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The Introduction of Plastic and Reconstructive Surgery to the University of Glasgow Undergraduate Medical Curriculum.

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ABSTRACT

Background

Misperceptions of plastic surgery remain common amongst medical students and the medical community.¹ This creates barriers in recruitment to specialty and patient referral. Before this study there was no formal plastic surgery teaching in University of Glasgow Undergraduate Medical Curriculum.

Materials and Methods

A plastic surgery teaching pilot was implemented for fourth year students. Oncoplastic breast surgery was used as an example of gold standard multidisciplinary reconstructive surgery. Surveys collected data before and after provision of teaching across four parameters; identification of plastic surgery subspecialties, understanding of plastic surgery, opinion of the pilot and curriculum, career preferences and gender.

Results

The response rate was 57% (n=160). The most and least recognised subspecialties were burns (48% (n=75)) and perineal and lower limb reconstruction (0% (n=0)) respectively, with more students identifying aesthetic surgery (16% (n=26)) than hand (9% (n=15)) or skin cancer surgery (6% (n=9)). The majority (129 (81%)) thought plastic surgery was poorly represented in their curriculum and wanted further information (98 (61%)). Reported understanding of plastic surgery significantly improved ($p < 0.00005$). Those interested in surgical careers increased from 39% (n=63) to 41% (n=66) with more males than females reporting interest ($p < 0.05$).

Conclusion

This study introduced plastic and reconstructive surgery into the undergraduate curriculum and led to further increased plastic surgery teaching. It improved student understanding, desire to gain more experience in the specialty and interest in surgical careers. Teaching students about subspecialties is vital to dispel misconceptions, ensure appropriate referrals and ignite interest in those with aptitude for surgical careers.

INTRODUCTION

The British Association of Plastic Reconstructive and Aesthetic Surgeons (BAPRAS) has depicted the salamander in their coat of arms since 1955, due to the reptile's unique ability to regenerate its limbs and tail.² To those within the specialty, this provides accurate imagery of restoring form and function. However, the varied and holistic work of the plastic surgeon is often poorly understood by members of the public and fellow medical professionals, in part due to overrepresentation of aesthetic surgery in the media.³

Misperceptions of the scope of plastic surgery have been reported in medical students worldwide, including in Australia,⁴ India,⁵ the United States⁶ and in the UK.⁷ This is a problematic barrier to recruiting the best applicants to specialty⁸, Greene et al (2008) noted that the most influential factor associated with recruitment in plastic surgery was exposure to the specialty at medical school.⁹ In addition, for those medical students pursuing non surgical careers an improved knowledge of plastic surgery may expedite appropriate referrals, reducing cost to both the Health Service and to the patient. Lees et al. (2008) reported a decline in plastic surgery in undergraduate curriculums and highlighted that topics including skin cancer and burns were taught to students without them realising that they were plastic surgery subspecialties. In addition, new shift patterns, run through programmes and pressure for trainees to subspecialise early in their career further limits exposure to tertiary specialties.¹⁰

Prior to this study there was no formal plastic surgery teaching in the undergraduate curriculum at the University of Glasgow Wolfson Medical School. Our aim was to provide introductory plastic surgery teaching and to survey fourth year medical students to determine their knowledge of plastic surgery subspecialties and their career aspirations.

MATERIALS AND METHODS

The introductory plastic surgery teaching session was 90 minutes long and used oncoplastic breast surgery as an example of gold standard multidisciplinary clinical practice, with reconstruction as an option in the patient's therapeutic journey. An introductory slide illustrated the other subspecialties in plastic and reconstructive surgery. The session was taught by members of the general and plastic surgery teams.

Surveys featuring an ordinal scale were distributed before and after the teaching. Data was collected across four parameters; understanding of the role of the NHS plastic surgeon, identification of plastic surgery subspecialties, a baseline of their knowledge of breast anatomy and pathology and their opinion of the teaching session and their curriculum.

Students were informed of the purpose of data collection, responses were collected anonymously, participation was voluntary and consent was implied with the return of the survey. The data from the surveys was analysed using GraphPad Prism 6 (GraphPad Software, San Diego) and AppleMac Numbers (version 5.3 (5989) 2018).

RESULTS

At the time of the introductory plastic surgery teaching session, the fourth year of University of Glasgow Wolfson Medical School comprised 279 students, 160 completed both questionnaires (57% response rate). Seventy four were female (46%), 60 were male (38%) and 26 (16%) students chose not to state their gender. Seventy two (45%) students had an undergraduate degree. Participant age ranged from 20-30 years (median 23) and 24 (15%) students did not state their age.

The majority of the students attending the teaching (129 (81%)) felt that plastic surgery was poorly represented in their curriculum. Students were asked to name plastic surgery subspecialties (see Table 1).

Table 1. Baseline knowledge of plastic surgery subspecialties (number of students (%))

| Subspecialty | |
|---------------|----------|
| Burns | 75 (47%) |
| Breast | 69 (43%) |
| Head and neck | 25 (16%) |

| | |
|------------------------------------|----------|
| Aesthetic | 25 (16%) |
| Oncoplastic | 21 (13%) |
| Trauma reconstruction | 19 (12%) |
| Hand Surgery | 15 (9%) |
| Cleft palate | 13 (8%) |
| Skin Cancer | 9 (6%) |
| Abdominal reconstruction | 3 (2%) |
| Congenital/neonatal reconstruction | 2 (1%) |
| Perineal reconstruction | 0 (0%) |
| Lower limb reconstruction | 0 (0%) |

The most commonly identified subspecialty was burns, but this was only by 47% (n=75) of students, followed by breast (43% (n=69)) surgery. More students recognised aesthetic surgery as a plastic surgery subspecialty (16% (n=25)) than hand (9% (n=15)) and skin cancer surgery (6% (n=9)). Only 12% (n=19) correctly identified plastic surgeons' role in trauma reconstruction. The least recognised subspecialties were congenital/neonatal reconstruction (1% (n=2)) and none of the students identified perineal reconstruction and lower limb reconstruction as subspecialties of plastic surgery.

The student's self reported understanding of the role of the NHS Plastic Surgeon improved significantly following the teaching ($p < 0.00005$) (see Figure 1.) The approach to teaching was well received (73% of students agreed that more similar collaborative sessions would be useful (n=98)) and the percentage of students reporting good or very good understanding improved for all learning outcomes following the session.

Before teaching 85 (53%) students wanted more exposure to plastic and reconstructive surgery which subsequently increased to 98 (61%) students after the session ($p = 0.14$). Free comment feedback included "Videos very helpful, would like to know more", "I know I do not want to pursue a career in surgery it was still interesting", "Very informative, excellent visual aids" (see figure 2).

The number of students who reported interest in pursuing a surgical career increased from 39% (n=63) to 41% (n=66) students after the teaching session. Thirty two (44%) of the 73 students in our cohort with undergraduate degrees had interest in a surgical career. More males (n=29) than females (n=24) reported a baseline ($p = 0.08$) interest in a surgical career, where gender was reported and significantly more males (n=31) than females (n=24) reported an interest in a surgical career after the teaching ($p < 0.05$). The number of students who strongly agreed to an interest in a surgical career increased after the teaching and this trend was true in both males ($p = 0.40$) and females ($p = 0.09$).

DISCUSSION

This study demonstrates the impact of an introductory plastic surgery teaching session, which encouraged students to consider reconstruction as part of patients' treatment journey and used oncoplastic breast surgery as an example.

Consistent with previous reports in the literature,^{12,13,14,15} the students in our cohort had poor baseline awareness of plastic surgery subspecialties. Few students recognised that skin cancer and hand surgery fall under the remit of plastic surgery. This poses a real concern for the safe and efficient referral of patients and for recruitment of future trainees. The best recognised subspecialties of plastic surgery were burns, breast, aesthetic and head and neck surgery. The majority of students felt that plastic surgery was poorly represented

in their curriculum and wished this to be improved. Their desire for further teaching sessions and experience in plastic surgery increased after the teaching.

Following the teaching session, students reported a greater awareness of the role of the NHS Plastic Surgeon. Gaucher and Thabut (2014) report the primary determinants of medical student's career choice were teaching they received within that specialty, interest in that specialty and knowledge of quality of life working within that specialty,¹⁶ thus highlighting the advantage for medical students to have an awareness of their subspecialty career options from the earliest possible stage.

More students reported interest in pursuing a surgical career after the teaching session. In a survey of 984 first year medical students in six African countries (Burch et al. 2011), 20% wished to pursue a career in surgery¹⁷ and a study 883 first year medical students from the five Scottish medical schools (Cleland et al. 2012) had similar results (22.5%).¹⁸ It is possible that the higher baseline rate of reported predilection for a surgical career in our cohort (39% (n=63)) reflects a degree of participation bias.

Hill et al. (2014) report that medical students hold the stereotype that surgeons are "*self confident and intimidating, and of surgical culture as competitive, masculine, and requiring sacrifice.*"¹⁹ Females are reported to feel significantly more intimidated and less confident than males during surgical attachments and students are more likely to pursue a career in which they identify a positive role model.¹⁶ There were more females (74 (48%) than males (58 (37%)) in our cohort but significantly ($p < 0.05$) more males strongly agreed to an interest in a surgical career. These findings highlight the importance of including surgical tertiary specialty teaching for medical students at an early stage in their career, to engage them in their education, inform them of their career options, dispel inaccurate stereotypes and provide accurate role models.

As a result of student feedback after this teaching session, clinical and University faculty convened and the first formal Plastic Surgery teaching curriculum covering a range of plastic surgery subspecialties was successfully introduced at the University of Glasgow Wolfson Medical School. This highlights value in obtaining student feedback.

CONCLUSION

This single centre study based at the largest medical school in Scotland confirmed that the baseline understanding of plastic surgery and its subspecialties was poor and that the majority of students want more plastic surgery teaching in their curriculum.

Importantly, this study illustrates that the introduction of a multidisciplinary approach, mimicking clinical practice oncoplastic principles, improved understanding of plastic and reconstructive surgery. Furthermore an increase in enthusiasm for further experience in the specialty and an increase in interest in surgical careers was reported after one teaching session.

Feedback from students allowed not only improvement of teaching but also successful implementation of further plastic surgery representation in the undergraduate curriculum.

Teaching medical students about the full range of specialties available to them is vital for the benefit of Health Service provision, future doctors and their patients.

MAIN MESSAGES

- This study illustrates that fourth year medical students at the largest medical school in Scotland's baseline understanding of plastic surgery and its subspecialties was lacking, the majority felt plastic surgery was poorly represented in their curriculum and wanted more plastic surgery teaching.
- A simple 90 minute pilot teaching session which introduced plastic surgery principles significantly improved student understanding of NHS plastic surgery and increased interest in gaining more experience in plastic surgery and in surgical careers.
- Importantly, the student feedback generated from this pilot led to collaboration between University and clinical faculty and the introduction of increased plastic surgery representation in the undergraduate curriculum at the biggest medical school in Scotland.

Contributors The study concept was from ST. The teaching session design and liaison with University of Glasgow Wolfson Medical School was ST. The survey was designed and implemented by GH. The article was written by GH and edited by ST, with data processing and analysis from GH.

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FIGURE LEGENDS

Figure 1. The student's understanding of the role the NHS plastic surgeon significantly improved after the teaching session. Student Ttest analysis (Graphpad prism pro 6). $p^{****} = <0.00005$ self reported understanding before vs after teaching session.

Figure 2. Visual Wordle™¹² representation of student's free comment feedback. Size of word represents frequency.

