Does degree of immobilization influence refracture rate in the forearm buckle fracture?

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CRD summary
This review examined whether the degree of immobilisation affected risk of refracture in children with forearm buckle fractures. The authors concluded that removable splints did not increase the risk of refracture or late displacement with buckle fractures of the wrist, but more research was needed. The review had some methodological weaknesses that may limit the reliability of the findings.

Authors' objectives
To determine whether the type of splint, cast or bandage used and/or the degree of immobilisation affects the risk of refracture in children with forearm buckle fractures.

Searching
MEDLINE, EMBASE, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), BIOSIS Previews, SPORTDiscus and IndMED databases and Google Scholar were searched in March 2007. Search terms were reported. No language restrictions were imposed. Relevant conference abstract sites were searched. Reference lists of relevant articles were searched.

Study selection
Randomised controlled trials (RCTs), quasi-randomised trials, cohort and prospective observational studies that focused on management of forearm buckle fractures in children were eligible for inclusion. Studies that evaluated any intervention were eligible and all reported outcomes were considered. Retrospective reviews and case series were excluded.

The included studies were all conducted in children with forearm buckle fractures. Treatment times ranged from 13 days to four weeks. Type of immobilisation included plaster splint, Futura splint, plaster cast, fibreglass splint, soft bandage and back slab splint. Outcomes evaluated included rate of refracture, physical functioning, pain, satisfaction with treatment and safety.

Two authors independently performed the selection process. Disagreements were achieved through consensus.

Assessment of study quality
Study validity was assessed using the Detsky score and level of evidence.

Two authors independently assessed validity of included studies.

Data extraction
Data were extracted on key outcomes such as rates of refracture, physical functioning and satisfaction.

Two authors independently extracted data.

Methods of synthesis
A narrative synthesis was undertaken as studies were deemed too heterogeneous for meta-analysis. Studies were grouped according to outcomes.

Results of the review
Five studies (n=455) were included in the review: three RCTs; one quasi-randomised trial; and one case series. Study size ranged from 39 to 201 participants. Length of follow-up ranged from three weeks to six months. The study quality assessment reported Detsky scores that ranged from 11/21 to 19/20 for the included trials.
The rates of refracture were no different in any of the five studies; none of the studies reported refractures in any patient regardless of type of immobilisation.

For physical functioning outcomes, one study reported no statistically significant difference between mobilisation methods. Compared with casts, splints improved children's ability to shower and bath. One study reported greater movement in patients with removable soft bandages than with casts. One study reported no significant differences between participants who had home removal and hospital removal of a back slab splint.

Patient satisfaction (three studies) was generally good for all types of immobilisation; more were satisfied with soft bandages and splints than with casts. There were no significant differences between immobilisation methods in terms of pain or safety, although one study indicated that patients had less pain and discomfort with soft bandages than with casts.

**Cost information**

Although material costs were estimated to be similar between treatment arms, studies indicated that splints that could be removed at home by a caregiver cost less than casts that needed to be removed by a clinician.

**Authors' conclusions**

Removable splints did not increase the risk of refracture or late displacement with buckle fractures of the wrist, but more research was needed.

**CRD commentary**

Inclusion criteria for the review were broadly defined. Several relevant sources were searched. No language restrictions were imposed. There was no attempt to locate unpublished studies, which may have caused omission of relevant studies. Study selection, data extraction and quality assessment were performed in duplicate, which reduced risks of error and bias in the review. However, one case series was included in the review, which violated the authors’ inclusion criteria. Quality assessment of included trials was undertaken, but limited details were provided and so interpretation of results was difficult. The quality of the included case series was not assessed. Studies were discussed narratively, as they were deemed too heterogeneous to undertake meta-analysis. Overall, the review had some methodological weaknesses and included generally small studies of short duration of follow-up, which may limit the reliability of the authors' findings. The call for more research appears warranted.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that a large prospective multicentre study was needed to evaluate the rate of refracture with different immobilisation techniques for forearm buckle fracture.

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