Research Article

Splints are an overall better alternative to casting for torus fractures in children in rural hospitals

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Abstract

The aim of the study was to compare the functional outcome, patient satisfaction and cost of two methods of treatment, namely plaster of Paris cast and a removable splint, for Torus or buckling fractures of the distal forearm in a rural teaching hospital setting. **Methods:** The study was done on71 consecutive patients with torus fracture presenting to the emergency department. The functional outcome was assessed using Mayo's wrist score and patient satisfaction with Verhaar scale. **Results:** Functional results were satisfactory in 95% of the splint group and in 89% of the plaster group. Patient satisfaction was good to excellent in 97% of the splint group and 91% of the plaster group. The splint group had approximately 61% reduction in overall costs in monetary terms. **Conclusion:** Removable splinting as opposed to plaster casting has an overall better functional outcome, patient satisfaction and lower cost and may be the preferable treatment option for these simple fractures.

Keywords: Torus fracture, removable splint, plaster cast, functional outcome, lower cost.

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INTRODUCTION

Approximately a third of all fractures in children occur at the wrist, usually falling on an outstretched hand. Torus fracture is also known as buckle fracture. Here the cortex "buckles" rather than breaks. The common age group is between 1 to 15years.Paediatric wrist injuries comprise 35to 45%of paediatric emergency department visits. Torus fractures comprise 85%of paediatric wrist injuries.[1] In paediatric bones the periosteum is thicker & stronger.[2] These fractures have little or no angulation. These are usually stable injuries.[3] Traditionally these fractures have been managed by below elbow casts. This method has been associated with high costs and long waiting periods.[4] It has been the experience to hear of the child using the plaster as an object to "assault" people with, probably because it was being retained for too long. The search therefore has been for a simpler, cost effective method which the patients can determine the time of splint removal by titrating it according to their symptoms.

OBJECTIVES

Our aim was to evaluate removable splintage versus plaster casts (requiring application and removal by a specialist) for compression (buckle) Torus fractures in children.

MATERIALS AND METHODS

The study was conducted at two rural tertiary care centres namely the Sree Balaji Medical College and Hospital, Chromepet, Chennai, where the first author (Dr.MK), was a post graduate resident, and continued at the Dr. Sommervell Memorial Medical College Karakonam, where the first author is working as a senior resident. The study was conducted between May 2013 to August 2014.Seventy one patients with unilateral wrist torus fractures were enrolled in the study and reviewed retrospectively. Patients were treated with either a plaster-of-Paris volarbelow elbowcast or a splint with splinting protocol. They were randomly divided into two groups on the day of attendance in the clinic. A full verbal and written explanation was given to the parents of children treated with removable wrist splint group. All the parents

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in the removable wrist splint group and the Plaster of Paris slab group gave an informed consent prior to being included into the study. This protocol emphasized the parents along with patients deciding when to wean from the usage of splint as their symptoms improved. Patients were reviewed about 4 weeks after fracture, and their initial and follow-up radiographs were compared for any changes in the fracture pattern. The duration of the treatment was four weeks for both groups. Appointments were made, for four weeks later, for the Plaster of Paris group fore cast removal, control radiography and filling of the follow-up form. The patients in the Removable Wrist Splint group were followed up through phone call upon termination of their treatment period. Questions were asked to both the parents and children to fill out the follow up form, regarding their satisfaction with the "singlevisit" service, severity of pain, their treatment convenience as well as to attribute any cast or splint problems or its complications. Patients were asked if they had pain alone or were there other symptoms associated, while using the wrist splint or the plastercast. The scale used to assess pain consisted of a semantic scale similar to an analog visual scale, but these were not exactly validated. These patients reported their experiences interms of no pain, pain on activity or pain at rest. The satisfaction of patients was calculated using Verhaar scale. The parents` responses to the questionnaire were analyzed by SPSS (ver. 12) and the studies were compared using the Chi-Square test. The costs of different materialsused in the two methods of treatment were borne by the patients themselves.

Figure 1. The Removable Wrist Splint used in this Current Study

RESULTS

Seventy one children with torus fracture of the wrist reported to the emergency department in our hospitals during this one year of study. Of them 39 (54.93%) were boys while the rest 32 (45.07%) were girls. There were 55 (77.46%) isolated fractures of the radius, 1 (1.41%) isolated fracture of ulna and 15 (21.13%) fractures of both radius and ulna. Of these 53 (74.65%) patients were right hand dominant while the rest 18 (25.35%) were left hand dominant. Patients treated by removable wrist splints were 37 (52.11%) while by using POP casting was 34 (47.89%).Of these falling down in 58 (81.69%) cases was the most common cause of fracture followed by sports related trauma in 11 (15.49%) cases and then others as in 2 (2.82%) cases. The patients attended emergency department from 2 hours to 4 days following injury(Mean1.65 ± S.D 1.14 days). In our Plaster of Paris group on follow-up all fractures were united clinically and radiologically with no loss in position. There were neither observed adverse events nor any skin problems in either of the group. Patients treated with Removable wrist splint removed their splint at 3.16 ± 0.75 weeks and the POP cast group at 3.13 ± 0.75 weeks. Excellent to good results, on Mayos wrist score, were seen in 95% of the splint group and 89% of the plaster group. Mild to moderate pain with activity was experienced by15 (40.54%) cases of those treated with Removable wrist splint and in the POP cast group 11 (32.35%) experienced mild to moderate pain with activity (P = 0.62). None of the patients had pain during rest. 34(91.9%) of patients in the Removable wrist splint group and 29(85.3%) of patients in the POP group found their treatment convenient (0.53). The compliance with both types of treatment was good except in 4 very young patients who tried to remove their splints soon after it was applied. There were no significant difference between the two groups regarding compliance (P = 0.54). Six (8.45%) patients developed a rash under the splint. There were no cases of difficulty found with removal of the wrist splint, and no residual symptoms. None of the casts were broken or became soft and only 2(2.82%) patients developed edema under the cast.

Cost-benefit Analysis

Treatment of the POP Cast group which involved screening visits, radiography in Emergency Department, visits to the fracture clinic, different resources used for application of casts, second attendance for removal of cast and radiography costed 830 rupees in India. Treatment of the Removable Wrist Splint involved screening visit, radiography in ED, and application of a wrist splint cost 385 rupees in India. This difference of 505 rupees represents a 61% reduction in treatment cost, a significantly large sum for the resource poor setting in which this study was conducted.

DISCUSSION

All of the fractures healed without any significant clinical changes in angulation or complications. The authors propose the following as a treatment protocol: radiographic diagnosis and application of the removable

splint in the emergency department and providing instructions for usage of splint. The elimination of any additional orthopaedic visit for repeat radiographs and removal of cast reduces the family's time lost from school and work and their money and the orthopaedic surgeon's time. This article reviews the literature on managing torus fractures with a splint and using plaster of Paris slab, and concludes that splinting is more cost effective, shows quicker return to normal function, and is better preferred by the parents.

CONCLUSION

Removable Wrist splint is the better option for successful and safe treatment of buckle fractures of the distal radius in children. It is preferred by both parents and children equally. Following the results of this study, removable wrist splint is now the treatment of choice for children diagnosed with buckle fractures in our institutions. The patient is only seen once in the emergency department and once the splint has been put on no follow-up appointment is necessary. The clinical outcomes were excellent. There are a number of advantages of treatment with a removable wrist splint. Wrist splints can be applied to all ages and sizes. Children are able to bathe, shower and swim in the splint, thereby not affecting their regular routine. The wrist splint is removed by the parents at home so that no orthopaedic outpatient clinic visit is needed. This reduces stress on both parents and children as they canstay in an environment where they can feel comfortable, bypassing the need for prolonged waiting outside the orthopaedic clinics, time off school for the child and time off work for the parents for a relatively trivial problem. The plaster saw and its potential distress for the patient and also its possible health hazards for the orthopaedic staff are avoided. There is reduced radiation to the children also. The lack of follow-up visit also saves the parents money as well as it reduces the waiting time for other patients.

REFERENCES

1. Rockwood CA, Wilkins KE. Fractures in children. 7th ed. Lippincott: Williams &Wilkins; 2010. p. 317–20.
2. Solan MC, Rees R, Daly K. Current management of torus fractures of the distalradius. Injury 2002;33(6):503–5.
3. Davidson JS, Brown DJ, Barnes SN, Bruce CE. Simple treatment for torus fracturesof the distal radius. J Bone Joint Surg Br 2001;83(8):1173–5.
4. Abraham A, Handoll HH, Khan T. Interventions for treating wrist fractures inchildren. Cochrane Database Syst Rev 2008;16(2):CD004576.
5. West S, Andrews J, Bebbington A, Ennis O, Alderman P. Buckle fractures of thedistal radius are safely treated in a soft bandage. A randomized prospective trialof bandage versus plaster cast. J PediatrOrthop2005;25(3):322–5.
6. Plint AC, Clifford T, Perry J, Bulloch B, Pusic M, Lalani A, et al. Wrist bucklefractures: a survey of current practice patterns and attitudes towards immobilization. Can J Emerg Med 2003;5:95–100.
7. Firmin F, Crouch R. Splinting versus casting of ''torus'' fractures to the distalradius in the paediatric patient presenting at the emergency department (ED): aliterature review. IntEmergNurs2009;17(3):173–8.
8. Bochang C, Katz K, Weigl D, Jie Y, Zhigang W, Bar-On E. Are frequent radiographsnecessary in the management of closed forearm fractures in children? J ChildOrthop2008;2(3):217–20.
9. Farbman KS, Vinci RJ, Cranley WR, Creevy WR, Bauchner H. The role of serialradiographies in the management of pediatric torus fracture.Arch PediatrAdolesc Med 1999;153:923–5.
10. Symons S, Roswell M, Bhowal B, Dias JJ. Hospital versus home management ofchildren with buckle fractures of the distal radius. J Bone Joint Surg Br2001;83(4):556–60.
11. Willet KM. Noise-induced hearing loss in orthopaedic staff. J Bone Joint Surg Br1991;73(1):133–5.
12. Wytch R, Ritchie IK, Clayton R. Potential hazards of modern splinting materials.Occup Health 1988;40(3):492–4.
13. Plint AC, Perry JJ, Correll R, Gaboury I, Lawton L. A randomized, controlled trialof removable splinting versus casting for wrist buckle fractures in children.Pediatrics2006;117(3):691–7.
14. Okeley E A, Ooi K S, Barnett P L. A randomized controlled trial of 2 methods of immobilizingtorus fractures of the distal forearm. PediatrEmerg Care 2008;24(2):65–70.
15. Pountos I, Clegg J, Siddiqui A. Diagnosis and treatment of greenstick and torusfractures of the distal radius in children: a prospective randomised single blindstudy. J Child Orthop2010;4(4):321–6.
16. Vernooij CM, Vreeburg ME, Segers MJ, Hammacher ER. Treatment of torusfractures in the forearm in children using bandage therapy. J Trauma Acute Care Surg2012;72(4):1093–7.
17. Kropman RHJ, Bemelman M, Segers MJM, Hammacher ER. Treatmentof impacted greenstick forearm fractures in children using bandage orcast therapy: a prospective randomized trial. J Trauma 2010;68:425–8.
18. Khan KS, Grufferty A, Gallagher O, Moore DP, Fogarty E, Dowling F. A randomizedtrial of soft cast for distal radius buckle fractures in children. ActaOrthopBelg2007;73(5):594–7.
19. Mbubaegbu CE, Munshi NI, Currie L. Audit of patient satisfaction with selfremovablesoft cast for greenstick fractures of the distal radius. J Clin Effect1997;2:14–5.
20. Taranu R, Webb J, Forth M, Brown G, Bowler C, Bayliss N. Using semi-rigidcasts in the management of buckle fractures. PediatrNurs2011;23(2):25–8.
21. Plint A, Perry J, Tsang J. Pediatric wrist buckle fractures: management andoutcomes. Can J Emerg Med 2004;6:397–401.

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