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Clinical Guidance

Trauma Pathways in Adults

Summary

These guidelines are to assist in clarifying correct referral pathway which will guide a more efficient management and better outcomes for patients.

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Date	Change details, since approval	Approved by
10.07.20	Trauma referral pathway reviewed by Dr Dev and Dr Tomasi. No changes required	Trauma Board

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Guy's and St. Thomas' NHS Foundation Trust Trauma Referral Pathways

These guidelines are to assist in clarifying correct referral pathway which will guide a more efficient management and better outcomes for patients. This is not a substitute for local acute management guidelines, which should be started before the referral is made if possible.

Please find pathways for the following injuries to:

1. Head
2. Face
3. Neck
4. Chest
5. Abdomen and pelvis
6. Limbs
7. Burns
8. Polytrauma

In case of pregnancy: fast bleep the Obstetrics SpR on 0672 or call their smartpage directly.

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M Gavrilovski, K Solanki v2.0 Feb 2021
Approved by Trauma board

Adult Trauma Team activation criteria (call 2222)

Activation criteria A
All adults

Step 1- Physiology

- GCS≤13
- Sustained BP < 90
- RR<10 or > 29

Step 2- Anatomy

- Chest injury with altered physiology
- Arterial bleeding requiring control with tourniquet
- Traumatic amputation/mangled limb proximal to wrist/ankle
- Penetrating trauma below the head/above the knees including axilla but not arms
- Spinal injury with abnormal neurology
- Open fracture of the lower limb proximal to the ankle
- Burns/scalds greater than 30%
- Facial burns with complete skin loss lower half of the face
- Circumferential burns from a flame injury

Step 3- Mechanism

- High speed RTC
- Death in the same passenger compartment
- Fall from height
- Person trapped under a vehicle or heavy object
- Bullseye to windscreen or damage to A post of the vehicle caused by impact of individual outside of the vehicle
- Motorcycle RTC
- Ejection from vehicle
- Pedestrian/cyclist vs vehicle

Step 4- Crew/TTL concerns

Trauma team activation
Document the decision not to activate

*These criteria are mainly based on the LAS Major Trauma Triage Tool predicting that the patient may have suffered a major trauma (ISS>15)/would benefit from care at the MTC
*This list is not exclusive and Trauma Team should be activated if Senior ED Clinician has concerns about the patient with trauma, **even if none of the above criteria are triggered**
*Intoxicated patients may be difficult to assess accurately – have a lower threshold to suspect serious injuries/activate Trauma Team

Activation criteria B
If activation criteria A negative, but age≥ 65 with an obvious injury, mechanism of injury or who have fallen<2m

Physiology

- Systolic BP<110mmHg
- Heart rate>90 bpm
- GCS<15
- Lactate >2 or BE <-2

Anatomy

- Significant injury to ≥2 body regions
- Suspected pelvic injury
- Suspected head or spinal injury
- Suspected chest injury

Other

- Patient on anticoagulants or has a bleeding disorder
- Severe pain
- Acutely short of breath
- Uncontrollable major haemorrhage

Immediate ED Consultant or Registrar (ST4+ or equivalent) review for:

1. **Trauma team activation**

   or

2. **If decision not to activate trauma team then fill in RAT Trauma assessment form**

In the absence of mechanism, but identification of injuries on <u>any</u> imaging then re-screen patient; consider retrospective trauma call*

- History of unconsciousness
- Significant medical history
- Inappropriate or inadequate history
- Inappropriate awareness of symptoms/injury

- **EM Consultant or Registrar (ST4+ or equivalent) review within 15 minutes**
- **Repeat screen post examination/imaging**

*The purpose of the trauma call (and clinical priority for the patient) is adequate examination, early and adequate imaging and reporting and <u>early identification of all injuries</u>

POPS input

(Peri-operative Medicine for Older People undergoing Surgery)
Mon-Fri 8am-4pm

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General surgery POPS Bleep 2740:

CGA assessment and plan for all patients 65 and over, ongoing case management with surgical team if medical complexity/complex discharge planning/rehabilitation needs (CGA review of patients under 65 by request if complex co-morbidity/frailty/cognitive impairment/complex decision making)

Cardiovascular POPS Mobile 07444815063:

CGA assessment and plan for patients with complex co-morbidity/frailty/cognitive impairment/complex decision making or by surgeon/anaesthetic request, ongoing case management with surgical team if medical complexity/complex discharge planning/rehabilitation needs

Thoracic POPS Ext 82092:

CGA assessment and plan for all patients 65 and over, ongoing case management with surgical team if medical complexity/complex discharge planning/rehabilitation needs (CGA review of patients under 65 by request if complex co-morbidity/frailty/cognitive impairment/complex decision making)

Trauma & orthopaedics POPS Bleep 1510:

CGA assessment and case management with surgical team in NOF patients 60 and over, single CGA assessment and plan for periprosthetic and distal femoral fractures 60 and over
(CGA review of patients with other fractures by request if complex co-morbidity/frailty/cognitive impairment/complex decision making)

Plastics POPS Bleep 2740:

CGA review of patients under 65 by request if complex co-morbidity/frailty/cognitive impairment/complex decision making

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1. Head Trauma

- **All patients must be assessed within 15 minutes of arrival and triaged based on**

GCS 15-13

- Consider CT head as per criteria on the right

GCS <12

TXA

- For people with a head injury and a GCS score of 12 or less who are not thought to have active extracranial bleeding, consider:
- 2 g intravenous bolus injection of **TRANEXAMIC ACID** WITHIN 2 hours of injury

GCS <8

- Early involvement of an appropriately trained clinician to provide advanced airway management
- Neurosurgical involvment if persisting coma (a GCS score of 8 or less) and after initial resuscitation and hypoglycaemia ruled out

ANTICOAGULANTS:

If taking vitamin K antagonists, direct-acting oral anticoagulants (DOACs), heparin and low molecular weight heparins) or antiplatelet treatment (excluding aspirin monotherapy):

- **CT Head within 8 hours** of the injury (for example, if it is difficult to do a risk assessment or if the person might not return to the emergency department if they have signs of deterioration) **or**
- **CT head within 1 hour** if they present more than 8 hours after the injury.
- Early consideration of discussion with haematology for anticoag reversal.

Head injury: assessment and early management (nice.org.uk)

CT Head Criteria:

CT head scan within 1 hour of any of these risk factors being identified:

- a GCS score of 12 or less on initial assessment in the emergency department
- a GCS score of less than 15 at ≥2 hours after the injury on assessment in the emergency department
- suspected open or depressed skull fracture
- any sign of basal skull fracture (haemotympanum, 'panda' eyes, cerebrospinal fluid leakage from the ear or nose)
- post-traumatic seizure
- focal neurological deficit
- more than 1 episode of vomiting.

CT head scan within 8 hours of the head injury if they have any of these risk factors:

- age 65 or over
- any current bleeding or clotting disorders
- dangerous mechanism of injury (a pedestrian or cyclist struck by a motor vehicle, an occupant ejected from a motor vehicle or a fall from a height of more than 1 m or 5 stairs)
- more than 30 minutes' retrograde amnesia of events immediately before the head injury.

All abnormal CT heads MUST be referred without delay to KCH via Acute Neurosurgery referral system online for decision on treatment, chased regularly, and discussed on the phone with KCH Neurosurgery where indicated.
https://nww.ihtl.nhs.uk/neurosurgery

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CT brain normal

Remains under ED/MSAU
Discharge if possible with appropriate head injury advice
If needs admission, referral to appropriate specialty relating to need for admission

Accepted for transfer to KCH

Transfer to KCH.
KCH neurosurgery have duty to find alternate bed if none available, depending on the urgency and emergency situation, especially if surgical intervention required.
If no bed available and clinical decision that it remains clinically safe and appropriate for the patient to remain at STH until bed available. Admission should be agreed by senior EM and relevant admitting specialty doctor

CT brain abnormal (not being transferred to KCH):

GCS ≤13

- **Early referral** and discussion with **CRT** alongside **anaesthetic** input
- Manage airway
- 15 minute neuro-observations
- Low threshold to re-scan and re-discuss with King's Neurosurgeons
- Identify Critical Care bed if appropriate

Admit to Relevant Speciality Prior to Kings NS reply if:

- Consultant agreement
- GCS <14
- No midline shift or mass effect
- Nil anti-coagulants

GCS ≥14 AND:

No urgent neurosurgical intervention required
AND
Absence of other significant injuries
AND
No significant acute medical issues
AND
No clear medical cause for fall
AND
No significant acute substance withdrawal
AND
Frailty score 1-4
AND
Not a chronic finding (e.g. chronic SDH)

Refer to general surgery for observations +/- repeat scan as per neurosurgical advice. *POPS will perform CGA (comprehensive geriatric assessment) on all patients 65 and over with case management as appropriate and support discharge planning in patients with LOS >48hrs or who may require neurorehabilitation*

GCS ≥14 AND:

No urgent neurosurgical intervention required
AND
Absence of other significant injuries
PLUS
Evidence of clear intercurrent acute medical problem e.g. pneumonia
OR
Evidence of clear medical cause for collapse/fall*
OR
Evidence of significant substance withdrawal (e.g. alcohol)
OR
Clinical Frailty Score 5-9
OR
For end of life care

Refer to general medicine or geriatric medicine

*ECG suggestive of complete heart block or significant arrhythmia - refer to cardiology

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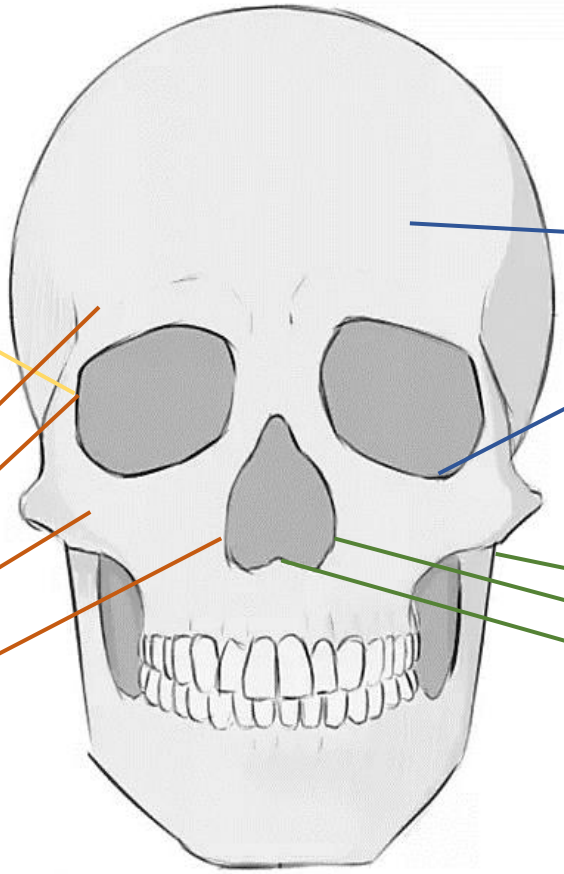
Facial and Skull Fracture Referral Pathways

Ophthalmology (via switchboard or Eye Casualty 84336/84136)

- Orbital wall fracture with eye signs*
- Globe injury

Maxillofacial (KCH SHO ext. 35051)

- Anterior table frontal bone
- Orbital wall fractures*
- Facial bone fractures
- Combination of nasal bone and other facial fractures



Neurosurgery (via KCH Neurosurgery portal)

- Posterior table frontal bone
- Basal skull fracture

ENT (SPR via switchboard)

- Mastoid fracture
- Isolated nasal fractures**
- Septal haematoma

*if restriction of ocular movements, diplopia, altered visual acuity or altered pupillary response- requires urgent discussion with on-call ophthalmologist

** refer to ENT emergency clinic for review in 1-2 weeks. Email: gst-tr.entemergency@gstt.nhs.uk

Please refer to the Facial Injury Pathway proforma on ED S drive for full guidelines and documentation of examination and imaging requests.

3. Trauma to the Neck

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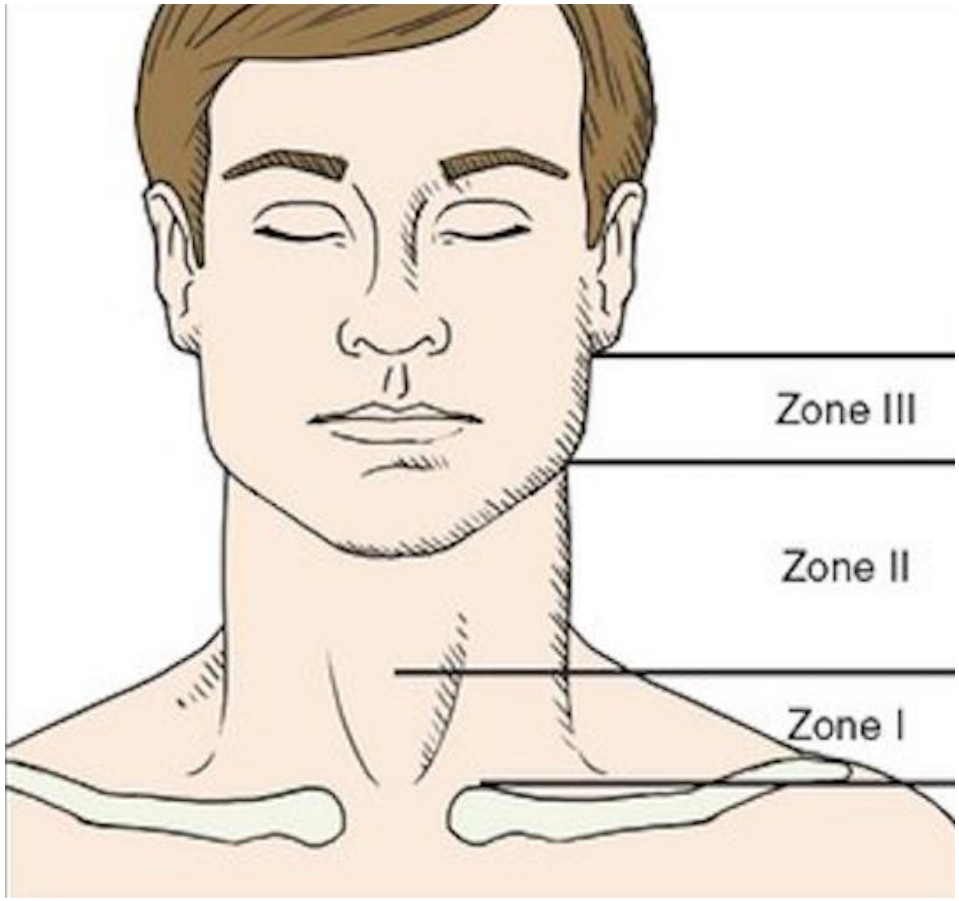
Assess for spinal cord injury
Consider immobilisation if appropriate
Contact KCH Neurosurgery
If intubation required, maintain spinal precautions throughout



<u>Penetrating Injury to Neck</u>
CT Angio of the Neck +/- head and chest

Zone 3 Injury
Above the Mandible
→ **ENT SpR via switch**

Zone 2 Injury
Cricoid Cartilage to Angle of Mandible
→ **ENT SpR via switch and Max-fax SpR via Kings switch.**
If vessel involvement - Vascular SpR

Zone 1 Injury
Clavicle to Cricoid Cartilage
→ **Cardiac Surgery SpR - 0200**
If vessel involvement - Vascular SpR

C-Spine Imaging Decision Tree

ANY HIGH RISK INJURY CRITERIA?
- Age >= 65 years
- Dangerous mechanism*
- Abnormal neurology
- Reduced GCS or cognition
- Spinal disease eg Ankylosing Spondylitis

No

DOES AT LEAST ONE CRITERIA FOR SAFE ASSESSMENT OF RANGE OF MOTION APPLY?
- Simple / slow speed rear end MVC**
- Comfortable in sitting position in Emergency Dept
- Ambulatory at any time since injury
- No midline C-spine tenderness

Yes

Secure C-Spine
Trauma mattress and immobilise with collar, blocks and tape.***

No

Yes

Suspected intoxication or distracting injury

No

Patient can actively rotate neck 45⁰ to the left and right

No

Yes

Clinical suspicion outweighs the sensitivity of plain imaging

Yes

No

Any concerning factor for poor quality plain imaging
- ☐ Probable degenerative changes
- ☐ Poor shoulder mobility eg arm injury
- ☐ Short neck length
- ☐ Increased muscle mass eg young male

Yes

No

Plain imaging
(Call Radiologist to ask for report within 1hr)

If normal → C-spine cleared radiologically

If acute abnormality or inadequate views

Maintain C-spine protection until clinically cleared
De-escalating spinal protection – senior decision only
(Registrar or Consultant)

Discuss with Radiology to organise CT C-Spine

No imaging required

PLEASE NOTE: Normal imaging only clears the C-spine radiologically, not clinically.

* Fall ≥1m/5 stairs; axial load; high-speed RTC / roll-over / ejection; recreational vehicles; bicycle; horse riding.
** Minor rear-end motor vehicle collision (MVC) excludes: pushed into oncoming traffic and hit by large or high-speed vehicle.
*** If patient is un-cooperative / agitated / distressed, allow position of comfort; avoid collar in compromised airway and pre-existing spinal deformity e.g. Ankylosing Spondylitis.

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4. Thoracic Trauma

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CT Chest/CXR Confirmed

Penetrating Injury

- **Cardiac Arrest** → Follow CA Protocol and Fast Bleep Cardiac Surgery - 0200
- **Massive Haemothorax** Chest drain >1.5L, >200ml/hour or unstable → Fast Bleep Cardiac Surgery – Consider CT angio or Urgent Theatre for Thoracotomy
- **Stable** Needs Admission with or w/o chest drain → Admit initially under cardiac surgery for first 24h at STH. Then if stable, transfer to Guys under thoracic surgery

Blunt Force Injury

- **Sternal Fracture** → Cardiac Surgery - 0200
- **Rib Fractures and Pulmonary Contusions** → Please follow Rib Fracture Pathway (Overview Below, Full Pathway on ED Clinical)

Thoracic Surgery Admission:

- All other injuries must be ruled out before admission under thoracic surgery.
  - Pts needing admission overnight will need a Guy's HDU bed.
- If no beds available, the pt is to be admitted under Cardiac Surgery at STH until a bed is available.

If the Pt is Frail, it's OOH or Requiring a Regional Block – Please Refer to Full Rib Fracture Pathway Document

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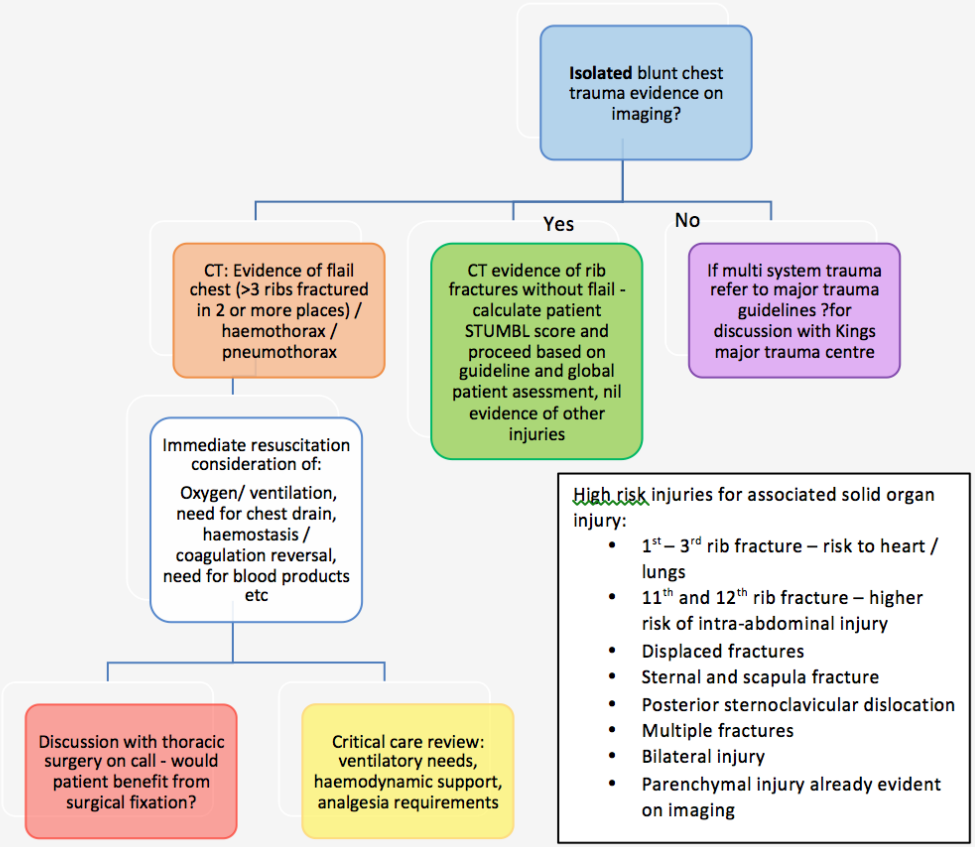
Stage 1: Identification of rib fractures on clinical assessment/abnormality noted on CXR/CT thorax



High risk injuries for associated solid organ injury:

- 1st – 3rd rib fracture – risk to heart / lungs
- 11th and 12th rib fracture – higher risk of intra-abdominal injury
- Displaced fractures
- Sternal and scapula fracture
- Posterior sternoclavicular dislocation
- Multiple fractures
- Bilateral injury
- Parenchymal injury already evident on imaging

Stage 2: Calculate STUMBL score and document CFS for patient to predict risk of pulmonary complications with 48-72 hours

STUMBL score	Points
Age (**1** point for every decade >10 years old)	
Oxygen saturations (**2** points for every drop of 5% saturations less than 95% on room air)	
Rib fracture score (**3** points for every fracture, regardless of multiple fractures per rib)	
Anticoagulant/antiplatelets (**4** points)	
Pre-existing chronic lung disease (**5** points if COPD / fibrosis / asthma / bronchiectasis)	
Total Score	

STUMBL score	Probability of developing complications
0-10	13% +/- 6
11-15	29% +/- 8
16-20	52% +/- 8
21-25	70% +/- 6
26-30	80% +/- 6
31+	88% +/- 7

Provided nil thoracic surgical input and advice from Major Trauma Centre to manage locally:

STUMBL score: 0-10 (risk of complications 13% +/- 6)

Low risk for complications:

- consider patient discharge if appropriate* with advice for deep breathing exercises, regular TTO analgesia and safety netting (see appendix 4 for patient information leaflet)
- In hours: Patient may be suitable for MSAU for further analgesia +/- STAT assessment – could identify patients who will benefit from falls clinic
- OOH: onwards referral to appropriate clinic eg. bone health

*Conditions: good oxygenation, able to deep breathe and cough without pain, adequate cognition to comply with advice and optimal social situation for good recovery

STUMBL score: 11-15 (risk of complications 29% +/- 8)

Moderate risk for complications:

- Consideration of serratus anterior block within the ED+/- discussion with anaesthesia for consideration of regional anaesthesia
- Admit patient for analgesia according to the WHO analgesia ladder and individual patient requirements
- All admissions as per thoracic referral pathway
- Physiotherapy assessment

STUMBL score: 16-20 (risk of complications 52% +/- 8)

High risk of complications:

- Clinical response team (CRT) review
- Consideration of need for Patient Controlled Analgesia / Epidural / Regional anaesthesia as appropriate – review from acute pain team in hours and anaesthetics out of hours
- Physiotherapy assessment

STUMBL score: >21 (risk of complications >70%)

High risk of complications:

- **Clinical response team (CRT) review** and agreement of escalation plan – **these patients benefit from Level 2 monitoring admission for first 24h** even if not otherwise appropriate for organ support
- **Early (24/7) anaesthetic intervention including nerve blocks is key**
- Discussion with thoracic surgery
- Anaesthetics/ acute pain review for analgesia optimisation
- Physiotherapy assessment

Referrals via SMARTPage but if require discussion:

Medical SpR
bleep 0154 / ext 58929

Acute Frailty Team
bleep 3024 / ext 57641

Chest physio/rehab
bleep 2103 (hours 0830-2000 7 days a week) OOH on call physio via switchboard - only for acute respiratory deterioration

Acute pain team
bleep 1523 / ext 80532
(hours: 9-5 mon-fri)

Anaesthetics SpR
bleep 0153

Clinical Response Team SpR
bleep 0610
SP 07871734296

At any stage patient needs critical care team review if:

- Oxygen requirements >4 litres to maintain sats >94% or evidence of respiratory distress

Patient needs regional anaesthesia and acute pain / anaesthetics review if:

- Still unable to deep breathe or cough due to pain after oral analgesia

As with any patient:

- Risk vs benefit assessment for stopping anticoagulation / reversal of coagulopathy

Clinical Frailty Score

5. Abdominal Trauma

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CRT review if YES to any injury

CT AP Confirmed

Penetrating Injury
Including Buttock/Groin

Vessel Injury and/or Heavy Bleeding?

YES:
Fast Blp Vascular or call via switch

NO:
Emergency General Surgery
SpR Bleep 0810
SHO Bleep 0145
or Smartpage

Blunt Force Injury

Kidney

Urology SpR via Switch/SP (Guys)

If unable to contact Urology Consultant or pt not stable for transfer
Gen Surgery SpR Blp 0810

Liver

Consider KCH Liver Unit transfer if requiring specialist care

If pt not stable for transfer or not for KCH: Gen Surgery SpR via 0810 or Smartpage

Fracture of the Pelvis or Acetabulum

If haemodynamically stable admit under Orthopaedics at STH for semi elective transfer

If Unstable:
Urgent transfer to KCH Discuss with Major Trauma Consultant via Switch by senior

All Other Abdominal Trauma

General Surgery
Blp 0145 or
via smartpage
if stable

If evidence of trauma to reproductive organs
Gynae SpR Blp 0480
or smartpage

6. Limb Trauma

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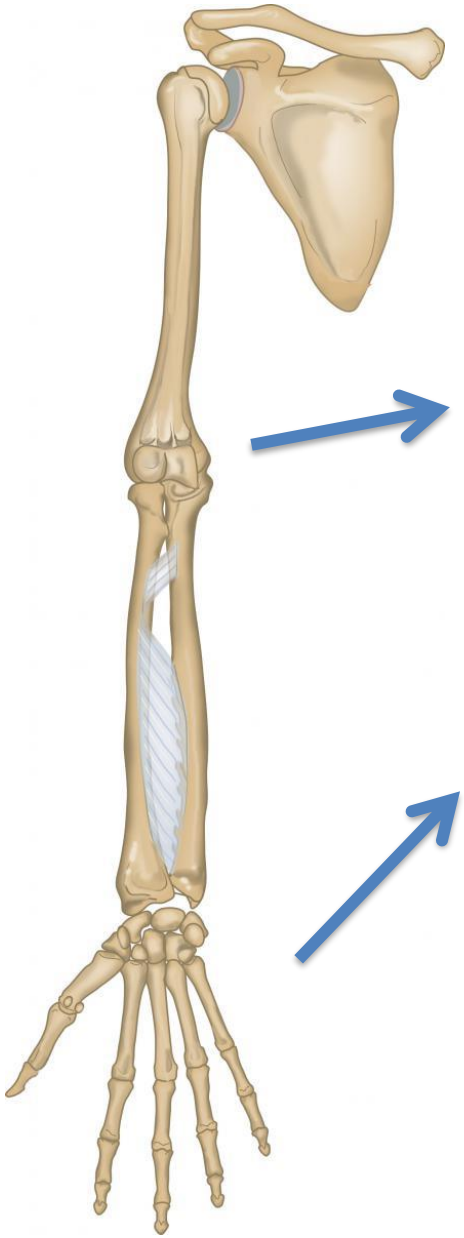


Upper Limb

Orthopaedics

Fracture or joint injury:
Shoulder to proximal carpal row.

Tendon injury:

Rotator cuff, biceps and triceps

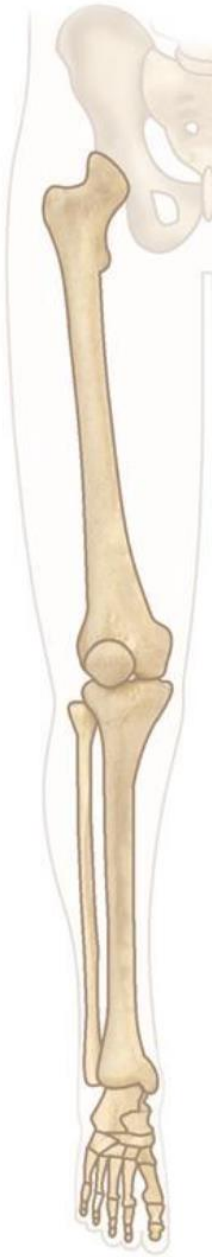
Plastics

Fracture or joint injury:
Distal carpal row and all bones more distal

Tendon injury:
Forearm, wrist, hand

Soft Tissue Injury:

Stabbings, lacerations, burns
+/-Skin loss, foreign bodies.



Lower Limb

Orthopaedics

Fracture, joint and tendon injuries including to the foot.

Plastics

Soft Tissue Injury:

Stabbings, lacerations, burns
+/-Skin loss, foreign bodies.

Vascular

Any vessel injury above the distal carpal row. Below that call plastics.

KCH Orthopaedics Referral:
If extensive open fractures/severe tissue loss –needs urgent KCH orthopaedics referral.

7. Burns

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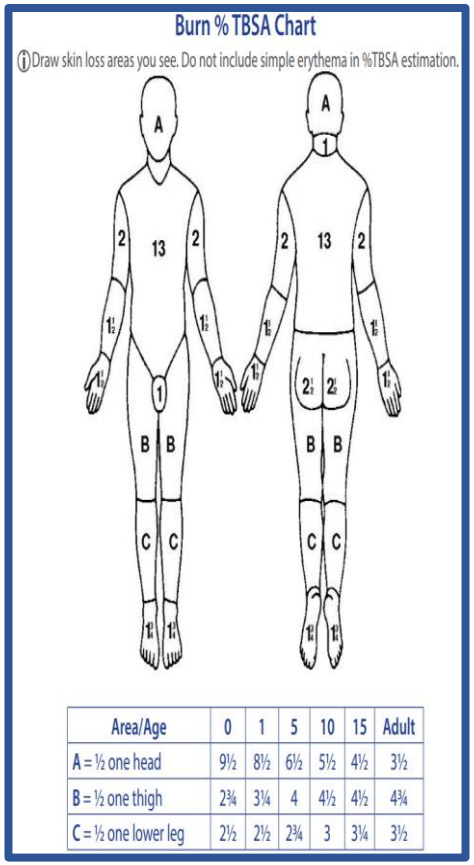
ASSESSMENT

*Assess as below; refer if any of the features in **bold** are present:*

- CAUSE
  - **Inhalation injury**
  - **Electrical**
  - **Chemical**
  - **Burns with trauma**
  - **Suspected NAI** or **self-harm**
- BURN DEPTH
  - Superficial/erythema
  - Superficial partial thickness
  - **Deep dermal**
  - **Full thickness**
- AFFECTED AREA
  - Risk areas: **face, scalp, ears, hands, feet, genitals**
  - **Circumferential burns**
  - **Joint involvement**
- SIZE
  - **>3% TBSA in adults**
- PATIENT DEMOGRAPHICS
  - **Age >60 years**
  - Significant co-morbidities (e.g**. diabetes**)
  - **Immunocompromise**
- WOUND
  - **Not healed after 2 weeks**
  - **Infection**
- SYSTEMIC FEATURES
  - Any features of **Toxic Shock Syndrome/ Burn Sepsis Syndrome: T >38°C, rash, diarrhoea and vomiting, malaise, not eating/drinking, tachycardia, tachypnoea, hypotension, reduced urine output**

Please refer to the LSEBN Guidance (www.lsebn.nhs.uk) for detailed management and assessment of burns.



Area/Age	0	1	5	10	15	Adult
A = ½ one head	9½	8½	6½	5½	4½	3½
B = ½ one thigh	2¾	3¼	4	4½	4½	4¾
C = ½ one lower leg	2½	2½	2¾	3	3¼	3½

MANAGEMENT

- FIRST AID
  - Cool for 20 mins with running water
  - Irrigate any chemicals
- PREPARE
  - Analgesia
  - Consider **tetanus immunisation**
  - Clean wound, remove non-viable tissue
  - Photograph
- ELEVATE BURNED AREAS
- DRESSINGS
  - Cover with loose longitudinal cling film (excl. face)
- FLUID RESUSCITATION, if:
  - **>15% TBSA burns** in **adults**
  - **>10% TBSA burns** in **elderly**

  → 24 hr fluid requirements from time of injury = **4mls x kg x %TBSA burned**

  Half to be given in **first 8 hrs**

  Half to be given in **next 16 hrs**

REFERRAL

Complete referral form via TRIPS (www.trips.nhs.uk) and attach photographs.

Refer to Chelsea and Westminster burns unit via:

- Adults: **02033152500**

8. POLYTRAUMA

All patients require CRT & anaesthetic review

Unstable Polytrauma

For URGENT discussion with KCH Major Trauma Consultant. Also refer to KCH acute referral for Major Trauma online:

- KCH bleep 950
- Or 02032995447
- Then portal: https://nww.ihtl.nhs.uk.teleomedic5/resource/Trauma/TraumaHTStartRefer

Trauma requiring surgery by more than one team

- Admit under the surgical specialty with the highest acuity injury requiring theatre first.
- If equal levels of acuity for consultant discussion with CRT input.
- Consider early discussion with Kings Major Trauma Team and refer via portal

Trauma requiring surgery by one team

Admit under the operating team. Review as required by other teams on the ward.

Stable Polytrauma NOT Requiring Surgical Intervention

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1. Consider URGENT discussion with KCH Major Trauma Consultant and complete online referral via portal. If the patient is not for transfer to KCH move to step 2.

2. Discuss the patient with CRT/consider the need for a higher acuity bed in HDU/ITU.

3. If suitable for ward-based care:
Admit pt under team with HIGHEST acuity injury. i.e.:

a) Intra-abdominal trauma requiring period of observation i.e. hepatic/splenic lacerations, admit under general surgery

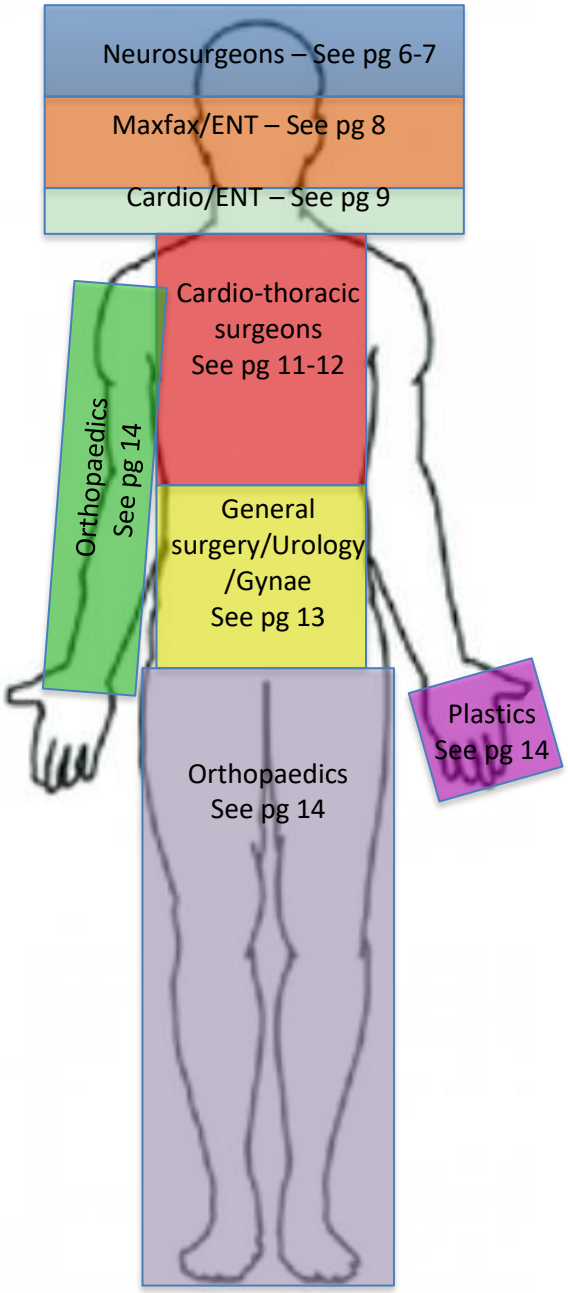
b) Rib fractures with STUMBL >11 or sternal fracture: admit under cardiac surgery at STH with thoracic input. Pts with Polytrauma are NOT to be transferred to Guys within the first 24 hours.

c) If several injuries of equal acuity - the pt must be discussed with the entire trauma team/MDT to determine the most appropriate admission pathway. Involvement of senior level discussion as required to make decision in a timely manner to avoid delays.

Please refer to adjacent image for an overview referral guide. More detailed referral information can be found under headings throughout this document.

When to Refer to Acute and General Medicine:

Only on Consultant agreement
AND
Absence of significant injuries requiring surgery or CRT
PLUS
Evidence of clear intercurrent acute medical problem e.g. pneumonia
OR
Evidence of clear medical cause for collapse/fall*
OR
Evidence of significant substance withdrawal (e.g. alcohol)
OR
Clinical Frailty Score 5-9
OR
For end of life care



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2. CT Head Criteria: Head injury: assessment and early management (nice.org.uk)
3. Facial injury pathway: ED S-drive
4. C spine imaging decision tree (on GTi): http://tww-wafr/WAFR-FAD/Applications/ClinicalGuidance/DocumentViewer.aspx?d=8742
5. GSTT Rib Fracture Pathway, December 2022: ED S-drive
6. LSEBN Initial Management of Burn Wounds: LSEBN Initial Management of Burn Wounds.pdf
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