

Comparison of Plaster Cast Versus Plaster Splint the Treatment of Children with Isolated Torus Fractures of the Radius or Ulna

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Abstract

A torus fracture (or buckle fracture) is an incomplete fracture of the long bones at the metaphysis and is characterised by bulging of the cortex. Surprisingly there is very little consensus on the ideal immobilization technique to be followed. The purpose of our study was to compare complications and resources requirements for plaster casts and plaster splints for distal forearm single bone buckle fractures in children. The study included data of 48 patients in three tertiary care centres. The rate of complications and the resource requirement was lower in the plaster slab group in comparison to the plaster cast group. Our study concluded that plaster splints for torus fractures in children are preferable to plaster casts.

Keywords: Torus; Plaster Slab; Plaster Cast.

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Introduction

A torus fracture (or buckle fracture) is an incomplete fracture of the long bones at the metaphysis and is characterised by bulging of the cortex [1]. These are very common paediatric injuries and very commonly occur in the forearm. The mechanism of such forearm injuries is generally understood to be sustained by a fall on an outstretched hand. These fractures can affect either of the bones of the forearm but generally affect the radius. These fractures are inherently stable and hence provides the orthopaedician with an expanded armamentarium of treatment options. Surprisingly there is very little unanimity on the precise length of immobilization and the ideal immobilization technique to be followed [2]. Accepted methods of immobilization include circumferential casts, removable plaster splints and removable prefabricated splints. Initial studies favoured splinting as a safe and effective option in

comparison to casts [3]. This is re-enforced by many paediatric emergency texts [4] but many textbooks still recommend circumferential short-arm casting [2]. A splint removes the technical challenges and risks of complications which are inherent to the application of a cast [9,10]. The purpose of our study was to compare complications and resources required for plaster casts and plaster splints for distal forearm single bone buckle fractures in children.

Material and methods

This was a retrospective study comparing complications and resource requirements for children with distal radial buckle fractures treated with plaster splints versus circumferential short-arm plaster casts. The study was conducted on patients in three tertiary care centres from August 2016 to July 2018. Children between the age group of 5-14 years who had presented at the outpatient

department or emergency department and had radiologically confirmed buckle fractures of the forearm along with treatment with either plaster splints or circumferential casts had their data included in the study. Our definition of minimal angulation was a fracture with angulation of 15° or less in the sagittal plane of the radiograph [5].

Exclusion criteria included children who had undergone skeletal maturity, had previous or concomitant forearm torus fractures or any confirmed metabolic bone diseases and pathological fractures. The patients had received plaster splints or circumferential casts as per the discretion of the treating surgeon.

Complications were noted at follow up visits and functional outcomes were assessed at 3 weeks 6 weeks and 12 weeks after application of the immobilization.

Results

Data of 21 patients with casts and 27 patients on splints were ultimately included in the study. This excluded patients who had been lost to follow up or had inadequately recorded clinical data. Resource and time requirements which had been noted by the surgeon was used for analysis (Table 1).

Table 1: Resource requirements

	Plaster Cast (n=21)	Plaster splint (n=27)
Additional assistants required	11	2
Delay of > 1 hour since radiographic confirmation of diagnosis	9	2

Complications at any follow up which had been noted or documented was utilized in the study.

Table 2: Complications

	Plaster Cast (n=21)	Plaster splint (n=27)
Pain	11	14
Sores	4	3
Itching	8	10
Irritation	7	7
Requirement of reapplication of early removal	2	0

None of the patients had a clinical deformity at the 3-week visit, and none required surgical intervention at any point in the three-month follow-up period. In none of the cases had fracture angulation deteriorated at follow up.

Discussion

Resource requirements

There was a greater requirement of trained assistant when applying a cast in comparison to applying a plaster splint. Since a cast required more resources to be gathered including often a trained assistant, this resulted in a delay from the radiographic diagnosis to the application of the cast these were measures that showed a trend towards decreased time and resources for applying a plaster splint in comparison to a cast.

Fracture angulation

Similar to our findings Boutis et al in their study had reported no requirement of surgical intervention in their study groups [6]. But 6 of their patients' required continued immobilization due to deterioration of the fracture angulation. Boutis et al had a larger study group in comparison to our study group. None of our patients had a clinical deformity at 3 months follow up.

Complications

None of the patients had described any serious complications due to the plaster casts or slabs although they did complain of irritation, soreness, itching and pain. 2 children with cast application required reapplication of the cast due to discomfort. Complication rates were similar to previous studies for casts and splints. The absence of any serious complications in our study is consistent with what has been reported earlier for minimally angulated fractures of the forearm as well as the distal radius in children [7,8].

Limitations of our study

Our study was a retrospective one. There was very little uniformity towards preparing the splints or casts as there were done by different doctors/paramedics. The study pool was very small, data of only 48 patients were included in the final study results. We believe that a larger study which would be prospective and randomized would go a long way towards conclusively proving the results.

Conclusion

Our study provides further information corroborating earlier studies that splinting is preferable to casting in torus fractures of the

forearm in paediatric patients. With the existing literature and evidence showing similar healing rates with both casting and splinting, our findings of higher rates of satisfaction, convenience, safety and preference in splints bring us to the conclusion that this mode of immobilization should become the treatment of choice for forearm torus/buckle fractures. Plaster splints of torus fractures will, therefore, reduce complications and improve resource management if used instead of plaster casts. We believe that a larger study which would be prospective and randomized would go a long way towards conclusively proving the results.

Conflict of interest: None declared

References

1. Firmin F, Crouch R. Splinting versus casting of "torus" fractures to the distal radius in the paediatric patient presenting at the emergency department (ED): A literature review. *International Emergency Nursing*. 2009;17(3):173-78.
2. Williams K, Smith G, Luhmann S, Mao J, Gunn J, Luhmann J. A Randomized Controlled Trial of Cast Versus Splint for Distal Radial Buckle Fracture. *Pediatric Emergency Care*. 2013;29(5):555-559.
3. Plint A, Clifford T, Perry J, et al. Wrist buckle fractures: a survey of current practice patterns and attitudes toward immobilization. *CJEM*. 2003;5:95Y100.
4. Burg MD, ten Napel SC. In: Baren JM, Rothrock SG, Brennan JA, et al. eds. *Pediatric Emergency Medicine*. Philadelphia, PA: Saunders Elsevier. 2008:172Y181.
5. Al Ansari K, Howard A, Seeto B, et al. Minimally angulated pediatric wrist fractures: Is casting without manipulation enough? *CJEM*. 2007;9:9-15.
6. Boutis K, Willan A, Babyn P, Goeree R, Howard A. Cast versus splint in children with minimally angulated fractures of the distal radius: a randomized controlled trial. 2019.
7. Do TT, Strub WM, Foad SL, et al. Reduction versus remodelling in pediatric distal forearm fractures: a preliminary cost analysis. *J Pediatr Orthop B* 2003;12:109-15.
8. Wilkins KE. Principles of fracture remodelling in children. *Injury*. 2005;36:A3-11.
9. Boyd AS, Benjamin HJ, Asplund C. Principles of casting and splinting. *Am Fam Physician*. 2009; 79:16-22.
10. Bakody E. Orthopaedic plaster casting: nurse and patient education. *Nurs Stand*. 2009;23:49-56.