**Clinical question.**

Does straightening an angulated suspected long bone fracture when compared with immobilizing in found position improve outcome (management of pain; safer transport; prognosis)?

**Is this question addressing an intervention/therapy, prognosis or diagnosis?** Intervention

**State if this is a proposed new topic or revision of existing worksheet:** New Topic

**Conflict of interest specific to this question**

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet?

- Jeffrey L. Pellegrino has no intellectual or financial conflicts of interest.

**Search strategy (including electronic databases searched).**

Terms: MESH- Fracture
Text- angle; angulated; emergency treatment; first aid; crush injury; traction; complications; emergency; Colles fracture; Smith fracture. Displaced- false joint,

PubMed (1966 - Current)—110 (8/16/08)
MEDLINE - (1950 - Current)—21 Reviewed
Medline in Process- no access

All EBM Reviews – Cochrane Library (Cochrane Database of Systematic Reviews (CDSR), the Database of Abstracts of Reviews of Effectiveness (DARE), and the Cochrane Controlled Trials Register (CCTR); Cochrane Methodology Register (Methods Studies); Health Technology Assessment Database (Technology Assessments); NHS Economic Evaluation Database (Economic Evaluations); About The Cochrane Collaboration (Cochrane Groups), Cochrane Bone, Joint and Muscle Trauma Group (1 Reviewed)
AHA End Note (0)
ACP Journal Club- no access
EMBASE- no access
= not yet accessed

Relevant article were also searched for other citations.

**State inclusion and exclusion criteria**

No exclusion criteria were used.

**Number of articles/sources meeting criteria for further review:**

22 articles were reviewed
9 not reviewed because of language
### Summary of evidence

#### Evidence Supporting Clinical Question

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A = full recovery of limb  
C = Pt. Survival, loss of limb  
E = Other endpoint  
B = limb survival of event with neurological deficiencies  
*Italics = Animal studies*

#### Evidence Neutral to Clinical question

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#### Evidence Opposing Clinical Question

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**REVIEWER’S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK:**

Assuming definitive care is available and after initial first aid addressing the A-B-Cs, no supporting evidence of straightening an angulated fracture (ex. Colles’ or Smith Fractures) during first aid is found to benefit or hinder outcome of limb. Primary mortality from femur/ pelvic fractures is related to loss of blood, delay in EMS or transport of injured can result in poor outcomes. Stability of limb or management of a pelvic fracture should be conceived as part of the resuscitative effort as errors in early management may lead to significant increases in mortality. Open wound first aid should be applied to open long bone fractures to limit deep infection Time to definitive care did not impact deep infection or issues of non-union. (Harley et al., 2002) LOE 5E

A compromise of circulation (i.e., no distal pulse) may be addressed by straightening and applying traction. Complications from traction of long bone fracture include:

- For crush or high velocity fracture with applied traction there is a benefit of limiting blood loss with an associated risk of compartment syndrome (Kenny, 2006) LOE 5A.
- Limitations of traction- specialized equipment, training, and multiple providers required (Melamed et al., 2007) LOE 5E (Wood et al., 2003) LOE 5E (Abarbanell, 2001) LOE 4E. Traction splinting does not appear to reduce pre-operative pain and clinical outcome, or affect fracture fixation and longer-term outcome (Parker & Handoll, H. H. G., 2006) LOE 5E.

Future question needing to be addressed: With a suspected long bone fracture, does the application of traction reduce blood loss, limiting mortality and morbities of hemorrhagic shock?

**Acknowledgements:**

**Annotated Citation List**


LOE: 4; Quality: poor; Neutral  
Comments: Retrospective study of one metropolitan area.


LOE: 5; Quality: poor; Neutral  
Comments: Single site, retrospective study, no relevance to manipulation in the field except for opportunity for infection of open fractures. Time to definitive care important for limiting infection. Implications for first aid in delayed help situations would be to clean and protect open fractures.


LOE: 5; Quality: poor; Opposing  
Comments: Cadaver experiment to ascertain pressure and reduce complications from compartment syndrome by not putting traction on fractures (in vitro study). Implications for concurrent injuries that contraindicate use of traction.


LOE: 5; Quality: poor; Neutral  
Comments: Consensus meeting, Israel Defence Forces Medical Corps, 2003: open fractures- 1st priority hemorrhage control; traction splints advocated in military setting for isolated femoral fractures and GSW w/o concomitants but may not be necessary in urban setting. Traction is presumed (i.e., no evidence) to reduce pain & hemorrhaging (small elliptical space); prevent further soft
tissue injury; reduce incidence of fat embolism. Limits of traction - 2 rescuers & equipment needed; time to apply longer than time to transport


LOE: 5; Quality: good; Neutral
Comments: Cochrane Review - traction does not appear to reduce pre-operative pain and clinical outcome, or affect fracture fixation and longer-term outcome.


LOE: 5; Quality: poor; Opposing
Comment: Descriptive, prospective study within one agency on the use of traction splints and concurrent injuries. Evidence suggest that gross injuries receive attention versus complicating injuries, which may be contraindications to Traction Splinting.


