

Open Fractures and Tetanus Prophylaxis in Children

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Paediatric Trauma Guidelines

Open fractures in major trauma

Background

Guidance is based on British Orthopaedic Association Standards for Trauma (BOAST4) “The Management of Severe Open Lower Limb Fractures” 2009.

Best outcomes are achieved by timely, specialist surgery rather than emergency surgery by less experienced teams. In the multiply injured child, this may require secondary transfer to the Paediatric MTC. The decision will lie with the Orthopaedic team at BSUH.

Management

On arrival to the ED, assess airway, breathing, circulation and disability as per APLS guidelines.

Identify and treat concomitant life threatening injuries

Assessment of the extremities should take place in the secondary survey after the airway, breathing and circulation have been assessed and stabilised, **unless there is life-threatening haemorrhage from the limb.**

1. Ensure adequate **intravenous analgesia** – **morphine** 0.1 mg/kg
2. Give **intravenous antibiotics** – ASAP, ideally within 3 hours of injury. **Co-amoxiclav** 30 mg/kg (max 1.2 g) or **Cefuroxime** 50 mg/kg (max 1.5 g) 8 hourly until wound debridement. Clindamycin 6 hourly if penicillin-allergic.
3. Neurovascular examination and documentation. Repeat every 15 minutes
4. Photograph wound
5. Remove gross contamination e.g. leaves
6. Cover wound with saline-soaked gauze and an impermeable film
7. Do not wash out wound at this stage or disturb wound once dressing on
8. Check tetanus status and update if not covered.
9. Align and splint fracture with a plaster backslab (to include whole leg / arm). Repeat neurovascular examination post-splinting.

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10. X-ray limb when safe to do so
11. Timing of definitive management depends on presence of other injuries and available expertise. Neurovascular impairment, compartment syndrome, or wound heavily contaminated requires urgent surgery. The decision will rest with the Orthopaedic team.

Tetanus prophylaxis

Background

Tetanus is an acute disease caused by the action of tetanus toxin, released following infection by *Clostridium tetani*. Tetanus spores are present in soil or manure and may be introduced into the body through a puncture wound, burn or scratch.

The tetanus vaccine is only given as part of a combined product. Current dosage schedule:

1. Primary immunisations: at 2, 3 and 4 months or given 1 month apart.
2. First booster: at pre-school age or at least 1 year after primary immunisations.
3. Second booster: at secondary school age (10 years after 1st booster) or at least 5 years after first booster.

Tetanus-prone wounds

- wounds / burns that require surgical intervention that is delayed > 6 hours
- wounds or burns that show a significant degree of devitalised tissue or a puncture-type injury, particularly where there has been contact with soil or manure
- open fractures
- wounds or burns in patients who have systemic sepsis

High risk wounds = heavy contamination with material likely to contain tetanus spores and / or extensive devitalised tissue.

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Management

IMMUNISATION STATUS	CLEAN WOUND	TETANUS-PRONE WOUND	
	Vaccine	Vaccine	Human tetanus immunoglobulin
Fully immunised - received total five doses of vaccine at appropriate intervals	None required	None required	Only if high risk
Primary immunisation complete Boosters incomplete but up to date	None required - Can give next dose if due soon	None required - Can give next dose if due soon	Only if high risk
Primary immunisation incomplete or boosters not up to date	Give dose and complete schedule	Give dose and complete schedule	Yes: One dose of human tetanus immunoglobulin in a different site
Not immunised or immunisation status not known or uncertain	Give dose and complete full 5 dose schedule	Give dose and complete full 5 dose schedule	Yes: One dose of human tetanus immunoglobulin in a different site

Tetanus immunoglobulin dose = 250 iunits I.M (500 iunits if > 24 hours since injury, or risk of heavy contamination, or following burns).

Which vaccine to give?	
Primary immunisation Child < 10 years	DTaP/IPV/Hib Pediacel 0.5 ml I.M
Primary immunisation Child > 10 years	Td/IPV Revaxis 0.5 ml I.M
Booster Child < 10 years	dTaP/IPV or DTaP/IPV Repevax or Infanrix IPV 0.5 ml I.M.
Booster Child > 10 years	Td/IPV Revaxis 0.5 ml I.M