

BSSH The British Society for
Surgery of the Hand

Hand Surgery in the UK

A resource for those involved in organising,
delivering and developing services for patients
with conditions of the hand and wrist.

Report of a Working Party (2018)



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BRITISH SOCIETY FOR SURGERY OF THE HAND

Royal College of Surgeons of England

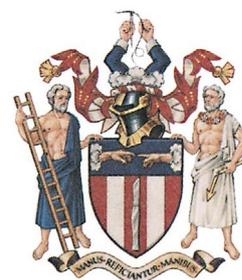
35-42 Lincoln's Inn Fields

London

WC2A 3PE

Tel: +44 (0) 20 7831 5162

www.bssh.ac.uk



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Background and Remit

There are two versions of this document - each printed and online at bssh.ac.uk

- A six-page summary for rapid perusal.
- A comprehensive document for more thorough engagement.

This document has the following purposes:

- A resource for those involved in organising, delivering and developing services for patients with conditions of the hand.
- A description of the British Society for Surgery of the Hand - its foundation, professional standing, activities and future strategy.
- An expression of the BSSH's views on the organisation, staffing, resources, standards and training that are required for the safe, effective, efficient delivery of care for patients afflicted by an injury or condition of the hand.

Members of the Working Party

Editor

Professor David Warwick (Southampton)

Editorial Committee

Mr Charles Pailthorpe (Reading)

Mr Jonathan Hobby (Basingstoke)

Contributors

Ms Jill Arrowsmith

(Derby)

Mr Dean Boyce

(Swansea)

Mr Dan Brown

(Liverpool)

Mr Jonathan Compson

(London)

Professor Tim Davis

(Nottingham)

Professor Joe Dias

(Leicester)

Mr Nick Downing

(Nottingham)

Mr Rupert Eckersley

(London)

Ms Sue Fullilove

(Plymouth)

Professor Grey Giddins

(Bath)

Mr Tim Hems

(Glasgow)

Mr Steve Hodgson

(Bolton)

Professor Abhilash Jain

(London)

Professor Vivien Lees

(Manchester)

Mr Alastair Platt

(Hull)

Mr Ian McNab

(Oxford)

Mr Andy Mahon

(Coventry)

Mr Ian Mawhinney

(Belfast)

Mr David Newington

(Swansea)

Mr Rob Poulter

(Truro)

Mr David Shewring

(Cardiff)

Ms Gill Smith

(London)

Mr Mike Waldram

(Birmingham)

Ms Christy Fowler

(British Association of Hand Therapists)

Ms Suzanne Beale

(British Association of Hand Therapists)

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1. Executive Summary

- Hand Surgery is a broad term which encompasses the multidisciplinary management of conditions of the hand.
- Services are provided at several facilities, from small rooms in GP surgeries through minor injuries units, local hospitals, independent treatment centres and regional centres. Surgery is performed by Orthopaedic Surgeons, Plastic Surgeons and specialised Hand Surgeons; some specially trained GPs and nurses may perform certain simpler procedures.
- There are particular requirements for trauma, elective conditions and children.
- The speciality of Hand Surgery is underpinned by a multidisciplinary team which includes Hand Therapists (who are trained in the disciplines of Physiotherapy and Occupational Therapy), Rheumatologists, Neurologists and GPs.
- There are variations in the provision of hand surgery services across the nation.
- The British Society for Surgery of the Hand, acting as the recognised professional body, has developed recommendations for the current and future provision of safe, efficient, clinically effective, cost effective treatment for conditions of the hand and wrist.

2. What is Hand Surgery?

A. Defining Hand Surgery

Hand surgery is a broad term which encompasses the multidisciplinary management of conditions of the hand. Most conditions do not require surgery and most surgeons manage more than just the hand. The remit is generally defined as: "Assessment and management of conditions affecting the hand, wrist and peripheral nerves of the upper limb".

It is a specialty that employs combined skills from the overlapping specialties of Orthopaedic Surgery, Plastic Surgery and Emergency Medicine. Input may be required from other fields to include Rheumatology, Neurology, Neurophysiology, Pain Medicine and Psychology. Hand Therapists (trained from the allied disciplines of Occupational Therapy and Physiotherapy) are crucial in maintaining or restoring the pain-free movement and sensibility upon which a functioning hand depends.

The surgical treatment of hand conditions employs more diverse skills than many other surgical disciplines, encompassing small bone fixation, microsurgery, arthroscopy, joint replacement, and the reconstruction of skin, muscle, tendon and nerves.

B. Remit of a Hand Surgeon

A Hand Surgeon is an experienced clinician with appropriate specialised training, diagnostic capability, surgical dexterity, specific professional qualifications who provides comprehensive care.

Some Hand Surgeons also include in their remit either the elbow or the elbow and shoulder, in which case the term 'Upper Limb Surgeon' is more appropriate. Some surgeons use the descriptor Orthopaedic Hand Surgeon or Plastic and Reconstructive Hand Surgeon to define more closely their subspecialty.

Some Hand Surgeons subspecialise yet further and manage more complex conditions such as microsurgical reconstruction, peripheral nerve surgery, brachial plexus surgery, joint replacement and congenital hand surgery.

Many Hand Surgeons are still engaged in the general workload of their parent specialty, in which case they might be defined as an 'Orthopaedic Surgeon, or Plastic Surgeon, with a special interest in Hand Surgery'.

3. Current Hand Surgery delivery in the UK

A. Organisation of Services

There are several models of provision of hand surgery services in the UK and many variations on these models exist. The organisation of services must facilitate prompt, competent and convenient provision of the generality of hand surgery for local populations and also ensure timely provision of complex specialist care. With best practice in organisation and communication, these models can become complementary with each other and thus avoid duplication or competition.

Specialised dedicated Hand Surgery Unit

This is typically situated in a regional teaching hospital. Such a unit combines plastic and orthopaedic hand surgery expertise to provide all aspects of adult and children's hand surgery including complex soft tissue and bone procedures for elective and trauma cases. Referrals derive from both the local catchment area and a wider area for complex cases. Surgeons will have specific sub-specialty interests. There is usually a dedicated on-call rota for hand trauma.

Regional Plastic Surgery Unit

This usually has an on-call rota to deal with severe and complex trauma cases from surrounding hospitals, including those requiring microsurgical and other complex soft tissue reconstruction.

It typically deals also with a wide range of elective cases including children's hand surgery.

Adult and Children Major Trauma Centre

This manages severely injured patients from a wide catchment area, many of which will also have complex hand injuries. It is typically situated in a major teaching hospital and may be closely linked to the above two types of unit or have dedicated Orthopaedic and Plastic Surgery hand specialists on site. There may be an on-call rota for hand trauma.

Large District Hospital

This is staffed by one or more hand surgeons, from orthopaedic or plastic surgery departments. Hand trauma services are typically provided as part of a general on-call rota rather than specific hand on-call service. The most urgent or complex cases may be referred to specialist units, whilst most cases are managed in-house. An elective hand surgery service is also provided except for the most complex cases.

Small District Hospital

There may be no surgeon with a specific interest in hand surgery. Relatively simple trauma and elective cases may be dealt with locally depending on available expertise - other cases are referred.

Local providers of elective hand surgery services

These include those set up in larger general practices and private hospitals, typically to perform some relatively common surgical procedures such as carpal tunnel release and trigger finger surgery for local populations. Procedures are performed by a competent clinician.

Hand surgery by those outside traditional hospital settings

Hand surgery provision in the UK has evolved over the past 10 years. The introduction of Independent Treatment Centres, 'Choose and Book', and NHS work seconded to the private hospitals in England has substantially altered service provision.

Specialised Commissioning

Specialist commissioning, whereby certain procedures are only performed in a limited number of units, is being developed. Certain complex or expensive hand surgery procedures would, in this model, be directly commissioned by NHS England, and include complex microsurgical reconstruction, tendon grafting, congenital hand deformity, radio-carpal wrist replacement, total distal radio-ulnar joint replacement, ulnar head replacement, small joint replacements, nerve reconstruction, complex soft tissue cover, complex scaphoid reconstruction, brachial plexus reconstruction, soft tissue sarcoma, malignant bone tumour

services and hand transplantation. Most of these procedures will be performed in specialised centres, mandating a 'hub and spoke' referral pattern.

In hand surgery there are surgeons with extensive training and experience who can perform some more specialised procedures in smaller units, particularly if a large team of supporting specialists or expensive inventory are not required. Nevertheless, for procedures which are rarely performed, the skills and equipment would justify referral to fewer specialised centres.

Multidisciplinary Assessment

The Musculoskeletal Services Framework encourages development of multidisciplinary Clinical Assessment and Treatment Services in which patients with hand and wrist conditions are assessed by those less trained and less experienced. Pathways are developed to try to facilitate appropriate, local and expedient treatment.

B. Hand Trauma

- In 2015/2016 there were 22.9 million attendances at England's Accident and Emergency Departments (1), of which 20% had hand injuries. In England, this equated to 4.58 million attendances for hand injuries. 916 000 (one in five) of these injuries required specialist care and 240 000 required surgery (2).
- 65% of Accident and Emergency attendances are to hospital Emergency Departments,

which have on-site Orthopaedic and/or Plastic Surgery cover. These departments have seen a 10% rise in attendances over the last decade (1).

- The remaining 35% of attendances are to minor injury units, walk-in centres and single specialty facilities. Minor injury units and walk-in centres are being increasingly used by the public, with attendances to these departments doubling over the last decade (1).
- The Major Trauma Network has been implemented across England since 2010, with subsequent improvement in survival of people with major injuries. Although a minority of people with multiple injuries have a hand injury, Major Trauma Centres should include a hand surgery unit capable of dealing in a timely manner with both isolated hand injuries and hand injuries in a multiply injured patient.
- Hand injuries predominantly affect the young working population and are a major source of disability, causing significant costs to the individual and society through time off work (3).
- Health and safety practices and legislation have reduced the incidence of mangling hand injuries in the UK but these injuries still occur, requiring urgent treatment and often many hours in the operating theatre.
- Many hand injuries can be managed non-operatively.
- When surgery is indicated, many of the procedures are relatively short (<1 hour) but some are of intermediate length (1 to 2 hours) and there are rare complex emergency cases, which often require many hours of operating time.
- The 2014 BSSH membership survey of trauma provision found that almost 80% of respondents had agreed protocols for referral with their local Accident and Emergency Departments; 20% of the respondents had a separate hand on-call rota; just over 35% had access to 3 or more hand trauma clinics per week but only 20% had access to dedicated operating lists for hand trauma cases. 75% had immediate access to hand therapy for in-patients and nearly 90% had urgent access to hand therapy for out-patient treatment.
- In 2015 the BSSH performed a national audit of open fracture and flexor tendon injury management over a 3-month period.
 - 5% of open fractures are seen by a hand surgery team within 6 hours of presentation to the Emergency Department, rising to just over 70% by 24 hours. Just over 60% of these injuries are then operated on within 24 hours of being seen by the hand surgery team.
 - Just over 70% of flexor tendon injuries are seen by a hand surgery team within 24 hours of presentation to the Emergency Department and just over 60% are then operated on within 48 hours of the hand surgery team review.
- The majority of hand injuries are suitable for management as a day case procedure, under either local or regional anaesthesia. The BSSH national audit showed that around a third of patients with open fractures were managed as a day case, with a further third having a single overnight stay.

References

1. NHS England, *A&E Attendances and Emergency Admissions*. <https://www.england.nhs.uk/statistics/statistical-work-areas/ae-waiting-times-and-activity/>
2. *Accident and Emergency Statistics: Demand, Performance and Pressure*. House of

Commons Briefing Paper Number 6964, 14 November 2016

3. de Putter, Selles, Polinder, Panneman, Hovius, van Beeck (2012) *Economic impact of hand and wrist injuries: health-care costs and productivity costs in a population-based study*. *J Bone Joint Surg Am.*; 94:e5
4. BOAST 7: *The British Orthopaedic Association Standards for Trauma* (2013). <http://www.boa.ac.uk/publications/boast-7-fracture-clinic-services/>

C. Elective Hand Surgery

- The demand for elective hand surgery is increasing. A recently published statistical analysis has predicted a 39% increase in the demand for operations for common hand conditions over the next 10 years. See table below (Bebbington and Furniss 2015).
 - This is in part explained by an 8% rise in the UK population over the last 10 years. The population is ageing and there is an increasing prevalence of diabetes, both of which increase the demand for hand surgery.
- The number of patients diagnosed with common hand conditions is increasing (Bebbington & Furness 2015). The fastest rate of increase is in carpal tunnel syndrome (an average increase of 1768 diagnoses per annum between 1998 and 2011). The number of diagnoses as a percentage of the population has also increased for trigger finger, cubital tunnel syndrome and Dupuytren’s contracture.
 - Elective hand surgery workload has increased substantially over the past 10 years. Carpal tunnel decompressions in England have increased by 15% from 47,804 in 2003/4 to 53,901 in 2013/4. Trigger finger release has increased by 75% (from 8,098 to 14,190) and fasciectomy for Dupuytren’s disease increased by 61% (11,826 to 19,092) over the same period (<http://www.hesonline.nhs.uk>). The rates of surgery for ganglion excision have changed little over the same period (from 7,412 to 8,065, a 9% increase), perhaps reflecting changing priorities in healthcare commissioning.

Year	Dupuytren’s operations	Carpal tunnel operations	Cubital tunnel release	Trigger finger release
2015	16797 (15893–17683)	66833 (60614–72948)	6664 (6005–7291)	14358 (13169–15510)
2020	19155 (17748–20563)	77506 (67998–87018)	9022 (8043–10002)	17618 (15803–19436)
2025	21998 (19995–24024)	90630 (77367–104020)	11575 (10247–12938)	21311 (18768–23896)
2030	25242 (22508–27929)	104922 (87236–122350)	14452 (12666–16167)	25550 (22107–28908)

Calculated number of operations for each common hand condition 2015 to 2030. Figures shown represent the mean (95% confidence intervals).

- The rates of day surgery have increased to 95% for carpal tunnel decompressions and 94% for trigger finger release in 2013/4 (<http://www.hesonline.nhs.uk>). The day surgery rates for palmar fasciectomy have increased from 46% day cases in 2004/5 to 84% in 2013/14. There will always be cases where co-morbidity or home circumstances require an overnight stay.
- Most soft tissue operations on the hand cause moderate pain that can be controlled by oral analgesic medication and almost are suitable for day surgery. However, some bone and joint procedures such as wrist fusion or wrist replacement cause greater pain, which may require parenteral analgesia for over 24 hours. Many of these cases require inpatient admission for adequate pain control. Short-stay or "23 hour" units are appropriate for many cases that are not suited to day surgery.
- A small but significant proportion of hand surgery requires lengthy operations and prolonged inpatient treatment because of case complexity and/or long distance between patients' homes and the hand centre.
- Anaesthetists require good support from nurses or operating department assistants. For example staffing that allows an operation to proceed under brachial plexus block, while the anaesthetist prepares the block on the next case, maximises efficiency. Judicious interspersing of short cases in which local anaesthesia is administered by the surgeon can assist in the same fashion.
- The majority of NHS hand surgery is still done in NHS hospitals (90.4%), with 8.7% being delivered by private providers and 0.9% in GP surgeries (<http://www.hesonline.nhs.uk>).
- The National Health Service in the UK is under financial pressure, and the tariffs paid for hand surgery have fallen over recent years. This has in part been offset by efficiencies in reducing length of stay and increasing day surgery rates. However, the current tariffs for hand surgery leave little margin; any further reduction in tariffs may threaten the financial viability of hand surgery services.
- Local variations
- There is variation in the rates of operative intervention for hand conditions between units, with a fourfold variation in episodes of trauma surgery and a sixfold variation in elective surgery (<http://www.hesonline.nhs.uk>). Some of this variation can be explained by the 'hub and spoke' model of hand surgery provision, with higher intervention rates in the tertiary referral centres.
- The recent Getting It Right First Time (GIRFT) initiative seeks to promote best practice and reduce variations in healthcare. It identifies potential efficiencies through concentrating work in centres of expertise, higher volume, reducing length of stay and reducing the price of surgical prostheses through improved procurement.

References

1. Bebbington, E., Furniss, D. (2015) Linear regression analysis of Hospital Episode Statistics predicts a large increase in demand for elective hand procedures in England. *J Plast Reconstr Aesthet Surg.* 68(2): 243-251.

A. Supporting Staff

Hand therapy

Hand therapy is fundamental to achieving good results from hand surgery, and crucial after procedures such as tendon repair. Hand therapists are essential members of multi-disciplinary hand surgery units and they combine the three skills of physiotherapy, occupational therapy and nursing. Some units have individuals that represent each skill, but in many units each therapist possesses all three skills. Hand therapists are especially skilled in the fitting and fabrication of splints, which are now used extensively in treating acute hand injuries and in post-surgical rehabilitation. Most hand therapists are members of national and international specialist professional associations including the British Association of Hand Therapy.

Hand therapy is also integral to the outpatient management of hand disorders. Therapists should be present with surgeons in the outpatient department, and the hand therapy department should be adjacent to the hand surgery outpatient department wherever possible. The department also needs to be well equipped with both the basic tools of hand therapy and the fabrication of splints.

Most established Hand Therapy Units have a defined new to follow-up ratio of 1:4. If commissioners restrict this ratio to 1:3 without heeding clinical need, adequate therapy input for some injuries (such as flexor tendons) would be compromised.

Radiology

The advances in radiology, notably in ultrasound and cross-sectional imaging have improved

the care of patients with hand conditions. Hand surgery services should be supported by specialised musculo-skeletal radiologists, with sufficient access to appropriate imaging tools and equipment and the ability to undertake guided injections. Multi-disciplinary review of imaging will improve patient care, and is mandatory for tumour surgery.

Anaesthesia

Expertise in regional anaesthesia is essential for delivering a hand surgery service.

Rheumatologist

Hand Surgeons treating inflammatory conditions, such as rheumatoid arthritis usually work within a multidisciplinary team to allow optimal medical management; joint clinics with the rheumatologist are encouraged.

Administration

Hand surgery requires adequate support from secretarial, management and outpatient staff.

Nursing

Many hand surgery procedures, in particular complex wounds and flaps, require experienced nurses with specific experience.

E. Children's Hand Surgery Services

Children's hand surgery should take place in a children's environment either at a children's hospital or an appropriate children's facility within a DGH or teaching hospital. The NHS has guidelines for treating children.

Assessment

Children with hand injuries or acute hand/upper limb problems should be taken to the nearest designated children's facility for assessment, unless there are specific protocols in place to manage certain conditions locally.

All children's facilities should have appropriate areas to assess paediatric upper limb injuries and all staff should have paediatric safeguarding training.

Admission

Emergency surgery for children should only occur in a facility with inpatient facilities, even if planned as a day-case. Any child admitted to hospital should be treated in paediatric facilities by paediatric trained nurse and have a named principal consultant. If the consultant is a surgeon, then the child should also be allocated a paediatrician responsible for their care.

When treating congenital hand conditions there can be very significant comorbidity, which may require the input of a paediatrician and back up of haematology, cardiac and renal medicine and genetic counselling services.

Surgical intervention

In the critically-ill child who needs surgery, hand surgery may be delayed if intensive care requires priority.

Surgical expertise

Not all conditions in the child's hand and wrist require surgery - most only require monitoring. Complex children's hand surgery requires specific training in paediatric orthopaedic

and plastic surgery techniques, including microsurgical capability. There needs to be a local network between tertiary and secondary facilities, with written clearly defined criteria for which common conditions are treated in which facilities: this will be dependent on age of the child, known co-morbidities, recognised learning difficulties, anaesthetic provision, and complexity of the surgical problem. Complex paediatric hand injuries and complex congenital hand problems will largely require specialist treatment in a tertiary unit - the appropriate units able to undertake this surgery should have been identified in the network.

References

1. *Standards for non-specialist emergency surgical care of children, RCS Dec 2015*

4. BSSH recommendations for delivery and future development

A. Organisation of Services

- Good communication and co-operative working, between smaller hospitals without specialist hand surgery services and the larger specialist units, should be developed and maintained to provide high quality and timely care of most hand surgery cases.
- Complex children's hand surgery should be provided in a dedicated children's environment by Hand Surgeons specifically trained in the relevant orthopaedic and plastic surgery techniques including microsurgery.
- Specialised commissioning and 'Getting it Right First Time' mandates the identification of units with appropriate expertise to provide specialised procedures. Dedicated referral pathways should be developed to facilitate the hub and spoke referral model. The BSSH Professional Standards Committee will engage in this process.
- As more simple hand surgery procedures move into primary care and to other non-mainstream teaching facilities, steps must be taken to ensure that future hand surgeons are not deprived of essential training opportunities.
- Integration of hand surgeons into the multidisciplinary musculoskeletal assessment teams will improve communication and patient care and reduce costs.
- The best practice from larger centres with established hub and spoke models should be followed by other areas.

Hub and Spoke Model

- Hand surgery is best provided by a 'Hub and Spoke' model.
- The provision of a Spoke hand surgery service for a population of 300,000 requires at least 2 or 3 full time hand surgeons, with 5 or 6 elective operating sessions, and adequate trauma provision.
- A Hub service requires more resources depending on what services are offered (i.e. brachial plexus, congenital hand etc.)
- A balanced Hub unit should have Consultants from Orthopaedic and Plastic Surgical specialties, whose junior medical staff would share the hand surgery on-call rota. This allows comprehensive acute injury care, which is especially relevant since both the European Working Time Directive (EWTD) and the increasing specialization throughout Orthopaedic and Plastic surgery have together diminished the exposure of both junior and senior surgeons to acute hand injuries.

Getting it Right First Time (GIRFT)

The BSSH supports this initiative which should raise standards and reduce costs. Development of hub and spoke models, proper training and audit of outcomes will all contribute to the successful integration of GIRFT into Hand Surgery.

B. Hand Trauma

- Hand injuries should be treated by surgeons with expertise in hand surgery.
- Hand injuries should be treated by therapists with expertise in hand therapy.
- The Hub and Spoke model of the organisation of hand trauma services is favoured.
- Hand surgery units managing hand injuries should have a dedicated hand trauma theatre sessions and hand trauma clinics to facilitate the timely treatment of hand injuries.
- Many hand emergency cases can be treated as day-cases, especially if there are good arrangements for regional anaesthesia. Hospitals should be encouraged to provide day surgery facilities for hand trauma cases.
- Anaesthetic support should include facilities for regional anaesthesia by brachial plexus block, which is the optimum mode of anaesthesia for many hand trauma cases. It provides excellent postoperative analgesia and avoids the risk of disruption of repairs during a restless recovery from general anaesthesia.
- Wide Awake Local Anaesthetic No Tourniquet (WALANT) techniques should be developed further.
- Hand surgery units should have access to appropriate intra-operative fluoroscopy imaging, such as the mini-C arm, to facilitate fracture manipulation and fixation whilst minimising the radiation dose delivered to the patient and staff. Mini-C arms convey the additional advantage of the surgeon operating the machine without the need for a radiographer.
- Severe or complex injuries, which may have vascular impairment, require immediate admission to a Hand Surgery Unit with facilities for soft-tissue and microvascular reconstruction. These cases require urgent surgery and may need many hours in the operating theatre as well as longer hospital stay and intensive postoperative hand therapy. Protocols for transfer of these cases should be in place.
- Open fractures, badly contaminated wounds and bite wounds require operative treatment within 24 hours. They should be referred immediately to the surgery team on call with transfer to hand surgery specialists when appropriate.
- Clean tendon or nerve divisions are suitable for immediate repair. However, irrigation and dressing of the wound in the Emergency Department, followed by operative repair as a day-case on a daytime operating list in the next five to seven days, is also appropriate. These cases should be either discussed with the hand surgery team on call on the day of injury or referred into a hand trauma clinic within 72 hours.
- Patients with closed fractures that do not require immediate surgery should be reviewed in a hand trauma clinic within 72 hours in accordance with BOAST guidelines.
- Brachial plexus injuries should be discussed with a specialist in brachial plexus surgery within 24 hours of injury, even if the patient is not immediately fit for transfer, as these injuries may require exploration and repair during the first week.
- Hand Surgery Units should have a low threshold for accepting referral from the Emergency Department and Minor Injury Units, where staff may not have the expertise or support to distinguish between a 'minor' hand injury of no significance and a 'minor' injury that leads to a poor outcome without specialist care.
- Direct access to specialist Hand Trauma Clinics and Hand Therapy Departments should be provided for Emergency Departments and Minor Injury Units to allow appropriate follow-up care of minor hand injuries whose initial treatment has been performed in the emergency department.

- Hand Surgery Units should develop networks with their local Emergency Departments and Minor Injury Units. Hand Surgery Units are encouraged to construct guidelines for referral to Hand Trauma Clinics in the light of local circumstances and local expertise in Emergency Departments and minor injury units.
- Where possible, direct access booking into a Hand Trauma Clinic should be available to the Emergency Department.
- Protocols for imaging scaphoid fractures should be defined with the Radiology Department, with rapid access to MRI scanning; this should minimise the risk of litigation which may follow an overlooked scaphoid fracture. It also reduces unnecessary repeated irradiation and prolonged yet unnecessary immobilisation in plaster for those without a fracture.
- The BSSH Standards for Hand Injury Care will be available on the BSSH website.
- The BSSH will work to support practitioners in Emergency Departments and Minor Injury Units, providing education aiming to improve the local care of simple hand injuries which do not require specialist care.
- The BSSH will work to educate the public about hand injury prevention to reduce the impact of hand injuries on the health and economics of the country.
- Local anaesthesia operating lists should be used for cases where the services of an anaesthetist are not required.
- Local anaesthesia cases should also be used as 'fillers' for gaps between general and regional anaesthesia cases.
- Wide Awake Local Anaesthetic No Tourniquet (WALANT) techniques should be developed further.
- All-day operating lists are more efficient than half-day lists and should be in place wherever possible.
- A surgeon and anaesthetist working regularly together are more efficient than ad hoc assignment of an anaesthetist.
- Pre-admission assessment for elective hand surgery increases efficiency for both day surgery and inpatient cases, by reducing unplanned cancellations and improving theatre utilisation.
- Hand surgery outpatient clinics can be run effectively in peripheral units such as community hospitals, provided that there is on-site availability of hand therapy support and radiograph facilities.
- The term 'Procedures of Limited Clinical Value' is not based on fact or reason and should be abandoned. The treatment of carpal tunnel syndrome and trigger finger provides demonstrable patient benefit with high satisfaction ratings. An informed and fair review would relabel these as Procedures of Significant Clinical Value.
- Dupuytren's surgery is complex with a risk of debilitating complications and poor outcomes. It should be performed in a 'hand surgery' rather than 'general orthopaedic' environment. This means proper hand surgery training, suitable anaesthesia, mandatory magnification and specialised hand therapy and wound care follow up.
- The 'Any Qualified Provider' model may have negative implications for training (common procedures perceived as 'simple' being performed outside of a training framework).

C. Elective Hand Surgery

- Most elective soft-tissue operations on the hand should be carried out in day surgery facilities.
- An overnight stay may be required by the nature of the surgery (especially for bony or extensive procedures), by the patient's general medical condition, and in a few cases by the distance between the patient's home and the hospital.
- Some complex cases require many hours of operating time, longer in-patient stay and prolonged postoperative therapy.

D. Multidisciplinary Assessment

Whilst assessment by less experienced person (eg GPSI or Therapist) in a multidisciplinary Clinical Assessment and Treatment Services might appear to offer cost savings and quicker treatment, for every patient whose condition is beyond the diagnostic knowledge or treatment skills of that person and thus needs to see a specialist, there will be duplicated cost and extra delay. There is also the medicolegal risk of missed diagnosis or inappropriate treatment. Integration of the Hand Surgeon into the initial triage of referrals and into the multidisciplinary clinic team is strongly advised.

The personnel involved (Therapists and GPs) may be providing this work at the expense of time which could have been spent providing hand therapy (rather than diagnosis) and much needed general practitioner services.

E. Support Staff

- Good clinical outcomes depend on skilled hand therapy.
- A population of 500,000 requires a minimum of six full time equivalent hand therapists (Burke, Dias et al. 2004). This recommendation excludes time spent in any extended roles.
- All hand surgery units should offer sufficient hand therapy support.
- Therapists should be present in hand surgery outpatient clinics.
- The extended roles of hand therapists and specialist nurses in the outpatient clinic should be encouraged.
- Dressings clinics run by nurses, with easy access to the hand surgeon in the event of a problem, will reduce the burden of medical follow-up.
- Combined rheumatologist / hand surgeon clinics are to be encouraged.
- Professional relationships with the radiology and neurophysiology departments are essential.

F. Workforce Requirements

In 2004, Burke and Dias devised a model of requirements for a hand surgery service covering a population of 500,000. Whilst updated figures are not available, increasing patient demands and lower thresholds for accepting a poor result mean that workforce requirements are likely to have increased against a background of competition for scarce resources.

Operating Theatre Requirements

- Six elective and four trauma operating sessions per week in a 'Spoke unit' are required but this is likely to be doubled i.e. 8 trauma and 12 elective sessions in a 'Hub unit'.
- Trauma operating should be available on daytime lists spread throughout the week, led by trained Consultants, with facilities for both complex and routine trauma operating.
- With the trend towards seven-day services, there needs to be equal provision of dedicated hand trauma facilities at the weekend.
- The number of daytime emergency lists required will vary according to local circumstances. The specialist hand surgery workload will depend upon the support provided by local orthopaedic and plastic services.
- Prompted by the reduced access to out-of-hours operating and by the national pressure on acute inpatient beds, the majority (80%) of emergency hand surgery cases should be performed as day cases. The Derby and Birmingham model of day-case emergency hand trauma is an exemplar (Mohan 2016).
- The day-case operating facilities should include surgeon operated Mini C-arm fluoroscopy to reduce dependence on ancillary radiography staff.
- Hand trauma operating should not be in competition with other surgical or orthopaedic emergencies.

- A team of experienced (band 6 or 7) nurses are helpful to co-ordinate admissions from the Emergency Department and improve the efficiency of surgical lists.
- An anaesthetic arm block service is recommended.
- Other models of care with daily access to a minor operating list have also proved effective for the treatment of the majority of injuries.

Outpatient Requirements

- Each hand surgeon should have the support of at least one trainee in each clinic. The clinics should not be overbooked to allow proper time for assessment, teaching and informed consent.
- Nurse-led dressing clinics, advanced nurse practitioners and therapy-led follow up of well-defined conditions are to be encouraged with adherence to consultant-covered protocols.

Training of Surgeons involved in Emergency Care

- Trainee surgeons from either Orthopaedics or Plastic Surgery should be 'released' from their parent specialty to partake in the on-call team in order to learn about acute hand injury care within the consultant-led service. Acute hand injury management and elective hand surgery is a mandatory learning requirement for FRCS Plast and FRCS Orth examinations.
- All consultants who participate in a hand injury on-call service should be trained in microsurgery; in a tertiary (Hub) centre they should be competent in the acute surgical management of replantation, large soft tissue defects, and complex fracture management.

References

1. Burke, F.D., Dias J.J et al. (2004). Providing care for hand disorders: a re-appraisal of need. *J Hand Surg (Br)* 29(6):575-9

G. Maintaining Standards of Care

Emergency

There needs to be a clear system for referral of acute hand injuries for definitive assessment and treatment by an orthopaedic, plastic surgical or hand surgical team, or for review within a fracture / emergency clinic.

Elective

Hand problems can be seen primarily by a wide range of allied professionals including physiotherapists and occupational therapists and specialists in various medical disciplines including rheumatology and neurology. Ideally the allied professionals should only see patients under a broad umbrella of support from an appropriate orthopaedic, plastic surgical or hand surgical unit.

In the community

Practitioners such as GPs who perform minor hand surgery should maintain some link with specialists in secondary care to ensure that they are current in practice, they have access for ready advice and support for management of more difficult cases and to satisfy clinical governance.

Revalidation and Audit

Revalidation is now established for all doctors under GMC regulations. This needs to be followed on a five-year cycle as well as yearly appraisals. Audit of clinical practice has become more rigorous. Clinicians are now expected to audit some part of their practice each year.

The BSSH has a secure web-based audit registry of common conditions (www.ukhandregistry.net); all clinicians who practice in hand surgery are encouraged to enter cases in this audit system to compare their practice with current standard practice in the NHS.

Errors

Reporting of errors in surgery has not been common, let alone comprehensive. It is likely that error reporting, as in the airline industry, will become increasingly important as a method for the NHS and clinicians to learn about both good and bad practices. The BSSH supports this development in line with the new philosophy of NHS Resolution.

Future

The BSSH would like the NHS to develop a system for clinicians to have their practice reviewed by external peers to optimise and validate their work. Whilst this is currently available when there is a problem in practice, ideally it should be available to all clinicians to enhance learning and cross-fertilisation of good ideas and good practice.

H. Medicolegal Challenges

The medico-legal environment

The aim of BSSH is to limit the medico-legal burden that follows missed injuries, missed diagnoses and poor surgical treatment by all those who treat patients with conditions of the hand.

There are certain hand conditions in which medical negligence appears more prevalent: missed scaphoid fractures, late displacement of distal radius fractures, incomplete carpal tunnel release, missed tendon injuries and complications of Dupuytren's surgery.

Protection from litigation

The best solution to this medico-legal threat is to ensure that the hand surgeon's practice is safe, effective and evidence-based. The hand surgeon must consider:

- A professional demeanour and empathy at all times.
- Meticulous surgical technique with magnifying loupes.
- Continuous professional development.
- Engaging in GIRFT, Specialised Commissioning and Hub and Spoke models, referring on cases beyond one's comfort zone.
- Taking a healthy sceptical view of new 'solutions' and implants which are enthusiastically promoted before proper peer review or longer term follow up or comparative studies.
- Respect the obligation for Duty of Candour.
- Engagement with the WHO checklist.
- In-house departmental meetings.
- Raising concerns.
- Multidisciplinary practice.

The BSSH established a Professional Standards Committee in 2016, which will consider these aspects as part of its remit.

Consent

The patient should be provided on more than one occasion with adequate information on the options for treatment. The benefits, risks and outcomes of all treatment options (including doing nothing and surgery) must be explained. This is a burden but is morally, ethically and now legally essential. The discussion must be documented and the patient is given a copy of that document. The BSSH believes that hospitals and clinics need to give clinicians the time and facility to deliver proper fully informed consent.

Allied health practitioners and non-specialist surgeons.

Trained hand surgeons can make errors but the NHS may be predictably exposed when those untrained or inexperienced in hand conditions provide care in accident departments, walk-in centres, general orthopaedic services, treatment centres and musculoskeletal triage systems.

The BSSH understands that in the modern NHS, traditional consultant-delivered work has been complemented by a workforce that is adaptable and able to respond to the needs of the country in providing a high-quality service for patients. Surgery when indicated may be delivered by non-specialists, such as general orthopaedic or plastic surgeons, ISTC surgeons and occasionally GP or nurse surgeons. The BSSH is willing to engage in training these within the philosophy of the Hub and Spoke model and GIRFT principles. The BSSH encourages these practitioners to become Allied Members of the BSSH and would welcome their attendance at the various educational and training courses run by the BSSH. The BSSH has a long-term aim of specific courses to support non-specialists. In addition, the BSSH would encourage all practitioners to enter their patients into the BSSH UK Hand Registry www.ukhandregistry.net to monitor their outcomes.

Emergency Nurse Practitioners are often the first point of contact with a patient who has injured their hand or wrist; training and experience are essential to understand the sometimes subtle physical signs of a significant injury.

5. BSSH recommendations for delivery and future development

A. Purpose and organisation of the BSSH

The British Society for Surgery of the Hand is the surgical specialty association that represents hand surgeons in the UK. The great majority of practicing hand surgeons are members of the association.

Founded in 1968, from the original Second Hand Club, the BSSH includes plastic and orthopaedic surgeons with common interest in hand surgery. Hand surgery is a crossover specialty drawing from both disciplines with the National Training Interface Group Fellowships in Hand Surgery co-ordinated by the intercollegiate Joint Committee of Surgical Training, reflecting that collaboration.

BSSH has strong links to its parent specialties namely the British Association of Plastic, Reconstructive and Aesthetic Surgeons (BAPRAS) and the British Orthopaedic Association (BOA). BSSH is one of the member organisations of the Federation of European Surgical Societies of the Hand (FESSH) and the International Federation of Surgical Societies of the Hand (IFSSH).

The BSSH has a proud record of having been in the vanguard of many developments in surgical endeavour including education, training and research. As a registered charity BSSH promotes, supports and develops hand surgery in the United Kingdom and beyond. BSSH organises two scientific meetings each year, runs an instructional course lecture programme and has important commitments to research

and the national clinical trials initiative of the Royal College of Surgeons of England. The Society runs its own Hand Surgery Diploma and Masters in Hand Surgery (MSc) programmes validated by the University of Manchester.

The wide portfolio of BSSH activities is delivered through a subcommittee structure accountable to the council and supported by a dedicated secretariat. The Professional and Clinical Standards Committee sets standards for members' professional conduct and promotes best clinical practice respectively. The direction of policy is the responsibility of the Strategy Committee working with council. The Education, Research and Audit Committees and the Committee of Management of the European Journal of Hand Surgery oversee their respective areas of responsibility. Communications policy exists to promote public understanding of health policy and surgical care related to hand surgery.

Membership of the organisation is by election at the Annual General Meeting or Extraordinary General Meeting following sponsored application to the Secretary of BSSH. BSSH is funded by a combination of membership subscription fees and income from the European Journal of Hand Surgery.

B. Education Activities

The Basics

- Hand surgery is a required core curriculum component of specialist training in both orthopaedic and plastic surgery.
- Training at this level is normally provided by rotation through registrar posts within the host Deanery (the organisation overseeing training in each region), offering subspecialty experience in hand surgery as a focussed apprenticeship.
- The individual specialty curricula allow for continuous assessment during these attachments using the Intercollegiate Surgical Curriculum Programme (ISCP) and surgeons in training are expected to complete the required number of specialty surgical procedures during this time.
- A basic knowledge and competency in simple hand surgery is assessed in the intercollegiate examinations in both disciplines.
- All orthopaedic and plastic surgeons should have reached a level to allow assessment of hand injuries and disorders and be able to manage the more straightforward cases as they commence their consultant post.
- Before the Certificate of Completion of Training (CCT) can be issued, trainee surgeons will have:
 - passed their specialty examination (FRCS Tr and Orth or FRCS Plast).
 - undertaken the required numbers of core procedures for their specialty reflected in their e-log book.
 - had satisfactory assessments at their Annual Review of Competency Progress (ARCP) through their training.

Advanced Training in Hand Surgery

- Registrars seeking advanced training in hand surgery, may choose to undertake a fellowship in hand surgery, prior to commencing their consultant post.

- There are many units within the UK and abroad offering fellowships.
- The quality of training in fellowship posts can vary considerably and not all may count towards training for CCT purposes

Advanced Interface Training Posts in Hand Surgery (ATPs)

- There are 10 advanced training posts in hand surgery in the UK. These are 12 month appointments at specialist hand surgery units throughout the UK and are under the guidance of the Training Interface Group (TIG) directed by the Joint Committee on Surgical Training (JCST).
- These are popular, prestigious posts and are taken pre-CCT. Surgeons are appointed at competitive interview regulated by the South West Deanery. The interviews normally take place in early May in Bristol, with the applicants being ranked by the Chair of the TIG, trainers from the 'host units' and members of the TIG committee.
- These are true interface fellowships exposing the trainee to both plastic and orthopaedic disciplines whilst on their attachment, to broaden the knowledge and expertise of the Fellow.
- A certificate of satisfactory completion of the Hand ATP is issued after assessment by the Hand TIG in conjunction with supporting documentation provided by the trainers during the fellowship and rigorous review of the e-logbooks.
- The development of the Hand Surgery Curriculum and the Diploma allows structured training and hand surgery trainees are encouraged to undertake the Diploma during their fellowship.

British Hand Surgery Diploma - BSSH

- The BSSH works with the University of Manchester to provide postgraduate education and qualifications in hand surgery.

The Diploma covers a syllabus-orientated course of study over 12-24 months using a system of tutorials, projects and workplace-based assessments usually delivered in the surgeon's base hospital.

- The standard of the examination is that of a consultant on their first day in a dedicated hand surgery practice.
- Most participants undertake a UK fellowship, often one of the Advanced Training Posts in Hand Surgery, but some work can be completed abroad. The course content is spread over eight modules with four tutorials and three assessments of various types in each. Once the coursework has been completed, the final examination can be taken. It is held once a year, in March, at the Royal Orthopaedic Hospital, Birmingham.
- Diploma holders have a respected qualification to satisfy professional development needs, demonstrate knowledge and commitment at consultant interview and reassure the public as to their level of training.
- Diplomates are also encouraged to become involved in tutoring and ultimately training as examiners. There is an established alumni group which is active in professional networking and peer support.

MSc in Hand Surgery

- Trainees who have successfully completed and passed the Diploma course also have the opportunity to work towards a Masters in Hand Surgery with the BSSH in conjunction with the University of Manchester.
- Each candidate will have an approved supervisor who will monitor progress along a defined timeline.
- The duration is one-year starting in the September of the year of application. All candidates must complete an online programme called 'Good Clinical Practice' and attend a two-day design and skill course which takes place in June.
- The dissertation can take the form of a variety of clinically relevant areas of academic work which must be original.

- It may comprise a grant application, systematic review or service development study.
- The dissertation is submitted in written format and reviewed by an academic panel who will award a pass, fail or distinction. Credits from the Diploma course count towards the final mark.

European Board of Hand Surgery Diploma – FESSH (Federation of European Societies for Surgery of the Hand)

- The European Board of Hand Surgery Diploma is coordinated by FESSH. Any surgeon whose national society is a member of FESSH / IFSSH can register to sit this examination.
- The Diploma consists of two parts, a written MCQ 'elimination' part which can be taken in a number of centres throughout Europe and, if successful, an oral examination comprising two parts over a day and a half prior to the FESSH meeting.
- There is a comprehensive syllabus for the examination and like the 'portfolio station' at the ATP interviews, an assessment is also made of the trainee's commitment to hand surgery, noting research activity, presentations and publications, instructional courses attended and operational logbook.

Conferences

- **BSSH** – The BSSH runs two 2-day conferences every year. They are frequently combined with the British Association of Hand Therapists (BAHT) and/or invited overseas Hand Societies. They contain instructional lectures, seminars, presentations of new research and a business meeting. Sponsors from implant distributors, booksellers and the pharmaceutical industry support the meetings.
- **FESSH** – The BSSH is one of the founder members of The Federation of European Societies for Surgery to the Hand, which holds an annual 3-day meeting with a similar format to the BSSH.

- **ASSH** – There is a close working relationship between the British and American Society for Surgery of the Hand (ASSH). There is usually a strong UK delegation at the American meeting where there is more of a bias towards instructional courses.
- **IFSSH** – The International Federation of Societies of Surgery of the Hand holds a conference every three years for surgeons from around the globe. It has been previously held in Australia, South Korea, Argentina and others. In 2022 the conference will be hosted by BSSH in London.

Instructional Course Series

- BSSH has run an instructional course series for many years in Manchester. Covering the hand surgery curriculum in a series of six two-day courses, over a three-year rolling cycle. It is aimed at senior trainees studying for their Hand Diploma as well as consultants as part of their revalidation. Delegates attend from both the UK and Europe.

Practical Courses

- There are several practical courses run at various centres around the country covering all aspects of hand surgery. BSSH runs a series of master classes associated with the Instructional Course and has taken over the running of practical courses for trainees from The Royal College of Surgeons.
- The BSSH has started an ambitious project to try to coordinate the running of these courses to ensure the whole curriculum is covered, to guarantee quality, decrease costs and to attempt to reduce duplication.

Journals

- There are several hand surgery journals, including the Journal of Hand Surgery (European), the Journal of Hand Surgery

(American), Hand as well as a few smaller circulation ones. The Journal of Hand Surgery (European) has the highest academically defined Impact Factor for any hand surgery journal in the world and is owned by the BSSH, which derives a significant proportion of its income from the Journal. 10% is donated to the FESSH in recognition of the Journal's role as the official journal of FESSH. The BSSH runs the Journal through the Committee of Management.

Summary

- Appointment to a post of Consultant Hand Surgeon in the UK, or Consultant in Orthopaedic/Plastic Surgery with an interest in hand surgery requires advanced training.
- There are many elements that can be considered as delivering advanced training but a period of fellowship training in hand surgery as an ATP or abroad is becoming almost obligatory.
- Fellowship training, coupled with presentations and publications, a diploma or higher degree in hand surgery and evidence of a commitment to hand surgery (such as regular attendance at BSSH scientific meetings), will provide the required foundation for success at consultant interview and a career in hand surgery.

BSSH appointment of Clinical Academic Post in Hand Surgery Research

In 2013 the BSSH provided £500,000 of funding over 5 years for the appointment of a Clinical Associate Professor to develop clinical hand surgery research. In the first round of selection, academic institutions competed to host a new clinical academic position and subsequently Nottingham University NHS Trust appointed a Clinical Professor of Hand Surgery. Since appointment, Nottingham have set up the Centre for Evidence Based Hand Surgery and formed a Hand Fracture Research Group which all BSSH members are free to join.

The centre is producing monthly updates of systematic reviews of relevance to hand surgery and held its first Hand Fracture Research forum in 2016. It will expand and develop over the coming years to provide a focus for hand surgery research.

Royal College of Surgeons Clinical Trials Initiative

In 2013 the RCS launched a national program to increase both the quality and quantity of clinical trials across surgery. The BSSH recognized the importance of this and in partnership with the British Association of Plastic, Reconstructive and Aesthetic Surgeons (BAPRAS) jointly funded a Surgical Specialty Lead over two three-year terms to encourage and lead on projects in hand surgery. This led to the establishment of the Reconstructive Surgery Trials Network (RSTN). At the time of writing the RSTN has over 540 members composed of both hand and plastic surgeons of all career stages who are interested and involved in collaborative clinical research. Within just three years the organisation has delivered on many large-scale projects and obtained over £1.3 million of competitive funding, including NIHR grants. The RSTN was modelled on the highly successful trainee collaborative in specialties such as general surgery and has been able to deliver results on time and to budget. Hand surgery projects include studies on mallet injury, the use of antibiotics in clean-hand injuries, paediatric nail-bed injuries, the use of steroids versus surgery in carpal tunnel syndrome and a national large scale hand trauma audit (>900 patients). Details of ongoing and future projects can be found on the website (<http://reconstructivesurgerytrials.net>).

Clinical Trials

In addition to the BSSH initiatives, academic groups across the country continue to lead high quality studies and BSSH members contribute significantly to the success of these projects.

Studies on distal radius fractures (DRAFFT), scaphoid fractures (SWIFFT) and Dupuytren's Disease (HAND-1) are just some examples. Recent funding has been secured from the NIHR for a large-scale trial into the comparison of collagenase versus surgery in Dupuytren's disease, demonstrating further the ability of hand surgeons to engage in high quality research.

BSSH Research Training

In addition to undertaking research the BSSH provides training in research. Two training days have been established annually, one in the summer and one in the winter. The summer training day is hosted by the RSTN at the Royal College of Surgeons and is in collaboration with BAPRAS. The BSSH hosts its own research training day, which coincides with the winter BSSH meeting. Both meetings are free of charge and aim to cater to all levels of research ability. In addition to these meetings the BSSH has held research symposium sessions at their national meetings to help engage surgeons.

C. Research

Background

The BSSH has made important contributions to hand surgery research. Within the last five years BSSH initiatives have made demonstrable differences to patient care. The BSSH has provided national research guidance and leadership, and has made significant funding contributions to projects and initiatives.

Major research initiatives by the BSSH include the appointment of the clinical academic post in hand surgery research, engagement with the Royal College of Surgeons Clinical Trials Initiative, initiating a James Lind Alliance Priority Setting Partnership and the continued funding of research fellowships and grants.

BSSH Research Committee

The BSSH Research Committee is composed of a group of academically interested hand surgeons who are selected in open competition via a peer review process. They volunteer their time to provide support to BSSH projects, advice to members, peer review of grants and leadership of the BSSH research agenda.

James Lind Alliance Priority Setting Partnership

In 2016 the BSSH funded and launched the James Lind Alliance (JLA) Priority Setting Partnership (PSP) on common conditions affecting the hand and wrist. The JLA is a non-profit making initiative which brings patients, carers and clinicians together in Priority Setting Partnerships. These partnerships identify and prioritise uncertainties, or 'unanswered questions', about the effects of treatments that they agree are the most important. The aim of this is to help ensure that those who fund health research are aware of what really matters to both patients and clinicians. Patients, carers, clinicians, therapists and other health professionals have been surveyed to identify a list of potential uncertainties. The top 10 priorities for research will be decided with input from representatives from all interested parties. This unique opportunity will identify crucial research questions in hand surgery. It will guide future hand surgery research in the UK. It will also provide compelling evidence to funding bodies of the importance of that research.

BSSH Accreditation by NICE for the development of guidelines

Guidelines on the management of common hand conditions are valuable for guiding clinical practice and their creation highlights uncertainties and draws the attention of research funders to these issues. NICE

accredits guideline development processes, such as that used by the BSSH, against fixed criteria. Ideally, the process involves a standardised system for producing guidelines in a multidisciplinary transparent manner that minimises bias. The BSSH has refined its procedure for producing guidelines and then created a guideline on the management of trigger digits in adults using this process, which is described in the 'BEST' manual: http://www.bssh.ac.uk/professionals/best_guidelines_on_trigger_fingers.aspx

Both the BEST manual and the completed guideline were submitted to NICE at the end of 2016 and these were assessed by NICE in January 2017 and passed the accreditation assessment. The BSSH thus has NICE accreditation as a provider of guidelines for 2016-2021. This will increase the exposure and weight of future BSSH guidelines produced according to the process and BSSH's guidelines programme will highlight areas of uncertainty for future research and allow training of Associates in the production of high quality systematic reviews.

Clinical Fellowship Funding

The BSSH has offered funding for trainees to undertake higher research degrees in hand surgery since 2011. This is through its competitive research fellowship scheme which provides sufficient funding (£50,000) to support one year of full-time research. This award helps fund the first year of a trainee's academic higher degree, which significantly enhances their chance of obtaining pilot data and larger grant success. These awards have been very successful and in 2016 the BSSH took this a step further, offering an additional three-year higher degree funding grant (£150,000). This will further encourage young surgeons to undertake significant research training and help build future capacity in research expertise for years to come.

Project funding

Annual awards for clinical and basic science funding (£10,000) continue to be popular and highly competitive. These smaller grants help obtain preliminary data which enhances chances of larger grant success. Recent funding includes a small award to establish the feasibility and acceptability of placebo surgery to hand surgeons and patients.

D. Audit

The UK Hand Registry is an audit database which is designed, managed and funded by the BSSH, available to all practitioners of hand surgery in the UK. It gathers Patient Reported Outcome Measurements (PROMS) before and after hand surgery to demonstrate how patients benefit or otherwise from the intervention. The reports produced allow surgeons to **audit their** outcomes with minimal effort and compare their own results with the aggregated results from all BSSH members. Surgeons are encouraged to use their outcome data to inform their own appraisal and continuing professional development, and this process is linked to a quality improvement program led by the BSSH database clinical governor.

Because of the requirement to monitor innovations closely, newly developed techniques and joint replacements will be integrated into the registry. It is also anticipated that using the data gathered, the BSSH can lead in the development of more reliable, validated PROMs, and identify which procedures provide the most benefit to patients. Joint replacement survivorship is also monitored and the large volume of data gathered will be invaluable for research.

E. Overseas work

Over many years BSSH members have travelled to perform voluntary work overseas. This has

ranged from disaster response, through one-off educational visits or surgical missions, to long-term placements or projects. In 2008 the BSSH Council took the decision to allocate funding to support overseas work by society members, entirely in keeping with the charitable status of the Society and its fundamental objective 'to promote and direct the development of hand surgery and to foster and coordinate education and research in hand surgery.'

The UK has one tenth of the population yet four times as many health workers as Sub-Saharan Africa. The comprehensive access to expert hand surgery we take for granted in the UK does not exist in the developing world. Hand trauma care may not be available at all or be unpredictable - it is provided by tribal healers, non-medical health workers (for example Orthopaedic Clinical Officers in Malawi) or limited state-provided healthcare by general orthopaedic surgeons. Elective hand surgery does not exist in many developing countries. UK hand surgeons have the surgical skills and knowledge and the educational ability to make a real difference to health workers and most importantly patients with life-changing hand conditions in the developing world.

The Story So Far

Initially BSSH funded multidisciplinary teams to perform two-week surgical missions in Sierra Leone and then educational surgical missions and earthquake disaster response in Nepal. Links have been established with other organisations performing voluntary surgical work overseas including World Orthopaedic Concern (WOC) and British Foundation for International Reconstructive Surgery and Training (BFIRST).

Many BSSH members devote their valuable time and energy performing voluntary work overseas. The greatest value is achieved by sustainable long-term projects supporting

health workers, especially with education, in providing the local hand surgery service, for which the BSSH can provide a valuable coordinating and supporting role.

BSSH Overseas Committee

The BSSH Overseas subcommittee was formed in 2016 with a vision 'To use BSSH resources to deliver maximum possible benefit for patients in need of hand surgery in the developing world.' The committee supports the costs of BSSH members travelling to developing countries to further local education and training in hand surgery and has developed a portfolio of projects that aim to produce sustainable benefits.

Nepal

The BSSH supports work in training local surgeons in reconstructive techniques particularly in burns and leprosy. Selected Nepalese surgeons have had sabbaticals in the UK to further their education.

Sierra Leone

This long-term project in collaboration with ReSurge Africa is to support the development of the first reconstructive surgical unit in this desperately poor country. Since the project was initiated in 2010 BSSH has supported 17 surgical missions involving 36 BSSH members leading multidisciplinary teams. After a two and a half year hiatus due to ebola, the missions recommenced in November 2016 with the goal of a reconstructive surgical unit staffed by local surgeons by 2020.

Malawi

Working in collaboration with World Orthopaedic Concern and the country's only hand surgeon we have supported delivery of a Hand Trauma Workshop. This workshop

delivered to the country's Orthopaedic Clinical Officers who provide the initial care for all hand injuries. Further workshops and educational support are planned.

Sudan

We have responded to a request from local surgeons to develop and deliver educational workshops covering the hand curriculum. These have been well received by many local plastic and orthopaedic surgeons. The long-term goal is to support the development of a Sudanese Society for Surgery of the Hand bringing together the currently separate and generalist groups of plastic and orthopaedic surgeons.

Cambodia

This project is led by BFIRST (bfirst.org.uk) to deliver a three-year hand curriculum training tailored to local needs. Local surgeons perform brachial plexus and peripheral nerve reconstructions. There may be an opportunity to broaden the training to include hand fractures on future visits.

Future Projects

In addition to our established projects we are exploring potential for members to support surgeons in Ethiopia and Uganda. To further support overseas surgeons we plan to establish an annual BSSH Travelling Fellowship for surgeons in the developing world to visit a UK unit. In order to widen the interest in overseas work we will hold one-day courses to equip BSSH and BAPRAS members to perform overseas work. This will be free to all BSSH members.

Please help

There are many opportunities for people to become involved:

If you are a politician use your contacts to ensure some international aid is directed to supporting collaborative projects between UK organisations and developing world healthcare projects. This will deliver real benefits to local health systems.

If you are an NHS Trust Chief Executive or Medical Director, encourage and support your clinicians (doctors, nurses and therapists) to perform voluntary work overseas. They will return with clinical and surgical skills sharpened, be better team players and have renewed perspective.

Appendix 1: BSSH Strategy Document

The BSSH has developed a Strategy for the development of hand surgery and the Society. This can be accessed at www.bssh.ac.uk

Appendix 2: Home Nation Differences

There is no unified British National Health Service; the National Health Services in Scotland and Northern Ireland have always been separate and NHS Wales was passed to the control of the devolved Welsh Government in 1999. Therefore, the delivery of hand surgery services differs across Britain.

England

The UK government department responsible for the NHS in England is the Department of Health, which takes political responsibility for the service. Ministerial responsibility is with the Secretary of State for Health in Westminster. The NHS budget for England in 2016/17 is £120 billion. Resource allocation and oversight was delegated to NHS England by the Health and Social Care Act, 2012. This gave GP-led groups responsibility for commissioning most local NHS services. NHS England commissions primary care services (including GPs) and some specialist services, and allocates funding to 211 geographically based Clinical Commissioning Groups (CCGs) across England.

The CCGs commission most services in their areas, including hospital and community-based healthcare. This has led to a 'post code lottery' of provision of hand surgery, since the funds available and priority given to various treatments differ. Many CCGs have applied the disingenuous term 'procedures of limited clinical value' to well-proven treatments such as trigger finger release and carpal tunnel release and fasciectomy. Some CCGs insist on the bureaucratic delay and expense of gaining 'prior approval' before treating these and other hand conditions. Many CCGs require that patients with hand conditions are seen by an allied health professional such as a physiotherapist prior to being treated; the use of a steroid injection prior to commissioning surgery is a pre-condition by some CCGs for conditions such as carpal tunnel syndrome and trigger finger. Some treatments such as collagenase injection for Dupuytren's Disease are provided by some CCGs but not others.

The maximum waiting time from non-urgent referral to treatment of hand conditions in England is currently supposed to be 18 weeks. Hand surgery is not only provided by the district hospital but CCGs may also commission from private hospitals or privately owned Independent Sector Treatment Centres (ISTCs). Simpler work may be performed in GP clinics. Regional trauma networks went live across England in April 2012 and the following year these major trauma services were commissioned by NHS England. The Trauma Networks consist of a Major Trauma Centre linked to satellite Trauma Units. There are 27 major trauma centres in England. Of those, 11 treat both adults and children, 11 treat adults only and five treat children only. The major trauma centres offer specialist services treating serious hand injuries such as limb replantation.

Scotland

Responsibility for the NHS in Scotland is devolved to the Scottish Government, with the Cabinet Secretary for Health and Wellbeing having ministerial responsibility. The total annual budget is approximately £12 billion. There are 14 regional NHS Boards covering Scotland, which plan, commission and deliver NHS services for their populations. There are also seven national or 'special' health boards, which organise national services and Healthcare Improvement Scotland. The Scottish Government sets national objectives and priorities for delivery by the NHS Boards.

There was a more reluctant uptake of 'market levers' in the NHS in Scotland during the 1990s. After devolution, the Health Boards and NHS Trusts were unified in 2004. Therefore, there is not a separation of the providers for hospital services and the health boards. The systems use 'bureaucratic levers' including performance targets and standards. Standards for maximum waiting times have been set and included in the Patient Rights (Scotland) Act 2011. The maximum waiting time for inpatient or day surgery treatment is currently 12 weeks and for new outpatient appointments is also 12 weeks. Patients with hand conditions are referred to local Orthopaedic or Plastic Surgery Departments. Treatment is provided by the local hospital or may be offered in different hospitals within the health board area in order to meet these waiting time targets.

There is a well-developed system of National Services in Scotland for providing management of very specialised, low-volume conditions, which may require high cost interventions. Of relevance to hand surgery, there are currently National Services for Brachial Plexus Injury and Spinal Cord Injury rehabilitation which includes upper limb reconstructive surgery. Trauma networks are still under development in Scotland, with the situation being complicated by the large size of the country relative to its population. It is currently planned to designate four Major Trauma Centres in Glasgow, Edinburgh, Dundee, and Aberdeen.

Wales

NHS Wales (Welsh: GIG Cymru) is the official corporate name of the Welsh National Health Service (Gwasanaeth Iechyd Gwladol Cymru), which is the responsibility of the devolved Welsh Government. The annual budget is £6 billion. NHS Wales was originally formed as part of the public health system for England and Wales created by the National Health Service Act 1946, with powers over the NHS in Wales coming under the Secretary of State for Wales in 1969. Responsibility for NHS Wales was passed to the Welsh Government under devolution in 1999 and has since then been the responsibility of the Welsh Minister for Health and Social Services.

There are seven Local Health Boards (LHBs) in Wales. Each LHB is responsible for delivering all NHS healthcare services within a geographical area.

Wales' largest teaching hospital, the University Hospital of Wales based in Cardiff is the largest hospital outside London and third largest in the United Kingdom. There is currently no designated Major Trauma Centre in Wales, but this will change in the near future; Swansea and Cardiff have each put in a bid.

Five of the health boards paid for spot contracts with private healthcare providers costing a total of more than £6 million between 2013 and 2015 to carry out NHS work on elective surgery to include hand conditions.

Another important organisation in the structure is 'Welsh Health Specialised Services Committee', an agency of NHS Wales whose primary role is to centrally organise and fund all tertiary care and other highly specialist services on behalf of the LHBs. It is currently looking at hand surgery becoming such a specialised service.

Currently hand surgery trauma services are provided by most hospitals which have orthopaedic surgeons who specialise in hands, most of whom also deal with non-emergency trauma.

The Welsh Centre for Plastic Surgery and Burns in Swansea, offers a 24hr on call service for 58.6% of the population and microsurgical service for 74.3%. The University Hospital of Wales in Cardiff, provides a 24hr on call service for 15.7%, except for trauma requiring microsurgical reconstruction. The remaining 25.7%, represents the population of North Wales, which is covered mainly by centres in Liverpool and Manchester. Specialist congenital hand surgery, brachial plexus and nerve surgery and upper limb cerebral palsy services are provided in Swansea.

The geography of Wales means that there are areas where cross-border arrangements are necessary. The population of North Wales is too small to support specialist units, so patients travel to Liverpool and Manchester for specialised hand surgery. There are no large hospitals in mid-Wales at all. The entitlement to free prescription charges is based on the GP with whom a patient is registered, so some patients who live in England benefit from this.

The 'Referral to Treatment' target in Wales for elective hand surgery is 26 weeks.

Northern Ireland

The Health and Social Care service was created by the Parliament of Northern Ireland in 1948 after the Beveridge Report. Health and Social Care in Northern Ireland (HSC) is the designation of the publicly funded service, which provides public health and other social care services in Northern Ireland. The Northern Ireland Executive through its Department of Health is responsible for its funding, while the Public Health Agency is the executive agency responsible for the provision of health and social care services across Northern Ireland. It is free of charge to all citizens of Northern Ireland and the rest of the UK. It is called the

'NHS', as in England, Scotland and Wales, but differs from the NHS in England and Wales in that it provides not only health care but also social care (the NHS in Scotland also includes social care). Social services are provided by local councils.

Some procedures are not locally provided and are provided on an extra-contractual referral basis, such as brachial plexus surgery. Historically this was performed in RNOH Stanmore, but more recently at the Mater Hospital in Dublin.

New hand treatments have to be approved by the HSC as a business case. Retrospective approval is uncommon and some treatments are not approved. Collagenase for Dupuytren's Disease was temporarily available in the Western Trust but was withdrawn.

The NHS waiting list target in Northern Ireland is 52 weeks; there appear to be too few trained hand surgeons in both Orthopaedic and Plastic Surgery which affects waiting time and training. Since there are no tariffs for procedures, more work does not equate with more income so there is no incentive for Trusts to appoint further surgeons. Extra funding has been provided for several waiting list initiatives after a bidding process and delivered by local surgeons working with local providers; some outside independent sector providers have also provided services, with many patients being treated in England. These measures have reduced waiting times for hand conditions. Political stability may underpin funding for waiting list initiative work.

Appendix 3: Future Trends in Hand Surgery

Introduction

Hand surgery is an exciting, diverse and expanding field and it would be impossible to cover all likely future advances in detail in this short chapter. An overview is presented with some specific examples of key areas that we believe will lead to rapid advances in the coming decade(s):

- Outcomes, Networks and Pathways
- Big Data, Genomics and Epidemiology
- Basic Science, Scar-free Healing and Translation into New Therapies
- New Technology, Materials and Surgical Techniques

Outcomes, Networks and Pathways

Hand Surgery faces the same financial and demographic challenges as the rest of musculoskeletal (MSK) medicine. Patients are living, working and remaining active for longer – so require ever-increasing medical care. Advances in care, growing patient awareness and expectations of care are also increasing demand, while austerity and financial restraint mean that healthcare resources are increasingly constrained.

At the 2014 EFORT Congress in London, Prof Tim Briggs described this as the 'Orthopaedic tsunami'. The congress concluded that the solutions to these challenges include: releasing resources by decreasing infection and re-operation rates, using outcomes data and rationalised evidence-based therapeutic approaches and better MSK training for GPs and medical students. The British Orthopaedic Association is addressing these challenges with the 'Getting It Right First Time' (GIRFT) initiative.

The BSSH and the hand surgery community is already 'ahead of the curve' on many of these issues. It has developed the infrastructure required to address the challenges ahead. It has produced a NICE accredited system to analyse the evidence base for hand surgery interventions and treatments and will develop guidelines and pathways for patient care. The BSSH's established track record of delivering high quality research (see Chapter 11) includes large randomised controlled surgical trials, via its research networks. This will rapidly expand as the networks gain further momentum - guided by the current BSSH - James Lind Alliance Research Priority Setting Partnership. The UK Hand Registry database (see Chapter 12) will expand to include a hand and wrist arthroplasty register. The Trauma Committee is auditing outcomes, will develop Professional Networks for Hand Trauma and will raise the awareness and prevention of common hand injuries. Rare conditions registers and Special Interest Groups for sub-specialist areas of practice will also be developed.

The delivery and development of Hand Surgery Training and Surgeons' Continuing Professional Development (CPD) will continue to be a high BSSH priority. Simulation, virtual reality, web and e-learning will enhance the traditional learning networks and environments. It may radically change the delivery of training, instructional courses, CPD, examinations and may provide opportunities to help deliver training in Primary Care and in developing countries.

Big Data, Genomics and Epidemiology

The era of big data has arrived. The way we use and collect data over the next 10 years will revolutionise the practice of medicine. The next generation of hand surgeons should critically analyse large volume data and apply this to clinical practice.

When the first draft of the Human Genome was published in 2001, it cost over US\$100 million. It is now possible to sequence an individual human genome within 24 hours for under US\$2000. This acceleration in genetic technology will hail the era of personalised medicine. In hand surgery, these data will improve our understanding of the causes of hand surgical conditions and lead to molecular investigations paving the way for new treatments.

Big data are also being collected in the field of epidemiology which will help us to understand and then modify the non-genetic causes of disease.

In the coming decade, more data will come from those wearable devices commonly used in sport and healthy living. These data will allow us to link activity and work patterns to hand conditions. Research is currently aimed towards smart splints which monitor compliance and administer therapy remotely, reducing the need to attend hospital appointments.

The key to realising the promise of these areas of innovation is collaboration between patients, surgeons, therapists, basic scientists, and data scientists. Only then can we exploit the opportunities that will present themselves.

Basic Science, 'Scar-free Healing' and translation into new therapies

Although animal models of chronic diseases which affect the hand such as fibrotic disorders have failed to translate to the clinic, hand surgeons are well placed to identify the underlying molecular mechanisms of diseases through their knowledge of the pathology and through access to both diseased and control human tissues. A study of surgically excised Dupuytren's tissue led to the identification of tumour necrosis factor as a therapeutic target, which is being tested in a phase II clinical trial. Similar approaches may lead to the identification of novel therapeutics for the

common but currently intractable problem of scarring around nerves, joints and tendons. Promoting tissue repair following injury or surgery remains a major unmet need for which there is considerable interest in harnessing the regenerative potential of stem cells.

New Technology, Materials and Surgical Techniques

- **Nerve transfers** have already changed the prospects of useful recovery in brachial plexus and other peripheral nerve injuries. Existing transfers will continue to evolve and as more widespread adoption of the technique spreads, new transfers and techniques will develop. There will be a rising demand for hand surgeons to provide services for neurological conditions such as stroke.
- **Imaging techniques** such as MRI and linked CT/US will reduce the role of arthroscopy as a purely diagnostic tool.
- Arthroscopic techniques will reduce invasive techniques in hand surgery. The miniaturisation of scopes will expand their use to address pathology in small finger joints.
- **Robotic surgery** has revolutionised ophthalmology and is likely to do the same in hand surgery. Initially this will develop in those procedures where precision relates to outcome, such as nerve repair, or where automation may enhance the reliability and speed of surgical repairs - such as tendon repair and skin suturing.
- **Hand transplantation** has captured great interest but its role may be superseded by advances in prosthetic technology. Unless huge advances are made with immunosuppression or tolerance of donor tissues, hand transplantation in the UK is likely to remain confined to a few dedicated specialist centres for a few specific indications.

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- **Bio-engineered nano-particles**, fibres and tubes (potentially seeded with appropriate growth factors) are already being investigated as a means to develop new implants and techniques that may revolutionise the directed healing of nerve, tendon and other tissues.
 - **3D Printing** and production techniques mean that custom fracture and arthroplasty jigs and implants are already a reality and their role is likely to increase for specific fractures and indications.
 - **Computer modelling** of joints will allow the design of more reliable joint replacements.
 - **New arthroplasty designs** and materials are being developed and trialled. They will be monitored via a national arthroplasty register, to ensure they continue to improve outcomes in hand and wrist joint replacements. Navigation is already an essential component of large joint arthroplasty in some countries. This technology will be refined and miniaturised to improve hand and wrist arthroplasty techniques. As hand and wrist arthroplasty implants and techniques mature to produce reliable and durable results, these procedures will be used much more frequently, incurring cost for the service but improving quality of life.

Hand Surgery in the UK

A resource for those involved in organising,
delivering and developing services for patients
with conditions of the hand and wrist.

Report of a Working Party (2018)



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BRITISH SOCIETY FOR SURGERY OF THE HAND

Royal College of Surgeons of England

35-42 Lincoln's Inn Fields

London

WC2A 3PE

Tel: +44 (0) 20 7831 5162

www.bssh.ac.uk

