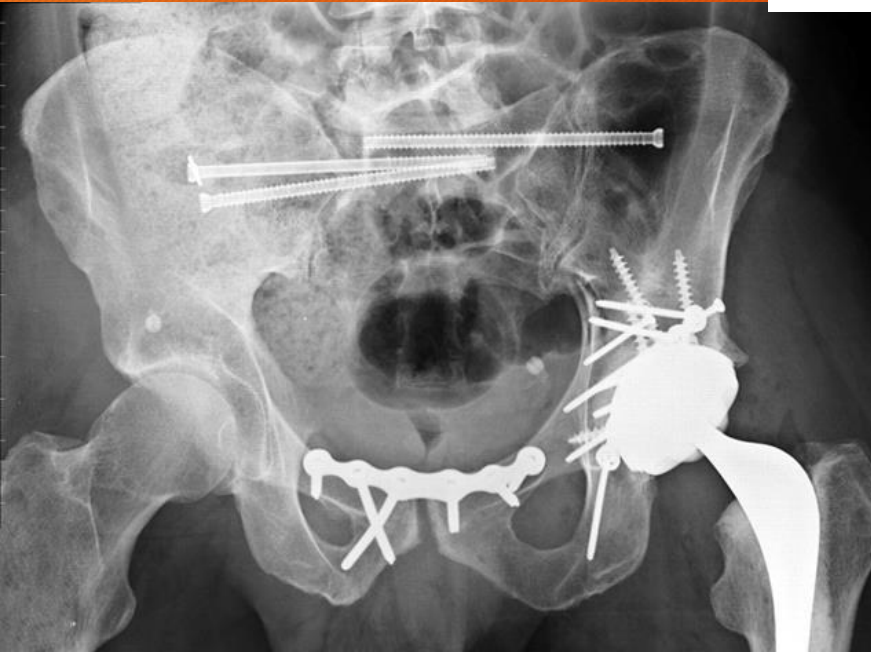
- Intramedullary nailing is surgery to repair a broken bone and keep it stable. The most common bones fixed by this procedure are the thigh, shin, hip, and upper arm. A permanent nail or rod is placed into the center of the bone. It will help you be able to put weight on the bone.



Open Reduction Internal Fixation

- Open reduction internal fixation (ORIF) is a surgery to fix severely broken bones.
- It's only used for serious fractures that can't be treated with a cast or splint. These injuries are usually fractures that are displaced, unstable, or those that involve the joint.
- “Open reduction” means a surgeon makes an incision to re-align the bone. “Internal fixation” means the bones are held together with hardware like metal pins, plates, rods, or screws. After the bone heals, this hardware isn't removed.
- Generally, ORIF is an urgent surgery. Your doctor might recommend ORIF if your bone:
 - breaks in multiple places
 - moves out of position
 - sticks out through the skin
- ORIF may also help if the bone was previously re-aligned without an incision – known as closed reduction – but didn't heal properly (malunion).

Open reduction
internal fixation
(ORIF)



Orthotic devices

- CAM boot
- Night splints
- Sarmiento brace
- Hinge knee brace
- TLSO, etc
- Hip ABD brace
- Shoulder braces



Casting or Splinting

- Hand/arm splints
 - Fractures
 - Tendon injuries/repairs
 - Sugar tong splints-prevents supination and pronation
- Casts-not removable



Half-Posterior Splint



Posterior Ankle Splint



Sugar-Tong Splint
(U-splint)



Common Precautions

- NWB-Non weight bearing
- WBAT-Weight bearing as tolerated
- TTWB-Toe Touch weight bearing
- 50% WB-50% weight bearing
- Flat foot WB
- WB through elbow only-distal injuries
- Hip precautions:
 - Anterior-usually no precautions. No external rotation or ABD of hip, no hip extension
 - Posterior-No internal rotation of hip, hip flexion no greater than 90*, no ADD of hip(crossing leg)
- Back precautions:
 - BLT-No bending, lifting or twisting

Most orthopedic injuries are 6-12 weeks from day of injury or fixation. Depends on severity of injury, age, bone health.

DME

Make detailed recommendations for DME:

- Shower chair-basic, tub transfer bench, stool, bariatric
- Slide board
- Wheelchairs with removable arms, elevating leg rests, seat size, cushion
- Toilet seat riser
- BSC-drop arm, standard, bariatric
- Mechanical lifts
- Walkers, crutches, knee scooter
- Remember.. these could be temporary needs, bones heal!

Adaptive Equipment

- Reacher
- Sock aide
- Toilet aide
- Leg lifter
- Elastic laces
- LH bath sponge
- Toilet aide

Recovery

- 6-12 weeks for bone healing depending on health of bone, etc.
- Are they following the WB precautions for proper healing?
- Malunions-not following precautions and may need further fixation.
- May progress WB and ROM activity sooner as they follow up with the medical team
- Therapy needs? Home health, snf, rehab, family training only?
- Placement options? Benefits for placement? What type of placement?
- Wait for rehab when patient can WB again?
- Family training. Start sooner than later.

Case Study

- 21 y/o male admitted for type 1 MVC. Unrestrained back seat passenger in a roll over. intubated at scene for agitation and combativeness.
- GCS 4/5 with scattered SAH, diffuse cerebral edema
- Multi rib fractures
- T12 and cervical fractures
- Displaced right femoral shaft fracture
- Skeletal traction placed day of admit by ortho. 15 pound skeletal traction.
- OR the following day for internal fixation with IMN.
- Pt is now WBAT on RLE post op.

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PORTABLE

PORTABLE

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SUPINE

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SUPINE

15 cm

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X TABLE

15 cm

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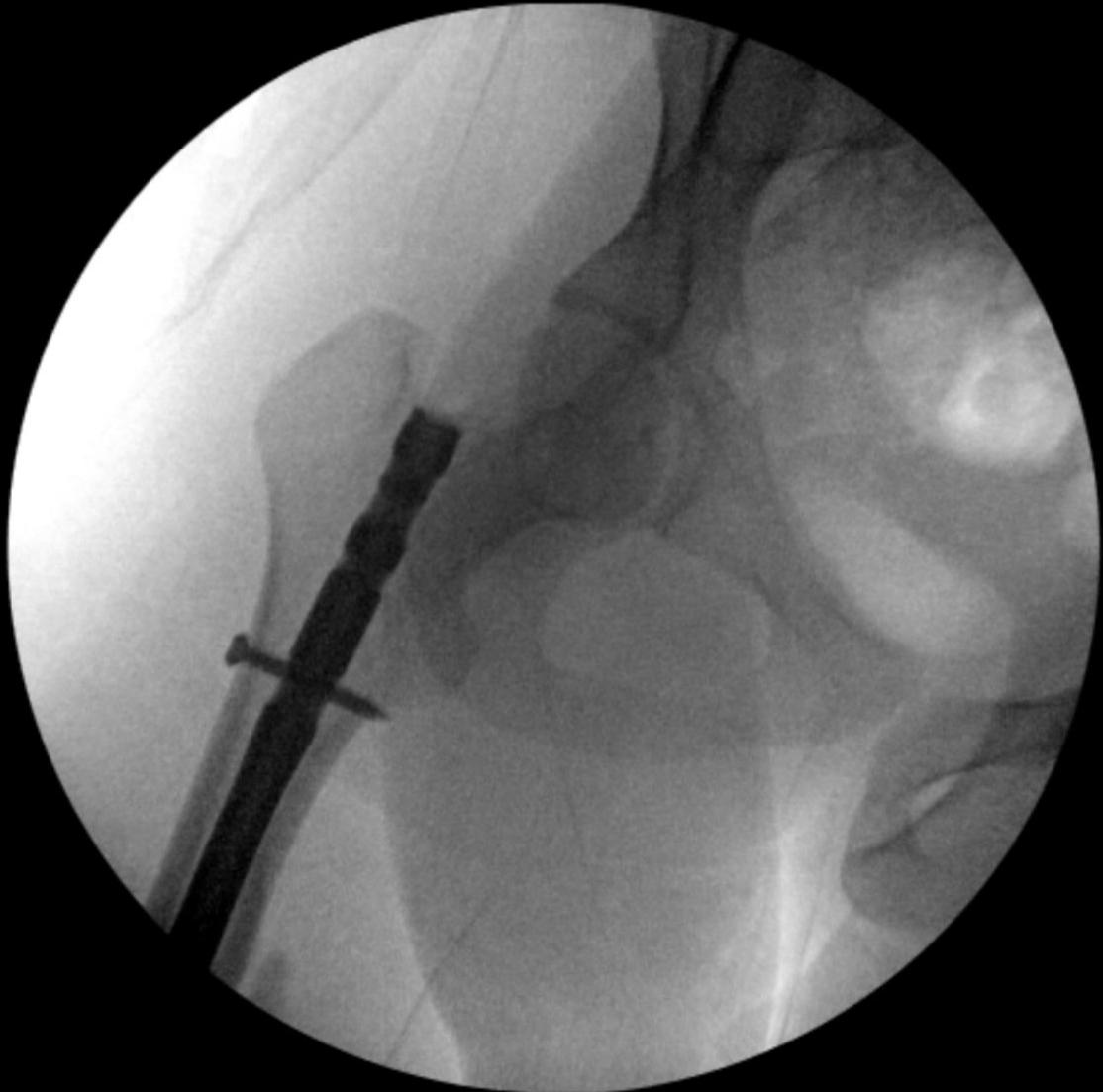
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Patient info Exam info Key image notes Exam notes Report

Questions

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Resources

- <https://www.verywellhealth.com/traction-fracture-and-broken-bone-treatment-2548529>
- <https://emedicine.medscape.com/article/80127-overview>
- <https://www.scheckandsiress.com/patient-information/care-and-use-of-your-device/hip-abduction-brace/>
- <https://www.aftertrauma.org/diagnosis-and-treatment/external-fixators#:~:text=An%20external%20fixator%20is%20a,a%20bar%20outside%20the%20skin.>
- <https://www.healthline.com/health/orif-surgery#candidates>
- <https://www.drugs.com/cg/intramedullary-nailing.html>
- [https://www.jshoulderelbow.org/article/S1058-2746\(17\)30476-7/fulltext?rss=yes](https://www.jshoulderelbow.org/article/S1058-2746(17)30476-7/fulltext?rss=yes)
- <https://www.orthobullets.com/recon/5013/tha-periprosthetic-fracture>
- https://www.medicinenet.com/what_are_the_4_types_of_fractures/article.htm