Splinting versus casting of "torus" fractures to the distal radius in the paediatric patient presenting at the emergency department (ED): a literature review

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CRD summary
The review found that for paediatric torus fractures in the emergency department, splinting had better clinical outcomes than plaster casting, was preferred by patients and was more cost-effective. In view of the lack of information about review processes and study validity, and failure to report measures of statistical variability, the authors' conclusions should be interpreted with caution.

Authors' objectives
To assess the effect of splinting versus casting in the emergency department for paediatric torus fractures of the distal radius.

Searching
PubMed, EMBASE, CINAHL, British Nursing Index and The Cochrane Library were searched for papers published from 1984 to June 2008. Search terms were reported. The search was limited to articles in English.

Study selection
Studies that compared splinting versus casting of paediatric torus fractures or that reported outcomes following radiographic follow-up of such fractures were eligible for the review. Studies that included other types of fracture were excluded.

Participants in included studies were mostly aged between six and 16 years. Where reported, patients had torus fractures of the wrist diagnosed by orthopaedic doctors in the emergency department and/or in a fracture clinic. The intervention consisted of a removable Velcro device or soft bandage splint. Controls (where applicable) received a below-elbow plaster cast. The review included a wide range of outcomes described in the primary studies, such as child/parent satisfaction rate, physical functioning, radiographic evidence of healing, adverse effects and costs. Duration of study follow-up ranged from three weeks to two years (where reported).

The authors did not state how the papers were selected for the review.

Assessment of study quality
The authors did not state that they formally assessed validity, although they discussed weaknesses of individual studies informally.

Data extraction
The authors did not state how data were extracted for the review.

Methods of synthesis
Studies were combined in a narrative synthesis, organised into clinical outcomes and cost implications.

Results of the review
Six studies were included in the review (n=495): four randomised controlled trials (RCTs) (n=392) and two retrospective surveys (n=103).

Four studies (three RCTs and one retrospective survey) reported that participants who used removable splints achieved satisfactory clinical and/or radiological healing. When removable splints were compared to plaster casts, one RCT reported no difference in healing (p=0.0001) and two RCTs reported that splinting was significantly preferred (p=0.41). Participants reported better physical functioning, less difficulty with everyday activities (one RCT) and higher levels of satisfaction (one RCT).
Two studies of follow-up radiographs after torus fracture found that all fractures healed without significant change in alignment whether immobilised by cast (one retrospective survey) or splint (one RCT).

One RCT of home versus clinic management of torus fractures found that children significantly preferred a removable splint (p<0.001).

Cost information
**Treatment:** One RCT (n=179) compared traditional (plaster cast) treatment versus splinting with one fracture clinic visit. The relative costs in 2001 were £116.98 versus £65.75. The number of children who failed to attend follow-up clinic was much higher in the splint group.

**Follow-up:** The review found that elimination of multiple routine follow-up visits (such as serial radiographs) after torus fracture could lead to significant cost savings.

Authors’ conclusions
Splinting had better clinical outcomes, was preferred by patients and was more cost-effective than plaster casting for paediatric torus fractures in the emergency department.

CRD commentary
The objectives and inclusion criteria of the review were clear. Relevant sources were searched for studies. The apparent restrictions to published English-language studies meant that the review was prone to publication and language biases. It was unclear whether steps were taken to minimise risk of reviewer bias and error by having more than one reviewer select studies and extract data. No information about study validity or funding was reported. These factors made it difficult to assess the reliability of the evidence presented. The choice of a narrative synthesis to combine the studies was appropriate, given their heterogeneity, but clinical significance of the findings was difficult to evaluate due to the lack of focus on a primary outcome and failure to report any measures of statistical variability. In view of the lack of information about review processes and study validity, and failure to report measures of statistical variability, the authors’ conclusions should be interpreted with caution.

Implications of the review for practice and research
**Practice:** The authors stated that splinting of paediatric torus fractures in the emergency department instead of casting may reduce costs, time and use of resources. The treatment decision should take into account pain score, age and development of the child; splinting may not suit very young children or children with special needs. New protocols, patient/parent information leaflets and one-stop orthopaedic clinic reviews were suggested.

**Research:** The authors stated that studies were needed to investigate risk of refracture of the affected limb while wearing a splinting device.

Funding
Not stated.

Bibliographic details

**PubMedID**
19577205

**DOI**
10.1016/j.ienj.2009.03.006

Original Paper URL
Indexing Status
Subject indexing assigned by NLM

MeSH
Attitude to Health; Casts, Surgical /adverse effects /economics; Child; Cost Savings; Emergency Treatment /adverse effects /economics /methods; Evidence-Based Emergency Medicine; Great Britain /epidemiology; Humans; Pediatrics /economics /methods; Practice Guidelines as Topic; Psychology, Child; Radius Fractures /diagnosis /epidemiology /therapy; Safety; Splints /adverse effects /economics; Treatment Outcome; Wrist Injuries /diagnosis /epidemiology /therapy

AccessionNumber
12009109084

Date bibliographic record published
10/03/2010

Date abstract record published
12/05/2010

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.