Controversies in Traction Splinting

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Disclosures

I have nothing to disclose.
History of Traction Splinting

• 1860: John Hilton designed first traction splint
• 1875: modified by Hugh Owen Thomas
  – designed strictly for in-hospital use
History of Traction Splinting

• 1915: Thomas leg splint adopted by French & British armies
  – “As is well known, the mortality in Great Britain from compound fractures of the femur in 1916 was 80 per cent. This was reduced coincident with the advent of the Thomas treatment until it reached 7.3 per cent in 1918, a wonderful achievement accomplished by the use of the appliances so admirably described by Meurice Sinclair in this great little book.”

Fig. 25. Diagram of Thomas’s splint drill.
Types of Traction Splints

- Thomas
- Hare
- Sager
- Kendrick
- CT-6
- Donway
- Slishman
History of Traction Splinting

• 2009 “Equipment for Ambulances” document
  – American College of Surgeons Committee on Trauma
  – American College of Emergency Physicians

• Traction splint for adult and pediatric patients recommended for all prehospital ambulances
Anatomy
Physiology

• The femur is by most measures the longest and strongest bone in the human body
• The adult thigh can hold 1-3 liters of blood
How often is the femur fractured?

• Incidence of 10/100,000 person years
• Kids and old people
Evidence for Traction Splinting?

- Slim
- No RCTs
Benefits of Traction Splinting

• Pain relief
• Protect soft tissue and nerves from injury from jagged bone ends
• Minimize bleeding
• Reduce incidence of fat emboli
Does Traction Add Anything?

• Aren’t these all the same benefits of splinting in general?
Some Evidence of Benefit...

  – Level I Trauma Center
  – Jan – Dec 2012
  – Isolated femur shaft fractures
  – 106 patients
  – Early splinted (pre-hospital) vs. late splinted (post-x-ray)
  – Early splinted had decreased need for blood transfusion and lower rate of pulmonary complications
But...

- Rosenberg et al, Ann Em Med 1982
- Single closed fractures of the femur in children were not responsible for significant hemorrhage resulting in shock
Hazards of Traction Splinting
Hazards of Traction Splinting

• Space limitations in rigs/helicopters
Contraindications to Traction

- Osteoporosis
- Fragile skin
- Concomitant proximal or distal fractures (hip, pelvis, knee, ankle)
- Large soft tissue deformity/partial amputation
Hazards of Traction Splinting

- Space limitations in rigs/helicopters
- How do you know the injury is mid shaft
- ...or that there aren’t other injuries proximal or distal
- Can cause nerve damage, other bone injury, skin damage, compartment syndrome
- May increase bleeding in some cases
And What About Penetrating Trauma or Open Fractures?

• Is this a contraindication to traction?
• How many of you were taught not to draw contaminated bone ends back into the wound?
Hazards of Traction Splinting

- Space limitations in rigs/helicopters
- How do you know the injury is mid shaft
- ...or that there aren’t other injuries proximal or distal
- Can cause nerve damage, other bone injury, skin damage, compartment syndrome
- May increase bleeding in some cases
- Rare use
So How Often Are They Placed?

- Abarbanell, N 2001:
  - Large urban setting
  - 12 months
  - 4,513 reports
  - 16 mid-thigh injuries
  - 5 felt by paramedics to be mid-shaft femur
  - 2 traction splints placed (remainder splinted in other ways)
So How Often Are They Placed?

- Runcie H, Greene M. 2015:
  - Mountain rescue in England and Wales
  - 2002-2012
  - Incidence of 9.3 suspected femur fractures on scene per year
  - 13% of suspected femur fractures treated with traction
And How Do We Do Placing Them?

• Daugherty MC, et al.
  – Children
  – Level 1 pediatric trauma center
  – Used x-rays to confirm good placement
  – 435 patients with femur fracture
  – 118 had a traction splint (115 were Hare)
  – 66% improperly placed
    • 52% too low
    • 18% too high
    • 10% leg rotation
    • 7% too large
    • 9% eccentric placement
    • 4% contraindication
  – 15% had more than 1 category of placement error
Hazards of Traction Splinting

- Space limitations in rigs/helicopters
- How do you know the injury is mid shaft
- ...or that there aren’t other injuries proximal or distal
- Can cause nerve damage, other bone injury, skin damage, compartment syndrome
- May increase bleeding in some cases
- Rare use
- No evidence of effectiveness or change in outcome
- Time
Possible alternatives

• Plain old splinting... without traction
  – Strap to other leg
  – Long board
  – Box splint
  – Posterior rigid splint
  – Vacuum splint
References


References


• Kwon YH and Kahwaji CI. *EMS, Traction Splint*. StatPearls [Internet]. Jan 2018.

• Runcie H and Greene M. *Femoral Traction Splints in Mountain Rescue Prehospital Care: To Use or Not to Use? That is the Question*. Wilderness & Environmental Medicine; Vol. 26, Iss. 3 (2015): 305-311.