DISTAL TORUS FRACTURE CLINICAL PATHWAY

EXECUTIVE SUMMARY

Physician Champions: Caitlyn Skuodas, PA

Clinical Relevance

Distal radius fractures account for over twenty-five percent of fractures in children[9]. Torus fractures, also known as buckle fractures, are the most common fracture pattern in children[5]. Therefore, pediatric distal radius buckle fractures account for a high volume of outpatient office visits and Emergency Department evaluations.

The pediatric skeleton differs from the skeletally mature by two main anatomic features: the physis and thick periosteum[1]. The physis, or growth plate, consists of hyaline cartilage and serves as a growth center for children. Thus, children's bones are primarily composed of calcified cartilage[2]. Therefore, incomplete bowing or bending injuries or deformities are common.

A torus fracture occurs when a compressive force – like a fall on an outstretched arm - causes a bend in one side of the bone[9] without a cortical break in the other. This fracture pattern is considered stable due to the unique properties of pediatric bone. This stability limits the risk of displacement or increase in angulation[9]. A minimally invasive approach to immobilization of distal torus fractures has shown to be as successful as traditional immobilization - casting [5,7]. Furthermore, repeat imaging has not been shown to alter treatment outcomes[5].

Primary Objective

The goal of this pathway is to utilize removable splinting rather than casting and to reduce the number of follow-ups and radiographs needed to evaluate and treat distal torus fractures.

- Inclusion criteria: Patient any age with distal forearm injury and/or suspicion for forearm fracture

- Exclusion criteria: All fractures or suspected fractures in the lower extremities or open fractures regardless of extremity.

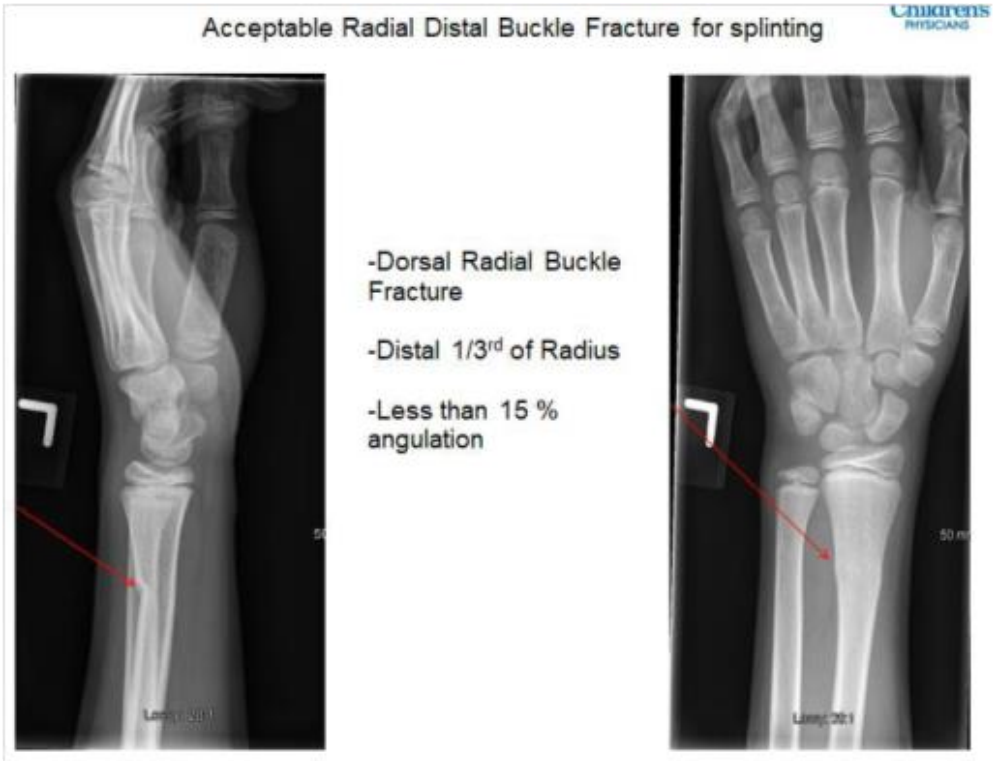
Radiographic Diagnosis of a Torus Fracture

See below for acceptable radial distal buckle fractures for splinting.

DISTAL TORUS FRACTURE CLINICAL PATHWAY

EXECUTIVE SUMMARY

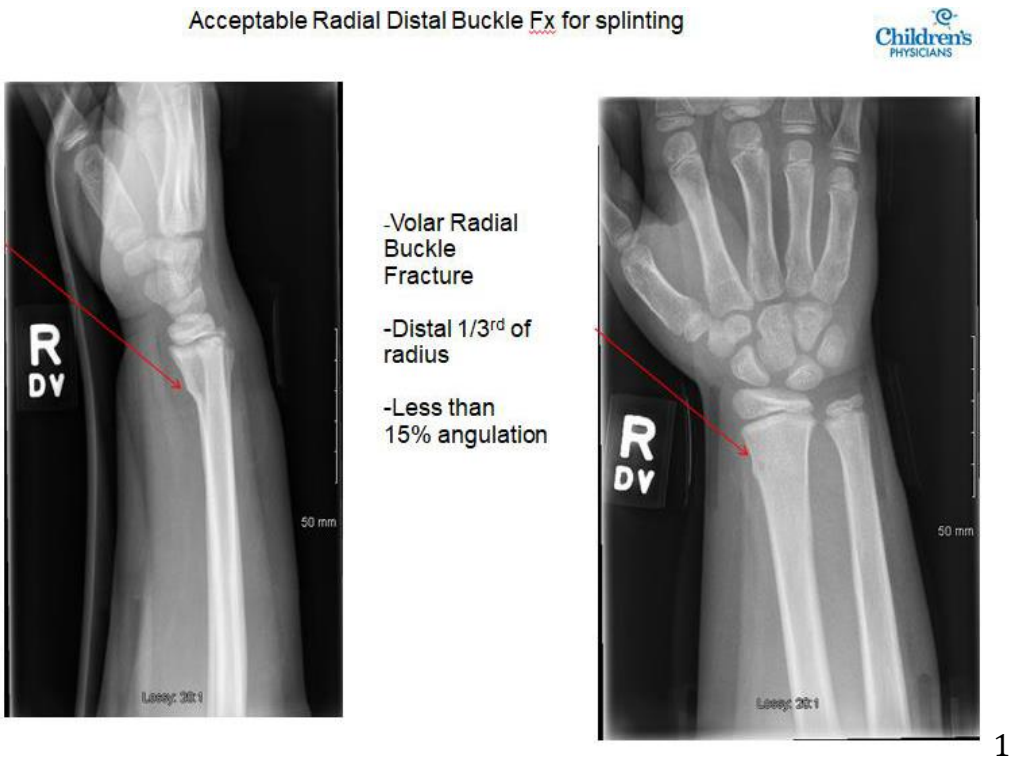
Physician Champions: Caitlyn Skuodas, PA



DISTAL TORUS FRACTURE CLINICAL PATHWAY

EXECUTIVE SUMMARY

Physician Champions: Caitlyn Skuodas, PA



1

Recommendations & Rationale

Removable Splint Immobilization

Splint immobilization allows for appropriate fracture healing and pain control. Pain scores reported by patients at three days post injury are equivalent among patients with cast and removable splint immobilization[7]. Immobilization is recommended for three weeks[5]. The use of a splint reduces the need for a clinical visit to an orthopedic provider for cast removal. Splinting also does not harbor complications commonly encountered with casting: cast deterioration, skin breakdown due to rubbing, or paresthesias[5].

Splint use is contraindicated in:

- A fracture in the proximal two-thirds of the forearm
- Angulation of greater than 15 degrees on metaphysis to shaft
- Shortened fracture
- Cortical break in the radius, indicating greenstick or complete fracture[2]

No Repeat Imaging

Repeat imaging in distal torus fractures is unnecessary[5]. The stability of a torus fracture negates the necessity of follow-up imaging as re-fracture has not been seen in randomized controlled trials[5] nor has more severe deformity been observed[7]. No follow-up is needed[9].

Vitamin D & Calcium Therapy

Our bodies need both Vitamin D and calcium to build healthy bones in childhood and to maintain bone health in adulthood. For children over 1 year of age, the recommended daily allowance of Vitamin D amount is 600 to 1000 International Units or 12.5 mcg per day. Intake of Vitamin D greater than 4,000 IU per day may result in potentially dangerous side effects[4].

Rationale

A Distal Torus Fracture Pathway for the Emergency Department and Outpatient care (Urgent Care and Children's Physicians) management will improve the timeliness and efficiency[3] of patient care by standardizing the splinting, imaging, and discharge instructions patients receive.

Complications

Physeal, greenstick, and/or complete fractures can be misdiagnosed as torus fractures. This occurs in less than 15% of Emergency Room visits[8]. Moreover, the risk of premature physeal fusion, or growth arrest, is less than 5% in Salter-Harris type, growth plate injuries. In addition, there have been no reported suboptimal outcomes regarding range of motion or function with removable splint immobilization[3].

Metrics

Process

- Increase the percentage of discharge's that include the dot phrase ".bonehealth"
- Increase documentation of "Acceptable for Distal Torus Fracture Pathway" or "Unacceptable for Distal Torus Fracture Pathway" documentation in Radiology note

Outcome

- Increase the proportion of distal torus fracture patients discharge with a splint

Balancing

- Monitor the proportion of patients returning to ED/CP/UC within 72 hours after splinting
- Monitor the proportion of Ortho consults that should have been placed during initial patient presentation, but were not, and required a revisit to CP/ED/UC within 7 days

Team Members

Champion:
Caitlyn Skuodas, PA-C – Orthopedic Surgery

Tim Mickel, MD – Orthopedic Surgery

Jenn Wang, MD - Emergency Department
Travis Kruse, MD - Radiology
Sarah Klostermeyer - RN Orthopedic Surgery Outpatient Clinic
Megan Norris - PA Children's Physicians
Megan Elliott - PA Children's Urgent Care
Taelyr Weekly - PhD, MPH, BSN, RN Clinical Effectiveness
Kelsey Zindel – DNP, APRN-NP, CPNP-AC/PC Clinical Effectiveness

Evidence

1. Asokan A, Kheir N. Pediatric Torus Buckle Fracture. 2022 Aug 3. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 32809469.
2. Atanelov Z, Bentley TP. Greenstick Fracture. 2023 Apr 25. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 30020651.
3. Colaco K, Willan A, Stimec J, Barra L, Davis A, Howard A, Boutis K. Home Management Versus Primary Care Physician Follow-up of Patients With Distal Radius Buckle Fractures: A Randomized Controlled Trial. Ann Emerg Med. 2021 Feb;77(2):163-173. doi: 10.1016/j.annemergmed.2020.07.039. Epub 2020 Oct 21. PMID: 33500115.
4. Institute of Medicine. Dietary Reference Intakes for Calcium and Vitamin D. Report Brief. Nov 2010. Found at https://www.nap.edu/resource/13050/Vitamin-D-and-Calcium-2010-Report-Brief.pdf.
5. Kuba MHM, Izuka BH. One Brace: One Visit: Treatment of Pediatric Distal Radius Buckle Fractures with a Removable Wrist Brace and No Follow-up Visit.
6. Lawrence JTR, MacAlpine EM, Buczek MJ, Horn BD, Williams BA, Manning K, Shah AS. Impact of Cost Information on Parental Decision Making: A Randomized Clinical Trial Evaluating Cast Versus Splint Selection for Pediatric Distal Radius Buckle Fractures. J Pediatr Orthop. 2022 Jan 1;42(1):e15-e20. doi: 10.1097/BPO.0000000000001980. PMID: 34889832.
7. Perry DC, Achten J, Knight R, Appelbe D, Dutton SJ, Dritsaki M, Mason JM, Roland DT, Messahel S, Widnall J, Costa ML. Immobilisation of torus fractures of the wrist in children (FORCE): a randomised control equivalence trial in the UK. Lancet. 2002 Jul;400:39-47. doi: 10.1016/S0140-6736(22)01015-7
8. Plint AC, Perry JJ, Correll R, Gaboury I, Lawton L. A randomized, controlled trial of removable splinting versus casting for wrist buckle fractures in children. Pediatrics 2006;117:691-7. https://www.nap.edu/resource/13050/Vitamin-D-and-Calcium-2010-Report-Brief.pdf
9. Sinikumpu JJ, Nietosvaara Y. Treatment of Distal Forearm Fractures in Children. Scand J Surg. 2021 Jun;110(2):276-280. doi: 10.1177/1457496920983104. Epub 2020 Dec 29. PMID: 33372581.