

BOAST Guidelines Summary

1) Hip fractures:

- a) MDT approach with orthogeriatric, anaesthetic and physio input with 2° prevention
- b) MRI / CT within 24 hours if uncertain (NWB)
- c) Correct and treat comorbidities early and operate within 36 hours
- d) Fixation / surgery should allow early FWB
- e) Active early assessment and recognition of dementia / delirium
- f) Hip fracture surgery is part of palliative care in terminally ill
- g) VTE and pressure sores prophylaxis
- h) Data entry into National Hip Fracture Database

2) Spinal Clearance in unconscious / un-assessable patient

- a) Protect spine until assessment/imaging
- b) Check neuro status/clinical exam
- c) Get radiological clearance if unable to assess within 48h
- d) 2-3mm CT from skull base to T1 (include at time of CT brain, NICE head injury)
- e) Thoracic/lumbar – either x-rays or CT
- f) Reporting by senior radiologist before clearance
- g) Remove immobilization while intubated, but re-apply before waking, and then clinically clear to exclude a ligamentous or cord injury ± MRI

3) Pelvic/Acetabular Fracture:

- a) Binder initially. Change to Ex-fix if prolonged/transfer delay
- b) massive transfusion protocol (1:1:1) ... then embolise/pelvic pack
- c) Early CT when stable
- d) Urgent urology input: CT/urethrography; intraperitoneal tears need urgent repair, extraperitoneal needed urgent drainage
- e) Any open pelvic # needs cystostomy tube and diversion colostomy to upper quadrant
- f) Liaise with pelvic recon team ASAP (definitive treatment in 5-7 days)
- g) Need follow-up for sexual disabilities, etc...
- h) Hip dislocation ± acetabular fracture: reduce urgently/assess stability/NV status pre- and post/skeletal traction. If still unstable, seek advice from pelvic surgeon. CT within 24h, definitive treatment within 5-10 day. DVT prophylaxis within 48 hours.

4) Open Tibia Fracture

- a) IV Coamoxiclav 1.2g within 3 hours of injury (Clindamycin 600mg if allergic)
- b) Serial NV and compartment observation
- c) Gross contamination (agriculture / sewage) and vascular impairment prompts surgery within 6 hours (warm ischaemia time)
- d) 4 compartment decompression via 2 incisions on lower leg for compartment syndrome
- e) Orthoplastic approach documented – early transfer if not available, and primary debridement by non-specialist only if unfit for transfer
- f) Gross contamination removed to allow photography, saline soaked gauze, impermeable dressing, and splinting (incl. knee & ankle)
- g) Primary debridement within 24 hours by senior plastic & orthopaedic surgeon together – regular trauma list with IV antibiotic cover that continues for 72 hours or until definitive closure
- h) VAC dressing or antibiotic bead pouch if delayed definitive fixation or skin cover – ideally definitive fixation / cover within 3-7 days.
- i) Paediatric open tibial wounds are treated in the same way – but not necessarily the fracture.

5) **Peripheral Nerve Injury:**

- a) Seek advice from specialist
- b) Fix skeleton first if appropriate, and explore nerve – record in notes
- c) Urgent repair best; if not able, then appose ends with fine coloured suture
- d) If palsy post-op, reduce dressings/reposition limb. If no improvement – specialist advice for re-exploration
- e) Painful post-op paralysis – urgently re-explore (? Compartment)
- f) EMGs/NCS rarely needed acutely.
- g) Seek advise for brachial plexus injury within 3 days

6) **Arterial injuries with fractures & dislocations**

- a) Life-threatening injuries first
- b) Control haemorrhage direct pressure/tourniquet
- c) Emergent reduction and rpt examination. Duplex/angio (CT or on-table)? DON'T delay.
- d) Assume pink, pulseless limb to have an arterial injury and involve vascular team
- e) Devascularised limb – URGENT exploration
- f) Amputation decision – TWO consultants
- g) First restore perfusion with vascular shunts, next stabilise skeleton, then vein graft
- h) Low threshold for fasciotomy

7) **Fracture Clinic Services**

- a) Patients seen <72h, consultant-led (supervised). Mx plan should be set.
- b) Plaster rom and x-ray facilities provided
- c) Further imaging should be prompt and NOT delay surgery
- d) Direct access to physio/OT
- e) CRPS should be identified early and pain clinic access available
- f) Fracture Liaison sevices available (falls prevention/fragility # services)
- g) Patient info leaflets available for common injuries
- h) Facilities should allow planned admission within safe time-frame set by surgeon for those who require surgical intervention

8) **Management of Traumatic Spinal Cord Injury (SCI)**

- a) All units should have named, linked spinal cord injury centre, who will agree protocols for nursing, joint protection and therapy. (either via written protocols or verbal discussion with on-call Consultant within 4 hours)
- b) Follow BOAST 2 for C-spine protection and clearance
- c) If managing SCI should have 24 hour CT & MRI facilities
- d) Serial neurological assessment on ASIA charts
- e) Centres treating SCI should have theatre access within 4 hours of injury
- f) Any agreed transfers to a Spinal Cord Injury Centre should be within 24h
- g) If unfit or transfer not needed, should have outreach visit by day 5
- h) Spinal cord injuries should be recorded in National SCI Database

9) Fracture Liaison Service

- a) Should be a part of in-patient trauma care or fracture clinics (BOAST 7)
- b) Led by consultant physician or GP with osteoporosis expertise
- c) Systems in place to identify patients 50+ with fragility fracture
- d) Patients should have leaflet on lifestyle, nutrition & osteoporosis
- e) Identify falls risks, and arrange DEXA scan within 3 months
- f) Links with metabolic bone specialist, and should update GP with all findings/advice

10) Compartment Syndrome

- a) Assess after all major injuries or prolonged surgery + clear documentation
- b) Pain on passive movement is key. (NV status should be documented too, but not d_x)
- c) Patients at risk should have hourly compartment nursing observations
- d) Avoid regional anaesthesia in high risk patients
- e) If suspicious – release all dressings to skin level, maintain BP and keep limb at level of heart – reassess within 30 minutes
- f) Consider compartment pressure measurement (optional) – BUT all units should have access to compartment pressure measurement equipment.
- g) Surgery within 1 hour once decision made – absolute pressure > 40mmHg, Delta P < 30mmHg, or convincing clinical signs
- h) Document compartments decompressed, debride necrotic muscle, 2nd look within 48 hours and early plastic surgery involvement.
- i) Late presentation (>12 hours) has higher complication risk. 2 consultant decision to operate and non-operative management is an option.

11) Paediatric Supracondylar Humerus Fracture

- a) Document radial pulse, digital cap refill, individual nerves: median, AIN, ulnar & radial
- b) Same day or next day surgery – not overnight routinely
- c) Overnight indications: absent radial pulse, impaired perfusion, threatened skin
- d) Medial wires should be inserted using technique to avoid ulnar nerve
- e) 2mm K-wires
- f) reduction to correct Baumann's angle and avoid cubitus varus
- g) Nerve injuries are usually transient neuropraxias – if post-op consider exploration
- h) A perfused limb does not require exploration of brachial artery, regardless of presence / absence of radial pulse
- i) An ischaemic limb however needs discussion with vascular team prior to reduction. If remains ischaemic after reduction, then needs exploration by surgeon trained in small vessel repair
- j) Post-operative documentation of nursing compartment observations (BOAST 10)
- k) Post-op x-ray between day 4-10 to ensure reduction maintained
- l) Wire removal at 3-4 weeks.

12) Management of Ankle Fractures

- a) Stable fractures should be treated with analgesia, splinting and patients allowed to FWB as tolerated. Follow-up optional.
- b) Where fracture stability is uncertain (but position acceptable), mobilise NWB but review within 2 weeks with weight bearing x-rays to confirm alignment maintained.
- c) When ankle mortise unstable, recommendation is early fixation in those <60 yrs. Over 60's can be treated with close contact casts if reduction can be maintained.
- d) Always check syndesmosis stability during ORIF.
- e) Surgical patients should be FWB as tolerated in a splint or cast – unless fixation tenuous, soft tissues a concern, or those with peripheral neuropathy. Check x-rays within 6 weeks.
- f) No consensus on removal of syndesmosis screws or VTE prophylaxis
- g) Advise patients on functional recovery, rehab, return to work/sports/driving.

13) Rehabilitation & Communication with Trauma Patients

- a) Start a rehab prescription within 24hrs: diagnosis, treatment, management plan, transfer plan, medication, VTE, expected goals, therapy requirement, OPD follow-up, wound care and any referrals for further care (e.g. psychological support, neuro trauma)
- b) Management plan communicated with patient and/or relatives in timely manner
- c) Each unit should have a designated coordinator for communication & liaison and made clear within 12 hours.
- d) All patients / carers should have at least one face-to-face meeting with this coordinator
- e) Give location information to family (e.g. phone numbers, visiting times, parking, rest areas and hotels.
- f) Discuss return to work, driving, sports, etc...
- g) System in place to make contact with patients within 2 weeks of discharge if complex needs, to assess progress,

14) Management of Urological Trauma Associated with Pelvic Fractures

- a) All high energy trauma cases must have an examination of the external genitalia / perineum (incl. DRE)
- b) Single pass 16F urethral catheter by an experienced doctor allowed, even if clinical or CT-confirmed urethral injury – document presence of blood or not in urine.
- c) Blood stained urine mandates a retrograde cystogram via catheter – involve urology if urethral or bladder injury confirmed.
- d) Failure to pass urethral catheter requires suprapubic catheter placed via Seldinger technique under USS-guidance using 16F silicon catheter – midline skin insertion, 3-4 finger-breadths above symphysis pubis. (Or can be inserted during emergency laparotomy.)
- e) If urethral or bladder injury, then pelvic fracture should be treated like an open-long bone with antibiotics for 72 hrs, and early fixation based on patient physiology.
- f) Intra-peritoneal bladder rupture requires emergency laparotomy and direct repair.
- g) Urethral injury in females and children need tertiary referral as more complex.
- h) Urethral repair is usually delayed for 3 months post injury, EXCEPT: ano-rectal injury, perineal degloving, bladder neck rupture, penetrating trauma anterior urethra, massive bladder displacement (= early direct repair within 48 hrs).
- i) Patients with anterior displaced pelvic fractures or urethral injury should be counselled on high risk of sexual dysfunction – provide written guidance, and refer to an Andrological service (all MTCs should have an established link)
- j) National audit setup as part of TARN.

Performing retrograde urethrogram:

x-ray plate under pelvis
dilute 10ml IV contrast with 10ml of saline
insert small Foley catheter into penile meatus and inflate balloon to seal tip only
inject contrast and take AP-pelvis (+lateral if possible)

Performing catheter cystogram

x-ray plate under pelvis
dilute 150ml IV contrast with 150ml of saline
insert small Foley catheter 2-3 cm further to ensure balloon not blocking bladder neck
(would seal and a bladder neck injury and give a false negative)
inject contrast and clamp catheter; take AP-pelvis (+ lateral if possible)
evacuate contrast and repeat AP-pelvis x-ray