



Perception and reality—a study of public and professional perceptions of plastic surgery[☆]

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Summary A questionnaire survey of the perception of plastic surgery amongst 1567 members of the public, general practitioners and medical students is presented. Closed-ended format questions were designed to assess understanding of the range of conditions managed by plastic surgeons. Respondents were asked to match nine surgical specialists with 40 conditions or procedures. To investigate understanding of the multidisciplinary nature of some surgery, respondents were asked which type of surgeon might have a supplementary role. Completed questionnaires from 1004 members of the public, 335 general practitioners, and 228 medical students are presented (responses rate > 65%). Significant differences were identified between public respondents and other groups. Plastic surgery was associated with reconstruction for trauma and cancer and procedures with a strong aesthetic element by all three groups. The public were poorly informed about some core plastic surgery including burns, melanoma and hand surgery. General practitioner and student respondents had a better understanding of the diversity of the specialty. However, both groups considered orthopaedic surgeons and not plastic surgeons to be hand surgeons. The strengths and weaknesses of this study are discussed together with potential areas for education and promotion.

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Plastic surgery is a discipline that covers a broad spectrum of conditions and is unique amongst surgical specialities in being technique-driven rather than being constrained by anatomical site,

pathological process or patient subgroup. As such it has been described as 'the last bastion of general surgery'.¹ This fundamental difference may have both positive and negative consequences. Versatility promotes innovation but may also engender confusion in the minds of the public, professional colleagues and policy makers. In the absence of a consistent image of plastic surgery, misconceptions and negative stereotypes may prevail.

The public are becoming increasingly aware of healthcare issues with women and adolescents in

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particular seeking information from print and broadcast media and the internet.^{2,3} Cosmetic plastic surgery receives ever-increasing media attention with regular features and advertisements in magazines and on television.⁴ M. Shawn Cole said, 'you are only as others perceive you to be'. But does public perception match the reality of plastic surgical practice in the United Kingdom or is the specialty perceived as being no more than 'a nip and a tuck'?⁵ There is little published evidence on public and professional perceptions of plastic surgery. This paper presents the results of a survey of the perception of plastic surgery amongst more than 1000 members of the public in three NHS regions.

General practitioners are the coordinators of care and gatekeepers of specialist services in UK and as such should match the needs of their patients to specialists with the appropriate skills. Elective referrals from general practitioners make up 50% of referrals to plastic surgery units.⁶ Purchasing arrangements are changing so that with the exception of a few specific areas that will be under the control of Regional Specialist Commissioning Groups, funding for core plastic surgery is being devolved to Primary Care Trusts. It is essential that we know what general practitioners and lay members of these groups understand about plastic surgery if we are to develop strategies to influence the funding decisions they make. We surveyed general practitioners in the Oxfordshire region to investigate their perception of plastic surgery. Medical students are the next generation of general practitioners, hospital colleagues and plastic surgeons. To investigate the contribution made by undergraduate training to the perception of plastic surgery, we surveyed the attitudes and beliefs of medical students at Oxford University.

The perception of plastic surgery amongst the public and our colleagues, present and future, is important. We present a questionnaire survey of public and professional perceptions of plastic surgery.

Methods

A questionnaire was developed with closed-ended format questions which were designed to be simple, easy to read and nonintrusive. Question wording and format were refined in a small focus group before a pilot study was undertaken with a group of 30 local general practitioners. Nine different surgical specialists were listed: cardiothoracic surgeon, ear nose and throat surgeon, orthopaedic

and trauma surgeon, neurosurgeon, plastic surgeon, general surgeon, vascular surgeon, urological surgeon and maxillofacial surgeon. Each type of surgeon was assigned a number (1-9) and respondents were asked to choose which surgeon would be most likely to treat one of the 40 given surgical procedures or conditions. Twenty of these were conditions managed routinely by plastic surgeons (Table 1). The other 20 were conditions managed routinely by a variety of other specialists, for example appendicitis and a hip fracture. In this way, respondents were blinded to the plastic surgical focus of the questionnaire. To investigate understanding of the multidisciplinary nature of some conditions, respondents were asked to state which other surgeon might be involved as well. Finally, respondents were given the option of stating, 'don't know'. The list of plastic surgery conditions was not exhaustive but included examples of congenital conditions, trauma and cancer reconstruction and aesthetic surgery.

Identical questionnaires were distributed to three different groups of individuals: members of the public attending accident and emergency departments at Wexham Park Hospital in Slough, John Radcliffe Hospital in Oxford and Stoke Mandeville Hospital in Aylesbury; general practitioners in the Oxfordshire region; and medical students at Oxford University. Boxes of questionnaires were placed in the accident and emergency department waiting areas and completed questionnaires were collected regularly. Names and addresses of general practitioners in the Oxfordshire region were obtained from local databases and questionnaires were sent by mail. Responses were returned in stamped addressed envelopes to a post box at the Nuffield Department of Surgery, Oxford University. There was no indication that the study primarily concerned plastic surgery or was being undertaken by the Department of Plastic Surgery. Medical students undertaking clinical training at Oxford University received questionnaires in their medical school pigeonholes. Completed questionnaires were collected from the medical school. Respondents were not made aware from the questionnaire or the address on the return envelope that the study was being conducted by the plastic surgeons.

Public and general practitioner respondents were asked to identify their sex and age group. Medical students were asked to identify their sex and clinical year of study. All returned questionnaires were reviewed. Three per cent of questionnaires from accident and emergency attendees were returned defaced and these were excluded from further analysis. A two-tailed Chi-squared test for categorical data was used to identify an

Table 1 The surgeon that respondents considered most likely to treat 20 conditions managed routinely by plastic surgeons

Condition or procedure	Surgeon most likely to manage condition		
	Public	General practitioners	Medical students
Scar that has become big and ugly	Plastic	Plastic	Plastic
Big burn on the chest	Plastic	Plastic	Plastic
Tendon in the hand which has been cut	General	Orthopaedic	Orthopaedic
Ugly nose after it has been broken and healed	Plastic	ENT	Plastic
Melanoma skin cancer	General	Plastic	General
Child born with a hare lip (cleft lip)	Plastic	Plastic	Maxillofacial
Skin graft	Plastic	Plastic	Plastic
Perform a 'face lift'	Plastic	Plastic	Plastic
Correction of breasts that are too large	Plastic	Plastic	Plastic
Child born with an oddly shaped head	Neurosurgeon	Neurosurgeon	Maxillofacial
Broken cheek bone due to a punch	Maxillofacial	Maxillofacial	Maxillofacial
Cut nerve in a leg	Neurosurgeon	Orthopaedic	Neurosurgeon
Large cancer of the mouth or lip	Maxillofacial	Maxillofacial	Maxillofacial
Back ulcer due to pressure (pressure sore)	General	Plastic	General
Reattach a finger that has been cut off	Plastic	Orthopaedic	Orthopaedic
Hole in the face after a tumour has been removed	Plastic	Plastic	Plastic
Repair of a torn or missing eyelid	Plastic	Plastic	Plastic
Enlarge a breast with implants	Plastic	Plastic	Plastic
Rebuild an ear that has been cut off	Plastic	Plastic	Plastic
Perform a 'nose job'	Plastic	Plastic	Plastic

Conditions and procedures are listed as in the questionnaire, with respondent-friendly language.

association between respondents' characteristics, such as their age or year of medical study, and the responses that they gave. Observed frequencies were compared with 'expected' frequencies (the number of responses that would be expected if there was no association between independent categories). 'Expected' frequencies were calculated from the totals for each category. Results were considered significant ($p < 0.05$) or highly significant ($p < 0.01$). Statistical analysis was performed by one author (SJ).

Results

A total of 1567 questionnaires were completed and analysed, 1004 from members of the public, 335 from general practitioners and 228 from medical students. The response rate for general practitioners and medical students was 65 and 67%, respectively. Fifty per cent of general practitioner and student respondents and 41% public respondents were male (Table 2). Public respondents were

skewed to the younger age group (Table 3). Responses were received from medical students in all clinical years with the majority in the first year (Table 4). There was a high level of consensus amongst general practitioners and students regarding the surgeon most likely to treat each condition. Public responses showed more variation with a greater number of surgical specialists chosen for each condition. Seventeen per cent (SD 5.6%) of public respondents answered 'don't know' for each condition as compared with 2.2% (SD 2.5%) general practitioners and 1.7% (SD 2.4%) medical students. This difference was statistically significant ($p < 0.01$).

Public perception

Public responses demonstrated a positive perception of the range of conditions managed by plastic surgeons. They considered that a plastic surgeon was most likely to perform 13/20 of the conditions managed routinely by the specialty (Table 1).

Table 2 Distribution of sexes among public respondents, general practitioner respondents and medical student respondents

	Public (% , n = 1004)	General practitioners (% , n = 335)	Medical students (% , n = 228)
Male	41	50	50
Female	51	24	42
Not stated	8	26	8

Table 3 Age distribution of public and general practitioner respondents

Age (years)	Public (% , n = 1004)	General practitioners (% , n = 335)
Under 15	21	0
15-25	21	0
26-35	16	9
36-45	18	32
46-55	11	27
56-65	6	7
Over 65	2	0
Not specified	5	25

Responses demonstrated some appreciation of the technique-driven nature of the specialty. Seventy-three per cent stated that a plastic surgeon was most likely to perform a skin graft compared with a general surgeon (5%) and a maxillofacial surgeon (3%). Public respondents also had some understanding of the reconstructive role of plastic surgeons. Forty-five per cent thought a plastic surgeon was most likely to reconstruct an ear compared with 20% for an ear, nose and throat (ENT) surgeon. A plastic surgeon was most likely to repair an eyelid (40%) as opposed to a maxillofacial surgeon (21%). Public responses demonstrated an appreciation of the aesthetic nature of plastic surgery. Forty-five per cent thought a plastic surgeon was most likely to perform a post-traumatic rhinoplasty (21% ENT, 16% maxillofacial) compared with 60% for a cosmetic rhinoplasty (13% ENT, 5% maxillofacial) (Fig. 1A). The plastic surgeon ranked first for other predominantly aesthetic procedures, including facelift (72%), breast reduction (67%) and breasts augmentation (65%). Plastic surgeons also ranked highly in conditions involving the face. Fifty per cent public respondents considered reconstruction after excision of a facial tumour would be performed by a plastic surgeon rather than a maxillofacial surgeon (24%) or an ENT surgeon (2%) (Fig. 1(B)). Responses suggested a distinction between extirpation and reconstruction. Asked who was most likely to treat a cancer of the mouth or lip, public respondents ranked the plastic surgeon fourth behind maxillo-

Table 4 Stage of clinical training of medical student respondents

Stage of clinical training	Medical students (% , n = 228)
First clinical year	59
Second clinical year	24
Final clinical year	14
Not specified	3

facial surgeon (32%), ENT surgeon (20%) and general surgeon (11%). Twenty-two per cent did not know. However, 39% thought a plastic surgeon 'might be involved as well' suggesting some understanding of the multidisciplinary nature of this type of surgery.

The public did not associate plastic surgery with some core work of the specialty. Only 15% thought that a plastic surgeon was most likely to treat melanoma, behind the general surgeon (34%). Twenty-three per cent did not know (Fig. 1(C)). Although 41% thought a plastic surgeon was most likely to treat a large burn, more respondents stated do not know or listed another type of surgeon (Fig. 1(D)). Cleft surgery was not associated as strongly with the specialty as might be expected. Thirty-eight per cent of the public thought a plastic surgeon most likely to treat cleft lip, compared with a maxillofacial surgeon (24%) and an ENT surgeon (12%) (Fig. 1(E)). Public respondents do not think of plastic surgeons as hand surgeons. Asked which surgeon was most likely to perform a tendon repair, 24% stated general surgeon, 20% orthopaedic surgeon, 16% neurosurgeon, 11% vascular surgeon and 9% plastic surgeon (Fig. 1(F)). Likewise, only 20% thought a plastic surgeon was most likely to replant a finger.

There was a significant association between public respondents' sex and their responses. More male respondents, than would have been expected had there been no association, reported that they did not know which surgeon performed a facelift ($p = 0.02$), a cosmetic rhinoplasty ($p = 0.009$), a breast reduction ($p = 0.001$) or treated craniosynostosis ($p = 0.002$). No significant association was identified between age of respondents and the responses they gave.

General practitioners perception

General practitioners in the Oxfordshire area seemed well informed about the range of conditions managed by plastic surgeons (Table 1). It was perceived that the plastic surgeon was most likely to revise a scar (97%), manage a burn (93%) (Fig. 1(D)), treat melanoma (84%) (Fig. 1(C)) and perform a skin graft (96%). Respondents were aware of the leading role played by plastic surgeons in cleft surgery. Sixty-six per cent considered a plastic surgeon was most likely to treat cleft lip compared with 25% for a maxillofacial surgeon and 7% for an ENT surgeon (Fig. 1(E)). However, despite Oxford having one of four national craniofacial units, only 8% of local General Practitioners thought a plastic surgeon was the most likely to treat craniosyn-

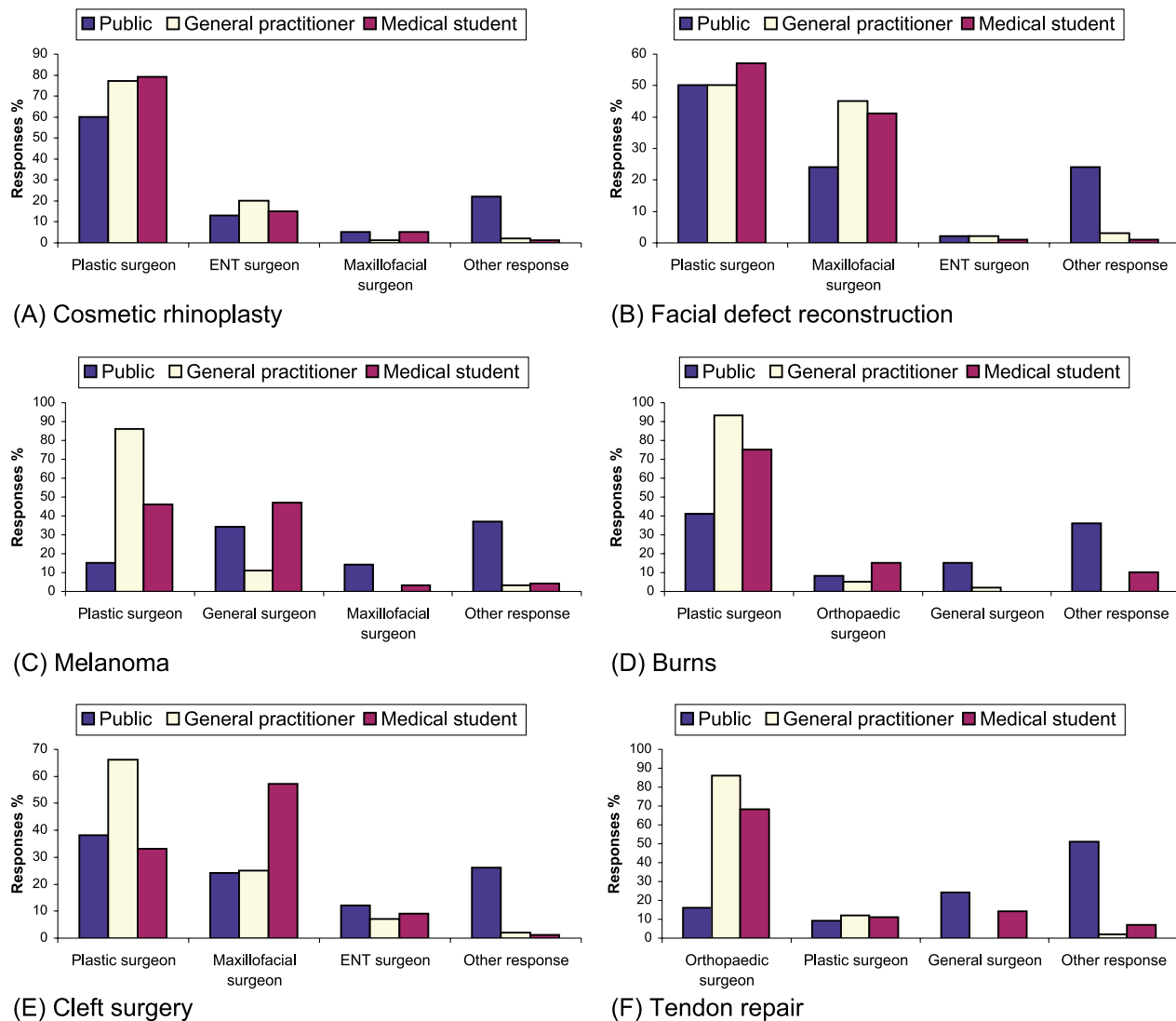


Figure 1 Surgeon most likely to perform procedures or treat conditions listed in the questionnaire: (A) cosmetic rhinoplasty; (B) reconstruction of a facial defect; (C) melanoma; (D) burns; (E) cleft surgery; and (F) tendon repair.

tosis, compared with 36% neurosurgeon and 34% maxillofacial surgeon. Sixteen per cent did not know, the largest proportion for any condition.

General practitioners associated aesthetic surgery overwhelmingly with plastic surgery, for example facelift (97%), breast reduction (90%) and breast augmentation (92%). Seventy-seven per cent thought a plastic surgeon was most likely to perform a cosmetic rhinoplasty rather than an ENT surgeon (20%) or a maxillofacial surgeon (1%) (Fig. 1(A)). In contrast, 77% considered an ENT surgeon would perform a post-traumatic rhinoplasty rather than a plastic surgeon (16%) or a maxillofacial surgeon (6%).

Respondents did not associate plastic surgeons with hand surgery or the management of lower limb trauma or facial fractures. Tendon repair and digital replantation were believed to be performed

by orthopaedic surgeons (86 and 62%, respectively) rather than plastic surgeons (12 and 24%) (Fig. 1(F)). Orthopaedic surgeons (53%), not plastic surgeons (7%), were thought most likely to repair a nerve in the leg. Fractures of the maxilla were considered the remit of the maxillofacial surgeon (83%) and not the ENT surgeon (7%) or the plastic surgeon (1%). However, 63% general practitioners thought a plastic surgeon might also be involved in treating a compound leg fracture.

Medical student perception

Medical student responses were similar to those given by General Practitioners with a few specific exceptions (Table 1). The majority (57%) thought a maxillofacial surgeon was most likely to treat cleft

lip compared with 33% plastic surgeon and 9% ENT surgeon (Fig. 1(E)). Forty-five per cent thought a maxillofacial surgeon was the most likely to manage craniosynostosis rather than a neurosurgeon (25%) or a plastic surgeon (14%). Students, like the public, considered a plastic surgeon was most likely to perform both post-traumatic (44%) and cosmetic rhinoplasty (79%) (Fig. 1(A)).

Medical students, like general practitioners, believed orthopaedic surgeons to be hand surgeons. Only 11% thought a plastic surgeon was most likely to repair a tendon (orthopaedic surgeon 68%, general surgeon 14%) (Fig. 1(F)) and 19% replant a digit (orthopaedic surgeon 58%, neurosurgeon 9%, vascular surgeon 9%). The same was true of lower limb surgery. The plastic surgeon (11%) ranked third, behind the neurosurgeon (47%) and orthopaedic surgeon (29%), as the specialist most likely to repair a nerve in the leg. Fifty-four per cent thought a plastic surgeon might also be involved in treating a compound leg fracture.

There was a significant association between the year of clinical training and type of surgeon chosen by medical students. In the management of melanoma, a greater number of first year students chose a general surgeon and a greater number of second and third year students chose a plastic surgeon, than would have been expected had there been no association ($p = 0.0025$). Regarding oral and lip cancer, fewer first years than expected chose the plastic surgeon; whilst a greater number of final year students than expected chose plastic surgery ($p = 0.003$). Finally, concerning lower limb nerve repair, half as many first years as expected chose the plastic surgeon whilst twice as many second and final year students than expected selected the plastic surgeon ($p = 0.00001$).

Discussion

The way plastic surgery is perceived by the public and our colleagues is important and this study demonstrates that we are not as others perceive us to be. The specialty was associated with reconstruction for trauma and cancer and procedures with a strong aesthetic element. However, the public were poorly informed about the role plastic surgeons play in some core areas of the specialty including burns, melanoma and hand surgery. General practitioner and medical student respondents had a better understanding of the diversity of pathology managed by plastic surgeons. However, both groups considered orthopaedic surgeons and not plastic surgeons to be hand surgeons.

This study represents the largest published survey of public and professional perceptions of plastic surgery. Previous studies have shown the public to be poorly informed about plastic surgery.^{1,7} Twenty four per cent of public respondents in one survey were unable to name five conditions treated by plastic surgeons.⁷ The most common responses in this study were burns and cosmetic surgery. In the study presented, closed-ended format questions were used to identify the surgeon associated with specific surgical problems. This type of question has been shown to increase response rates when surveying public attitudes.⁸ Question wording was designed to be simple and respondent-friendly. However, the use of emotive language, such as *ugly* nose in the case of post-traumatic rhinoplasty, may have resulted in a degree of selection bias towards plastic surgery. The association between plastic surgery and beauty or appearance appears to be valid, given the large proportion of all three groups associating conditions with a strong aesthetic element with the specialty.

One weakness of the study is that the groups may not be representative and in particular accident and emergency department attendees may not be representative of the public at large. This group was skewed to a younger age group and this has been shown to reduce response rates.⁹ However, using the Chi-squared test there was no association between respondent age and the responses given. It is unlikely that children below 15 years of age attended A&E alone and these respondents might have received assistance in completing the questionnaire from an older guardian.

Responses from all three groups suggest that plastic surgeons are not considered to be hand surgeons. Only 9% of the public, 12% of general practitioners and 11% of medical students thought a plastic surgeon was most likely to perform a tendon repair. The results of this study may not be representative of perception nationwide, particularly with regard to general practitioner and student responses, which were obtained from a single geographical area. One possible explanation for this misconception is that Oxford is served by a high profile orthopaedic trauma service and a hand service that is based at an orthopaedic unit. Public responses are less likely to have been biased by local service provision as data was collected from accident and emergency departments in three different counties. Furthermore, use of the term orthopaedic and trauma surgeon in the questionnaire may have led to bias towards this specialty.

A second weakness of the study was the limited number of surgical specialties listed. Some respondents suggested other specialists including

'oncologist' and 'breast surgeon'. The inclusion of dermatology was considered given the contribution of that specialty to melanoma and minor skin surgery. However, it was decided to include only nine surgical specialities in the interests of brevity as this has been shown to maximise response rates.⁹ Oculoplastic surgery and general breast surgery were not included because, as subspecialties, it was felt their inclusion might cause confusion. Plastic surgery may have been over-represented in responses despite attempts to blind respondents by including 20 condition managed routinely by other specialities.

Plastic surgery has a public profile: 83% public respondents to a telephone survey had heard of the specialty whilst only 21% had heard of maxillofacial surgery.¹⁰ The word plastic suggests something false and disposable and some authors have proposed changing the name of the specialty.¹¹ We believe that data from this study and others suggest that this would be a mistake. The results presented, identify areas that could be targeted by future educational and promotional campaigns. How these campaigns are developed is another question. The public access a variety of sources for healthcare information.³ Television programs such as that which followed plastic surgeons performing cleft surgery in Pakistan promote a positive perception of the specialty.¹² Websites of good quality and reliable content may also be valuable sources of information.¹³

Plastic surgery departments rely on general practitioners for half of their referrals. The availability of specialist care has been shown to affect general practitioner referral rates.¹⁴ We must continue to make ourselves available to colleagues for advice and referrals and disseminate information about the remit of our specialty through involvement in vocational training and in post-graduate training schemes. Finally, today's medical students are tomorrow's general practitioners and hospital specialists. We have demonstrated a significant association between the year of undergraduate training and the type of surgeon chosen by medical students. This suggests that undergraduate training may form the basis of the misconceptions identified in general practitioner responses. In 1986 plastic surgery was included in the curriculum of 77% UK medical schools and in 62% was compulsory.¹⁵ Since then undergraduate medical education has undergone a revolution and the position of plastic surgery has changed. In a recent survey of UK medical schools, plastic surgery was

part of the curriculum in 12/17 but in only two was this compulsory.¹⁶ It is essential that students continue to gain from exposure to the specialty,¹⁷ so our future colleagues are better able to match the needs of their patients to the skills of the appropriate specialist, and also the most able students continue to aspire to a career in plastic surgery.

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