

General practitioners' knowledge of hand surgery in Singapore: a survey study

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INTRODUCTION Hand surgery is a subspecialty with a dedicated training programme in Singapore. Currently, Singapore is one of two countries in the world that still provides dedicated advanced hand specialty training. As hand surgeons depend on referrals from institutions and general practitioners, appropriate hand surgical referral requires the referring physician to have knowledge and understanding of common hand conditions as well as less common but more urgent surgical conditions, and their available surgical treatments. This study aimed to determine the knowledge of hand surgery and hand surgical conditions among general practitioners.

METHODS A questionnaire survey was conducted during a continuing medical education symposium on hand surgery in Singapore. Participants responded to 12 questions on hand trauma by keying the answers into a computer database system. The results were then analysed.

RESULTS A total of 35 general practitioners responded to our survey, and they were able to answer 53% of the questions correctly. We found knowledge gaps among the participants regarding hand surgical conditions, and identified areas where increased education during medical school, postgraduate training and continuing medical education may be beneficial. Areas that were found to be weak included recognising injuries that pose a high risk for developing wound infection, complications of topical steroid injection in trigger finger treatment and hand tumours.

CONCLUSION Improving hand surgery knowledge among general practitioners not only leads to improved primary care, but it can also facilitate prompt recognition of surgical problems and subsequent referral to appropriate hand surgeons for treatment. This may possibly reduce the load of tertiary institutions in treating non-urgent hand conditions.

Keywords: continuing medical education, general practitioner, hand surgery, medical school, primary care
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INTRODUCTION

Hand surgery in Singapore started as a service at Singapore General Hospital in 1952. The early conditions treated included hand trauma from firecrackers, injuries from home and cottage industries, leprosy and paralysis from poliomyelitis.⁽¹⁾ As Singapore became more industrialised, the increased number of severe hand injuries obligated more subspecialised care to evolve in the country. From 1975 to 1985, the advancement and application of microsurgery in Singapore further raised interest in the subspecialty. The first advanced hand surgery course was held in 1981, and 20 years later, in 2011, there are now three hospitals in Singapore with established hand surgery departments and divisions staffed by subspecialty-trained hand surgeons.

Singapore is currently one of two countries (the other is Finland) in the world that has a dedicated advanced hand surgery training programme to train young surgeons in the specialty of Hand Surgery.^(1,2) As the country moves forward, the requirement of specialised care in hand injuries mandates the training of more hand surgeons.⁽³⁾ With the introduction of the Hand Surgery Residency training programme in 2011, it is projected that all hospitals in Singapore will be staffed by hand surgeons in the near future. In concert with this development, it is also important to

improve primary care for hand conditions, which would increase the primary physician's confidence in treating non-surgical hand conditions, as well as prompt recognition of surgical conditions and their subsequent referral to a hand surgeon. However, previous studies have shown that the referral process for highly specialised hand care may be problematic. Physicians may have a negative perception of the effectiveness of hand surgical treatments in conditions such as rheumatoid arthritis and tetraplegia, and thus have a bias toward non-surgical treatment of these conditions, which may negatively impact their referral decisions.^(4,5)

The aim of our study was to determine the knowledge of hand surgery among general practitioners (GPs) in order to understand the requirements for hand surgery training and education for GPs, in the hope that improvements could be made to our medical school, postgraduate and continuing medical education training programmes.

METHODS

A questionnaire survey of GPs was conducted during a continuing medical education symposium on hand surgery. The questionnaire was given to the participants to complete

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Table I. Survey questionnaire.

No.	Question	Answers*
1	Appropriate treatment for penetrating palm injury	<ul style="list-style-type: none"> Wash the wound and allow for secondary healing Wound lavage and steri-strips/tissue glue Toilette and suture Send patient to the hospital for further treatment Perform an X-ray, wound suture if no fracture is detected
2	Wound that is at the highest risk of infection	<ul style="list-style-type: none"> High pressure water jet injury to the hand Laceration over the dorsum of the hand from a paper-cutting knife Laceration over the palmar surface of the hand by a paper-cutting knife Burst laceration of the pulp after a cupboard door slam on a digit Being pierced by a rusty needle
3	Most common wrist injury after a fall on an outstretched hand	<ul style="list-style-type: none"> Scaphoid fracture Fracture of the distal radius Scapholunate ligament tear Perilunate dislocation None of the above
4	Radiograph of typical osteoarthritis	<ul style="list-style-type: none"> Ankylosis of the joint Subchondral erosions Joint space narrowing and osteophytes Soft tissue swelling Periarticular erosions
5	Complications of steroid injections in trigger finger except	<ul style="list-style-type: none"> Flexor tenosynovitis No improvement in symptoms Hypopigmentation Fat necrosis/atrophy Digital nerve injury
6	Picture showing Finkelstein's Test	<ul style="list-style-type: none"> Carpal tunnel syndrome De Quervain's tenosynovitis Wartenburg's syndrome Intersection syndrome First carpometacarpal joint osteoarthritis
7	Which is not a sign or symptom of severe carpal tunnel syndrome?	<ul style="list-style-type: none"> Burns over the radial 3 fingertips Numbness of hands only in cold rooms Wasting of the Thenar muscles, especially the abductor pollicis brevis Loss in manual dexterity of fingers 2-point discrimination (2PD, sensory) > 10 mm
8	Efficacious non-surgical management of carpal tunnel syndrome	<ul style="list-style-type: none"> Diuretics Vitamin B complex (B6) Ultrasonography therapy Heat treatment Steroids (oral or injectable)
9	Which is not true about cubital tunnel syndrome?	<ul style="list-style-type: none"> Numbness and tingling in small finger and ulnar half of ring finger Pain is not a symptom Weakness of power grip Hypersensitivity on palpation Global numbness extending from the neck
10	Most common bacteria in hand infection	<ul style="list-style-type: none"> Staphylococcus aureus <i>Escherichia coli</i> <i>Eikenella corrodens</i> <i>Pseudomonas aeruginosa</i> <i>Bacteroides fragilis</i>
11	Which is not a sign of suppurative flexor tenosynovitis?	<ul style="list-style-type: none"> Pain of passive digit extension Tenderness along flexor sheath Fusiform digit swelling Semi-flexed resting posture of the digit Digit held in full extension
12	Most common malignant hand tumour	<ul style="list-style-type: none"> Synovial sarcoma Chondrosarcoma Squamous cell carcinoma Osteosarcoma Melanoma

*Correct answers are indicated in bold.

prior to the lectures, which encompassed topics on the approach to hand and wrist pain, hand and wrist injuries, hand numbness, hand infections, swellings in the hand and principles of hand occupational therapy. The survey was offered to all the symposium participants and consisted of 12 questions on hand trauma (Table I), including degenerative conditions, repetitive strain disorders, nerve conditions, infections and tumours of the hand, diagnosis, initial treatment, recognition of complications and the need for referral to a specialist. The surveys were anonymous. The participants keyed their answers into a computer data system, and the results were then analysed. A waiver of written informed consent and ethics board review was obtained from the National University Hospital for the purpose of this study.

RESULTS

A total of 35 respondents completed the questionnaire. Of these, 22 (62.8%) GPs had ≥ 16 years of experience in primary care, while five (14.3%) had < 5 years of experience, and eight (22.9%) had 6–15 years of experience. 12 (34.3%) GPs were in a solo practice, while ten (28.6%) were in a small group practice with < 6 doctors and 13 (37.1%) were in a large group practice with ≥ 6 doctors. 31 (88.6%) respondents had previous surgical rotations, and out of these 31, five (14.3%) respondents had done a posting in hand surgery and six (17.1%) had not had any surgical rotation. In all, 28 (80.0%) GPs had performed minor hand surgical procedures in their clinic, such as toilet and suture, while the remaining seven (20.0%) did not perform any minor procedures. 22 (62.9%) GPs had performed topical steroid injections in the clinic, while 13 (37.1%) did not do so. 31 (88.6%) GPs reported seeing hand surgery-related cases in their practice, while four (11.4%) did not. 94.3% of the GPs reported that $< 10\%$ of the patients seen in their practice were hand surgery-related, while two (5.7%) reported that more than 20% of their patients presented with hand-related injuries. All 35 doctors were aware that Hand Surgery is a separate specialty from Orthopaedic and Plastic Surgery. Table II represents the background information of the respondents' medical practices.

Our results showed that the respondents were able to answer 53.0% of the questions correctly. Areas that were found to be weak included recognising injuries that pose a high risk for developing wound infection, complications of topical steroid injection in treatment of trigger finger and hand tumours. Only 14 of the 35 respondents (40.0%) recognised that high-pressure jet injuries of the hand are at a high risk for developing infection, and 24 (69%) did not recognise one of the established complications of steroid injection for trigger finger. Areas that the respondents fared very well included the clinical signs and symptoms of hand conditions, where about 83% ($n = 29$) and 69% ($n = 24$) were able to recognise the signs and symptoms of cubital tunnel syndrome and suppurative flexor tenosynovitis, respectively. 32 (91%) respondents were aware that *Staphylococcus aureus* is the most common causative bacterium in hand infections.

Table II. Background information on the medical practices of the general practitioners surveyed.

Question	No. (%)
Length of time in primary care (yrs)	
1–5	5 (14.3)
6–10	5 (14.3)
11–15	3 (8.6)
16–20	6 (17.1)
> 20	16 (45.7)
Type of practice	
Solo	12 (34.3)
< 6 doctors	10 (38.6)
≥ 6 doctors	13 (37.1)
Has done prior surgical posting	
Yes, with Hand Surgery posting	5 (14.3)
Yes, without Hand Surgery posting	25 (71.4)
No prior surgical posting	5 (14.3)
Performed minor procedures in the clinic	
Yes	28 (80.0)
No	7 (20.0)
Performed topical steroid injection in the clinic	
Yes	22 (53.7)
No	13 (31.7)
Hand surgery-related cases were seen in the practice	
Yes	31 (88.6)
No	4 (11.4)
No. of hand-related cases in practice (%)	
0	1 (2.9)
1–5	24 (68.5)
6–10	8 (22.9)
11–20	0 (0.0)
> 20	2 (5.7)
Is aware that Hand Surgery is a separate specialty from Orthopaedic and Plastic Surgery	
Yes	35 (100.0)
No	0 (0.0)

DISCUSSION

Hand surgery is a highly specialised surgical specialty. Surgical treatment of hand conditions requires highly qualified and technically competent surgeons in order to obtain the optimal functional outcome for the patient. In today's age of cost-effective healthcare, hand conditions that do not require surgical treatment can be safely treated by GPs in primary care facilities, which are often less costly. However, it is also important for GPs to recognise urgent surgical conditions that require emergent surgical intervention so as to prevent unnecessary complications. Hand conditions that can be effectively treated with surgical intervention should be referred to a hand surgeon to maximise the outcome of treatment for the patient.

Orthopaedic and musculoskeletal conditions are the most common problems in patients presenting for medical care.⁽⁶⁾ However, musculoskeletal education in medical school has been shown to be inadequate in preparing future doctors for diagnosing and managing musculoskeletal conditions.^(7,8) Therefore, increasing knowledge of musculoskeletal and hand surgical conditions among GPs may enhance primary healthcare

delivery and outcomes, as well as facilitate recognition of surgical problems for prompt referral to a tertiary centre for treatment. It is, therefore, vital for hand surgeons to continue to provide continuing medical education on common hand conditions to GPs.

This study found that there are some knowledge gaps among GPs that need to be addressed in order to improve patient outcomes. For example, more than 60% of the respondents did not think that high-pressure water jet injuries to the hand are serious injuries that require prompt surgical treatment in order to minimise the risk of amputation. 9% of the respondents who may be giving topical steroid injections for trigger fingers did not know that suppurative flexor tenosynovitis is a potential complication of treatment. This complication, which may result in amputation of the finger and loss of function of the whole hand, is a very serious consequence for an easily treatable condition. In addition, 37.1% of the respondents did not think that penetrating injury in the palm requires evaluation by a hand surgeon. This may be due to a deficiency in knowledge of critical structures that could be injured in the hand during a penetrating hand injury, e.g. the nerves, vessels, and tendons that require repair, if transected. Sound knowledge about the structural and functional anatomy of the hand is essential so as to rule out injury to these critical structures clinically. Otherwise, surgical exploration is necessary to exclude injury to these structures.

This study was not without its limitations. Firstly, the sample size was small, and thus not representative of the whole cohort of GPs in Singapore. Moreover, the fact these GPs had enrolled in the symposium may indicate that they already had a prior interest in hand conditions. This selection bias, however, may

only make our results more significant, as there may be an even bigger knowledge gap regarding hand conditions among GPs who have less interest in hand surgery.

Most of the GPs surveyed treated hand conditions in their practice. Knowledge gaps identified in this study, for example, injuries that are at a high risk for developing infection or damaging critical structures that impair hand functions, need to be addressed in continuing medical education and medical schools. This will eventually lead to better care for treatable hand conditions by primary healthcare providers, prompt referrals for conditions requiring specialist care, and ultimately, improved outcome for patients.

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