Paediatric Matters
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Tips and Tricks: Reducing Cast Related Harm in Children

Patient story

Justin aged 2 years was on the trampoline with his older brother. He suddenly started crying and seemed reluctant to weight bear on his right leg. He presented to his local Emergency Department (ED) where an x-ray showed a transverse fracture of the right proximal tibial metaphysis. A compressive bandage (Tubigrip) and below-knee back slab was applied, and his parents were advised to keep the cast dry, avoid weight bearing and come back for review in 10 days.

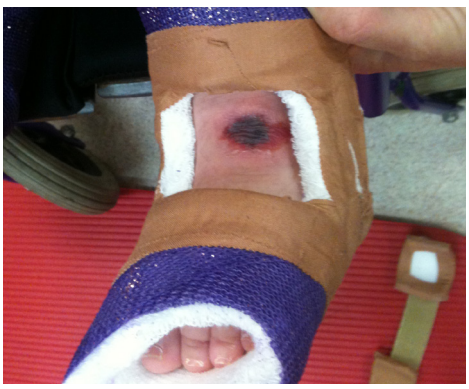
Over the next few days, Justin often cried in pain, pointing to his right heel. He returned to the ED when the cast had become wet and was unraveling, so the cast was reinforced, and pain relief prescribed. The family did not attend the scheduled fracture clinic review the next week.

Three weeks post injury, the family re-presented to the fracture clinic as Justin was still in pain and pointing to his right heel. The family was reassured that this was expected. On final presentation, Justin's cast was removed, and he was found to have an iatrogenic stage 4 pressure injury on his right heel with muscle, tendon, cartilage and bone on view.

QPQC Review

The QPQC reviewed all serious paediatric clinical incidents involving casts +/- splints in Queensland from June 2014 to April 2019. This included 5 incidents involving permanent patient harm (SAC 1) and 24 incidents involving temporary patient harm (SAC 2).

Pressure injuries developed in 66% of incidents.



This photo shows a typical pressure injury.

Risk factors for cast related injury included:

- Cast Application (79% incidents) – loose/unravelling casts, incorrectly positioned, insufficient padding or incorrect materials;
- Cast Management (76% incidents) – lack of continuity of care, inadequate escalation, poor communication with families, families not adhering to treatment plan or lost to follow up, family concerns not acted upon; and
- Cast Removal (21% incidents) – burns, friction injuries, cuts and vasovagal episodes (fainting).

Red flags

Patient Risk Factors

- Children with impaired ability to communicate their pain or symptoms (i.e. young/nonverbal children)
- Children with impaired sensation (i.e. neurological conditions such as spina bifida)
- Children with behavioural or development related non-adherence (may compromise plans for non-weight bearing)
- Children who may be socially disadvantaged or geographically isolated (may hinder adherence with treatment plan/follow up)
- Children with hip spicas (risk of pressure injuries)

Clinical Red Flags

- Pain: localised, persistent (>3 days) or new; not near the fracture site; requiring strong pain relief medication; or as the reason for multiple re-presentations. Can be described as burning or numbness.
- Heel pain away from fracture site (should be treated as a pressure injury until proven otherwise)
- Multiple re-presentation or nonattendance at follow up appointments.

Lessons learnt

1. **Casting is a skill.** Clinicians need training, guidelines, supervision and access to consultants in and out of hours. For advice, contact your local orthopaedic service. Queensland Children's Hospitals experts can be contacted through Children's Advice and Transport Co-ordination Hub (CATCH) on 13 CATCH (13 22 82). Telehealth may be an option (07 3068 5954).
2. **Casting usually significantly reduces fracture pain.** Persistent pain (longer than three days) or severe pain is due to a pressure injury until proven otherwise.
3. **Families and clinicians need to be aware that pressure injuries are potential complication of casts.** This requires an active discussion with families about signs of complications and when to re-present, as well as providing written information on cast care/risks. Listening to family's concerns is important.
4. **Fracture clinic non-attendance or multiple re-presentations can be a red flag for complications.** Multiple re-presentations warrant escalation for senior review. A system for flagging and following up non-attendees as a priority should be in place.
5. **Cast removal can be associated with complications** such as burns, friction injuries and cuts (especially when padding is insufficient). Vasovagal episodes (fainting) are not uncommon after cast removal. Awareness and planning for these risks is important.

Useful Links

Queensland Health Internal Resources

CHQ Work Instruction: Physiotherapy Casting Clinic
CHQ Procedure: Cast Management for Children
CHQ Procedure: Pressure Injury Prevention when using Orthoses (Splints/Casts/Devices)

Other Resources

Fact Sheets for Families - Cast Care
Qld Health Pressure Injury Staging Course and Guide
International Guideline for Prevention and Treatment of Pressure Ulcers/Injuries
Royal Children's Hospital Fracture Casting Videos

For further information **email QPQC@health.qld.gov.au** or
visit **www.childrens.health.qld.gov.au/chq/health-professionals/qpqc**

Queensland Government