

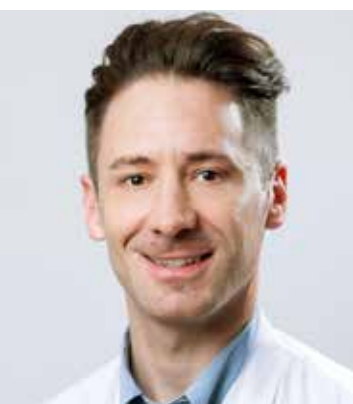
US fellowships in surgical disciplines – How to get there and what to expect

Access to high-volume training in reconstructive microsurgery or surgical oncology is challenging for Swiss residents. Fellowships in the United States offer a unique opportunity to get exposure in these competitive surgical disciplines. This article highlights the experience of three Swiss surgeons completing fellowships in hand surgery, reconstructive microsurgery, and surgical oncology.

PD Dr. Dr. med. Florian Früh, Department of Plastic Surgery and Hand Surgery, Cantonal Hospital Aarau, florian.frueh@ksa.ch

Dr. med. Tarek Ismail, Department of Plastic, Reconstructive, Aesthetic and Hand Surgery, University Hospital Basel, tarek.ismail@usb.ch

PD Dr. Dr. med. Perparim Limani, Department of Surgery and Transplantation, University Hospital Zurich, perparim.limani@usz.ch



PD Dr. Dr. med. Florian Früh

In Switzerland, most surgical residencies include a common trunk of 2 years and a specialized training of 4 years. During the latter, trainees need to complete a surgical logbook and are supposed to achieve independency to master even complex operations. In certain subspecialties, this can be particularly challenging due to a limited exposure in residency. For instance, microsurgical interventions are not only characterized by a steep learning curve but are also relatively rare in Switzerland, at least as hands-on procedures for residents. The introduction of Highly Specialized Medicine (HSM) for complex oncological surgery is an additional factor. Consequently, access to HSM surgery (for example esophageal and rectal surgery, complex liver resection, and pancreatectomy) for residents is limited to a few Swiss training hospitals. In contrast to the Swiss system, in the United States (US) surgeons usually proceed to fellowship after residency.



Dr. med. Tarek Ismail

These postgraduate training programs are under the umbrella of the Accreditation Council for Graduate Medical Education (ACGME). ACGME program requirements are defined regarding the educational program (i.e., educational components of the curriculum, integration of competencies into the curriculum, pain management, and research). Fellowships are part of a structured medical education and an established tool to obtain high-intensity training in surgical subspecialties. During a period of 12 months, competitively selected fellows are exposed to a minimal number of specialized surgeries. After fellowship graduation, surgeons commonly apply for attending positions in hospitals or go to private practice.

The US is the third-largest country with a population of ~330 million and the rate of specialized surgeons per inhabitant is lower than in Switzerland. For instance, in 2013 there was one hand surgeon per ~160000 inhabitants in the US¹ whereas in Switzerland this rate is approximately four times higher. Since training during fellowships is limited to a predefined period, the number of cases per fellow is a critical issue. Many US centers frequently deal with complex cases and injuries. Accordingly, in large hand trauma units, ACGME-fellows can expect high-volume training in difficult cases that are comparatively rare in Switzerland, such as mangled hands or avulsion amputations. Likewise, US microsurgery fellowships guarantee maximal exposure in complex reconstruction utilizing free tissue transfer. The goal is to expose trainees to a high volume of microsurgical cases with increased complexity on a routine basis, allowing for eventual independent operating and increased comfort in executing challenging cases and managing complications.

The authors of this article have completed US fellowships in hand surgery, microsurgery, and surgical oncology. In the following, the process of the application as well as the fellowship experience are reported.

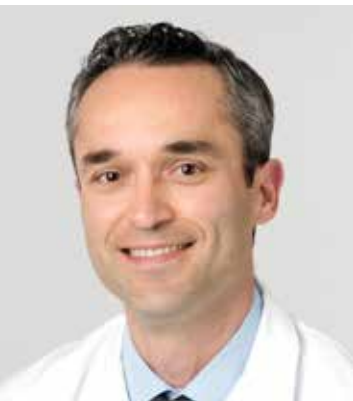
Requirements for US fellowship application

International medical graduates (IMGs) are individuals that completed their basic medical degree in medical schools outside of the US and Canada. Before applying for US fellowships, IMGs need to fulfil various requirements: First, the foreign medical school needs to be accredited by the Educational Commission for Foreign Medical Graduates (ECFMG). Second, obtaining the ECFMG certificate is mandatory (i.e., the US medical school examinations for IMGs). Currently, completing the ECFMG certificate includes two written multiple-choice exams while the oral exam has been cancelled due to the coronavirus pandemic. A description of the pathway can be found online (Table 2). Finally, IMGs must have completed residency training at the onset of fellowship training. IMGs interested in US fellowships can find potential positions online (Table 1). Fellowship applications are usually submitted through the online «match» system, which is available for different surgical disciplines. Recent matching statistics are published online and give an idea of the success rates of IMG applications (Table 2). Of note, the above-mentioned requirements are also essential when applying for a US training license, which is a *sine qua non* for a fellowship.

What happens after acceptance?

After being accepted for a fellowship position, several steps need to be completed by a fellow to enter the US and to start training. The ECFMG offers support for IMGs in the preparation of a fellowship through the Exchange Visitor Sponsorship Program (EVSP). There are helpful checklists that walk the applicant through the complicated process of obtaining a visa and a medical license. Most importantly, IMGs need to obtain the form DS-2019, also called the Certificate of Eligibility for Exchange Visitor (J-1) Status, which is required for a visa appointment at the US embassy in Bern. The visa granted for international fellows is commonly a J1 type and valid for the period of the fellowship. J1 physicians need to leave the US 30 days after termination of the training program. Table 2 provides the reader with the most important websites for the application process.

The terms for issuance of a US medical license can vary between fellowships and states since local medical boards are responsible for that process. While some programs provide support for international fellows through visa offices, some do not and fellows need



PD Dr. Dr. med. Perparim Limani

to organize most on their own. Since individual steps involved in obtaining a medical training license can only be completed after arrival in the US (i.e., getting a social security number), the medical license issuance may be delayed for a few weeks. This can also lead to a delayed start of clinical training depending on the institution's regulations. It is important for prospective aspirants for US fellowships that, in addition to the formal criteria (USMLE, ECFMG etc), one deals with the administrative matters early when planning the fellowship. In particular, sufficient time should be allowed for obtaining the work visa for the US. Many host institutions are helpful in this regard and most US university hospitals have set up a special visa office for their foreign employees.

Personal experience

After arrival in the US, international fellows need to become familiar with the characteristics of American healthcare. The complete adaption to new workflows including the healthcare software Epic (<https://www.epic.com/software>) takes a few weeks and can be a challenge since it is commonly a «learning by doing». In general, there are flatter hierarchies in the US compared with Switzerland. For instance, there are only three clinical positions in hospitals: Residents, fellows, and attendings. ACGME-fellows undergo intense 1:1 teaching from the beginning of their training since the programs guarantee a minimal number of specialized surgeries. There are, however, important differences compared with the Swiss system since training time is limited to a one-year period. In the beginning of the fellowship, the fellow is evaluated concerning technical and organizational abilities. Subsequently, depending on the structure of the training program, international fellows can obtain attending privileges and work more independently while always being under the proctorship of the local faculty. Maximal working hours are limited to 80 per week with two weeks holidays per year.

Hand Surgery and Microsurgery (The Buncke Clinic, San Francisco, CA)

Located in the heart of San Francisco, the Buncke Clinic has been at the forefront of hand surgery and reconstructive microsurgery since the 1960ies with seminal work on toe-to-hand transplantation and replantation²⁻⁴. Today, the fellowship offers a unique spectrum including replantation, limb salvage, peripheral nerve surgery as well as transgender surgery and breast reconstruction. This is particularly appealing for plastic surgeons dealing with extremity reconstruction since US fellowships rarely offer combined training in reconstructive microsurgery and hand surgery. There are two ACGME fellow, one junior fellow, and two resident positions. Fellows take call ~ every 3d to 4th night and weekend.

Case load and case complexity during the fellowship?

F. Früh: Since the Buncke Clinic attracts trauma cases from the Northern California Bay Area with several million people, the fellowship offered weekly replantations and mangled extremities (Fig. 1). In general, the exposure to microsurgery was high with > 80 free flaps, > 30 replantations/revascularizations, and > 150



Fig. 1: Microsurgical upper extremity reconstruction with attending microsurgeon Bauback Safa, MD, FACS, MBA (left). Photographer: Walter Lin, MD.

hand-sewn anastomoses per fellow. Moreover, the female-to-male transgender surgery training was exceptional with commonly 2 microsurgical phalloplasty cases per week.

Most important take-home messages?

F. Früh: Due to the high case load and the technical teaching, I could maximize efficiency during replantation and microsurgical tissue transfer. Technical refinements and particularly the thoughtful use of the tourniquet during microsurgery have significantly changed my approach to replantation and free flap procedures. I was also deeply impressed by the constant teaching motivation and respectful interaction of the faculty with residents and fellows.

Microsurgery (MD Anderson Cancer Center, Houston, TX)

The University of Texas MD Anderson Cancer Center (MDACC) is one of the leading teaching hospitals in the treatment of cancer. It is the largest cancer center in the US and according to Newsweek, MDACC is considered the best hospital in the world for cancer-related treatments⁵.

The Department of Plastic Surgery provides a one-year fellowship program in microvascular reconstructive surgery. This educational program includes training in advanced microvascular and complex reconstructive surgery techniques for head and neck, breast, extremity and lymphatic surgery. The fellowship is designed to provide advanced postgraduate training for plastic surgeons in microvascular reconstructive surgery specifically related to the oncologic patient. The Department of Plastic Surgery consists of 26 faculty members and 9 clinical fellows who handle > 1000 microvascular cases per year. Out of the 9 fellows, normally one or two are IMGs who are selected through a highly competitive selection process.

Case load and case complexity during the fellowship?

T. Ismail: The fellow will acquire special expertise in the evaluation and management of difficult problems related to cancers as well as treatment of the oncologic patient undergoing microvascular reconstruction. The fellow will develop practical expertise for a variety of microvascular flaps for reconstruction all over the body. The average case load per fellow is about 120 microvascular reconstructions within 1 year. MDACC features a unique patient population, including those with significant comorbidities as well as history of previous treatments including radiation and surgery. About 10-20% of the patients need more than one free flap for reconstruction due to the complex nature of the reconstruction. The fellow is responsible for his «microvascular case» at all times. Additionally, he is part of the on call service, which is distributed

Table 1
Websites to find a fellowship in hand surgery, microsurgery, or surgical oncology.

Hand Surgery	www.assh.org/applications/s/fellowshipdirectory
Microsurgery	www.microsurg.org/education/fellowships/fellowship-search/
Surgical Oncology	www.fellowshipcouncil.org/directory-of-fellowships/?match=1

amongst the 9 fellows and 3-4 residents. The faculty consists of world leading experts in the field of microvascular reconstruction who are dedicated to train a new generation of microsurgeons.

Most important take-home messages?

T. Ismail: For me personally this year was crucial in my training. Due to the enormous case load, variety of microsurgical specialties, complexity of the cases as well as teaching mentality of the faculty, I had maximal exposure with individual teaching and supervision. Additionally, working hand in hand with 8 other co-fellows who will be life-long colleagues is a unique experience. (Fig. 2)

Surgical Oncology

(MD Anderson Cancer Center, Houston, TX)

MDACC Department of Surgical Oncology offers clinical fellowships in various fields including Surgical Oncology. Fellows are exposed to a large volume of complex surgical problems and are involved in the evaluation of new patients, treatment planning including multidisciplinary approaches, performance of surgical procedures, and follow-up care. More than 85% of MDACC ACGME graduates assume a full-time appointment in academic surgery. Specific requirement for this fellowship are:

- IMGs must have a valid certificate from the ECFMG.
- At the time of entry into the fellowship program, all applicants will be board-eligible or board-certified general surgeons under the auspices of the American Board of Surgery.
- Applicants must have passed each step of the USMLE by the third attempt. The application is centralized and submitted via the Electronic Residency Application Service (ERAS, table 2). This takes you into the competitive application process with other applicants.



Fig. 2: The MD Anderson Microsurgery Fellowship. MD Anderson Fellowship Class 2020/2021.

P. Limani: For me personally, it was a very educational time during my fellowship. I was able to put together a personal program from the available spectrum of surgical oncology (i.e., colorectal, hepato-pancreatobiliary, gastric, melanoma, breast, endocrine, and peritoneal surface malignancy) according to the curriculum guidelines. Also impressive for me was the size and case load. The hospital has over 23,000 employees with 46 operation theatres, where almost exclusively oncological operations were performed on a daily basis. My focus was on the performance of surgical procedures. However, inter-disciplinary treatment of patients was very professional and effective, so that the best possible outcome could be achieved. As a team, we always had the goal of «patient first» in treatment.

Conclusion

US fellowships in surgical disciplines are a unique opportunity to get insights into a different healthcare system. Our fellowship experiences were exceptional not only from a technical but also from a teaching and cultural point of view. Even if it is a big challenge to be accepted by the most competitive programs, we feel that every minute of this extra work is worth the effort.

References

1. Rios-Diaz AJ, Metcalfe D, Singh M, Zogg CK, Olufajo OA, Ramos MS, et al. Inequalities in Specialist Hand Surgeon Distribution across the United States. *Plast Reconstr Surg.* 2016;137(5):1516-22.
2. Buntic RF, Buncke HJ. Successful replantation of an amputated tongue. *Plast Reconstr Surg.* 1998;101(6):1604-7.
3. Buncke HJ, Rose EH, Brownstein MJ, Chater NL. Successful replantation of two avulsed scalps by microvascular anastomoses. *Plast Reconstr Surg.* 1978;61(5):666-72.
4. Safa B, Greyson MA, Eberlin KR. Efficiency in Replantation/Revascularization Surgery. *Hand Clin.* 2019;35(2):131-41.
5. <https://health.usnews.com/best-hospitals/area/tx/university-of-texas-md-anderson-cancer-center-6741945/cancer>



The MD Anderson Surgical Oncology Fellowship. A. View from the office to the University of Texas MD Anderson Cancer Center Main Campus in Houston, TX. B. HPB surgical procedure under the supervision of Prof. Dr. Jean-Nicolas Vauthey, section head HPB surgery.

Table 2

Websites for fellowship application.

ECFMG	www.ecfm.org
ERAS	students-residents.aamc.org/applying-fellowships-eras/applying-fellowships-eras
EVSP	www.ecfm.org/evsp/about.html
EVSP reference guide	www.ecfm.org/evsp/evsprfgd.pdf
EVSP application checklist	www.ecfm.org/evsp/initial-accredited.pdf
Online match	www.nrmp.org/intro-to-the-match
USMLE	www.usmle.org