Which common pediatric orthopedic injuries actually need a cast?

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VDFP Dine & Learn ER Roundtable – March 4, 2020

Buckle fractures of the distal radius do not need a cast – *the most common pediatric fracture*

From two 2014 surveys on the management of distal radius buckle fractures

ERP: Pediatric Emergency Care 2014;30: 462-468

Peds Ortho: Journal of Pediatric Orthopaedics 2015;35:18–23

- 63% of Canadian ERP (N=447) used removable splint/slab as primary method of immobilization
  - 76% of Peds ERP
  - 55% of Adult ERP
- 55% of Canadian pediatric orthopedic surgeons (N=40) use splints as primary method of immobilization

From a 2016 systematic review of 8 RCT (total N=825) comparing cast immobilization vs alternatives (tensor, fibreglass/POP splint, velcro splint) for buckle fractures of distal radius in patients <18 years old

Journal of Pediatric Orthopaedics B 2016, 25:183–190

- No secondary fracture displacement
- No re-fractures (out to 6 months; 2 trials)
- Pain scores no different between cast and alternatives (4 of 6 trials). Pain score worse for alternative (2 trials) but baseline pain scores were higher in the alternative groups
- Alternative splinting allowed earlier return to normal ROM
- Parental preference/comfort scores favoured alternatives

From a Cochrane review of wrist fracture management in kids

Cochrane Database of Systematic Reviews 2018, Issue 12. Art. No.: CD012470

> "Where available, the quality of the RCT-based evidence on interventions for treating wrist fractures in children is low or very low. However, there is reassuring evidence of a full return to previous function with no serious adverse events, including refracture, for correctly diagnosed buckle fractures, whatever the treatment used."

What other injuries don't need a circumferential cast?

Emergency Medicine Clinics of North America 2020, 38:31–59

- Greenstick, transverse, Salter-Harris I or II fractures of the distal **radius** with <15° angulation or <5 mm displacement
  - treat with removable splint +/- Ortho follow-up
- isolated **ulnar** fractures (nightstick fracture) with minimal or no angulation or displacement
  - treat with removable splint +/- Ortho follow-up
- middle-third **clavicle** fractures in kids <12 yo with <100% displacement or <2 cm shortening
  - treat with sling for comfort +/- Ortho follow-up
- supracondylar fractures of the **humerus** (includes effusion-only) with <2 mm displacement and minimal angulation
  - best in backslab with Ortho follow-up
- distal **fibula** ankle fractures (Salter I or II, avulsions) with minimal or no displacement
  - treat with commercial brace (stirrup or ASO-type) +/- Ortho follow-up
- X-ray negative wrist and ankle injuries (despite up to 25% occult fracture rate)
  - if needed for symptom relief treat with the same brace as for fracture, follow-up prn

Management of Ankle Sprains – *the most common and best studied ligamentous injuries*
From a 2018 CPG on the treatment and prevention of ankle sprains
British Journal of Sports Medicine 2018, 52: 956-971. Selected items from Table 8, edited and annotated

Modality	Recommendation	LOE
RICE	RICE is not advised as treatment modality after a lateral ankle sprain (LAS). *There is no evidence that RICE alone, or cryotherapy, or compression therapy alone has any positive influence on pain, swelling or patient function. Therefore, there is no role for RICE alone in the treatment of acute LAS.*	2
NSAIDs	NSAIDs may be used to reduce pain and swelling. *NSAIDs may be used by patients who have incurred an acute LAS for the primary purpose of reducing pain and swelling. However, care should be taken in NSAID usage as it is associated with complications and may suppress or delay the natural healing process*	2
Immobilisation	Immobilisation should not be used in the treatment of a LAS. *If immobilisation is applied to treat pain or oedema, it should be for a maximum of 10 days after which functional treatment should be commenced.*	2
Functional support	Functional support is preferred over immobilisation, especially the use of a brace. *Use of functional support for 4–6 weeks is preferred over immobilisation. The use of an ankle brace shows the greatest effects compared with other types of functional support.*	2
	For prevention (primary and secondary), both tape and brace may be used. Choice of modality should always be based on patient preferences.	1
Exercise	Exercise therapy should be started as soon as possible to recover joint functionality. *Whether exercise therapy should be supervised or not remains unclear due to contradictory evidence and requires further research.*	1
	For recurrent ankle sprains, exercise should be included in regular training activities as much as possible.	1
Surgery	… (goal is to) avoid unnecessary invasive treatment on patients that would just as well recover from conservative treatment.	1
Other therapies	Based on current evidence, other modalities than the ones mentioned above are not advised. *No effect on pain, oedema, function and return to play has been shown for ultrasound (level 1), laser therapy (level 1), electrotherapy (level 1) and shortwave therapy (level 2). Evidence on accupuncture is inconclusive (level 1). A small cohort study indicated that local vibration therapy may be effective... while another study indicated the possible beneficial effect of Bioptron light therapy in addition to cryotherapy (level 3).*	1-3
Work resumption	Immediate functional treatment and a return to work schedule are advised to minimise work absenteeism.	3
Sport resumption	Supervised exercises are advised with the focus on proprioception, strength, coordination and function.	1

Really? No RICE?
From a 2004 systematic review of the use of ice for acute soft-tissue injury (N=22 trials included)
American Journal of Sports Medicine, 2004. 32(1): 251-261

> "There was marginal evidence that ice plus exercise is most effective, after ankle sprain and postsurgery. There was little evidence to suggest that the addition of ice to compression had any significant effect... Few studies assessed the effectiveness of ice on closed soft-tissue injury, and there was no evidence of an optimal mode or duration of treatment."

From a 2019 US patent application for a novel device to treat soft tissue injury
https://patents.google.com/patent/US20200000632A1/en – *Simultaneous thermal and cooling therapeutic device*

> "For example, by using hot and cold at the same time, the signals of the brain become confused and may alleviate the area of injury quicker."

Dr Jeff Eisen, 4 March 2020