A new standard for treatment of torus fractures of the wrist?

A large multicenter trial evaluated effects on pain and function for pediatric patients treated with a soft bandage vs rigid immobilization.

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PRACTICE CHANGER

For uncomplicated pediatric torus fractures of the distal radius, consider definitive management with soft bandage immobilization until pain resolution, rather than rigid immobilization and clinical follow-up.

STRENGTH OF RECOMMENDATION

B: Based on a single randomized controlled trial with patient-oriented outcomes.[1]

Perry DC, Achten J, Knight R, et al; FORCE Collaborators in collaboration with PERUKI. Immobilisation of torus fractures of the wrist in children (FORCE): a randomised controlled equivalence trial in the UK. *Lancet*. 2022;400:39-47. doi: 10.1016/S0140-6736(22)01015-7

ILLUSTRATIVE CASE

A 9-year-old girl presents to your urgent care clinic after a fall while snowboarding for the first time. She reports falling forward onto her outstretched right hand and describes pain in her distal right forearm. She denies paresthesias, weakness, or lacerations. Physical examination reveals mild edema of the dorsal aspect of her distal right forearm and tenderness to palpation of the dorsal aspect of her distal radius. She denies tenderness to palpation of her ulna, anatomic snuffbox, hand, and elbow. Range of motion of the wrist is full on passive testing, but she declines active testing due to pain. Wrist radiographs reveal an uncomplicated torus fracture of the distal radius. Can immobilization with a soft bandage alone sufficiently treat this fracture?

Fractures of the distal radius are among the most common fractures of the upper extremity and commonly occur from a fall onto an outstretched hand.[2] In the pediatric population, torus fractures, also known as *buckle fractures*, are the most common type of distal radius fracture, comprising an estimated 50% of pediatric wrist fractures.[3,4] This is due to the presence of a physeal growth plate, thicker periosteum, and softer underlying bone in pediatric patients.[4,5] When an axial load is applied, as in a fall onto an outstretched hand, the force can lead to plastic deformation, with or without cortical disruption of the bone.[4,5]

Pediatric torus fractures of the distal radius generally are treated with immobilization,[2] traditionally through a short arm cast or a removable, rigid wrist splint.[2,6] The wrist often is immobilized for 3 to 4 weeks, with routine follow-up and potential repeat plain film radiography to ensure stability.[2,6]

Despite common use of immobilization, torus fractures of the distal radius are anatomically stable, and displacement is unlikely to occur.[7,8] As such, many studies have suggested that treatment of torus fractures with rigid immobilization in a cast or splint may not be necessary.[9,10] However, a 2018 Cochrane review concluded that the quality of evidence illustrating similar recovery between treatments was low, leaving uncertainty as to the most appropriate management strategy.[6] Less casting and follow-up imaging could have positive implications for patient satisfaction, health care–associated costs, and radiation exposure.[10]

This study, the Forearm Fracture Recovery in Children Evaluation (FORCE) trial,

compared the traditional treatment of distal radius torus fractures with rigid immobilization to soft immobilization and immediate discharge.

STUDY SUMMARY

Providing quality evidence for a standard of care

FORCE was a randomized controlled equivalence trial (N = 965) across 23 emergency departments (EDs) in the United Kingdom that compared pain and function in pediatric patients with distal radius torus fractures treated with a soft bandage and immediate discharge vs rigid immobilization and routine follow-up.[1] Patients included children ages 4 to 15 years presenting to the ED with a distal radius torus fracture, which was confirmed radiologically.

At 3 days, pain scores improved by 3.2 points in the soft bandage group and 3.1 points in the rigid immobilization group.

Patients with concomitant ipsilateral ulnar fractures were included in the study. Researchers excluded patients with injuries older than 36 hours, evidence of cortical disruption on radiograph (eg, greenstick fracture), or additional fractures other than the wrist, or those who were deemed unable to follow up with the full study protocol (eg, having insufficient English comprehension).

Patients were randomly assigned in a 1:1 ratio to receive treatment with either a soft bandage such as a gauze roller bandage (n = 489) or rigid immobilization (n = 476). For patients in the bandage group, a soft bandage was applied in the ED or provided for home application without planned clinical follow-up. Patients in the rigid immobilization group were treated in the ED with either a removable manufactured splint or a molded splint or cast, followed by the standard follow-up practice of the treating center. Patients in the soft bandage group were advised not to wear the bandage for more than 3 weeks. Blinding was not possible, but the treatment team did not take part in patient follow-up.

The primary outcome was change in pain 3 days after treatment, measured on the Wong-Baker FACES Pain Rating Scale (an ordinal assessment using 6 illustrated facial expressions translated to a numeric rating on a scale of 0-10, with higher scores indicating worse pain). This scale has an established minimum clinically important difference (MCID) value of 1 face (2 points).[11] Per standard practice in equivalence trials, the equivalence margin was defined as half the MCID, with a value of 1.0 used in this study.

Secondary outcomes measured over the 6-week follow-up period included additional pain measurements using the Wong-Baker scale, measures of function and health-related quality of life, analgesia use, days of absence from school or childcare, complication rates, and patient satisfaction. This study used modified intention-to-treat and per-protocol analyses.

The mean age of participants was 9.6 years; 39% were girls and 61% were boys. In the bandage group, 94% opted to have the soft bandage applied in the ED, and 95% of the rigid immobilization group were treated with a removable wrist splint in the ED. At 3 days, pain scores improved by 3.2 points (standard deviation [SD] = 2.1) in the soft bandage group and 3.1 points (SD = 2.1) in the rigid immobilization group. The adjusted difference was –0.1 (95% CI, –0.37 to 0.17) in the intention-to-treat analysis and –0.06 (95% CI, –0.34 to 0.21) in the per-protocol analysis, which were both less than the predetermined equivalence margin. This equivalence margin also was met at all secondary time points (1 day, 7 days, 3 weeks, and 6 weeks after treatment) and in subgroup analysis of those 4 to 7 years and 8 to 15 years.

Use of any analgesia in the prior 24 hours was slightly higher in the soft bandage group on Day 1 (83% vs 78%; $P = .04$) and Day 3 (57% vs 51%; $P = .05$), but this difference was not seen on Day 7. Satisfaction, measured via a 7-point Likert scale (range from "extremely satisfied" to "extremely unsatisfied"), was slightly lower in the soft bandage group on Day 1 (median 2 [interquartile range = 1, 2] vs median 1 [interquartile range = 1, 2]; $P < .0001$) but was not different after 6 weeks. There were no measured differences in any other secondary outcomes, including function, quality of life, and complication rates.

By the primary end point of 3 days, 36 patients (7%) in the soft bandage group returned to medical care requesting a change to rigid immobilization, compared with 1 patient (0.2%) in the rigid immobilization group declining intervention.

WHAT'S NEW

Equivalence in pain and function scores

This trial showed equivalence in pain at 3 days' follow-up in children with distal radius torus fractures who were offered bandaging and then immediately discharged from the ED, compared with rigid immobilization and clinical follow-up. There were no significant differences in pain or function between groups during the 6 weeks following the initial injury. De-escalation of treatment offers an equivalent, resource-sparing alternative to traditional treatment of these fractures.

CAVEATS

Lack of masking likely introduced bias

There are no major caveats associated with managing distal radius torus fractures with a soft bandage and discharge from the ED, compared with the traditional treatment of rigid immobilization. However, bias was likely introduced in patient-reported outcomes due to the inability to mask patients and families to the treatment allocation. This may have led to overstating the severity of outcomes in the bandage group, given the strong preference for rigid immobilization, although equivalence was illustrated despite this potential bias.

CHALLENGES TO IMPLEMENTATION

Preferences may be difficult to change

Parents and clinicians demonstrated a preference for rigid immobilization, as shown in the imbalance in treatment crossovers, with 7% of children changing to the rigid immobilization group by the primary study end point of 3 days. The study authors hypothesized that crossovers may have been due to the perception by some parents that rigid immobilization is the gold standard of treatment, as well as clinicians' seeking to escalate care for patients returning for follow-up. Policy and guideline changes, as well as physician efforts to educate patients on outcomes with soft bandage treatment, are likely to improve these misconceptions. JFP

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