

## MICROSURGERY TRAINING IN FRANCE

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The Microsurgery began in France in 1972. Since the beginning of many training centers have been created, today we identify 19 places of education throughout the territory. Each training center organizes its own program so we will present here the experience of microsurgery teaching as it is carried out at the «Ecole de chirurgie de l'assistance Publique Hôpitaux de Paris». The microsurgery lab has 44 years experience in microsurgery education and the author has helped set up the programs and their organization and she has been involved in education for over 40 years.

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## ОБУЧЕНИЕ МИКРОХИРУРГИИ ВО ФРАНЦИИ

Ж. Леганье

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Микрохирургия во Франции появилась в 1972 г. В то время было создано множество учебных центров. Сегодня мы выделяем 19 центров обучения по всей территории страны. Каждый учебный центр имеет собственную программу. В настоящей статье мы представим опыт преподавания микрохирургии в «Ecole de chirurgie de l'assistance Publique Hôpitaux de Paris». Лаборатория микрохирургии имеет 44-летний опыт обучения в области микрохирургии. Автор принимала участие в создании программ и их организации, в работе центра она участвует более 40 лет.

**Ключевые слова:** *микрохирургия, образование, Франция.*

**Конфликт интересов:** авторы подтверждают отсутствие конфликта интересов, о котором необходимо сообщить.

**Прозрачность финансовой деятельности:** никто из авторов не имеет финансовой заинтересованности в представленных материалах или методах.

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## HISTORY OF EDUCATION IN MICROSURGERY IN FRANCE

The Microsurgery began in France date from 1972–1974. In 1976, surgeons from several surgical disciplines decided to share their experiences and develop Microsurgery by creating the Group "GAM" (Group for the Advancement of Microsurgery) whose 1st President was Professor Jacques

Baudet. In 2020, GAM was to organize its 42nd Congress.

The first training in Microsurgery appeared in 1972. Between 1972 and 1983, 11 training centers had been created. Today we have 19 training locations across the whole of France.

Despite some attempts, notably through the GAM, to seek to standardize training at the national level, this has never succeeded and 48 years

after the opening of the first centers, there is still no standard concerning the organization of formations.

Despite the lack of standardization, there are generally, as at the international level, two levels of training:

- 1 basic course which lasts between 3 and 5 days depending on the centers.
- 1 advanced course lasting between 40 to 120 hours of practical work. Advanced courses are mainly in the form of a University Diploma.

## TRAINING PROGRAM IN FRANCE

### *The example of the Paris School of Surgery*

The School of Surgery (Fig. 1) has a Microsurgery laboratory specially dedicated to training. This laboratory has been in existence since 1976. There are 11 operating microscopes. At the head of this laboratory have succeeded 3 orthopedic surgeons: Professor A. Gilbert, Professor A.C. Masquelet and now Professor Fr. Fitoussi. Technical supervision is provided by 1 engineer and 2 laboratory technicians.



Fig. 1. In the School of Surgery

Рис. 1. В Школе хирургии

We organize 2 courses: a basic course and an advanced course (University Diploma).

The training courses are open to all surgeons of any specialty and of any origin (more than 70 nationalities to date). Since its opening, around 2,450 students have followed the initial training

and 1,550 the University Diploma. The trainees are mainly surgical residents from Paris.

Currently, we welcome above 60 people per year for basic training and also above 60 trainees of the University Diploma.

### *Organization and program of basic course*

The 3-day initiation program for microsurgery is as follows:

- how to use a microscope and the instruments;
- knots on compress and on silicone tube;
- dissection and anastomosis of the rat abdominal aorta;
- dissection and anastomosis of the carotid artery and the external jugular vein;
- dissection and anastomosis of the femoral artery and vein;
- bypass of the aorta through the external jugular vein.

### *Organization and Program of the University Diploma (Fig. 2)*

The practical teaching of the University Diploma takes place over 9 months. Each student comes to train for half a day a week, for a total of 30 four-hour sessions.

Program :

Students have a training about twenty techniques on the rat. Several end to end anastomosis, grafts, bypass, kidney transplantation, groin flap transfer at the opposite side or on the neck.

Our teaching method is the formation by increasing difficulties – during the first 15 sessions the students never do the same technique but they practice techniques which are more and more difficult. We think that it's good method for doing progress.

## STEP-BY-STEP TECHNIQUES OF END-TO-END AND END-TO-SIDE ANASTOMOSES

All anastomoses are performed at separate points and using the symmetrical biangulation technique.

## DIFFERENT MODELS USED FOR THE EDUCATION; NON-LIVING AND LIVING

For the first steps in learning microsurgery, we use compresses to learn how to tie knots and silicone tubes to learn how to make anastomoses. These two exercises are done over a whole day.

Then we offer two practice sessions on the chicken thigh before performing all the other exercises in the anesthetized rat.

## FACULTE DE MEDECINE - SORBONNE UNIVERSITE

# DIPLOME UNIVERSITAIRE DE TECHNIQUES MICROCHIRURGICALES

Année universitaire 2020 – 2021

**Directeur d'enseignement : Professeur F. FITOUSSI**  
L'enseignement comprend 25 heures de cours théoriques et 120 heures de travaux pratiques.

## PROGRAMME DES COURS THEORIQUES

<b>Lundi 30 Novembre 2020</b> 14 h 00 15 h 00 16 h 00 17 h 00	Introduction à l'enseignement..... Principes, difficultés, complications de la suture vasculaire..... Principes, réalisation et surveillance des lambeaux libres..... Etudes anatomiques par méthode d'injection.....	<b>F. FITOUSSI</b> <b>J. LEGAGNEUX, J.-L. VIGNES</b> <b>F. FITOUSSI</b> <b>L. BOURCHEIX</b>
<b>Lundi 4 janvier 2021</b> 14 h 00 15 h 00 16 h 00 17 h 00	Sutures et greffes nerveuses : facteurs influençant la suture nerveuse Techniques et résultats..... Diagnostique, indications et résultats de la chirurgie du plexus brachial..... Microchirurgie et reconstruction faciale..... Chirurgie réparatrice de la face et du thorax.....	<b>M. MERLE</b> <b>M. MERLE</b> <b>R. BOSCH</b> <b>L. LANTIERI</b>
<b>Lundi 25 Janvier 2021</b> 14 h 00 15 h 00 16 h 00 17 h 00	Reimplantations digitales..... Transferts musculaires libres fonctionnels..... Allogreffes fonctionnelles vascularisées face et main..... Microchirurgie en ORL.....	<b>E. MASMEJEAN</b> <b>A. CAMBON-BINDER</b> <b>L. LANTIERI</b> <b>D. SALVAN</b>
<b>Lundi 8 Mars 2021</b> 14 h 00 15 h 00 16 h 00 17 h 00	Techniques de reconstruction osseuse..... Anatomie chirurgicale des transferts osseux vascularisés..... Application clinique des transferts osseux vascularisés..... Sites donneurs de lambeaux libres de réparation des parties molles.....	<b>F. FITOUSSI</b> <b>L. BOURCHEIX</b> <b>M. GERMAIN</b> <b>A.C. MASQUELET</b>
<b>Lundi 12 Avril 2021</b> 14 h 00 15 h 00 16 h 00 17 h 00	Microchirurgie gynécologique..... Lambeaux perforants..... Reconstruction mammaire..... Microchirurgie digestive et transfert d'épiploon.....	<b>M. CARBONNEL</b> <b>M. ATLAN</b> <b>M. ATLAN</b> <b>M. GERMAIN</b>
<b>Lundi 10 mai 2021</b> 15 h 00 16 h 00 17 h 00	Replantation de segments de membres : Membre supérieur et Membre inférieur. (Doigts exceptés)..... Microchirurgie en neurochirurgie..... Préparation à l'examen.....	<b>J.N. GOUBIER</b> <b>F. PROUST</b> <b>J.-L. VIGNES - N. POITEVIN</b>

## TRAVAUX PRATIQUES

Les candidats devront s'entraîner pendant toute l'année universitaire, soit au laboratoire de l'Ecole de chirurgie, soit dans leur laboratoire d'accueil, sur une vingtaine de techniques microchirurgicales expérimentales dont la liste leur sera communiquée lors de l'inscription. En plus de l'apprentissage des techniques demandées, les candidats devront réaliser un protocole expérimental qui fera l'objet d'un mémoire à présenter lors de l'examen et à remettre au secrétariat le 3 juin 2021, délai de rigueur.

## DEROULEMENT DE L'EXAMEN

A la fin de l'année universitaire, les candidats devront satisfaire à un examen dont la date sera communiquée ultérieurement. L'examen, qui se déroule à l'Ecole de chirurgie, comporte :

- une épreuve écrite d'une heure sur le programme théorique,
- une épreuve pratique de six heures (pendant cette épreuve les candidats devront réaliser 3 techniques du programme),
- une épreuve orale où ils présenteront leur mémoire.

Les cours théoriques sont obligatoires, au-delà de 2 absences, l'étudiant ne pourra pas passer l'examen.

*Le Doyen de la FMSU*  
**Pr. Bruno RIOU**  
*Le Directeur de l'Enseignement*  
**Pr. F. FITOUSSI**

## CONDITIONS D'ADMISSION

Le diplôme s'adresse aux personnes ayant déjà reçu une formation élémentaire en microchirurgie vasculaire (un justificatif sera demandé lors de la préinscription).

Sont admis à s'inscrire :

- Les Docteurs en médecine titulaires du D.E.S. ou du D.E.S.C. de la discipline Chirurgicale délivré par la Commission de qualification de l'Ordre des Médecins.

Les Docteurs en médecine titulaires d'un D.E.S. ou du D.E.S.C. de spécialité chirurgicale, ou gynécologique obstétrique, site et cou, masto-écologie ayant reçu la qualification de l'Ordre des Médecins

- Les étudiants titulaires d'un diplôme permettant d'exercer la Médecine dans leur pays.

- Les internes ayant validé trois semestres de Chirurgie et les étudiants du D.F.M.S. et D.F.M.S.A. ayant validé trois semestres de spécialités chirurgicales.

- Les docteurs Vétérinaires.

*Le Président de la Sorbonne Université*  
**Pr. Jean CHAMBAZ**  
*Le Directeur Scientifique de l'Ecole de Chirurgie*  
**Pr. P. FRILEUX**

## INSCRIPTIONS

Une autorisation d'inscription devra être demandée, elle sera exigée lors de l'inscription à la faculté.

S'adresser au Secrétariat de l'Ecole : 7, rue du Fer Moulin - 75005 PARIS du lundi au vendredi, du 1<sup>er</sup> septembre 2020 au 23 octobre 2020 inclus (Tél : 01.46.69.15.62 ou 15.60).

Les étudiants ayant reçu l'autorisation d'inscription devront enlever un dossier administratif à la Faculté de Médecine Sorbonne Université - «Les Cordeliers» 15, rue de l'Ecole de Médecine scolarité III - Esc. H - RDC - 75006 PARIS Tél : 01. 44. 27. 45.75 ou 45.82 /45.94 /45.76 - Fax : 01. 44. 27.45. 97.

Les inscriptions à la Faculté se feront du 10 novembre 2020 au 21 décembre 2020 inclus.

Droits d'enseignements : Formation Initiale :

Etudiants DES + FFI +

CCA inscrit en D.E.S.C. : 1.000 €

F.C. Individuelle : 2.000 € -

F.C. Employeur : 2.000 €

Droits de scolarité : 243 €

Fig. 2. Organization and Program of the University Diploma

## DIFFERENT ASSESSMENTS TOOLS TO DETERMINE QUALITY OF TRAINING

At the end of each exercise, the trainer checks the quality of the technique and opens the anasto-

moses to check the regularity of the passage of the points.

The student also learns to self-criticize, he learns to analyze his mistakes.

In June, at the end of the academic year, students have an exam. This exam consists of a

theoretical test, and – an oral examination in connection with a small experimental work they made during the year and – the most important part is the practical test – the test is composed of three techniques – Students have to do three techniques in six hours and they must pass two of the three techniques.

### **MODELS AND CURRICULUM IN SUPER MICROSURGERY, TECHNIQUES IN COMPLETING SUPER MICROANASTOMOSIS**

In the University Diploma program, students perform anastomoses of small diameters (grafting the femoral artery through the epigastric vein for example) but for us “super microsurgery” is a subjective term that has no real meaning. We use a mi-

croscope so we do microsurgery, but what does the word “super microsurgery” really mean?

### **ROBOTIC MICROSURGERY AND ITS TRAINING**

We do not have any experience in robotic microsurgery at the school of surgery. Currently we do not have a robot dedicated to microsurgery, nor an electronic simulator.

### **FUTURE IN MICROSURGERY EDUCATION; VIRTUAL TRAINING**

In the near future, we plan to reduce the number of exercises using rats and replace them with exercises on inert tissues (chicken thighs for example) in order to respect the 3R rule. Mental imagery is also a learning support tool that we will develop. A study on the modeling of anastomosis is also underway.

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