

Plastic Surgery Training across Seven Continents: Results from the First Global Trainee Survey

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Background: Little is known about the demographics and ambitions of plastic surgery trainees and if these differ between regions. This study sought opinion from current and recently graduated plastic surgery trainees to map demographics, training structure, and ambitions of plastic surgery trainees worldwide.

Methods: A cross-sectional study was designed and administered by the international trainee organization International Confederation of Societies of Plastic Surgery Trainees. A questionnaire of 45 questions was distributed digitally through several international channels using the REDCap platform.

Results: A total of 290 junior plastic surgeons, of whom 124 (42.8%) were women, from all seven International Confederation of Societies of Plastic Surgery regions, participated in this study. Of the trainees, 21% have emigrated, and 75% expressed a desire to undertake a part of their training abroad. The most common length of training in plastic surgery is 5 years. There is a difference in working hours between regions, where more than 80-hour work weeks are most common in Asia (24.1%), and work weeks of less than 40 hours are most common in Middle East (30.8%). A majority of trainees (85%) reported a research interest, and we found a negative correlation between the extent of research ambition and reported clinical workload.

Conclusions: We present here the first international investigation of trainee experiences of plastic surgery training. We show that training structure and organization vary between institutions, and that plastic surgery trainees report a strong interest in international training as well as in research. (*Plast Reconstr Surg Glob Open* 2022;10:e4520; doi: [10.1097/GOX.0000000000004520](https://doi.org/10.1097/GOX.0000000000004520); Published online 7 October 2022.)

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INTRODUCTION

There is limited information regarding the demographics of plastic surgery trainees and how postgraduate training programs vary across regions. In terms of gender, in a recent survey of UK plastic surgery trainees, 53% of the 131 respondents were men.¹ This contrasts with other settings such as India, where male trainees represent 71% of their cohorts.² In the US, women now constitute 41% of integrated plastic surgery residents.³

Regarding program structure, the United Kingdom (UK) plastic surgery training pathway involves a 2-year core surgery program followed by a 6-year plastic surgery training program, whereas the United States (US) training pathway is divided into an integrated model of 6 years and an independent model of 3 years.^{1,4}

The majority of plastic surgery trainees in the UK receive 2 hours of protected teaching time a week, and 4 regional training days per year.¹ A survey of American program directors showed that residents commonly had 3–4 hours of educational time per week, and that on average

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one educational course per trainee was sponsored by the program.⁵ Results from a recent survey of Ibero-Latin American trainees showed a great heterogeneity of training programs within the region, underlining the need for standardization to facilitate interaction and exchanges.⁶

A few studies have investigated the ambitions of plastic surgery trainees. Surveys have shown that 56% of US trainees, 62% of Indian trainees, and 82% of UK trainees in plastic surgery have a desire to undertake a fellowship as part of their training.^{1,2,4} A Canadian survey of 95 plastic surgery trainees showed that more than 70% of participants were interested in conducting research, and that the foremost barrier was lack of time.⁷

As shown above, the majority of previous surveys inquiring into training in plastic surgery have focused on trainees in the UK and in North America, with no previous studies looking at this from a global perspective.⁶

The International Confederation of Societies of Plastic Surgery (ICOPLAST) gathers more than 60 national member societies.^{8,9} The Committee for Trainee Affairs, ICOPLAST Trainees, has, in the last year, rapidly expanded internationally, and through WhatsApp groups and social media such as Twitter and Instagram, it connects many plastic surgery trainees worldwide. We believe that the majority of plastic surgery trainees have been connected to ICOPLAST through the WhatsApp groups and social media channels mentioned above, and/or through their national society. The importance of strategies for the strengthening of plastic surgery and international communication around plastic surgery training has been highlighted recently in ICOPLAST educational activities and trainee discussions, and also by others such as the ESPRAS (European Society of Plastic, Reconstructive and Aesthetic Surgery) European Leadership Forum.¹⁰

The primary aim of this study was to describe the demographics, training program, and ambitions of plastic surgery trainees worldwide, and to investigate any differences in the above-mentioned areas between regions. The secondary aim was to examine what plastic surgery trainees want from an international trainee organization.

METHODS

A working group from the ICOPLAST Committee for Trainee Affairs was set up to conduct a survey aimed at all current and recently graduated plastic surgery trainees worldwide. ICOPLAST Trainees are organized through regional steering committees, consisting of national trainee delegates from all member states. Through regional WhatsApp groups, for Europe, the Middle East, Africa, North America, Latin-America, and Australia-Asia, the trainee committee reaches and connects plastic surgery trainee globally.

An international working group of trainees designed a digital questionnaire consisting of 45 questions including two free-text answers. (See **Appendix 1, Supplemental Digital Content 1**, the ICOPLAST global training survey. <http://links.lww.com/PRSGO/C234>.) The survey questions covered four domains:

Takeaways

Question: There is limited information regarding the demographics and ambitions of plastic surgery trainees and if these differ between global regions.

Findings: We used our global trainee group to seek opinion from plastic surgery trainees in order to map demographics, training structure, and ambitions of plastic surgery trainees worldwide.

Meaning: A total of 290 junior plastic surgeons participated in the survey. The results of the survey describe the demographics and ambitions of plastic surgery trainees globally. We show that training structure and organization vary between regions and institutions, and that plastic surgery trainees report a strong interest in international training as well as in research.

demographics, structure of training program, career aspirations with regard to fellowship training and research, and knowledge of and interest in ICOPLAST. The survey was coded in the RedCap web-based application and tested for usability, technical functionality, and duration by ten trainees. The order of the questions was fixed and not randomized. Adaptive questioning was used to specify nation (from choice of world region) and for further questions regarding career aspirations depending on previous answers. All questions, apart from consent, were nonmandatory, and all items had a nonresponse option.

A link to the digital open survey was distributed through three channels: through regional and national web-based messaging platforms, through the international network of plastic surgery consultant delegates to ICOPLAST, and through the ICOPLAST newsletter. The regional WhatsApp groups of trainees contained, during the time of distribution, between 900 and 1100 participants. The survey opened on November 2, 2020 and closed on February 2, 2021.

All respondents were provided with written information about the purpose of the study, the length of time of the survey, which data were stored and for how long, and who the investigator was. Through a compulsory check box at the beginning of the survey, respondents gave their consent to participation and data processing. Data were collected anonymously. Respondents were invited to share their email addresses for information purposes; however, email addresses were separated from survey responses early in data management to avoid the possibility of tracing back survey replies to any single individual. Since no health data or other sensitive information was collected, we did not obtain consent from an institutional review board. No incentives were offered in exchange of completion of the survey.

Data were extracted from RedCap, and all data management and statistical analysis were performed in StataIC 13. Data were presented for all regions through descriptive analyses, as frequency, percentages, and distributions, and for comparisons between groups and regions, data were analyzed through Pearson's chi-square test.

In terms of study design and reporting, we followed the Checklist for Reporting Results of Internet E-Surveys.¹¹

RESULTS

Ten responses were excluded due to the participant not providing consent for data to be analyzed and used. All remaining 290 survey responses were analyzed, regardless of missing information or incompleteness.

Demographics

Trainees from 46 countries over all seven global regions participated in the survey, with a majority of respondents from Europe (Fig. 1), of which 124 (42.8%) were women (Table 1). Female trainees constitute a larger part of the respondents in Australia (50.0%), Europe (49.7%), North America (46.1%), and Africa (41.7%) compared with in Latin America (33.3%), Asia (25.8%), and the Middle East (15.4%), but the gender differences between regions are not statistically significant ($P = .071$).

Sixty-one respondents (21.0%) are currently working in a different country than where they went to medical school, whereof most of those who gave details (37; 62.7%) worked within the same global region as where they went to medical school. Of those who had moved to a different country, training reasons were the most common reason stated by 37 respondents (62.7%), followed by family reasons (14; 23.7%) and political reasons (6; 10.2%).

A higher proportion of trainees in Africa (47.2%) and the Middle East (53.9%) were 35 years or older, compared with the other regions ($P = .001$). Women made

Table 1. Demographics of Respondents

Survey Question	Responses, n (%)
What is your gender?	
Male	165 (56.9)
Female	124 (42.8)
Missing	1 (0.3)
What is your age?	
20–24 y	1 (0.3)
25–29 y	63 (21.7)
30–34 y	141 (48.6)
35–39 y	54 (18.6)
40–44 y	20 (6.9)
45–49 y	3 (1.0)
50 y or older	7 (2.4)
Missing	1 (0.3)
Are you working now in the same country as where you went to medical school?	
Yes	229 (79.0)
No	61 (21.0)
Missing	0 (0.0)
What is your level of training in plastic surgery?	
Early (first 1–2 y)	71 (24.5)
Middle	73 (25.2)
Late (will qualify as a consultant within 1–2 y)	85 (29.3)
On fellowship, not yet at consultancy level	9 (3.1)
On fellowship, at consultancy level	11 (3.8)
Consultant, within 5 y of qualification	25 (8.6)
Consultant, more than 5 y of qualification	7 (2.4)
Other/prefer not to answer/missing	9 (3.1)

up between 15.4% (Middle East) and 50.0% (Australia/New Zealand) of participants, but the differences across regions were not statistically significant ($P = 0.071$).

Structure of Training Program

The most common length of training in plastic surgery is 5 years (Table 2). By region, the most common length of training in plastic surgery is 3–4 years in Asia (66.7% of trainees state they train 3–4 years in plastic surgery) and Latin America (66.7%); 5 years in Europe (37.3%), Africa (50.0%), and Australia (100.0%); 6 years in North America (53.9%); and more than 6 years in the Middle East (38.5%). When length of training in plastic surgery is compared between regions, the differences between regions are statistically significant ($P < 0.001$).

The most common length of training in general surgery is 1 year in Australia (14.3%); 2 years in Europe (38.7%), Africa (69.4%), Asia (36.7%), the Middle East (30.8%), and North America (30.4%); and 4 years or more in Latin America (55.0%) ($P < 0.001$).

Reported time spent at the hospital and on call varies widely (Table 2). There is a difference in working hours between regions where more than 80-hour work weeks are most common in Asia (24.1%), and work weeks of less than 40 hours are most common in the Middle East (30.8%). We found that trainees working less than 60 hours per week were more likely (41.6%) than trainees working more than 60 hours per week (21.7%) to have annual holiday of 5 weeks or more.

A third of respondents (109; 37.6%) feel that the training in their country compares well to the training in other countries of their region. Respondents identify more training in the subspecialties within plastic surgery (174; 60.6%), a better-organized teaching program (155; 54.0%), and higher caseload training (117; 40.8%) as the most important ways in which plastic surgery training

In what region are you working now?

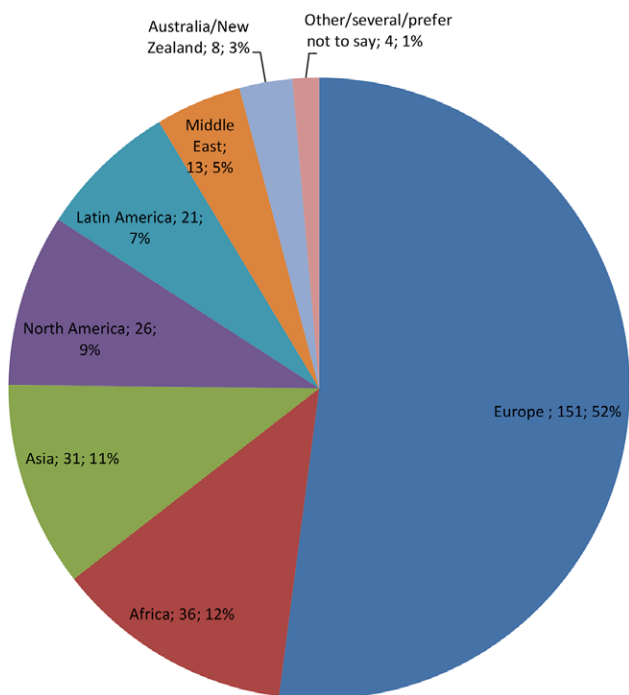


Fig. 1. Current region of practice of survey participants.

Table 2. Structure of Training Program

Survey Question	Responses, n*
How long is your training in plastic surgery?	
2–3 y	29 (10.0)
3–4 y	76 (26.2)
5 y	97 (33.5)
6 y	64 (22.1)
More than 6 y	21 (7.2)
Do not know/unsure	1 (0.3)
Missing	2 (0.7)
How long do you train in general surgery?	
1 y	67 (23.1)
2 y	107 (36.9)
3 y	22 (7.6)
4 y or more	33 (11.4)
Do not know/unsure	46 (15.9)
Missing	15 (5.2)
How many hours do you spend on clinical work per week? If you work part time, please estimate what would be the full-time equivalent.	
<40 h	31 (10.7)
40–50 h	90 (31.0)
50–60 h	81 (27.9)
60–70 h	39 (13.5)
70–80 h	27 (9.3)
>80 h	19 (6.6)
Missing	3 (1.0)
How often are you typically on call? If you work part time, please estimate what would be the full-time equivalent?	
3 nights per week or more	54 (18.6)
2 nights per week	88 (30.3)
1 night per week	80 (27.6)
1 night every second week	18 (6.2)
Less than 1 night every second week	8 (2.8)
No on-call work at all	23 (7.9)
Prefer not to answer	9 (3.1)
Missing	10 (3.5)
How many hours do you spend on-call, at the hospital or from your home, during an average week? If you work part time, please estimate what would be the full-time equivalent.	
<10 h	49 (16.9)
10–20 h	80 (27.6)
20–30 h	55 (19.0)
30–40 h	26 (9.0)
>40 h	34 (11.7)
No on-call work at all	21 (7.2)
Prefer not to answer	17 (5.9)
Missing	8 (2.8)
Do you get leave after being on call during the night or the weekend?	
Yes, I typically get a half-day leave	26 (9.0)
Yes, I typically get a full-day leave	52 (17.9)
It is optional, I can request to get a half- or a full-day leave after on call if I want it	23 (7.9)
No, I do not get leave after being on call	152 (52.4)
Other/prefer not to answer	28 (9.7)
Missing	9 (3.1)
When do you typically leave the hospital in the evening?	
4 PM	56 (19.3)
5 PM	71 (24.5)
6 PM	61 (21.0)
7 PM	48 (16.6)
8 PM	28 (9.7)
9 PM	4 (1.4)
10 PM or later	12 (4.1)
Missing	10 (3.5)
How many weeks of holiday do you typically get each year? If you work part time, please estimate what would be the full-time equivalent.	
<3 wk	54 (18.6)
3–4 wk	127 (43.8)
5–6 wk	92 (31.7)
7–8 wk	5 (1.7)
9 wk or more	4 (1.4)
Missing	8 (2.8)
How many days do you get off to attend conferences or meetings? If you work part time, please estimate what would be the full-time equivalent.	
No time off for conferences or meetings	38 (13.1)
1–2 d per year	31 (10.7)
3–4 d per year	59 (20.3)
5–6 d per year	77 (26.6)
1–2 wk per year	60 (20.7)
More than 2 wk per year	17 (5.9)

(Continued)

Table 2. Continued

Survey Question	Responses, n *
Missing	8 (2.8)
Does your workplace pay for your microsurgery loupes?	
No, I pay myself	204 (70.3)
Yes, I get reimbursed for the whole cost of my loupes	31 (10.7)
Yes, I get reimbursed for some of the cost of my loupes	12 (4.1)
I do not have loupes	31 (10.7)
Prefer not to answer	4 (1.4)
Missing	8 (2.8)
How do you feel the training in your country compares to that of other countries in your region?	
Very well. After finishing my training I am more competent than most newly qualified plastic surgeons from other countries in my region	60 (20.7)
Well. After finishing my training I am equally competent as newly qualified plastic surgeons from other countries in my region	109 (37.6)
Not so well. After finishing my training I am not quite as competent as newly qualified plastic surgeons from other countries in my region	46 (15.9)
Poorly. After finishing my training I am not as competent as newly qualified plastic surgeons from other countries in my region	22 (7.6)
Not sure/prefer not to answer	45 (15.5)
Missing	8 (2.8)
What are the most important ways that plastic surgery training can be improved where you are working now? Please check a maximum of three options:	
Higher caseload training	113 (40.2)
More training in the subspecialties within plastic surgery	170 (60.5)
Better access to material and equipment	80 (28.5)
A better-organised teaching program	152 (54.1)
More research opportunities	61 (21.7)
Higher salary	75 (26.7)
More trainers (qualified plastic surgeons)	99 (35.2)
Nothing training is satisfactory and successful	16 (5.7)
Other/prefer not to answer	11 (3.9)
Missing	9 (3.1)
You have stated that you are working now in a different country from where you went to medical school. In the country where you went to medical school, what are the most important ways that plastic surgery training could be improved? Please check a maximum of three options:	Total Number of Eligible Responders for This Question: 55
Higher caseload training	15 (27.3)
More training in the subspecialties within plastic surgery	27 (49.1)
Better access to material and equipment	18 (32.7)
A better-organised teaching program	28 (50.9)
More research opportunities	12 (21.8)
Higher salary	14 (25.5)
More trainers (qualified plastic surgeons)	18 (32.7)
Nothing training is satisfactory and successful	1 (1.8)
Other/prefer not to answer	16 (29.1)

*Percentage of 290 respondents, unless stated otherwise.

can be improved. Those who have moved to a different country after medical school identify a better-organized teaching program (50.9%), more training in the subspecialties (49.1%), more trainers (32.7%), and better access to material and equipment (32.7%) as the most important ways in which plastic surgery training can be improved in the country they chose to leave after medical school.

Career Aspirations

The majority of respondents (217; 74.8%) are interested in pursuing part of their training in a different country (Table 3). For those who were interested but would not pursue working or training abroad, family concerns were the most commonly stated reason (28; 62.2%). An interest in training abroad was less common for trainees currently working or training in North America (57.7%) compared with trainees in other regions ($P = 0.019$).

Most trainees (245; 84.5%) are interested in doing research with the aim of publishing an article, most commonly (147; 60.3%) in parallel to plastic surgery training, for mixed reasons (Table 3).

Some of the research-interested trainees are planning a Doctorate of Philosophy (PhD) (71; 29.5%); however, a majority is aiming for one to two published articles (68; 28.2%) or more than two articles (66; 27.4%) but not equivalent to a research degree. Pursuing a PhD is more common for trainees currently active in Europe (46.8% of trainees) compared with other regions. The most common type of research planned or already undertaken among research-interested trainees is research on clinical outcomes (planned or undertaken by 87.2% of research-interested trainees) and research describing new or modified surgical methods (47.9%).

There was no difference in research interest between trainees working less than 50 hours a week, 50–70 hours a week, or more than 70 hours a week ($P = 0.789$). More trainees working less than 50 hours a week were interested in pursuing a PhD (39; 39.0%) compared with trainees working 50–70 hours a week (26; 25.7%) and with trainees working more than 70 hours a week (6; 15.8%) ($P = 0.002$).

Interest in an International Trainee Organization

Of respondents, 238 (82.1%) report being a member of their national society of plastic surgery, membership

Table 3. Career Aspirations

Survey Question	Responses, n (%)*
Are you interested in doing part of your training in a different country than where you are working now?	
Yes, I am interested	217 (74.8)
No, I am not interested	12 (4.1)
Although I am interested in working abroad, I will not pursue this for practical or personal reasons	19 (6.6)
Not sure/prefer not to answer	5 (1.7)
Missing	37 (12.8)
Are you interested in working as a consultant in a different country after completing your training?	
Yes, I am interested	193 (66.6)
No, I am not interested	40 (13.8)
Although I am interested in working abroad, I will not pursue this for practical or personal reasons	34 (11.7)
Not sure/prefer not to answer	19 (6.6)
Missing	4 (1.4)
How long do you think you will be working as a consultant in a different country after completing your training?	Total Number of Eligible Responders for This Question: 194
Temporarily, 1–3 months	13 (6.7)
Temporarily, 3–12 months	42 (21.7)
Temporarily, 1 year or more	83 (42.8)
Never to return	26 (13.4)
Not sure/prefer not to answer	30 (15.5)
Are you interested in doing research with the aim of publishing an article in a peer-reviewed journal?	
Yes, I am interested	245 (84.5)
No, I am not interested	22 (7.6)
Although I am interested, I will not do research for practical/personal reasons	13 (4.5)
Other/prefer not to answer	6 (2.1)
Missing	4 (1.4)
What is your motive to do research?	Total Number of Eligible Responders for This Question: 245
Research is a requirement or a strong expectation of my training program	49 (20.0)
I am interested in research, even though it is not a requirement of my training program	84 (34.3)
I am interested in research and it is also a requirement or a strong expectation of my training program	98 (40.0)
Other/prefer not to answer	13 (5.3)
Missing	1 (0.4)
What is the primary reason for your interest in research? Choose any and all answers that are appropriate:	Total Number of Eligible Responders for This Question: 182
I think it is fun/challenging/interesting	120 (65.9)
It provides variation from clinical work	94 (51.6)
It will be good for my career	119 (65.4)
It will give me the opportunity to go abroad to work or do research	69 (37.9)
Other reasons	13 (7.1)
Missing	3 (1.6)

*Percentage of 290 respondents, unless stated otherwise.

Table 4. Knowledge of ICOPLAST

Survey Question	Responses, n (%)
Does your national society have a trainee representative on the board?	
Yes	120 (41.4)
No	41 (14.1)
Do not know/not sure	124 (42.8)
Missing	5 (1.7)
Before this survey, had you heard about ICOPLAST?	
Yes	220 (75.9)
No	63 (21.7)
Do not know/not sure	6 (2.1)
Missing	1 (0.3)
Before this survey, had you heard about ICOPLAST Trainees?	
Yes	117 (40.3)
No	167 (57.6)
Do not know/not sure	6 (2.1)
Missing	0 (0.0)
What do you think ICOPLAST Trainees should focus on? Please check a maximum of three options:	
Free online webinars, lectures, journal clubs, and other educational resources	214 (75.1)
Facilitating international research collaboration	119 (41.8)
Facilitating training exchanges such as fellowships and research stays	239 (83.9)
Improving working conditions locally such as rotas and training schedules	62 (21.8)
Fighting bullying and harassment in plastic surgery	32 (11.2)
Working for a sustainable future with regard to taking care of the planet's global resources, for example through less or more earthbound traveling and through sustainable surgery	51 (17.9)
Working for well-being/individual sustainability such as physical and mental health during training and peer-to-peer support	54 (18.9)
Ensuring similar standards in plastic surgery training worldwide	133 (46.7)
Building international relationships for future collaboration	147 (51.6)
We are planning more meetings for plastic surgery trainees, and would like to know what you would like to see in a meeting in your region that would make you want to participate? Please check a maximum of three options:	
Accessibility (geographically)	122 (43.4)
Fair price	143 (50.9)
Innovation within plastic surgery	126 (44.8)
Research: inspiration, ideas, and suggestions for collaborations	100 (35.6)
Training: comparison between countries, spreading good ideas, etc	173 (61.6)
Sustainability: sustainable surgery, "green hospitals," etc	33 (11.7)
Sustainability: mental health during training, avoiding burn-out, combating bullying, etc	42 (14.9)
International expert presenters on certain topics	134 (47.7)
Social time	63 (22.4)
Other/prefer not to answer	2 (0.7)

being least commonly reported among trainees based in Africa (22; 61.1% were members) (Table 4).

Of the presented options, a majority of trainees would prefer for an international trainee organization such as ICOPLAST Trainees to focus on facilitating training exchanges (243; 83.5%), free online educational resources

(219; 75.3%), and building international relationships for future collaboration (152; 52.2%).

Of the presented options, trainees stated that topics they would most like to see in a regional trainee meeting were training (177; 61.7%), international expert presenters (138; 48.1%), and innovation (128; 44.6%).

DISCUSSION

Our results represent the first attempt to capture the background, training characteristics, and career aspirations of plastic surgery trainees from a global perspective. Trainees from almost 50 countries worldwide participated in the survey. In keeping with other regional studies of plastic surgery trainees, slightly more men compared with women participated.¹⁻³ The true distribution is likely to vary between regions, although such differences were not statistically significant in our data. Hypothetically, an underrepresented group could be both more eager to seek international connections such as ICOPLAST Trainees and have more difficulty getting access to such networks, thus making the true gender distribution of plastic surgery trainees difficult to determine. We believe the gender distribution among the respondents in our survey to be roughly representative of the true distribution globally, with female trainees being underrepresented in relation to male trainees.

A fifth of respondents report having emigrated, a majority having moved to another country in the same global region. This speaks of a highly internationally interested medical community, and indeed our respondents report training as the most common reason for moving to a different country. Three-quarters of respondents are interested in pursuing part of their training or future work in a different country. This might not be representative, considering the trainees reached by our survey might have a particularly strong interest in international collaborations. However, the results compare well to previous surveys, showing that 56% of US trainees, 62% of Indian trainees, and 82% of UK trainees in plastic surgery have a desire to undertake a fellowship as part of their training.^{1,2,4}

The above-mentioned findings underline the importance of international organizations for connecting plastic surgeons and for ensuring an appropriate transfer of training certificates. Such a translation of competencies poses specific challenges, considering plastic surgery training programs vary widely between and within regions. This is evidenced by what is reported by our survey participants and is also demonstrated by previous studies on training structure.^{1,4} An interesting finding is the difference in focus of training programs, in terms of time spent on training in general and plastic surgeries, respectively.

The median plastic surgery trainee spends more than 50 hours on clinical work weekly plus an additional 10–20 hours on call, receives between 3 and 4 weeks of holiday per year, and is granted 5 to 6 days a year to attend conferences. Judging by what is reported in the responses to our survey 60–70-hour working weeks is not uncommon. Interestingly, we found that trainees reporting longer working weeks are also less likely to have more than 4 weeks of annual holiday, suggesting that rather than training programs compensating for long work hours by granting additional annual leave, the view on work-life balance probably differs by country and/or region.

This is to our knowledge the first survey to attempt to compare working hours in plastic surgery between countries and/or continents. It is possible that working hours vary to a great extent also within regions, although the implementation in Europe of the European Working

Time Directive ought to ensure similar working hours between the European countries. In light of our findings, we believe it would be of great interest to conduct a survey of plastic surgery training correlating working hours, training program structure, caseload, and clinician burnout. The importance of a high caseload during surgical training, for operative progress as well as for reliable assessment, has been established previously.¹² The implementation in Europe of the European Working Time Directive has been shown to decrease caseload but increase preparedness for theatre and alertness among trainees.¹³ As the negative impact of burnout, exhaustion, and lack of rest on patient safety and clinical outcomes is increasingly recognized, working hours and workload for trainees worldwide will need to be adjusted accordingly. This places a great demand on program directors to reconcile shorter working weeks with the need for maintained caseload and effectiveness of training.

Most respondents report an interest in research, which is commonly pursued in parallel to plastic surgery training, and often centered on clinical outcomes. The reason for this is most often reported as a combination of interest with research being a requirement or a strong expectation of their training program. Pursuing a PhD is more common for trainees in Europe, which may be related to the common need in Europe for a PhD to secure an academic post, and we also saw a strong correlation to clinical workload. It is not possible from the data at hand to draw conclusions on causation; however, we have speculated that shorter working weeks may lead to more trainees feeling they have the time and ability to undertake a PhD in parallel to their clinical work.

Although a majority of respondents report being a member of their national society of plastic surgery, trainee representation in the national society leadership is rare. We believe that this is an important point to address moving forward, as the trainees of today are the plastic surgery colleagues of tomorrow, and their apparent interest in their work and in international collaborations should be engaged and put to use on a national as well as an international level.

We found that trainees desire an international association such as ours to focus on facilitating training exchanges, free online educational resources, and building international relationships. These and other findings provide essential guidelines for our future activities and underline the importance of an international association of plastic surgery trainees. We hope the results from our questionnaire will form the basis for establishing a meaningful connection with trainees through social media channels, WhatsApp groups, and national plastic surgery societies, and we intend to repeat this survey in 5–10 years' time.

Although measures were made to reach as many plastic surgery trainees as possible, our network is better established and our routes of communication are more efficient in Europe, as evidenced by a majority of respondents from this region. When posing questions on trainee attitudes to training programs, there is a risk that some potential participants decline to participate, or that participants modify their responses, based on concerns of confidentiality. We made an

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effort to counteract this through explicitly stating in the survey participants' information firstly that the survey was anonymous and secondly that the investigators are fellow trainees. We cannot, however, be certain that no invited participants resisted from answering the survey based on concerns of confidentiality. Since many strategies for survey dissemination were used and since the total number of plastic surgery trainees worldwide is unknown, we cannot tell how many eligible participants were reached, and thus, response rate cannot be calculated for this survey. Furthermore, ours being an open survey leads to the possibility of duplicate entries, a weakness we were unable to address with this methodology. Since we developed a survey specifically for the domains we were interested to investigate, the survey is not validated, and conclusions must be drawn with great care.¹⁴ The level of training varies widely among participants and has, in some observations, not been entered, and we do not have enough data to tell whether the opinions on some of the questions in our survey differ between newly qualified trainees and early trainees. The extrapolation of our results is further limited by participants being likely to be "internationally interested," fluent in English, and having the time and interest to engage in an international trainee initiative. Thus, our results may not be valid for all plastic surgery trainees worldwide, and may reflect a survey bias, especially since the majority of respondents were based in Europe, as previously mentioned. Nevertheless, we believe our findings to be of value, as they add to the literature on the demographics and career aspirations of future plastic surgeons, and constitute the first global effort to capture this information.

In conclusion, we present data to support the notion that plastic surgery trainees display a keen interest in international mobility and collaboration, and that this interest could possibly be hindered by the regional variance in training structure and length. We show that plastic surgery trainees commonly report a 60–70-hour working week, and that although research interest is widely reported, the extent of research pursuits is negatively associated with reported clinical working hours. We present common suggestions for improvement of training, and, finally, we ascertain what plastic surgery trainees desire from an international trainee organization, allowing us to identify strategies to meet these needs, for the benefit of the area of plastic surgery.

REFERENCES

1. Fell M, Staruch R, Baker BG, et al; Collaborating Authors. Plastic surgery training in the UK: results from a national survey of trainee experiences. *JPRAS Open*. 2020;25:72–82.
2. Kumar S, More A, Harikar M. The impact of COVID-19 and Lockdown on plastic surgery training and practice in India. *Indian J Plast Surg*. 2020;53:273–279.
3. Chen K, Ha G, Schultz BD, et al. Is there gender inequality in plastic surgery? Evaluation of society leadership and composition of editorial boards. *Plast Reconstr Surg*. 2020;145:433e–437e.
4. Hashmi A, Khan FA, Herman F, et al. A survey of current state of training of plastic surgery residents. *BMC Res Notes*. 2017;10:234.
5. Fisher M, Alba B, Duvvuri P, et al. The state of plastic surgery education outside of the operating room. *Plast Reconstr Surg*. 2020;146:1189–1194.
6. Mayer HF, Jacobo OM, Grattarola G. Plastic surgery training in Ibero-Latin America: a cross-sectional survey study. *J Plast Reconstr Aesthet Surg*. 2021;74:1633–1701.
7. Barriers and attitudes to research among residents in plastic and reconstructive surgery: a national multicenter cross-sectional study. *J Surg Educ*. 2017;74:1094–1104.
8. Cooter RD, Brightman LA, Clarke HM, et al. Establishing priorities for the International Confederation of Plastic Surgery Societies. *Plast Reconstr Surg Glob Open*. 2018;6:e1878.
9. Rakhorst HA, Badran H, Clarke HM, et al. Introducing the International Confederation of Plastic Surgery Societies: ICOPLAST. *Plast Reconstr Surg*. 2017;140:627–633.
10. Giunta RE. [Relevance of economic aspects in plastic surgery and hand surgery]. *Handchir Mikrochir Plast Chir*. 2020;52:457.
11. Eysenbach G. Improving the quality of web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *J Med Internet Res*. 2004;6:e34.
12. Williams RG, Swanson DB, Fryer JP, et al. How many observations are needed to assess a surgical trainee's state of operative competency? *Ann Surg*. 2019;269:377–382.
13. de Blacam C, Tierney S, Shelley O. Experience of plastic surgery registrars in a European working time directive compliant rota. *J Plast Surg Hand Surg*. 2017;51:264–269.
14. Santesso N, Barbara AM, Kamran R, et al. Conclusions from surveys may not consider important biases: a systematic survey of surveys. *J Clin Epidemiol*. 2020;122:108–114.