Best Practice in Children's Trauma & Orthopaedics in the UK

Section 1: **Introduction**

The aim of this document is to set out BSCOS's position on the best practice in the delivery of children's trauma & orthopaedics in the UK.

The provision of trauma & orthopaedic services to children and young people in the UK is shared between larger groups of surgeons in tertiary referral centres/children's hospitals and solo practitioners or smaller groups in district general hospitals. Basic orthopaedic trauma care is delivered by most orthopaedic surgeons who are on trauma on call rotas.

The key to safe practice is effective clinical governance.

In the section on the configuration of elective services, we stress the importance of collaborative working, peer review and the benefits of dual consultant operating, particularly in low volume high complexity (LVHC) surgeries. We also emphasise the importance of following best practice guidelines and clinical consensus.

The guiding principle of trauma services is the safe delivery of trauma care as local to the child's home as practicable, within a clinical network which includes agreed referral pathways for more complex cases. Again, the emphasis is on peer review and support, underscored by local agreement and guidelines for safe management.

Our review closes with a discussion on the achievement and maintenance of consultant competency before emphasising the importance of collaborative working and the maintenance of professional standards.

Whilst the vast majority of children's trauma & orthopaedic work in the UK is based in the NHS, all of the points discussed below equally apply to practice in the private sector.

Section 2: **Configuration of Elective Services**

Elective operating within children's trauma & orthopaedics offers unique challenges. Whilst a considerable proportion of services are provided in tertiary and children's hospital settings, an equally significant volume of work is undertaken by smaller units in DGHs. BSCOS members are providing high quality services for the children under their care in both settings. To ease pressure on the child's education, the parent/guardian's work commitments and the family's life as a whole, it is important to achieve a balance between service provision in a (remote) tertiary centre and the provision of safe effective services as close to the family home as practicable.

Children's orthopaedics is unusual amongst the orthopaedic specialties in encompassing a wide variety of procedures for a complex group of conditions.

Effective elective services should be delivered based on a collaborative working approach which takes account of peer review and recognised national or regional best practice guidelines/consensus documents. Particular care is required when new techniques are introduced and there should be defined processes for this. Within that structure however, it should be acknowledged that for each individual child there will be a number of different management approaches, each of which may be valid – but all should be the subject of constructive discussion and review within peer review meetings.

The Importance of Peer Review

Best practice is that elective surgical cases are subject to peer review, to involve a discussion of the natural history of the case without (surgical) intervention, the management strategies available and the surgical options and techniques. This discussion should involve colleagues with experience of the management of that condition (peer review meeting). These reviews will usually be held at Trust level, but smaller units may need discussion between centres. This allows them to benefit from adequate experience for discussion and decision-making.

Peer review meetings should be held regularly and timetabled within job plans. A format and structure for the meeting, including which clinicians are present, minimum numbers to be quorate, and method of documentation should be agreed within the Trust (or Network). Realistic and appropriate outcome measures should be agreed pre-op and confirmed at post-op meetings.

A summary of the peer review meeting outcome(s) should be documented in the child's notes and any relevant communications passed on to parents/guardians, GPs and all other health care professionals involved.

Proper functioning peer review panels require a minimum attendance of adequately experienced and competent paediatric orthopaedic surgeons willing to engage and share knowledge and experience. It is recommended that a minimum number of consultants attend pre- and post-operative peer reviews

at least once a month. Regular non-attendance by specific individuals should be identified by unit leads and actioned through annual appraisal.

Low Volume High Complexity Surgery

Low volume high complexity (LVHC) surgery includes procedures that:

- are technically difficult.
- require complex intraoperative decision making.
- are lengthy.
- carry a high risk of complications.
- are performed in small numbers.

BSCOS has suggested a list of procedures that could be considered LVHC surgery. The list is not exhaustive, and surgeons should consider their experience level and operative numbers. Individual and patient factors should also be taken into consideration. Suggestions for LVHC cases include:

Pelvic osteotomies

DDH surgery (open reductions and osteotomies) including revision surgery

Cerebral palsy /neuromuscular hip reconstructions

Multilevel surgery in cerebral palsy / neuromuscular cases

Growing rod insertion in osteogenesis imperfecta and skeletal dysplasias

Knee ligament and patello-femoral reconstruction

Femoral osteotomies

Upper limb reconstruction

Foot and ankle deformity correction

A document regarding lower limb reconstruction using external or internal fixation will be issued by the British Limb Reconstruction Society.

Any procedures either new to the consultant or the unit should be discussed with colleagues and closely audited.

For low volume high complexity (LVHC) cases we recommend peer review meetings involving consultants with experience of managing the condition and performing the relevant operative procedures. Dependent on the numbers of experienced consultants within each Trust, consideration should be given to both pre- and post-op discussion being collaborative between Trusts.

We recommend the development of regional audit in children's T & O, in particular for reviewing LVHC cases. These meetings should include a summary of the outcomes from each unit. Both clinical cases and service provision should be reviewed, and the meetings should be held in a supportive environment where issues arising can be discussed and support offered to ensure service excellence across the region.

All peer review meetings should be documented and outcomes recorded as well as included in the patient records.

Consultant job plans need to accommodate these peer review/MDT meetings which are a vital part of clinical governance.

The Benefits of Dual Consultant Operating

Many BSCOS members report the benefit of operating with their peers for certain cases. This reflects case-mix, the complexity of surgeries and the changing nature of surgical training. Significant benefits of dual consultant operating include:

- Increasing individual surgical experience and numbers of cases.
- Guaranteed skilled assistance.
- The potential for providing more reproducible/better outcomes.
- The benefit of improved intra-operative surgical decision-making through collaboration.
- An enhanced training experience for orthopaedic trainees and fellows.

These factors all contribute to improved overall patient safety.

Individual consultants will decide on the likely need for dual consultant operating. It will depend on the seniority and experience of the consultant involved. This should be discussed & confirmed at pre-operative peer review meetings. Dual consultant operating may be recommended for many of the cases suggested to be LVHC as above.

The benefits of dual consultant operating should be acknowledged at Trust level and consultant job plans may need to be amended.

Pre-operative Pathways and Consent

As per GMC guidelines it is recommended that all surgical cases are seen in a pre-operative clinic prior to their surgical admission date. This will allow the outcome of any pre op peer review meeting to be discussed with the child & their parents/guardians, including the goal(s) of surgery in each case. Discussions will of course include risks, benefits and complications including post-operative recommendations. The pre-op clinic enables liaison with anaesthetic colleagues, paediatricians

(including those staffing HDU/ITU if needed) and relevant allied healthcare colleagues (physiotherapists, OTs, nursing staff etc).

Pre-operative optimisation of the child's health and rehabilitation potential may need to start many months prior to surgery, frequently when being on placed on the waiting list. This is achieved by liaising closely with the anaesthetic team and with all of the medical specialists involved with the child. This discussion may include the safest location for surgery for that child (dependent on regional HDU and ITU availability). Physiotherapy colleagues may like to review for pre-habilitation in many cases.

Pre-operative clinics are a vital part of the child's surgical pathway and need adequate provision and job planning.

The Use of Consensus Documents/Best Practice Guidelines and the Development of Outcome Measures

Elective procedures should be undertaken in a collaborative environment, within peer groups, based on best practice and where available be evidence-based. The benefit of discussion with senior experienced colleagues is invaluable. In formulating individualised management plans, colleagues can draw on multiple sources. These include:

- BOAST guidelines.
- BSCOS consensus statements
- Regional (and national) best practice documents
- Peer-agreed Trust policies
- National referral systems

BSCOS encourages the development of best practice guidelines. These may be national or regional (for example in liaison with surgery in children operational delivery networks (SIC-ODNs)). The collaboration between SIC-ODNs to harmonise guidelines and data collection should be encouraged - the ongoing work of the UK Clubfoot Network is an example of the development of such best practice.

We encourage the ongoing development of clinically based regional network discussions and data collection, as well as National Registries.

Suitable child-friendly and specific outcome measures continue to be developed and utilised. We welcome the development and use of Outcome Data Sets (including Patient Reported Outcome Measures) and their use in reviewing the outcomes of paediatric orthopaedic provision.

We support the ongoing development of the National Consultant Information Programme (NCIP) by which surgical data is collected at individual surgeon, Trust, Regional and National level. We recommend using NCIP to record and analyse working practice and identify significant discrepancies to guide clinical practice and service provision.

Effective clinical governance is key to the best practice in children's Trauma & Orthopaedic provision. Job plans & Trust finances may be impacted through complying with these recommendations (including Peer Review Meetings, dual consultant operating, pre-assessment clinics, Regional clinical network meetings etc). All such activity should be job planned & acknowledged by Trust management. It should be noted, the impact of change in job plans may result in an increase in inpatient & outpatient waiting times. This can be mitigated against by strong collaboration between clinicians and management. However, these additional activities must be facilitated to allow surgeons to operate in a safe environment.

SECTION 2 KEY POINTS:

Peer Review	Surgical cases should be the subject of peer review pre-operatively to confirm safe decision making and post operatively to ensure surgical aims have been achieved. It is recommended that such meetings are timetabled within job plan.
Documentation	All peer review meetings (PRMs) and subsequent clinical decisions should be documented in accordance with good clinical governance. It is recommended that this documentation includes an agenda and register of attendance. The clinical outcomes decided should be minuted and made readily available in the patient's notes. Clinical information should be discussed with the patients and any relevant correspondence forwarded to other health care workers involved in the child's care.
Low Volume High Complexity Surgery	LVHC cases should undergo a robust peer review process and should include surgeons experienced in the management of such conditions. Collaborative working between units or regionally through Surgery in Children Operational Delivery Networks (SIC-ODNs) is recommended where surgeon numbers or experience is lower.
Dual Consultant Operating	Dual consultant operating should be considered for LVHC cases at pre-operative peer review meetings. It should be recognised that dual consultant operating optimises patient safety and clinical outcomes and should be supported at a Trust level.
Pre-Operative Clinics	Dedicated pre-operative clinics are recommended to establish a comprehensive consenting process and allow for a full pre-operative assessment of the child's needs both before and after surgery. These clinics should be timetabled within job plans.

Section 3: **Best Practice in Children's Fracture Management**

The purpose of this section is to describe a system which supports orthopaedic trauma surgeons, who are not children's orthopaedic specialists, to treat injuries in the paediatric population. We also suggest a governance structure around management of specific critical injuries.

The guiding principle is the provision of safe effective local care, with agreed pathways to specialist centres for the management of more complex cases.

Configuration of Services

Most children's fractures are treated in District General Hospitals (designated as Local Emergency Hospitals and Trauma Units) without specialist trained paediatric orthopaedic surgeons. Relatively few are managed in designated Paediatric Major Trauma Centres (PMTC), which include the five stand-alone Children's Hospitals, which are also Major Trauma Centres (MTC).

Surgical care is therefore predominantly delivered by non-specialist orthopaedic trauma surgeons.

The suggested regional structure for children's musculoskeletal trauma is:

- A **Network** structure hosted by a Managed Clinical Network/Operational Delivery Network.
- A **Regional** lead clinician or team: a specialist children's orthopaedic surgeon/ surgical team with a trauma practice, likely based in an MTC.
- A **Unit** lead clinician: a designated clinician for children's trauma management in every treating unit.

Regional Network

The current regional networks differ between the four nations.

In England, there are two systems which could potentially host a peer-support governance structure. These are:

1 Paediatric Critical Care / Surgery in Children Operational Delivery Networks (SIC-ODNs) and

2 Regional Trauma Operational Delivery Networks (Trauma Networks).

Specialist children's surgeons typically utilise the Surgery in Children ODN whereas orthopaedic trauma surgeons are more familiar with Trauma Networks.

Following discussions with representatives of each framework, we recommend that peer support management should sit within the Surgery in Children ODN, along with the governance of elective children's orthopaedic surgery. However, collaboration should still take place between the Surgery in

Children ODN and the regional Trauma Network to enhance communication between trauma teams and the integration of standards (including Key Performance Indicators).

Regional and Local Leadership

The exact organization of the peer support system will vary between regions and will be decided by negotiation with interested parties through the Surgery in Children ODN.

Leadership of the regional trauma peer support system could come from an individual or team, not necessarily based at the paediatric trauma centre. The leadership have responsibility for ensuring engagement with peer support, audit compliance and for ensuring appropriate training of general trauma surgeons in the region.

Peer Support

Peer support consists of two complementary systems:

1 Contemporaneous access to specialist advice through an on-call system or a suitable digital patient referral platform (where available).

2 A regular regional peer review meeting for review of the management of key injuries. The exact structure and practice will be decided by negotiation through the ODN.

24/7 advice should be available to all trauma surgeons using an on-call system or a digital patient referral platform which affords direct communication and provides documentation to guide management of emergency cases.

The management of specific critical conditions (see below) should be discussed at regular peer review meetings. This will also afford opportunities to share good practice and to discuss rare cases. Online access to the meeting should be available for all surgeons within the peer support network. It is anticipated that these will be incorporated into existing peer review or MDT meetings, either for children's orthopaedic teams or for trauma meetings in children's hospitals.

Clerical support for meetings should be provided by the hosting ODN or Trust; and documentation of the meetings will include a record of attendees as part of the governance structure. A log of engagement with peer review meetings should be kept and made available to the regional trauma network as required.

Key Potentially Life-changing Injuries.

The impact of certain low-energy injuries to children can have devastating, life-long and life-changing consequences compared to adults. This is particularly true of injuries to the growth plates and injuries around the hip. Currently this is not taken into account in the provision of trauma services as described

in the Service Specification for Major Trauma, nor are these injuries documented in the National Major Trauma Registry.

Peer review of the management of these and other critical injuries will ensure early identification of potential complications by specialist clinicians. Additionally, it will improve awareness of the risks among the whole team and may provide the rationale for ED bypass / ED-to-ED transfer guidelines for selected high risk injuries in children.

Practice will vary between networks and over time, but suggested conditions for discussion include:

Open fractures

Pelvic fractures

Femoral neck fractures

Slipped Upper Femoral Epiphysis (SUFE).

Lower limb physeal fractures

Intra-articular fractures

Pathological fractures and those occurring in children with underlying musculoskeletal conditions

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Musculoskeletal infections in children are managed by various orthopaedic teams according to local practice and in accordance with BOAST guidelines. Some networks may wish to include infection cases in their peer review discussions.

Best Practice Guidelines, Consensus Documents and Outcome Measures

Children's trauma management decisions should be undertaken in a collaborative environment within peer groups. To support decision making, colleagues can draw on multiple sources. These include:

- BOAST guidelines on open fracture management, supracondylar fractures and musculoskeletal infection in children.
- GIRFT and BOAST recommendations on the management of forearm fractures.
- NICE trauma guidelines which contain guidance on the management of simple and complex fractures in children, including femur fractures and intra-articular fractures of the distal tibia.

- Regional (and national) Best Practice Documents including collaboration between ODNs to harmonise guidelines.
- Peer agreed Trust Policies.
- National Referral Systems.

Outcomes

Suitable managerial and clerical support should be made available to facilitate the reporting of both operational and clinical outcomes.

Operational outcomes:

- Regional peer review meeting engagement through documentation by ODN.
- Trauma system peer review. MTCs will be reviewed through a proposed national programme. DGHs and Trauma Units will be reviewed by the regional trauma network.

The National Major Trauma Registry (NMTR) is becoming more functional and will provide outcome data for seriously injured children in the future.

Clinical outcomes:

- Through peer review meeting documentation, it should be possible to audit measures such as time from injury to fixation for supracondylar fracture humerus; time to fixation/definitive stabilisation of femoral shaft fractures; admission rates for forearm fractures; and unplanned returns to theatre.
- Outcome registries such as the Orthopaedic Trauma Register (OTR) continue to be developed and utilised. We welcome the development and use of outcome data sets (including Patient Reported Outcomes Measures) and their use in reviewing the outcomes of paediatric orthopaedic trauma provision.
- As above, we support the ongoing development of the National Consultant Information Programme (NCIP) and its expansion to cover orthopaedic trauma procedures.

Training Recommendations

We recommend that all children's orthopaedic specialists who deal with trauma and the Unit lead clinician(s) should attend a comprehensive children's fracture training course and suggest that attendance should be repeated as required.

As a minimum, local training on supracondylar fracture management and elastic nail fixation of long bones should be provided to all orthopaedic trauma consultants as recommended by GIRFT.

We recommend a stronger focus on children's trauma management is part of the specialist curriculum for orthopaedic trainees and that consideration should be given to mandating their attendance at a comprehensive children's fracture training course.

SECTION 3: KEY POINTS

Configuration of Trauma Services	It is recommended that the regional structure of Children's Musculoskeletal trauma services should follow the recommended configuration: • A **Network** structure hosted by a Managed Clinical Network/Operational Delivery Network. • A **Regional** lead clinician or team: a specialist children's orthopaedic surgeon/ surgical team with a trauma practice, likely based in an MTC. • A **Unit** lead clinician: a designated clinician for children's trauma management in every treating unit.
Peer Support	Emergency 24-hour advice should be available to all trauma surgeons using an on-call system or digital patient referral platform to guide management of emergency cases. The exact structure and practice will be decided by negotiation through the ODN. It is recommended that all emergency and trauma case outcomes are regularly discussed and shared at peer review meetings, the minutes and attendance of which should be clearly documented.
Life Changing Injuries	Specific paediatric injuries that could have potentially life-changing results should be discussed at PRMs. These should include amongst others: o*pen fractures, pelvic fractures, femoral neck fractures, Slipped Upper Femoral Epiphysis (SUFE), lower limb physeal fractures, intra-articular fractures and pathological fractures or fractures occurring in children with underlying musculoskeletal conditions*
Training	All surgeons who manage children's trauma should attend a children's fracture training course regularly. Specific training in supracondylar management and elastic nailing of long bone fractures should be provided locally to all trauma consultants as recommended by GIRFT.

Section 4: **Recommendations for Consultant Competency in Paediatric Orthopaedics**

Level of Training

A paediatric orthopaedic subspecialist should have fellowship training, as well as higher surgical training in orthopaedics, in an appropriate paediatric orthopaedic centre in the UK or abroad. There is currently no additional diploma in paediatric orthopaedics as has been adopted in some countries for the subspecialty and in the UK for other subspecialties.

When applying for a paediatric orthopaedic consultant post, it is recommended that the appointment board seeks evidence that the candidate has experience of multi-disciplinary decision making and case reviews in both pre- and post-operative settings. The candidate must show understanding of the importance of such processes, be willing to engage with colleagues and manage interpersonal relationships appropriately to ensure a well-functioning unit.

Maintenance of competency

BSCOS recommends that annual appraisal has a specific focus on multi-disciplinary working and interpersonal relationships with colleagues. Dealing with rare and complex paediatric orthopaedic conditions requires shared learning and decision making and so peer review and multidisciplinary working is of fundamental importance in this subspecialty. Trusts should have a system for recognising, reporting and resolving interpersonal disputes promptly through mediation as and when they arise. BSCOS can provide mentorship for new consultants as required.

Paediatric orthopaedic surgeons can also maintain and enhance competency through a range of activities including amongst others: courses, as delegates or faculty; examining for the FRCS(Orth) and equivalent; working within ODNs; appointing and training fellows; taking part in peer-review and multidisciplinary regional and national meetings. Such work should be recognised, accommodated and valued by hospital Trusts.

Paediatric orthopaedic surgeons are encouraged to take part in regional and national peer-review and MDT panels for areas of particular interest. Trusts must make allowance for attendance and contribution to such panels.

Membership of Specialist Society

Paediatric orthopaedic consultants should be members of a specialist paediatric orthopaedic society and be able to attend the annual conference and/or an annual national orthopaedic congress children's section frequently. This is to facilitate continued professional development and enable regular discussion with a wider network of surgeons for especially complex cases.

Training and Competency	Paediatric orthopaedic sub-specialist surgeons should have attained higher surgical training in orthopaedics in addition to fellowship training in a paediatric orthopaedic centre in the UK or abroad. Maintenance of competency should be assessed through annual appraisal and PRM/MDT collaboration should be clearly demonstrated in addition to membership of a paediatric orthopaedic society.
Membership	Paediatric orthopaedic consultants should be members of a specialist paediatric orthopaedic society and be able to attend the annual conference at least once every 3 years. Additionally, surgeons are encouraged to take part in regional and national MDT panels. Trusts must make allowance for attendance and contribution to such panels.

Section 5: **Collaborative Working & Professional standards**

The standards of behaviour expected from surgeons and the wider surgical team are well described and documented in a number of resources from professional bodies such as the Royal Surgical Colleges and the GMC.

According to *Good Surgical Practice* "Surgeons have a duty to promote a positive working environment and effective surgical team working that enhances the performance of their team and results in good outcomes for patient safety". The common goal of the team to which all should be committed and contribute is high quality care for the patient. However, this shared responsibility in multi-surgeon or multi-disciplinary settings should not diminish a surgeon's own professional responsibility to their patient.

Surgeons are expected to contribute to a number of meetings, including governance, multi-disciplinary and multi-surgeon meetings discussing patient care and surgical plans. Meetings should occur in a safe climate, in which all team members demonstrate mutual trust and respect. A safe inter-personal environment should be established and maintained, so that members feel free to express their views, challenge one another and raise concerns.

Teams should support a culture of honesty, candour and objectivity in which concerns can be raised safely by all members. Members of the surgical team should actively invite contributions and feedback from all other members and ensure that the views of new and junior members are heard and considered.

Communication between team members should be clear, open and respectful at all times. Each member should be open to feedback and willing to reflect on feedback about their own performance and behaviour and acknowledge any mistakes. Differences of opinion will inevitably occur and should be handled constructively, with members attempting to understand opposing views, through

respectful questioning, listening and open-minded consideration. Members should explain clearly why they disagree. All team members should be prepared to challenge counterproductive behaviour in colleagues constructively, objectively and proportionately.

Surgeons should raise concerns at the earliest opportunity when they have reasonable grounds to believe that the care of patients may be compromised by the conduct, performance or health of a colleague, as well as by system inadequacies.

SECTION 5: KEY POINTS

Contribution	Surgeons have a duty to contribute to peer review/MDT discussions and governance meetings in order to maintain high professional standards and patient safety.
Professional Attitude	All surgeons have a responsibility to ensure that a psychologically safe environment is maintained at all times so that safety concerns can be raised and addressed.

Section 6: **Summary**

The provision of trauma and orthopaedic care for children and young people in the UK is delivered by surgeons committed to safe and modern working practices. In this document, we have aimed to highlight best practice. The key to safe and effective working is robust clinical governance in a strong collaborative professional environment.

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