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Editorial

Lessons learned during my hand surgery career

Les leçons à tirer de la chirurgie de la main

My intention here is not to retrace the history of hand surgery. Rather, I want to summarize my 40 years of experience in hand surgery. Or, more specifically, the lessons I've learned that may turn out to be useful for surgeons in training.

I have helped with the implementation of hand surgery training and had many roles within the Société Française de Chirurgie de la Main [French Society for Surgery of the Hand]. However, my practice was not limited to hand surgery. I started out in general surgery (which no longer exists as a specialty), then I received combined training in orthopedic surgery and plastic surgery. Gradually, my practice shifted towards repair surgery (i.e. surgery for defects), which also no longer exists as a surgical specialty. The reason I broadened my career path was to highlight the importance of hand surgery as an activity that *transcends the practical knowledge required by multiple specialties and inspires innovation*, as long as it is not the first specialization completed during the training of new surgeons. The reason is simple: while the hand is a crossroads, it also provides a framework for research, innovation and practice that is both narrow and boundless. Such is the paradox of this compact unit, with its formidably complex anatomy and instrumental and social functions that take on a character that is both obvious and essential to each person. However, it is vulnerable to injury because it sits at the end of the highly mobile upper limb and can move freely. When it is injured, developing a surgical approach is difficult because of its amazing array of different types of tissues. In this small area, multiple bones, joints, tendon, muscles, arteries, veins, and nerves coexist in complete harmony. And we cannot forget the skin, whose texture is completely different on the palm versus the dorsum of the hand.

I have learned three key lessons during my long career in hand surgery; they involve emergency trauma cases, the uniqueness of each operation and, more distinctively, that of the psychoflexed hand.

1st lesson: traumatic hand injuries

While the previous considerations may be trivial, we can draw two practical conclusions:

- Any time a wound breaches the skin, one must assume that an underlying structure (tendon, nerve, artery, etc.) is damaged. This carries with it the decision to perform surgical exploration. I cannot emphasize this enough! The typical example is a small skin wound caused by an oyster knife during a Christmas or New

Year's Eve dinner. Such a wound may hide tendon or nerve transection and be completely asymptomatic, like a healthy carrier of COVID-19. One must know how to debride the skin, but also the tendon sheath because a puncture wound in a sheath can conceal more extensive damage and be an entry point for infection.

- The second conclusion is that the hand surgeon must have comprehensive technical skills, especially in trauma surgery. His expertise must include techniques to repair bones, joints, nerves, tendons, arteries, and skin defects. The surgeon must also have mastered how to perform surgery under a microscope. In this way, hand surgery transcends the practices of other specialties. And tissue repair must take into account the essential functional (and cosmetic) requirements of the hand. This may require that some hard choices be made; for example, amputating a finger whose highly technical salvage would result in a functional disaster and a visible social disability. Thus, some strategy must supplement this purely technical dimension.

How else does one deal with a major trauma where the hand is crushed, the skin extensively shredded and damage to other tissues can only be guessed? The first step is trimming away tissue, a type of big cleanup that will remove devitalized tissues and will help to prevent infection. Next comes bone reconstruction and then the repair of various tendon, nerve and vascular structures, from deep to superficial, and lastly, closing the skin. It may be necessary to use a flap for skin coverage, which requires detailed knowledge of the local anatomy. All of these detection, identification, evaluation and repair steps can be condensed into a single surgical session, which will allow the tendons and joints to be mobilized during the early postoperative course. This is done to prevent stiffness and adhesions that can compromise the outcome. We call this the “all-in-one” strategy, which was developed by hand surgeons in Nancy (France) in the 1970s [1].

In some instances, the degree of wound contamination and the extent of the tissue defects in various structures require that we shift to a sequential strategy [2], where the initial surgery consists of “damage control” [3], following by several scheduled surgeries that will require bone, joint, tendon, or nerve grafts—depending on the exact situation. This short description gives us a picture of the massive scale of this task and of the importance involving the patient in surgical deliberations to choose the most appropriate solution.

In fact, in the 1980s, guided by our cumulative experience in performing surgery on badly damaged hands, we applied these principles to managing other severe limb traumas, particularly open leg fractures where covering the fracture site either immediately or secondarily reduces the infection rate and helps to speed bone union.

In this way, hand surgery inspired innovation by contributing to concept shifts and technical transfers.

2nd lesson: the hand is constantly the subject of innovative practices

Surgical techniques are never written in stone. Improvements are made each day, often in the form of tips and tricks that make the surgical procedure easier, but do not always lead to publications. A surgeon's imagination has no limits, as long as it remains within reason and helps patients. In this way, surgery can be compared to art in general, not because we evaluate the esthetics of a surgical outcome, but because art and surgery—like many fields of human activity—both require creativity. And hand surgery offers infinite opportunities for creativity and thought.

One example is carpal tunnel syndrome, which everyone knows about, including most lay people. It is likely the most common of all surgical procedures. It would be logical to expect that this technique has been described in minute detail and that all surgeons carry it out in the same manner. But the opposite is true. While every hand surgeon does this procedure more than a hundred times per year, there are notable differences between surgeons, even though the outcome remains the same. Even for a routine surgery like carpal tunnel release, every surgeon has their own style, stamping their signature on the procedure by not doing it exactly like everyone else. These surgeons have had multiple opportunities to make slight improvements that are not captured in textbooks, which only record the “standards” and mainly outline the principles and rules. Every surgeon is entrusted with bringing and applying their own personal touch. Just like every patient is unique, each surgery is unique in that we never carry out the exact same procedure.

Some of my personal thoughts have, over time, developed into well-argued actions:

- 1 Carpal tunnel surgery has been excessively trivialized over the past 20 years because of technological or logistical advances that have been given a lot of media coverage (outpatient surgery, regional anesthesia, endoscopic surgery, ultrasound-guided surgery, mini-incisions, etc.). The prevailing discourse is dominated by an emphasis on the harmless nature of the surgical procedure, which lasts less than 10 min, with no particular reference to the postoperative course. The first thing we must do when talking with patients is to “detrivialize” the surgical treatment of carpal tunnel syndrome by informing patients before surgery that returning to normal may take several months, especially if they work full time. Thus, the time away from work must be tailored to each patient rather instead of being based on prescribed standards.
- 2 As for the technique itself, it is remarkable that, regardless of which procedure is used, the aim is to transect the flexor retinaculum to release the median nerve being compressed in the canal. I have remained true to the technique where the release is done through a surgical exposure. A few years ago, some surgeons wanted, incorrectly, to contrast the endoscopic technique and the surgical exposure technique, arguing that the surgical scar caused postoperative pain over the long term, which was true for extensive approaches. But this argument ignored the improvements made over the past 20 years to the

incision itself. Thanks to anatomical studies that continue to be updated [4–6], focused especially on the path of the superficial nerves and their variations, we gradually went from a long incision that started on the distal portion of the forearm to a short incision located in the palm, which did not impact the heel of the hand, a highly sensitive area. Before the widespread introduction of endoscopy, the controversies were mostly about the incision's path on the surface with no special focus on how we crossed through the deeper layers to reach the retinaculum.

Through an anatomical study [7] inspired by many intraoperative observations, we were able to demonstrate the existence of a fatty appendage innervated by a branch of the ulnar nerve, arising from Guyon's canal, which rested on the flexor retinaculum and was located in the path of the skin incision. This fatty appendage, which is spared in the endoscopic technique but cut when an extensive surgical approach is used, may be one of the reasons why some patients have persistent pain in the heel of the hand. Thus, when making an incision anywhere along the retinaculum, it is vital to pull this fatty tissue mass back to protect it. Consequently, the long-term functional outcomes of open procedures and endoscopic ones are identical [8,9]. However, direct exposure allows surgeons to easily detect any anatomical variations that impact the muscles and nerve branches, thus avoiding potential postoperative complications.

Furthermore, I have long been struck by the texture of the flexor retinaculum, which I believe can be characterized using two criteria: its morphology (area and thickness) and its resistance to being cut by a scalpel. When viewed in terms of these intraoperative parameters, we can see that the retinaculum varies greatly from one individual to another and could well reflect the *quality of the connective tissue in the specific patient we are operating on*. We can begin to see what happens next: this hypothesis could be supported by histological studies of biopsy samples taken from the retinaculum. The results could be juxtaposed with the patient's idiosyncrasies that we may have noticed during the preoperative consultation. Ultimately, we could issue a prognosis based on the outcome of the postoperative course, which we already know varies greatly from one patient to another.

The lessons I have drawn from this experience have multiplied over the years:

- Each operation is unique because each patient is unique, and we never operate in exactly the same manner.
- It is when we are faced with situations that we consider unusual that our experience is forged, i.e. coming across something novel at any moment in time, especially for operations that we do frequently. From this standpoint, experience cannot be passed on because, as Louis-Ferdinand Céline [10] contends, “experience is a muffled lantern that throws only light on the bearer. . . it's incommunicable. . .”.¹ Experience differs from competence; the latter can actually be transferred by standardized knowledge.
- Even for items that have become commonplace, nothing is set in stone. There are always improvements to make and research to do. However, this requires losing one's attachment to the daily routine that Bergson vigorously denounced [11] and to always be curious and allow oneself to be surprised.

¹ This citation from Céline, passed on by his daughter Colette Destouches, is often confused with the one attributed to Confucius that “experience is a lantern hanging on the back, which only illuminates the path traveled”. The quote by Confucius does not have the same meaning as the one by Céline.

3rd lesson: psycho-flexed hand

This is a formidable trap for young surgeons as there are several clinical presentations of the psycho-flexed hand, such as Secretan's syndrome, apotemnophilia, etc. I want to spend a bit of time talking about psychogenic contractures.

Every hand surgeon, at some point, will see bizarre cases during a consultation, for example, a patient who has an unusual hand or finger posture [12]. Wrist in extreme flexion, or closure of one or more fingers or even extension of a single finger; there is no pattern. What these postures have in common is onset following a minor trauma or surgical procedure on the hand itself, the irreducibility of the posture, and a constant state of watchfulness. Any attempt by the surgeon to passively reduce the deformity comes up against insurmountable resistance. The patient cannot do anything about it either but laments this state and blames the surgical procedure if one was done previously. The patient's allegation, expressed in more of a fatalistic tone than an aggressive one, should lead surgeons to consider the diagnosis of psychogenic contracture related to a conversion disorder (formerly called hysteria), as we can see in the famous medical portrait by André Bouillet, "A Clinical Lesson at the Salpêtrière," showing the neurologist Jean-Martin Charcot. The central figure, a woman named Blanche Wittman—whom Charcot regularly featured in his demonstrations—is in a hysterical trance induced by hypnosis. The curling of her left hand is evidence of hypertonia causing a contracture (Fig. 1).

When faced with this type of case in real life, the role of the clinician is to rule out any organic causes: Dupuytren's disease, locked trigger finger, iatrogenic palsy following a surgical procedure, functional dystonia such as writer's cramp, etc. The diagnosis of psychogenic contracture is confirmed by a short general anesthesia test: the posture is reduced spontaneously but returns as soon as the patient awakens.

I will not go on too much about this intriguing condition, which occurs mainly in the hand but can extend to the entire upper limb or impact the lower limb or even the spine (camptocormia). I simply want hand surgeons to remember two key concepts:

- Persistent lack of mobility in the joint affected by the contracture when the patient is deeply unconscious may, of course, suggest stiffness, but it is important to consider other diagnoses. Thus, a "contracture" of the elbow that I had concluded had a

psychogenic origin—and was confirmed by renowned neurologists—was actually related to intracranial calcifications, sequelae of toxoplasmosis related to an HIV infection.

- If the psychogenic origin is indisputable, one must not neglect the posture's symbolic nature, which conveys an internal psychological conflict denied by the patient. Healing is possible only when the conflict is resolved by a process carried out without the patient's knowledge. Most importantly, surgeons must think of it as a psychiatric disorder and hold back from prescribing surgery. Too often, we see patients who are operated unsuccessfully for "clenched fist syndrome" especially related to conversion disorder.

It was during Freud's 6-month stay at the Salpêtrière in 1885, where he met Charcot, that Freud became aware of hysterical phenomena, including in men. But his stroke of genius was to contend that hysteria had a psychological basis, not an organic one as claimed by Charcot. In an article called "Hysteria" published in 1888,² Freud delivered to doctors—and especially surgeons—a message that is surprising topical and merits being restated: "Trauma is a frequent cause of hysteria for two reasons. First, because the previously undetected hysterical tendency can manifest itself following an intense physical trauma, which is accompanied by fear and a momentary loss of consciousness. Second, because the body part affected by the trauma becomes the site of a local hysterical phenomenon. Thus, for example, in individuals suffering from hysteria, a minor hand contusion can trigger the development of a hand contracture (...). It is of vital importance that surgeons have deep knowledge of this stubborn disease, because in such cases, a surgical intervention cannot be justified. The differential diagnosis of these states is not always easy to do, especially when joints are involved." (Underlining is mine). Let us not forget that "the hand is the crossroads of our anxieties," as Raymond Vilain was often heard to say. He was one of the pioneers of hand surgery in France and cofounder of one of the first "SOS Mains" [Hand Trauma Center].

These are the three lessons that I felt were essential to share and that show at which point hand surgery teaches us humility.

Conflict of interest

The author has no conflicts of interest to disclosure relative to this article.

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² The article in question is included in the general medical book: *Handwörterbuch der gesamten Medizin*, compiled by A. Villaret, Stuttgart, Ferdinand Enke, 1888. It was initially translated into French by Fernando Da Amorim, a psychoanalyst.



Fig. 1. A Clinical Lesson at the Salpêtrière (Bouillet, 1887) – The person, who is in a state of catalepsy brought on by hypnosis, is supported by Babinski. Note the pronation-flexion of the left wrist, which reflects a psychogenic contracture. The young man with his arms crossed by the window is Charcot's own son, who goes missing on a scientific expedition to the Arctic.

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Received 8 June 2020

Available online 10 October 2020