

KNEE RECONSTRUCTIVE SURGERY FELLOWSHIP

Université de Montréal (Québec, Canada)

October 2020 – October 2021

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Thanks to a grant from the University of Montreal and the generous support of Swiss Orthopedics, I had the opportunity to perform a year of advanced training with a clinical fellowship.

Between October 2020 and October 2021, I completed my fellowship in sports knee reconstructive surgery under the direction of Prof. Julio C. Fernandes and Dr. Pierre Ranger.

Why Canada?

Canada remains one of the most advanced countries in medical and surgical training. Specialists are trained with extreme care: the university structures are state-of-the-art and the support offered is important. While in university and later during residency (the equivalent of our training period for Medical Assistants), the trainees are closely followed by the professors with a very advantageous professor to trainee ratio.

The hospital hierarchy - different from the one found in Switzerland and other European countries - also makes the professor-resident relationship more direct. In fact, the role of the "Chef de Clinique / Oberzartz" does not exist, making team work much more intimate.

Fellowship training in a subspecialty is very popular among residents who finish their specialty training after the final exam provided by the Royal College. To work in a university hospital, it is necessary to have achieved at least one year of fellowship. Therefore, the proposal of different fellowship programs, in orthopedics as in other specialties, is very varied and organized. Most of the hospitals that offer a fellowship program (mostly university hospitals) provide a grant for fellows to have a financial support (a feature not always respected in Europe or Asia).

The fellow becomes an integral part of the team assuming a central role both in the clinical field and in the research field.

During the fellowship, the fellow focuses on his own field of sub-specialization also integrating himself into the trauma on-call system, allowing him to explore this surgical field as well.

Why Montreal?

Montreal is the largest city in Quebec and the second most populous city in Canada. The influx of patients is much greater than in our Switzerland. It is a very lively city with a multicultural population. Despite being in a French-speaking Province, the city remains bilingual (French and English) which reminded me nicely of my work experiences in the bilingual city of Fribourg.

It is a city full of sporting activities and sport is seen as a lifestyle. There are countless high-level sports teams: Montreal Alouettes for football, Montreal Impact for soccer, the acclaimed Montreal Canadiens for hockey (seen here as a “religion”), up to the more artistic Cirque du Soleil known all over the world. The city even hosts the prestigious Formula 1 Grand Prix; a perfect city for a Sport surgeon!



Figure 1. The famous tour of the Montreal University in the background

The University of Montreal has a deep academic history and large university hospital centers located throughout the city. The training offer that was proposed to me by high qualified specialists fully responded to my interest to subspecialize in sports surgery and knee surgery.

The clinical activity

After a moment of acclimatization (also including the 2-week quarantine provided for new arrivals in the Country) and after having adequately equipped myself with clothing suitable for the harsh Canadian cold, I was fully integrated into «the Knee Team».

The clinical, operative and consultative activities concerned the sports knee, following the patients in all their phases; from the surgery, to the postoperative period, to the re-education period, to remote follow-up.

Although most of the practice was inherent to sports surgery, the team also performed many prosthetic operations (total knee prostheses, single-compartment and femoropatellar prostheses). This is because athletes also do get old! But also, because some cases presented arthrosis caused by other underlying problems more typical of sports surgery.

A typical example that I encountered several times during my practice here: a relative young patient with a severe femoropatellar arthrosis linked to trochlea dysplasia who had also had multiple episodes of patella luxation. The solution then was a patellar-femoral prosthesis with MPFL ligament reconstruction. Like a metal tracheoplasty!

Ligament surgeries were the ones we performed the most, from isolated ACL and PCL to reconstructions of dislocated knees. Working in a university hospital, I have used and learned a wide variety of techniques. For example, for LCAs, we used allografts, autographs, mixed

technique with artificial implants, internal braces, all-inside, outside-in and sometimes inside-out (I'm not saying I loved them all, but at least now I know them closely).

One of my chiefs, Dr. Ranger, has a lot of expertise in ligament reconstruction after knee dislocation. He is one of the world's leading experts in the use of the "Ligament Augmentation

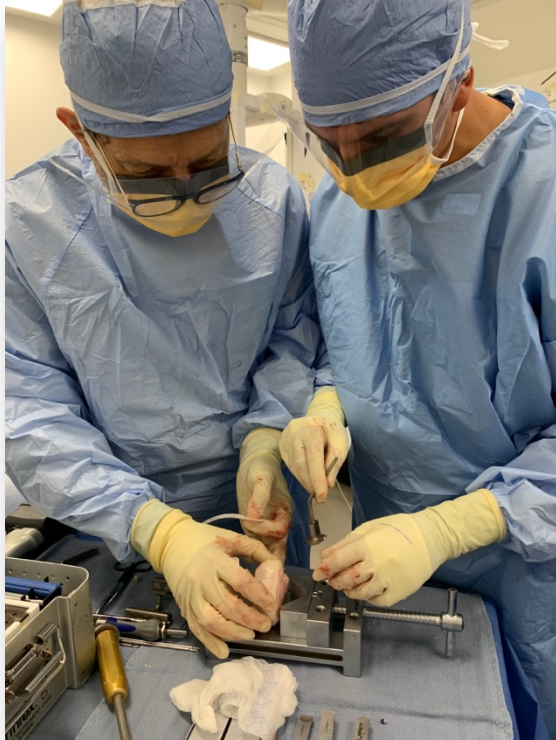


Figure 2. Prof. Fernandes and me during a fresh cartilage transplant

and Reconstruction System" used with a hybrid technique (with also the re-insertion of the injured ligament).

Professor Fernandes is a great fan of surgery related to biological regeneration. With him, I learned internal and external meniscus transplants and cartilage transplants, what we can call the Holy Grail of knee sports surgery. Luckily, Quebec has its own tissue bank and getting fresh cadaveric tissue wasn't too difficult.

During these months of clinical activity, femoropatellar pathology was the pathology I was most interested in. In addition to performing the most common surgeries (such as osteotomies of the anterior tibial tuberosity, the MPFL ligamentoplasty, the femoropatellar prostheses), I learned and improved the femoral trochleoplasty technique, a surgery not yet so widespread but which will certainly become increasingly necessary in knee surgery reference centers.

In addition to my surgical activity, I helped my bosses with consultations. Those were for

me the most intense but also the most formative hours, because we took the time to analyze and discuss the therapeutic indications. The result of an effective surgery begins with the right indication!

Teaching and Research

Right from the beginning, research was included in my fellowship activities. I analyzed all the trochleoplasty techniques for the correction of femoral trochlea dysplasia. I did so by doing a thorough literature review and by communicating with experts in knee surgery on networks I work with (ESSKA and Swiss Orthopedics). Then, my chiefs and I highlighted the strong and weak points of each technique and studied some improvements that we tested in the cadaveric laboratory.



Figure 3. Improving trochlea cartilage fresh transplant at the cadaver Lab

In the cadaveric laboratory, we developed a new minimally invasive technique for the reconstruction of the popliteal tendon (single or associated with an ACL plastic) which we then presented at the SICOT world congress 2021 (Société Internationale de Chirurgie Orthopédique et de Traumatologie). In the same laboratory, we improved our trochlea cartilage transplantation technique for femoropatellar arthritis.

With the support of Prof. Fernandes, I began a morphological radiological analysis of the lateral trochlea as a possible cause of anterior knee pain in patients who did not have the radiological criteria for patella instability. We presented the preliminary results at the SICOT congress 2021. During my stay at the University of Sherbrooke (Canada) the following year, I expanded the study to make it multicentric.

With Dr. Ranger, we collected a series of case reports about knee squeaking after reconstructive surgery. This is a topic that can be rarely found in the literature. Currently, this article is under review for publication. Furthermore, my team and I wrote a book chapter about the use of genetics in the diagnosis and treatment of infections in orthopedics. This falls into another interesting field of research that is conducted in Montreal : nanotechnologies applied to genetic therapy for musculoskeletal diseases. Last but not the least, I had the pleasure to be involved in teaching the medical school students of the University of Montreal. I was a locomotor system tutor and taught to the students according to the APP (*apprentissage par problème / problem based learning*) method. This is an innovative teaching method that has been used here for over 25 years. It contrasts with the well-known «academic magistral lessons». This new teaching method has recently been adopted by the Faculty of Medicine of Geneva.



Figure 4. Dr. Ranger and me during a formation for orthopedic surgery residents

In conclusion

My fellowship in Montreal was one of the best years of my training. I studied my field of interest, sports surgery and in particular knee surgery. It allowed me to become very competent in this subspeciality.

I have broadened my theoretical knowledge, my surgical skills and my research proficiency. I have developed an intimate relationship with my two bosses, Prof. Fernandes and Dr. Ranger, who in addition to being exceptional mentors, also proved to be wonderful friends.

I hope that anyone who wants, can have a fellowship experience like mine that offers not only an incredible professional experience, but also emotional connections that will remain forever.



Figure 5. My Canadian frozen fellowship at -30°C