

## Hand, Wrist and Elbow - Elliot Sorene

### Elliot Sorene

- Consultant surgeon at King Edward VII Hospital
- Specializes in and best regarded doctor for: hand, wrist, and elbow surgery
- Fellow of the Royal College of Surgeons
- Has seen 16 different conditions
- Practiced in London for years
- “If something is too good to be true, it means it is too good to be true.”

### Sub-Specialty Hand Surgeries:

- Pediatric hand surgery
- Adult hand surgery
- *Traumatic conditions*
  - Fractures
  - Nerve injuries
  - Tendon injuries
  - Post traumatic reconstruction of problems after injuries
- *Elective conditions*
  - Cerebral Palsy
  - Pediatric abnormalities
  - Congenital abnormalities
  - Overuse syndromes: Tennis Elbow, Carpal Tunnel Syndrome, Trigger Finger, Tenosynovitis, Infections.

### Newton Franklin's Reconstruction

- Skiing accident caused a broken wrist. The wrist was broken in a number of pieces.
- Fixed with a **locking plate**
  - The locking plate locks the pieces of a fracture in a rigid and stable position.
  - The heads of the screws lock in the plate and there was immediate rehabilitation; no need for a patient to be in plaster.
  - Traditionally, patients who had wrist fractures would be in plaster 6-8 weeks. Eventually, they would have very stiff hands and the concept of fixing a plate rigidly to begin with and stably. Being able to move it straight away is very important.
  - *(Any surgery completed is not as important as the rehabilitation thereafter. If the rehab is not adequate, the patient will get a substandard result.)*
  - *(Mr. Sorene will not elect to operate if the patient is in a situation where he knows they will not get the necessary rehabilitation.)*
- **Newton Franklin had a displaced fracture**
  - When reconstructing a fracture, you are reconstructing the articular surface.

- When using a locking plate for a distal radius fracture, it can be fixed in a position where pegs and screws, through the plate, hold it together. This allows one to immediately mobilize with a normal range of movement.
- He used his fracture as inspiration for his album, *Rebuilt by Humans*.

### **Normal Treatment of Choice for a Fracture:**

- It depends on what the surgeon is more comfortable with doing.
- There's no one way to fix a fracture.
- Locking plates have become more common over the years.
- Previously, patients were in plaster for a prolonged period of time.

**Sensible/Normal Rehab for a Fracture Fixed with a Plate or Splint** (*all assuming the fracture is fixed rigidly enough with a plate; strong, good quality bone; not osteoporotic*)

- Go immediately for full range of movement excluding weight bearing exercises.
- Mr. Sorene is adamant about working very closely with hand therapists.

### **Physios-Patient Role**

- Aiming for range of movement. (*Wrist fractures can cause elbow to stiffen, shoulder to stiffen, and fingers to stiffen*)
- If patients do not mobilize quick enough, they can develop stiffness and complex regional pain syndrome.
- Edema Management
- Swelling
- Limb Management

### **Plastered Effects (*According to Mr. Sorene*)**

- Stiffness
- Skin Changes
- Limb can change
- Immobilizes the metacarpophalangeal joints
- After six weeks, patients will develop carpal tunnel syndrome, complex regional syndrome

### **Complex Regional Pain (*According to Mr. Sorene*)**

- Hard to understand
- Can occur after a paper cut, carpal tunnel decompression, closed fracture, etc.
- Related to overreaction of certain neural stimuli to pain, to the injury itself, to the swelling of the limb, to the blood supply of the limb, to the venous return of the limb.
- Situation where the limb shuts down and stiffens up.
- It is not a black or white definition.
- If one doesn't move or is immobilized for six weeks in plaster, a certain element of dystrophy and stiffness occurs.
- Involves severe pain, aggressive stiffness.
- Can cause Dupuytren's thickening that changes palmar fascia.
- The whole limb can change.

### **Why Move the Fracture**

- Distal radius fracture goes into dorsal angulation and radial deviation.
- Position to reduce the fracture is on the deviation and forced flexion.
- Once fracture is reduced, the plaster should be ideally immobilized in a functional position.

### **Recognizing different Emergencies/Accidents**

- If coming from a very long way to see Mr. Sorene, the patient is either has *complex regional pain syndrome* (being immobilized in plaster for a period of time) of *Kienbock's Disease*.

### **Kienbock's Disease**

- Rare condition
- Unknown condition where the blood supply shuts off the lunate bone.
- Creates anxiety in patients when they hear, "disease."
- It is asymptomatic.
- Can cause pain and progressive stiffness in the wrist
- Normally found incidentally
- Patients should pursue their pain after a wrist injury not feeling better.
- Linked to certain blood vessel arrangements in lunate.
- Very common in patients with cerebral palsy.
- **Classification Systems**
  - *Reconstructive option* for early on in the disease
  - *Salvage option* after it has all gone bad and the bone has collapsed is either a fusion or a joint replacement.
- **Consequence of not having lunate functioning**
  - If the lunate is fragmented into many pieces, and the patient has a full range of movement, then we will leave them alone.
  - If it is early on, and it is discovered on the MRI scan that the patient has wrist pain, it will be unusual to find an asymptomatic Kienbock's disease.
  - If a patient had wrist pain and you X-rayed the wrist and saw a lunate not yet collapsed, yet sclerotic (later discovering Kienbock's disease), there are procedures to revascularize the immobilization in a splint.
- Only treated for pain
- Generally, if it is an incidental finding, you'll treat the original finding and ignore the disease. If it is advanced, then it is treated.
- It is possible to have a patient where they have wrist pain, and you don't see anything on the X-ray. On the MRI, you can see the bone is dying, put them in a splint for a few months, a bit of physiotherapy, a bit of rehab, and it can disappear or heal. It's also possible to never see that.
- Sometimes patients have pain stage 1 and sometimes they don't notice until stage 4. With an MRI, we are able to detect Kienbock's Disease early on amongst many other conditions.

### **Emphasis on Radius in treating Kienbock's Disease**

- Kienbock's Disease is more common in patients that have a longer radius.
- The step between the radius and ulna increases the load over the lunate and can interfere with the blood supply.
- Doing radial shortening alters the mechanics.

### **Clinic Examination (*According to Mr. Sorene*)**

- Assume the patient may not have been X-rayed when entering with a wrist sprain/fracture.
- *Scaphoid Fracture* is of utmost importance apart from Kienbock's disease.
- There could be ligament injuries of the wrist and may need more investigation with no progression.
- Mr. Sorene asks, "Where does it hurt you on the wrist?" If the patient says, "Everywhere," Mr. Sorene will say, "If you had a piece of gold dust at the end of this finger, I want you to show me exactly where it hurts the most. You can only touch one place."
- If it isn't traumatic, Mr. Sorene believes it to be De Quervain's Tenosynovitis.
- The back of the wrist indicates Kienbock's disease.

- A different direction points to base of thumb arthritis.
- Another direction of the patient indicating the hurt area could mean fibrocartilage complex or a ligament structure on a side of the wrist.
- **Maximum tenderness:** Where the patient points on physical examination. If they stiffen up, it's a warning sign something's going on. *(You will expect initial stiffness, but if it's not getting better, and becomes more stiff after weeks or months, then it is an issue worth looking into)*

#### How to vascularize a lunate?

- Has to do with Scaphoid Fracture and because of the lunate.
- There is a connection between the radial artery and ulnar artery on both sides, but primarily, on the back of the wrist, there is a connection.
- There are vessels that go back in the floors and in between the extensor compartments of the wrist.
- Technique: Lift a piece of bone on a branch of one of these vessels, lift it in the air, and it's a piece of bone → flap bone. (A piece of bone that has a vessel attached to it. Magnification is used to do this)
- The vascularized bone is called graft with a named vessel, giving it blood supply.
- It is plugged into the bone and then a little screw is put across.

#### Does soft tissue massage help with vascularization or is the reduced vascularity of the bone too much to overcome?

- Some of the operations for Keinbock's disease, for example, involve an osteotomy of the distal radius or core decompression of the distal radius (digging a hole).
- These operations occur because you are increasing the blood supply to the area. It also helps the lunate to heal.
- Movement, soft tissue massage, anything you do that can get that limb to work makes it heal.
- Without movement, the blood supply is altered.

#### Physical detection of imbalance in length

- Sometimes
- If the arm is extremely prominent, there may be an ulnar positive, linking to other conditions → arthritis process.

#### De Quervain's Disease (*According to Mr. Sorene*)

- Tenosynovitis of the first extensor compartment → causes swelling. Radial sided wrist pain
- Classic patient is postpartum De Quervain's tenosynovitis after giving birth.
- Has to do with repetitive movement, buggy, holding the baby very tight when you hold a baby with a force flexed position of the wrist; lack of sleep, hormonal changes in the mother, doing activities that cause tendonitis.
- More common in patients that have more than two tendons. There is a risk factor for osteoarthritis at the thumb base
- Similar to trigger finger: the patient gets the sheath which the extensor pollicis brevis and the abductor pollicis brevis goes through, becomes thickened and swollen, and get a nodule (feels rock hard like bone, attracting pain)
- Conservative treatment would be therapy (acupuncture, ultrasound treatment, etc), rehabilitation, splinting
- Surgery is the last treatment to be considered.
- Splinting 2-3 weeks is the first approach to tenosynovitis it is very painful and swollen with a nodule.
- After no significant improvement with splinting, steroid injection would be next.

- Injections around tendons or the use of a guided ultrasound steroid injection has a risk of rupturing the tendon. This is not talked about.
- The conservative approach is the usual approach. If not, there is an operation to release that.
- Complications are not talked about in steroid injections
- There is skin depigmentation, particularly in dark skinned patients (be turn bright white)
- Mr. Sorene goes for the consent form because of issue with complication
- Very successful procedure
- De Quervain's mostly gets better with splinting because it's the rest itself and specific movement.
  - Having the splint generally helps with pain and calms down the area.

## Dupuytren's Disease

- Linked with frozen shoulder and trigger finger.
- Some say, Dupuytren's is linked to smoking and alcohol.
- Linked to trigger digits and carpal tunnel syndrome.
- Normally, it affects more than one finger and normally, it's pretty relentless.
- Classically, it would be the ring finger and little finger, but in more aggressive patterns.
- Classically genetic.
- Can progress to extremely severe contractures.
- POSSIBLE STUDY: Patients that aren't diabetic that have frozen shoulder and Dupuytren's are pre-diabetic?
- If you go to certain parts of the world: Norway, Sweden, North of England, Scotland, a lot of patients (*90% of patients after age 50*) will have little nodules and lumps and bumps in their hand.
- Under the skin, you have palmar fascia.
  - Sheath of tissue that holds the skin down to the structures underneath.
- In certain patients, they have a different expression of collagen: fibroblast becoming myofibroblast. Something triggers these little lumps and bumps to cause the nodules of Dupuytren's Disease to cause contractures and bend the finger down.
  - Nodules appear anywhere. Most common: ring finger or radial side of the hand.
  - Garrett's pads can develop over the dorsal and proximal interphalangeal joints.
  - These nodules could turn into a cord and bend fingers down.
    - Can be confused with trigger digits.
  - Once there is a contracture, the patient can't get their hand down flat on the table.
- You only ever treat a patient with this disease when you're prepared to take the risk of them getting worse.
- It can take a number of months to recover from it.
- If the patient recovers after 6 months, and they are exactly where they were beforehand weeks later, patients seek a less invasive method of treatment.
  - Needling involves taking a needle and scraping the cord to break it
  - **Xiapex treatment** is a collagenase (Mr. Sorene employs). It is to inject an enzyme into the Dupuytren's area.
    - If we look at Green's Operative Hand Surgery, Xiapex is the first line treatment and basically, it is an injection followed by manipulation.
    - It is not without possible complications
    - In America, there's 1% flexor tendon rupture complication. Patients should be consented.
    - Can cause skin tears.
    - The results are similar to surgery.
  - Manipulation to strengthen the finger can be just as effective as surgery.
- In many places, it is a normality.
- Once it is a functional problem, then the patient may want to go get it checked on.

- Recurrence rate: 30%-50% in five years.
  - Can be retreated with Xiapex if it is significant.
- Before patients get to hand specialists, know that increasing the blood supply could make it worse. Therapy is of utmost importance as Dupuytren's Disease causes aggressive stiffness.
- Linkage between Dupuytren's and hand, wrist, or other osteoarthritis?
  - Fixing flexion contracture of PIP joint can cause that joint to become very stiff and become arthritic because it hasn't moved.
  - It can become ankylotic.

## Trigger Finger

- Swelling over the *A1 pulley*
  - Traps the tendon. Ring finger
  - Maybe congenitally smaller?
  - Can swell, become tight, and causes the tendon to catch.
  - More common in patients with diabetes
  - More common in patients with Dupuytren's disease.
  - More common in patients that do manual work: repetitive golfers, tennis, and for no reason at all.
- There is triggering over the A3 pulley as well, but rare.
- Pulleys: Your flexor tendon has rings that stop it from bowstringing. You have rings that go out. You have: A1, A2, A3, A4, A5.
  - There are 5 *annular* pulleys: *annulus* → Ring that go out the finger
- Success rate for injecting into the tendon sheath (methylene blue with the steroid).
- X-ray the patient afterwards to see if there was correlation between steroid itself going into the tendon sheath or not.
- Splinting a finger would be problematic.
- **Trigger Thumb**
  - The base of the thumb you immobilize, but the tip of the thumb is the most important.
  - Extremely difficult to function with a splinted thumb.
- We were designed to be standing up, not sitting in a chair with our spines flexed, our forearms pronated, our wrists flexed, staring at screens all day.
- Began more commonly with mobile phones. Called, "BlackBerry thumb."
- A massage can help.
- Many trigger digits can get better on their own.
- Once the joint becomes rigid and if they've had it for years, it can be permanent.
- Certain trigger digits can have a sort of Dupuytren.
  - They have a different fibroblast (type 3 collagen)

## Carpal Tunnel Syndrome

- If the patient doesn't have significant muscle wasting, then soft issue therapy is fine.
- Mild carpal tunnel syndrome can resolve by itself
- Can be related to pregnancy.
- Can respond to:
  - a splint
  - conservative treatment
  - mobilization
  - soft tissue management
  - steroid injection
- Not everyone needs an operation
- Can resolve itself
- Normal: bits of pins and needles now and then



- It is hard to change what you do for your job or when you're unconscious.
- A splint can be useful, although it is controversial because it has been measured whether the wrist is also extended.
- Ideally, you'd splint them in a neutral position.

### How Skin Gets Depigmented

- The steroid
- Once the steroid is injected, there is a backflow through the tract where injected.
- The steroid comes out through the tract and kills the fat. A layer of subcutaneous fat disappears and a bluish tinge appears.
- It can get better or stay permanent.

### Huge Variation in Anatomy of the Hand?

- There are different tendons. Carpal tunnel syndrome.
- There can be tendons all over the place.
  - Many not functional
- Sometimes, when you open up the carpal tunnel, you can see an extra tendon within the carpal tunnel.
- You can see the Palmaris profundus tend
- You can see a tendon going through the median nerve.
- On the back of the hand, you can see extra an extensor digitorum brevis and aberrant muscle.

### Laser Therapy and Ultrasound

- Administered once everything has been tried particularly for carpal tunnel syndrome, tendonitis, and types of trigger fingers.
- Laser can change in the blood supply to the area.
- (*A lot of conservative treatment is no better or worse than the evidence for a lot of the operations that we do.*)

### Tennis/Golfer's Elbow

- Explain to the patient that it is a condition which is an abnormality; that they are getting lateral elbow pain
- Most patient's get it one time in their life.
- Can be related to moving, half lifting boxes, doing some kind of unaccustomed activity.
- Often, resting, muscle stretching, wearing a clasp, and massaging can be very useful.
- Mr. Sorene respects everyone's opinion on tennis elbow because no one really knows. Whether you inject steroid, saline, needle it, or platelet rich plasma, all results compared are similar to surgery.
- There's shockwave treatment (*controversial*).
- Surgery is the last resort.
- Mrs. Sorene releases the diseased tissue off the lateral epicondyle and send the piece off to histopathology.
  - The reason being: when Mr. Sorene gets the result back showing a degeneration of the tendon, it reinforces the patient that he removed the disease tissue. The answer is...we don't really know.
- Most patients do get better after surgery.
- **"What's the point in this?"**
  - In the evidence based world that we live in, it is all about informed consent. There's a BMJ article Mr. Sorene has about tennis elbow which he actually printed a number of them and giving them to the patient.
  - Mr. Sorene remains very open and puts himself out there a bit by saying that there are many ways of treating Tennis Elbow.
- An injection increases the blood supply to the area.

- Needling (of course, now there are people saying that steroids are bad for tennis elbow) is where you stick a needle into the periosteum and revascularizing.
- Mr. Sorene refers normally dry needling under ultrasound guidance.
- Not an inflammatory condition: no local heat, redness, swelling, etc.

### **Diseased Tissue**

- Like a block of edematous.
- Like a piece of aubergine with mayonnaise.
- It doesn't look like a tendon.
- With the dissections planned to run in the future, human and animal anatomy will be provided to compare.

### **Being Open-Mind**

- Surgeons, doctors, have to be open minded and think about how different doctors specified in an area would look at a patient.
- The truth is somewhere in between and doctors have to tailor that to the patient.
- A patient came in with osteoarthritis at the base of their thumbs. Mr. Sorene can look at an X-ray and see a severely arthritic thumb base. He thinks about operating. There are other options: therapy, manipulation, splintage, even putting a patient on medication... everyone is right. There is a place for everyone
- It is all about teamwork.
- "If you think you're the man and you're going to solve all your problems with a knife, you're not going to be a good hand surgeon, to be honest."

### **Arthritic Thumb**

- Look at the history of the patient first with other investigations.
- If that patient has been in a splint for a few weeks and feels better, or who's had an ultrasound treatment and feels better, or has had a steroid injection and feels better, Mr. Sorene is beyond the stage of looking at an X-ray.
- Conservative treatment should be done first.
- No matter what you replace the joint with (metal, ceramic, silicon, tendon), the results are similar
- Base of thumb surgery can take a long time to rehabilitate
- Surgery is for pain relief. Mr. Sorene never guarantees more increased range of movement. This is very relevant for PIP joint arthritis.
- With base of thumb, you can get a stronger grip and get more movement because they're in less pain.

### **Elbow Replacement**

- This is a problematic challenge, stiff elbows.
- No promise of more movement, just pain removal.
- No joint replacement is as good as the hip
- Afterwards, they tend to stiffen up.
- It is often a more restrained joint. It's basically a hinge.
- The replacement is nowhere near what the native elbow is.
- The capsule around the joint stiffens up and when a joint replacement is done, it will reform and stiffen up.
- The muscles and tendons shorten.
- Physical Therapy and Rehab
  - It is extremely important because if the wrist/elbow is not going to get moving, it will stiffen up. It should be moved as early as possible.
- When replacing the joint, you are specifically removing the radial head, the olecranon fossa, the proximal ulna and hold of the distal humerus in effect.



## **Radial Head Replacement**

- Radial head replacement is something done often after a trauma.
  - There is an interruption to the interosseous membrane.
  - If it is not replaced, it can cause an Essex-Lopresti: When the hole of the radius migrates.
- If you have a functioning interosseous membrane, if your relations between your radius and your ulna are maintained, if the structures holding your two forearm bones together are intact then without a radial head, you, in essence, do not need it.
- A replacement would be needed if there is an interruption between the radius and ulna. (To stop proximal migration of the radius.

## **Cerebral Palsy**

- Indian children are mostly treated for spasticity primarily with tendon transfer surgery. In India, they have no access to different methods (ex: 20 hours by bus to the nearest city).
- In the United Kingdom, primary treatment would be non-operative and would physiotherapy, manipulation, the splintage and lengthening and manipulation of joints. They have access to these kinds of methods.
- With respect to Dystonia, it is a complex issue and management of it is non-operative. Anything higher than neurological, peripheral nerve entrapment, Mr. Sorene conducts nerve studies.
- EMG, botox injections can be very effective with patients as an adjunct to physiotherapy with cerebral palsy.

## **Musicians Hand**

- These patients develop overuse syndromes: tendonitis, trigger fingers, carpal tunnel syndrome.
- How long the rehabilitation is often needs to be tailored to what they do.
- Manage them primarily as a patient. You may have to adapt/tweak something for their lifestyle.
- Dystonia
  - Involuntary/spasticity
  - Goes back to overuse and repetitive movement
- Pushing the extremes of the human body.
- Taking a break from the loop of these repetitive movements can have a great deal of effect.
- The reflex movement becomes involuntary because it is habitual.

## **What is Missed When Being Referred**

- Scaphoid fractures and wrist fractures are often missed, even in professional sports, people could often miss it.
- Degenerative problems are often a little bit overlooked.

## **Tine's and Phalen's Tests? Value?**

- You have to look at the patient's history.
  - If the patient says, "I'm waking up at night, shaking my hand," they say, "I get it when I'm holding my mobile phone, when I'm holding the steering wheel," then yes, Tinel.
- It can be quite satisfying to tap them very gently and they get a Tinel's sign.
- Mr. Sorene prefers the hand raising test.
  - Hold your hands in the air for about a minute or so. After awhile, they'll say, "I'm getting pins and needles," and classically, it'll be in them idle, in the ring finger. It is not a good test for carpal tunnel syndrome.

## **CRPS in hand and forearm**

- Rigid hand: sweating, hairy hand
  - Say, “First, don’t panic.”
  - If it is bad, they will need to see a surgeon.
- Physical therapy is the most important thing
- Spread the patient to a number of colleagues. (It is a multi-disciplinary thing)

#### **How Elliot Sorene works with other doctors**

- All by referral and email
- Therapists will ring in and say, “the guy you saw yesterday...” and they will send over a picture.
- “We are on the same side.”
- We are pretty honest and open with each other.

#### **Type of Rehab**

- Should be specific to the surgery.
- There are many issues with pain, when patients want to be able to move their hands. They want the problem fixed.
- If you can start off from a good position, you do all right.
- They patients will comply if they want to be better.
- It isn’t just one doctor’s fault. It is a combination of things.