Hand surgery as subspecialty of plastic surgery among Saudi medical students: is it recognized well?

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ABSTRACT

Background: Plastic surgery has multiple sub-specialties, with hand surgeries being one of them. Medical students must recognize hand surgery as a subspecialty to understand the full scope of the discipline and improve their future referral patterns. This is the first study in Saudi Arabia to assess medical students’ perception of the role of plastic surgeons in hand surgeries.

Methods: The study is cross-sectional, with an online questionnaire distributed among medical students in a local medical institute. The data were collected between January and February 2021. The data were analyzed using Statistical Packages for Social Sciences version 21.

Results: Three hundred and one student participated. There were 198 males and 103 females. Students most commonly chose plastic surgery to treat the burn of the hand scenario (67.8%), while the most commonly chose orthopedic surgery to treat a severed finger extensor tendon (71.1%), fracture scaphoid (89.4%), and rheumatoid arthritis deformity (63.8%). The most commonly chosen general surgery was to treat a severed finger. The most common sources of information were the teaching sessions, the internet, and personal experience.

Conclusion: Medical students were found to have insufficient perception that hand surgery is a plastic surgery specialty. Improving students’ perception is possible through problem based learning sessions led by doctors and increasing the number and length of plastic surgery clinical rotations.

Keywords: Hand surgery, medical students, perception, knowledge, Saudi Arabia.

Introduction

Hand surgery is a relatively young but crucial subspecialty discipline established by the cooperation of general surgeons, plastic surgeons, orthopedic surgeons, vascular surgeons, and neurosurgeons [1]. Huge worldwide demand and a need exist for surgeons specializing in hand and wrist surgery because the medical industry generally faces a massive challenge dealing with traumatic injuries in hands and with congenital and acquired deformities. Until recently, surgeons either willfully neglected or inadequately treated these [2]. It became evident that specialized interdisciplinary care of the hand patient was necessary. Orthopedic surgeons predominate in the current hand surgery field, followed by plastic and general surgeons [1]. The lack of recognizing plastic surgery as a hand specialty is due to a rising stereotype that plastic surgery is cosmetic [3-5]. Furthermore, one study found a decrease in the trend of plastic surgeons subspecializing in hand surgery fellowships [6]. Another study on the future career path for plastic surgery residents found that most intended to pursue their career in private practice.

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In addition, many medical students and interns are still unaware of how plastic surgeons can operate in hand surgeries [8,9]. A study conducted in Saudi Arabia in 2021 found that medical students and interns had insufficient knowledge about the role of plastic surgeons in peripheral hand neuropathies, fractured scaphoid, and carpal tunnel syndrome [10]. This has led to the lack of knowledge many students have about the true role of plastic surgeons in various hand clinical cases. Early exposure to the surgical subspecialty during medical school guides students in choosing their specialty and builds a foundation for future referral patterns. Therefore, orthopedic, plastic, and general surgeons have a responsibility to educate medical students about the role of plastic surgeons in hand surgery and about which other surgeons can participate in the operations.

No previous studies have assessed medical students’ and interns’ perception and understanding of the role of different surgeons and specifically plastic surgeons in hand surgeries in Saudi Arabia. Therefore, the present study examines this. Moreover, it analyzes the impact of prior clinical exposure to surgical subspecialties on students’ current understanding. This will guide educating institutions and surgeons toward better educating future physicians about the role of different surgeons in hand cases and the importance of plastic surgeons’ role in hand surgery. Ultimately, this could affect referral patterns and help decrease the hand surgery supply-demand gap.

Subjects and Methods

This is a qualitative cross-sectional questionnaire-based study performed among medical students and interns in the College of Medicine, King Faisal University, Saudi Arabia, as an example of a single medical institute. The data were collected through an online questionnaire between January and February 2021. In total, 301 students completed the questionnaire. The questionnaire was written by the authors (FJ and AB), and it was sent for review to assure its validity and accuracy. The final version was released online. This work has been reported and checked according to the STROCSS criteria [11]. The online questionnaire was created on Google Forms and posted online. Table 2 was formulated with help from previous research in the literature [9]. Written informed consent was obtained, stating the demands of the study, before doing the questionnaires. Those who agreed to participate were enrolled. There are no exclusion criteria. Descriptive statistics are presented using numbers and percentages. The relationship between clinical exposure to general, orthopedic, and plastic surgery regarding the different clinical scenarios has been conducted using a Chi-square test. A p-value of 0.05 is considered to be statistically significant. A multivariate regression has also been performed for selecting plastic surgery based on prior clinical exposure to plastic, orthopedic, and general surgery. The odds ratio and 95% confidence interval (CI) were also reported. All data analyses were completed using Statistical Packages for Social Sciences version 21 Armonk, New York, IBM Corporation.

Results

This study enrolled 301 medical students to evaluate their perception of hand surgeries. Table 1 presents the students’ sociodemographic characteristics. Nearly two-thirds (65.8%) were males, and the most common age group was 22-24 years old (48.5%). Regarding their academic year, 21.3% were in the fifth year, 19.9% in the fourth year, and 19.6% in the third year. Furthermore, nearly 60% obtained a 4.5-5 GPA.

Table 2 describes the distribution of medical students who had clinical exposure according to surgical specialty. Interns had more exposures in general surgery (87.5%), followed by obstetrics/gynecology (62.5%) and neurosurgery (18.8%). Meanwhile, fifth years had more clinical exposure in orthopedic surgery (67.2%), followed by ophthalmology (37.5%), dermatology (29.7%), urology (18.8%), and plastic surgery (7.8%). Fourth-years had more exposure in ENT (50%) and cardiothoracic surgery (16.7%).

Table 3 shows the percentage of students selecting each surgical specialty based on the clinical scenario. Students most commonly chose plastic surgery to treat the burn of the hand scenario (67.8%). In comparison, orthopedic surgery was the most common choice to treat various clinical scenarios, including severed finger extensor...
tendon (71.1%), fracture scaphoid (89.4%), rheumatoid arthritis deformity (63.8%), and brachial plexus injury (40.2%). Students chose general surgery most often (61.8%). It was neurology (43.5%) for treating carpal tunnel syndrome, while for ulnar nerve repair, it was neurosurgery (39.5%).

Table 4 shows a multivariate regression model for selecting plastic surgery based on prior clinical exposure to plastic surgery, orthopedic surgery, and general surgery. As shown in Figure 1, the prevalence of medical students who selected plastic surgery to treat brachial plexus injury was statistically significantly higher having prior plastic surgical exposure ($p < 0.05$). Other clinical scenarios showed no significant relationship.

As per Figure 2, the prevalence of medical students who selected orthopedic surgery to treat severed finger extensor tendon, rheumatoid arthritis deformity, a severed finger, brachial plexus injury, ulnar nerve repair, carpal tunnel, and burned hand was statistically significantly higher having prior orthopedic surgical exposure ($p < 0.05$). Other clinical scenarios showed no significant relationship.

As shown in Figure 3, the prevalence of medical students who chose general surgery to treat a severed finger was statistically significantly higher having prior general surgery exposure ($p < 0.05$). Other clinical scenarios showed no significant relationship.

Figure 4 shows the best-known source of information regarding hand surgery was teaching sessions (62.8%), followed by internet (47.5%) and personal encounter/
experience (42.2%), while the least known was TV/series (12.3%).

**Discussion**

This study is the first to evaluate the perception medical students and interns in King Faisal University have of the different surgical specialties and the role of plastic surgery in various hand clinical scenarios. Plastic surgery was less commonly chosen in all clinical scenarios than orthopedic and general surgery, excluding the burned hand cases, despite over half the students having a GPA above 4.5 (Table 1). Similarly, a study conducted among the Brazilian population showed plastic surgery was chosen least for the hand cases presented [12]. Moreover, prior clinical exposure to plastic surgery showed no significant improvement except for the brachial plexus case. That said, a previous study conducted at the University of Utah [13] showed that prior exposure was associated with a significantly higher chance of choosing plastic surgery in all cases. This indicates that our institution needs further education for our students about the role of plastic surgeons in the hand surgery field.

Our study finds that with different clinical scenarios, orthopedic surgery was most chosen by the participants, especially in the scenarios of the fractured scaphoid, severed finger extensor tendon, rheumatoid arthritis deformity, and brachial plexus injury. A study conducted among the general Saudi population saw similar results [14]. Moreover, Figure 2 shows that prior orthopedic and general surgery exposure were associated with significantly higher chances of choosing severed extensor tendon, rheumatoid arthritis deformity, and brachial plexus injury. Meanwhile, it was the most common specialty to be chosen in the severed finger case in general surgery. At the same time, this was significantly

Table 4. Multivariate regression analysis for selecting plastic surgery based on prior clinical exposure to plastic, orthopedic, and general surgery.

<table>
<thead>
<tr>
<th>Clinical scenario</th>
<th>Plastic surgery</th>
<th>Orthopedic surgery</th>
<th>General surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AOR 95% CI</td>
<td>AOR 95% CI</td>
<td>AOR 95% CI</td>
</tr>
<tr>
<td>Severed finger</td>
<td>0.242 0.042-1.411</td>
<td>2.401 ** 1.308-4.407</td>
<td>1.760 ** 1.045-2.965</td>
</tr>
<tr>
<td>Severed finger extensor tendon</td>
<td>2.015 0.420-9.677</td>
<td>1.333 0.599-2.966</td>
<td>1.661 0.814-3.390</td>
</tr>
<tr>
<td>Fracture scaphoid</td>
<td>0.734 0.072-7.451</td>
<td>0.756 0.244-2.344</td>
<td>0.729 0.269-1.972</td>
</tr>
<tr>
<td>Burn, hand</td>
<td>1.714 0.410-7.159</td>
<td>1.033 0.536-1.993</td>
<td>1.719 0.998-2.964</td>
</tr>
<tr>
<td>Carpal tunnel</td>
<td>2.583 0.370-18.145</td>
<td>0.589 0.138-2.522</td>
<td>0.838 0.246-2.858</td>
</tr>
<tr>
<td>Rheumatoid arthritis deformity</td>
<td>-- --</td>
<td>14.949 ** 1.958-114.16</td>
<td>5.841 0.887-38.469</td>
</tr>
<tr>
<td>Ulnar nerve repair</td>
<td>1.419 0.235-8.566</td>
<td>1.282 0.436-3.769</td>
<td>0.928 0.343-2.508</td>
</tr>
<tr>
<td>Brachial plexus injury</td>
<td>4.748 0.834-27.022</td>
<td>2.282 0.746-6.977</td>
<td>2.284 0.786-6.638</td>
</tr>
</tbody>
</table>

AOR-Adjusted odds ratio; CI-Confidence interval.

** Significant at \( p < 0.05 \) level.

Figure 1. Percentage of medical students selecting plastic surgery for hand clinical scenarios by prior clinical exposure.
higher with previous exposure to the specialty itself, as seen in Figure 3.

In peripheral nerve injury and ulnar nerve injury cases, neurosurgery was the most common specialty chosen, while only 9% of the students chose plastic surgery. This is attributable to students having higher previous neurosurgery exposure than plastic surgery in all academic years (Table 2).

Several factors contribute to medical student’s lack of knowledge to choose plastic surgery in the different clinical scenarios. For example, as observed in Table 1, the most common source of information about hand surgeries is teaching sessions, which are the problem-based learning (PBL) sessions in our institution. This suggests doctors must improve content delivery in the PBL sessions regarding the role of plastic surgeons in different hand surgery cases. Moreover, around 40.5% of students received their knowledge from the clinical rotations. In our institution, plastic surgery is covered for only 1 day of the entire surgery rotation, contributing to the lack of exposure to the specialty.
compared with orthopedic and general surgery, which are covered for a longer period. Furthermore, one-third of participants got their knowledge from social media, which previous literature suggests influences the public and medical students to consider plastic surgery mostly cosmetic [15-17].

Conclusion

Our medical students and interns need further awareness and understanding of plastic surgeons’ role in the different hand surgery cases. This is deliverable through PBL sessions led by doctors, increasing the number and length of plastic surgery clinical rotations, and encouraging orthopedic and general surgeons to explain which surgeons participate in different hand surgery cases during the clinical rotations. Furthermore, this research can guide other institutes to study their own students’ understanding and knowledge. Several limitations must be considered. First, this study was conducted in a single medical institute and did not represent all medical students in Saudi Arabia. Thus, other institutes must conduct similar studies for their students. Furthermore, this study is a cross-sectional study with a small sample size.

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List of Abbreviation

- GPA: Grade point average
- SPSS: Statistical Packages for Social Sciences

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent to participate

Written informed consent was obtained from all the participants.

Ethical approval

The ethical approval was obtained from King Faisal University, KFU-REC-2021 - NOV-EA000184, dated 23rd November 2021.

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