

## The effect of educational internships on medical students' perceptions of plastic surgery

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### Abstract

**Objective:** To investigate the effects of plastic, reconstructive and aesthetic surgery educational internships on medical students' perceptions of the scope of plastic surgery.

**Methods:** This cross-sectional study was conducted at the Gulhane Medical Faculty, Ankara, Turkey, from 2012 to 2013, and comprised 4th-, 5th- and 6th-year medical students. Students were given a questionnaire consisting of 28 questions related to maxillofacial and upper and lower extremity medical conditions, and skin, aesthetic and congenital anomalies. They were asked to correlate the treatment of certain medical conditions to the correct specialist clinics. SPSS 19 was used for data analysis.

**Results:** Of the 145 participants, 65(44.83%) had received internship education of plastic surgery while 80(55.17%) had not received internship training. In 27(96.4%) of the 28 medical conditions covered, patient referral to plastic surgery specialists was found to be significantly higher in the student group that participated in educational internships ( $p < 0.05$ ). For this same group of students, certain medical conditions, such as ptosis, pressure sores, parotid gland masses, venous ulcerations, facial nerve paralysis, septum deviations and large soft tissue defects with open tibia fracture, were less commonly referred to plastic surgery (<50% each).

**Conclusion:** Short duration of educational plastic surgery internships prevented instructors from giving complete and detailed information to their students.

**Keywords:** Plastic surgery, Perception, Medical faculty, Medical student, Education. (JPMA 67: 66; 2017)

### Introduction

Written in Ancient Egypt, the Edwin Smith Medical Papyrus proves that the historical continuum of plastic surgery began approximately 3,500 years ago. Later, the Sumerians wrote about plastic surgery on clay tablets.<sup>1</sup> While Indian medical practices have played a particularly vital role in plastic surgery, they have influenced other surgery types as well. In the past, many Indian individuals would have their noses removed as punishment for their crimes. For people that had committed adultery, Indian medical practitioners would perform surgical interventions that were similar to present-day rhinoplasties. Using tissues taken from the cheeks and the forehead, they would perform reconstructive-nasal surgeries.<sup>2,3</sup>

Although the roots of plastic, reconstructive and aesthetic surgery (PRAS) relied on ancient history, currently it is rapidly growing and developing specialty. The wide range of plastic surgery procedures leads to a number of problems. Because it deals with a wide network of diseases, it is sometimes misunderstood by members of

society, other specialists, and medical colleagues. Additionally, other specialties increasingly interfere with the field of plastic surgery.<sup>4,5</sup> PRAS internship training given to young colleagues during their medical faculty education should help to change the misperception about the professional liability of plastic surgery.

This study was planned to investigate the effects of PRAS educational internships on medical students' perceptions of the scope and viability of plastic surgery.

### Subjects and Methods

This cross-sectional study was conducted at the Gulhane Medical Faculty, Ankara, Turkey, from 2012 to 2013, and comprised 4th, 5th and 6th-year medical students. Students who had either completed or not completed an educational PRAS internship were included. Ethical approval was obtained for the study.

A questionnaire was given to determine frequency of referrals of students in the two groups with different clinical conditions to various departments in general and plastic surgery in particular. Students were given a questionnaire consisting of 28 questions related to diseases and medical conditions in the maxillofacial area and upper and lower extremities, and to skin, trunk, aesthetic, and congenital anomalies. Student (with PRAS internship education (+) and without PRAS internship

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education (-) referrals of patients to certain medical departments, such as eye surgery, urology, neurology, obstetrics, paediatrics, orthopaedics, dermatology, brain surgery, plastic surgery, general surgery, ear, nose, and throat, cardiovascular surgery, and physical therapy and rehabilitation, were investigated.

The data was evaluated using Microsoft Excel and SPSS 19. Chi-square test was used for comparisons between groups. P<0.05 was considered statistically significant.

### Results

Of the 145 participants, 65(44.83%) had completed an

**Table:** Referral rates for certain clinical conditions to plastic surgery (for both student groups) and referral rates to other clinics in-group of students who had completed educational PRAS internship.

Medical conditions	Referral rates to plastic surgery			Referral rates to other clinics in-group of students who had completed educational PRAS internship
	Educational PRAS internship (-) students (n=80)	Educational PRAS internship (+) students (n=65)	p	
1 The finger injury	50% (n=40)	95.38% (n=62)	<0.000	4.62% (n=3) Orthopaedics
2 The radial artery injury with an extensor tendon laceration	43.75% (n=35)	93.85% (n=61)	<0.000	3.08% (n=2) Orthopaedics 1.54% (n=1) General surgery 1.54% (n=1) Cardiovascular surgery
3 The Carpal Tunnel syndrome	22.50% (n=18)	61.54% (n=40)	<0.000	20.0% (n=13) Brain surgery 10.77% (n=7) Orthopaedics 4.62% (n=3) Neurology 1.54% (n=1) Physical therapy and rehabilitation 1.54% (n=1) General surgery
4 The nose injury with nasal fracture	47.50% (n=38)	73.85% (n=48)	0.001	26.15% (n=17) Ear, nose, and throat
5 The nose deformity that needs cosmetic nose reshaping	83.75% (n=67)	98.46% (n=64)	0.03	1.54% (n=1) Ear, nose, and throat
6 A 3-month-old baby with a skull deformity	30% (n=24)	78.46% (n=51)	<0.000	18.46% (n=12) Paediatric surgery 3.08% (n=2) Brain surgery
7 The deviated nasal septum that cause difficulty breathing	28.75% (n=23)	46.15% (n=30)	0.03	52.31% (n=34) Ear, nose, and throat 1.54% (n=1) Paediatric surgery
8 The median nerve injury	37.50% (n=30)	83.08% (n=54)	<0.000	15.38% (n=10) Brain surgery 1.54% (n=1) Neurology
9 The brachial plexus injury	33.75% (n=27)	72.31% (n=47)	<0.000	21.54% (n=14) Brain surgery 3.08% (n=2) Neurology 1.54% (n=1) General surgery 1.54% (n=1) Orthopaedics
10 The upper eyelid ptosis	12.50% (n=10)	32.31% (n=21)	0.004	29.23% (n=19) Neurology 29.23% (n=19) Eye 7.69% (n=5) Brain surgery 1.54% (n=1) Dermatology
11 The patient needs breast reconstruction after mastectomy	47.50% (n=38)	93.85% (n=61)	<0.000	4.62% (n=3) General surgery 1.54% (n=1) Obstetrics
12 An abnormal urination with an abnormally located urinary hole (hypospadias)	7.50% (n=6)	72.31% (n=47)	<0.000	20.0% (n=13) Urology 6.15% (n=4) Paediatric surgery 1.54% (n=1) General surgery
13 The facial paralysis	12.50% (n=10)	43.08% (n=28)	<0.000	30.7% (n=20) Neurology 21.54% (n=14) Ear, nose, and throat 3.08% (n=2) Brain surgery 1.54% (n=1) Dermatology
14 The prominent ear deformity	58.75% (n=47)	95.38% (n=62)	<0.000	3.08% (n=2) Ear, nose, and throat 1.54% (n=1) Brain surgery
15 The nevus (an asymmetric, pigmented, and irregular border)	23.75% (n=19)	63.08% (n=41)	<0.000	35.38% (n=23) Dermatology 1.54% (n=1) Ear, nose, and throat
16 An open tibia fracture with a severe soft tissue defect	13.75% (n=11)	38.46% (n=25)	0.001	58.46% (n=38) Orthopaedics

Next Page >>>>

17	The trauma related diplopia (double vision) and periorbital oedema	6.25% (n=5)	43.08% (n=28)		1.54% (n=1) General surgery 1.54% (n=1) Physical therapy and rehabilitation 38.46% (n=25) Eye 13.85% (n=9) Neurology
18	The mass on his right parotid gland	16.25% (n=13)	49.23% (n=32)	<0.000	4.62% (n=3) Brain surgery 46.15% (n=30) Ear, nose, and throat 3.08% (n=2) Neurology
19	The capitatum fracture	8.75% (n=7)	23.08% (n=15)	0.015	1.54% (n=1) General surgery 73.85% (n=48) Orthopaedics 1.54% (n=1) Neurology
20	The 3rd degree burns	57.50% (n=46)	100% (n=65)	<0.000	1.54 (n=1) Brain surgery -
21	The mandible fracture	37.50% (n=30)	93.85% (n=61)	<0.000	6.15% (n=4) Orthopaedics
22	The cleft lip and palate	43.75% (n=35)	95.38% (n=62)	<0.000	4.62% (n=3) Paediatric surgery
23	A child is born without an ear and needs ear reconstruction	48.75% (n=39)	87.69% (n=57)	<0.000	6.15% (n=4) Paediatric surgery 6.15% (n=4) Ear, nose, and throat
24	A patient has a sacral pressure sore	16.25% (n=13)	44.62% (n=29)	<0.000	36.92% (n=24) Physical therapy and rehabilitation 15.43 (n=10) Neurology 3.08% (n=2) Brain surgery
25	Trauma related ecchymosis and periorbital oedema	12.50% (n=10)	53.85% (n=35)	<0.000	33.85% (n=22) Eye 3.08% (n=2) Neurology 3.08% (n=2) Brain surgery 3.08% (n=2) Ear, nose, and throat 3.08% (n=2) Dermatology
26	The diabetes related foot ulcers	30% (n=24)	55.38% (n=36)	0.002	20.00% (n=13) Orthopaedics 9.23% (n=6) Physical therapy and rehabilitation 6.15% (n=4) Dermatology 4.62% (n=3) Cardiovascular surgery 3.08% (n=2) General surgery 1.54% (n=1) Neurology
27	The venous ulcers in lower extremity	21.25% (n=17)	15.38% (n=10)	0.247	75.38% (n=49) Cardiovascular surgery 6.15% (n=4) Dermatology 3.08% (n=2) General surgery
28	The maxillary fracture	32.50% (n=26)	87.69% (n=57)	<0.000	6.15% (n=4) Ear, nose, and throat 4.62% (n=3) Orthopaedics 1.54% (n=1) Neurology

PRAS: Plastic, reconstructive and aesthetic surgery.

educational PRAS internship and 80(55.17%) had not. Moreover, 31(21.4%) students were in the sixth year, 54(37.2%) in the fifth year and 60(41.8%) in the fourth year. While none of the 4th-year students had completed the PRAS internship, all 6th-year students had completed it. Also, 34(63%) 5th-year students had completed, and 20(37%) had not completed the educational PRAS internship.

Both groups arrived at the same decision to refer the patient with a deep ulcerated lesion on their right leg, secondary to chronic venous insufficiency, to a plastic surgery clinic.

Most PRAS internship education (+) students referred soft

tissue-related medical conditions in the upper extremities (skin, nerve, artery and tendon injuries) to a plastic surgery clinic (Table-1). By contrast, plastic surgery referral rates were lower for medical conditions associated with eyelid ptosis (32.31%), lacrimal gland tumours (49.23%), facial nerve paralysis (43.08%), functional nasal surgery (e.g., septum deviation) in the maxillofacial region (46.15%).

In-group of PRAS education (+) students' referral rates for plastic surgery associated with burn injuries was 100% (Table-1).

A significantly higher number of students who had completed an educational PRAS internship referred

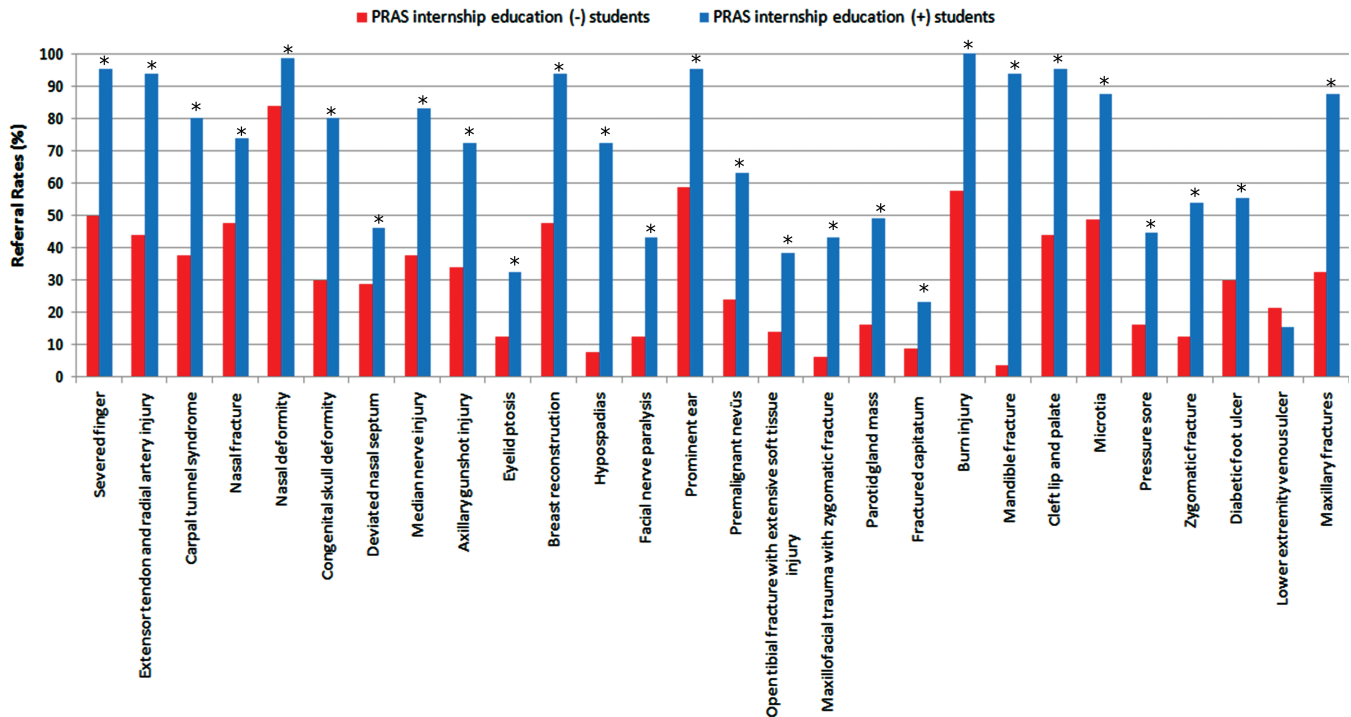


Figure-1: Referral rates to plastic surgery clinic under different clinical conditions (for both student groups). \* p<0.05.

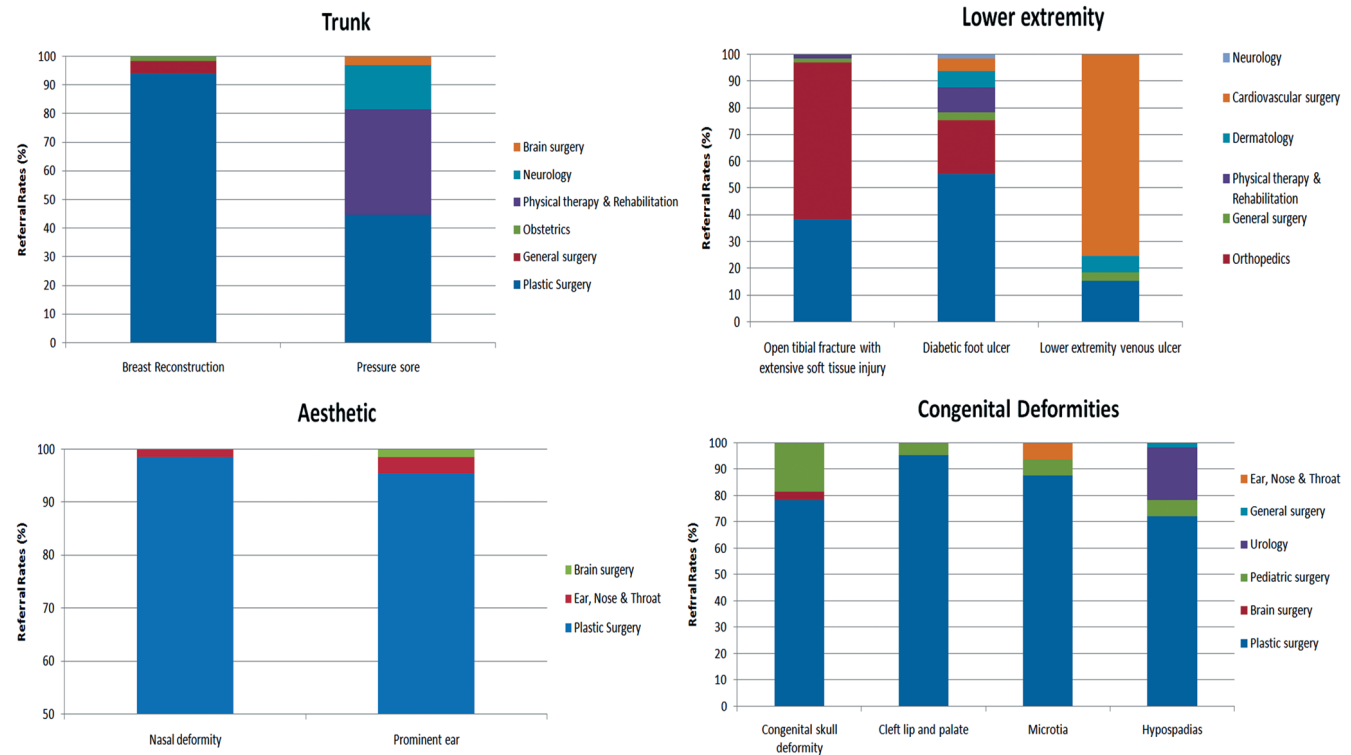


Figure-2: Referral rates of PRAS internship education (+) student for plastic surgery in conditions associated with the breast and sacral regions and referral rates of PRAS internship conditions associated with the lower extremity; Referral rates of PRAS internship conditions associated with cosmetic appearance and referral rates of PRAS internship education (+) student for plastic surgery in conditions associated with congenital deformities.

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27(96.4%) of the 28 medical conditions to plastic surgery clinics than students who had not completed an educational PRAS internship ( $p < 0.05$ ) (Figure-1).

Referral rates were similarly low for trunk and lower extremity related conditions like decubitus (44.62%), venous insufficiency ulcers (15.38%), and open tibia fractures with severe soft tissue defects (38-46%).

PRAS internship (+) student referral rates for plastic surgery in medical conditions associated with aesthetic surgery were very high (Table-1). Referral rates were similarly high for conditions associated with congenital deformities (Figure-2).

## Discussion

While several studies have evaluated the public's misperceptions of plastic surgery, few have been conducted in Turkey.<sup>6-9</sup> These studies reveal that many communities are uninformed about the therapeutic values of plastic surgery.

Although PRAS effectively treats a wide range of diseases, the media focuses almost solely on its aesthetic and cosmetic values.<sup>5,10</sup> While it is an incontrovertible fact that the media informs people and can raise awareness in a community, its emphasis on PRAS' cosmetic benefits overlooks the surgeries' reconstructive advantages.<sup>8</sup> The media uses plastic surgeons to add credibility to magazines and entertainment programmes that promote beauty and cosmetic ideals. In a study published in 2006, Reid and Malone examined 1,191 articles that discussed some aspect of plastic surgery. The study revealed that while 10% of the articles evaluated reconstruction, 89% of the articles focussed only on cosmetic and aesthetic issues.<sup>11</sup> Future physicians and medical students are also negatively influenced by the media's uninformed presentation of plastic surgery and misperceptions of PRAS extend to medical scholars as well. Similar research has assessed health worker perceptions of plastic surgery and its content.<sup>5,12</sup> For example, Panse et al. asked 100 assistant doctors to provide their opinions on plastic surgery.<sup>5</sup> The majority of these physicians believed that plastic surgery was used primarily for cosmetic and aesthetic purposes. Likewise, Tanna et al.'s study concluded that most primary care practitioners referred hand surgery cases to orthopaedic surgeons and cleft palate and lip issues to maxillofacial surgeons.<sup>12</sup> The authors suggested that family physicians, and especially primary care practitioners, could be informed by arranging interviews and incorporating activities approved by plastic surgery societies. By contrast, we believe that in terms of gaining knowledge about the scope of plastic surgery, the earlier education is more

valuable than postgraduate education. Therefore, students of medical faculty should be informed of plastic surgery practices during their formative educations. This alone should help to change misinformed perceptions. For these reasons, our evaluation of the perception of PRAS included medical school students. Educational PRAS internships are vital to the training of physicians who will play future roles in increasing community awareness. They will ensure that future practitioners will make the correct referrals to the appropriate clinics.

Only a few international studies evaluate plastic surgery content and medical faculty students' perceptions of the practice.<sup>4,13</sup> A recent US study conducted by Kling et al. evaluated 2,434 students from 44 medical faculties. This study's nationwide participation pool involved first- and 2nd-year medical students and revealed that students were generally under-informed about the practices of plastic surgery.<sup>13</sup> Another study, conducted by Agarwal et al., revealed that most first- and 2nd-year medical students believed that plastic surgery was linked primarily to cosmetic and aesthetic issues.<sup>4</sup> However, to contrast these studies, 4th-, 5th- and 6th year students of a medical faculty were chosen to enrol in our study. In the earlier period of medical education (1st, 2nd and 3rd years), students study basic sciences. During this pre-clinical period, students' perceptions about surgical conditions and the treatment of disease are often very similar to the general public's as shown in the earlier studies.<sup>4,13</sup> There are clinical sciences-exposed students who have completed or have not completed the educational internship of PRAS, in the group of 4th-, 5th- and 6th-year students. Therefore, selection of 4th, 5th- and 6th-year students would make it possible to show only the contribution of educational PRAS internships to the correction of misperceptions about plastic surgery and its practices. Our study revealed that students not enrolled in an educational PRAS internship held misperceptions that were similar to those listed in the study above.<sup>4,13</sup> In fact, most students who had yet to complete the educational internship assumed that plastic surgery was associated with aesthetic nasal surgery (83.7%) and aesthetic ear surgery (58.7%). These same students held the belief that eyelid (12.5%), facial nerve surgeries (12.5%), congenital deformities (30%), and functional nasal surgeries (28.75%), all of which are prevalently reconstructed with plastic surgery were not related to plastic surgery at all. However, a significantly higher number of students who had completed an educational PRAS internship referred 27 of the 28 medical conditions to plastic surgery clinics. These results indicated that student perceptions changed considerably after completion of an educational PRAS internship.

The format and length of medical school education is different around the world.<sup>14</sup> Usually it takes 5 to 6 years, and the first 3 years of education consist of preclinical sciences. In our country, the duration of medical education is 6 years. The students face clinical sciences after the 3rd year of medical education. Generally, students have had only limited experiences with plastic surgery during the undergraduate years. In addition, the term of "internship" can be varied in different parts of the world. We use the internship as a meaning of "a short rotation in a specialty". There are also differences in terms of duration, content and optionality of PRAS internship education from country to country.<sup>15</sup> For many medical schools in the United States and Canada, plastic surgery is not a regular part of the curriculum. Differently, it is a regular part in the 5th year of core education in Turkey. Although the duration of educational PRAS internships is brief (7 days), students learned a great deal about plastic surgery, its practices and issues related to plastic surgery that was raised in the questionnaire in this study. We believe the academic exposure of the students is not limited to lectures and demonstrations; they also see patients and assist in the operating room during PRAS internship education.

Because diseases and functional abnormalities in many anatomical regions of the body can be diagnosed and treated by PRAS, plastic surgery shares common areas of interest with several other specialties. For instance, both PRAS and other specialties are primarily focused on diseases that affect the upper extremities and maxillofacial areas that require surgical intervention. As a result of educational internships in other surgical specialties, many students, including those who have completed an educational PRAS internship, choose to refer patients to fields other than plastic surgery when medical conditions related to its basic issues. International studies that involve large groups of medical students confirm this fact.<sup>4</sup> In a study conducted by Agarwal et al., medical conditions in upper extremities and maxillofacial areas correlated greatly with specialties other than PRAS. In our study, educational PRAS internship (-) students rarely associate the surgical medical conditions of hands and upper extremities (hand and wrist injuries, tendon and radial artery injuries, carpal tunnel syndrome and wrist bone fractures) with plastic surgery. Although students who had internships primarily referred patients with skin, nerve, artery and tendon injuries to plastic surgery, referral rates for carpal tunnel syndrome and axillary region injuries were low. This finding reveals that the majority of students who completed their educational PRAS internships correlated traumas with plastic surgery. During medical training, it should therefore be

emphasised that non-traumatic diseases (such as carpal tunnel syndrome) should be considered for plastic surgery. Both groups of students referred few medical conditions in the maxillofacial area (eyelid ptosis, septum deviations, salivary gland tumours, and facial nerve paralysis) to a plastic surgery specialist (<50%). Most students (98.46%) who completed their educational PRAS internships linked aesthetic nasal surgery to plastic surgery. During PRAS training, the notion that plastic surgery deals with aesthetic issues should, therefore, be extended to include the reparation of functional nasal problems. According to the questionnaire's results, traumatic bone fractures in the maxillofacial area were highly linked to plastic surgery. Conversely, the number of students who thought that facial nerve paralysis and salivary gland tumours should be treated with plastic surgery was low (<50%). To remedy this oversight, PRAS trainers should provide detailed explanations of the benefits that plastic surgery can provide. These explanations can include functional surgical reconstructions such as the reconstruction of facial nerve paralysis.

According to the questionnaire's results, every student who had completed their educational PRAS internship (100%) linked treatment of burn traumas to plastic surgery. We believe that this correlation is due to two significant factors: 1) our hospital's burn unit is managed by a plastic surgery clinic, and 2) the educational PRAS internship includes training modules on burn patients. Because other burn units in the world may run by a variety of clinic and specialist types, similar studies at different centres would likely produce dissimilar results.

## Conclusion

Short duration of educational plastic surgery internships prevented instructors from giving complete and detailed information to their students about the scope of PRAS. On the first and final days of such internship programmes, PRAS trainers should inform students about the fields, basics, content and operations of plastic surgery in detail. Doing so will increase the future rate of referrals to plastic surgery specialists. Memorable patient photos, pre-operation and post-operation photos, suture and skill development laboratories, activities that require active student participation, and activities and practices that include computer-aided animations prepared by plastic surgery associations can increase interest in plastic surgery and prevent students from misperceiving its applicability. To encourage patients to pursue PRAS for hand and peripheral nerve surgeries, surgeons should use visual media to promote the treatment of issues not commonly associated with plastic surgery. A more

comprehensive study, conducted in institutions that provide medical training, may help those who are interested in obtaining additional information about the specialty. Studies like the current one will play a significant role in determining ideal strategies for providing accurate information about plastic surgery and correct common misperceptions about its general applicability.

**Disclaimer:** This study was presented at the Turkish Plastic, Reconstructive and Aesthetic Surgery Society 36th National Congress from October 25 to November 2014 in Istanbul, Turkey. This paper is an expanded form with an improved text.

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