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IMPROVE YOUR ACHILLES TENDON RUPTURE

-Chapter 3 Sketch-

First two Weeks

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MY ACHILLES TENDON RUPTURE

I am going to tell you all I have learned about my Achilles tendon rupture and try to explain in detail everything that happens and everything you can do to maximize your recovery. But first, I must introduce myself very briefly.

I am Carlos Antonio Espósito Barreiro, an enthusiastic father, nurse and physiotherapist.

After almost twenty years in Spain, and with my first child around 18 months old, I had an almost total rupture of my left Achilles tendon, which implied a radical change during the following months of life, both for me and for my family (my wife, my son and my mother). Imagine what it means for a physiotherapist to have an injury of such magnitude; a flood of information and emotions.

However, despite the adverse event, I took it as a test that I had to undergo and in which I could not fail in any way, but without excessive self-generated pressure . Difficult to apply.

On the one hand, I had work obligations. At that time I was coordinating my working hours at the hospital as a nurse and my private practice hours as a physiotherapist. Beyond the formalities of the first month, they were not a major problem, although the uncertainty of neglecting the physiotherapy consultation worried me at times.

On the other hand, there was my family life, the one that affected me emotionally and worried me the most, as this condition completely prevented me from carrying out any activity of daily life, self-care or personal hygiene, not to mention taking care of my son, an almost eighteen-month-old baby.

During the development of this guide you will know everything that I lived and felt, most likely coinciding with much of what happens or has happened to you as a patient with an injured Achilles tendon, so I can

talk to you with total frankness about the content that is not seen, but that is carried on your back.

For this reason, we will make this common feeling an excuse to support each other in a lasting way, because whoever has injured this tendon once, begins to look at life with different eyes, with more love and empathy for the simple things, which are the ones that satisfy us the most.

Pre-injury times

During the time leading up to the injury, some events occurred that I considered important and that I wanted you to know about.

From them stem some of the theories as to why I got injured. Yes, I have several.

A few months before the injury, I had a not minor episode that started on the opposite foot. After a while of being with my son on the sofa, I proceeded to stand up, and at that very moment, a prick in the middle area of the calf of my right leg (the opposite to the one that was later injured) came back like a knife to the heel area. And since the day after that episode, a discomfort had been accompanying me around the insertion area of the right Achilles tendon. I understood, for physiological or anatomical reasons, that this pain was not the tendon itself, and that it came from a higher area, probably caused by a small entrapment or tension in the nervous system.

There were several details of my anatomy and my day to day life that allowed this symptom to be perpetuated over time. One of them was my anatomical configuration, in which there was a clear predominance of reduced movement of the entire posterior region, starting with a marked lumbar curvature (physiological hyperlordosis) and excessive tension of the psoas and iliacus muscles, hamstrings (biceps femoris, semimembranosus and semitendinosus) and triceps suralis (gastrocnemius and soleus).

But the factor I was most concerned about was the labour factor, as it was more difficult to change. As nurses, we can spend many hours

standing and in a forward lean, which brings us closer to the patient and allows us to perform any of the countless nursing tasks. In addition to this, inappropriate footwear for my characteristics
given by the hospital (too flat and not light-weight design), didn't help my needs either.
So this is where my first theory comes from (you will see the following theories below). A symptom in the opposite leg, due to excessive and prolonged loading of the entire posterior chain, conditioned the quality and capacity of the left Achilles tendon. It is likely that the information and perception of pain coming from the right side received a defensive response to both sides. This generated an increased tension of the nervous and myotendinous system (muscles and tendons) as a protective or warning measure. Clearly, I did not listen to it.

And a curious fact. Only 4% of Achilles tendon ruptures occur in tendons with previous tendinopathy[1]. Sounds familiar?

Day 0. A bad decision?

The whole previous story concludes on May 29th, 2017. And I say the whole previous story because there are several factors that converged that day, with a single outcome.
My fitness was not what I wanted it to be; I hadn't been exercising regularly for some time, and although I was making real changes, I still wasn't in a good place.
And I can affirm that I was making changes, since that same morning I had paid for the whole semester of the municipal swimming pool for the three members of the family that we were at that time. Luckily I was able
to take advantage of it, although not as I had thought. In addition to this, a parallel story had been going on for a long time. Years of playing

[1] Yasui Y, Tonogai I, Rosenbaum AJ, Shimozono Y, Kawano H, Kenne- dy JG. The Risk of Achilles Tendon Rupture in the Patients with Achilles Tendinopathy: Healthcare Database Analysis in the United States. Biomed Res Int. 2017; 2017:7021862. doi: 10.1155/2017/7021862. Epub 2017 Apr 30. PMID: 28540301; PMCID: PMC5429922.

football had given me several sprained ankles, and although I had no great difficulties with the after-effects, I was in the habit of applying a carefully made bandage with rigid tape to both ankles before each game. This ensured that I didn't re-injure them, and that I didn't force a sick leave. Ironically, about a month before, I had an allergic reaction on both feet from a new brand of tape I had bought, which forced me to use a corticosteroid ointment for several weeks until the irritation and itching subsided. I remember a shift at the hospital in which I had to go to the bathroom several times to cool my feet with cold water due to the itching I was suffering.

It has been described that corticosteroid treatments affect tendons quality; to be honest, I didn't find evidence to confirm that a topical (skin) corticosteroid treatment could have affected the quality of my tendons, but it's still a possibility. Regarding drug causes, there is also evidence that states that antibiotics of the quinolone family (levofloxacin, ciprofloxacin, etc.) can alter the quality of tendons[2].

This allergic reaction, when I was able to play again, meant that I had to change the way I made my bandage. Underneath the adhesive tape, I placed a layer of pretape, a thin, non adhesive bandage that is used to preserve delicate structures or with abundant hair. In this way, the tape was only adhered to the central part of the foot and above the ankle. Therefore, the tractions generated were not distributed along the length of the bandage, but were distributed between the lower and upper anchor, and although it was a valid option for preserving the skin, it was probably not the best option considering what was about to happen.

Guess where the upper anchor was placed. Yes, just below my Achilles tendon rupture. Many conditions were given for me to have this injury, and I didn't know them or I didn't want to read them.

While it is true that such a misfortune is unlikely, I could foresee even in my discomfort of late that I had to change. I had already told

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[2]Shakibaei M, de Souza P, van Sickle D, Stahlmann R. Biochemical changes in Achilles tendon from juvenile dogs after treatment with ci- profloxacin or feeding a magnesium-deficient diet. Arch Toxicol. 2001 Aug; 75(6):369-74. doi: 10.1007/s002040100243. PMID: 11570695.

my teammates that I would not continue in the next tournament unless we changed to indoor football, or I changed my position, because as a center forward I had not been tolerating lastly the attacks of opponents who often came at the wrong time, mainly because of their low physical condition, which meant an extrinsic factor that I could not control (a center forward tends to get hit by defenders from behind and unexpectedly) unless I changed my playing position or type of activity.

And as usual, I arrived around the time of kick-off and the warm-up was almost non-existent.

The moment of injury

It is curious how a tendon can become injured; at first you can imagine that it can be caused by a blow, or that it occurs from a sudden movement, and yet the simplest movement is capable of causing the rupture. Specifically in my case, and I add an extra fact, it happened in the first ten minutes of the second half of a seven-a-side football match on synthetic turf. I remember asking one of my teammates, who was resting outside, to make the change in the tenth minute of the game. That minute never came.

Between the fifth and tenth minute, after walking several steps and trotting off to reposition myself on the field, in a linear direction, at a slow speed and without physical contact with any of my opponents, I felt the characteristic sign of the stone on my left Achilles tendon.

My left-handedness was really affected, as it was my skilled side; and lefties have a special feeling about being left-handed, let's call it a silent pride.

What I first felt was as if someone had stepped on my heel from behind with his boots. However, during the fall, I turned to see who had stepped on me, and when I saw that no one was there, the inevitable diagnosis appeared in slow motion as my body fell to the synthetic turf.

If I had to make a comparison of the feeling I had, I would say it feels

similar to a dog bite right in that area. If you've torn your Achilles tendon, and you've been bitten by a dog, you know what I'm talking about.

But the most striking thing at that moment was the intense sound that could be heard by some colleagues who were several meters away.

Despite this, they tried to encourage me and insisted that it was probably a sprain. But the details of the injury, coupled with the functional impotence that was evident - I could barely flex my foot - and my knowledge of the injury seemed like a prelude to all that was to come over the next few months: double sick leave (I worked in the hospital as a nurse and as a private physiotherapist), long-term rehabilitation, complexities in performing my activities of daily living, personal grooming, and what first came to mind, not being able to care of my son, even in his fundamental needs.

Immediately, my great teammate and hospital colleague Carlos Noriega took me to the Emergency Department of the Son Llàtzer Hospital in Palma de Mallorca.

Once assessed by the ER doctor and with a positive Thompson's test, I underwent a blood test -the leukocytes were slightly elevated; apparently it is a physiological response after the injury-, a foot x-ray to detect bone pathology and finally an ultrasound, which showed that I had an 80% rupture of the left Achilles tendon in the myotendinous area (the area where the muscle and tendon join), although days later the traumatologist confirmed that the injury had been purely tendon, which for rehabilitation purposes, was a good piece of information.

After that, I was placed in a posterior splint with the foot in equinus position and sent home with the date of surgery already confirmed, 72 hours later. In this type of injury, the ideal is to perform the surgery as soon as possible, as it improves the prognosis of the repair, but the saturation of the operating rooms that week prevented me from being able to do it earlier. Even so, it was not a bad waiting time.

A not minor peculiarity is that I did not suffer a great pain; if I had to talk about a scale from 0 to 10, I would have given it a five or six at the time of the injury; I remember having had much more painful sprains than this one.

However, when I arrived at the ER I was put ice on the area of the injury, which made the pain increase up to an 8 or 9 and pushed me to need a single dose of dexketoprofen (non-steroidal anti-inflammatory drug); the only painkiller I needed until the day of the surgery, three days later. This area is less vascularized than the rest of the tendon, which makes it more susceptible to injury, while there is a large number of mechanoreceptors (nerve receptors that report movement and tension), but not nociceptors, which are the neuronal receptors that inform the brain about potential pain or damaging stimuli. For this reason, patients often do not describe their injury as a very painful event.

Picture 5. Photo of the splint at rest.

Days prior to the intervention

During the three-day wait, I had no major problems with pain. The posterior splint was in place with the foot in a slightly equinus position and did not cause me any major discomfort. It was important that I did not put any load on that foot, as adding stress to the tendon could worsen the rupture rate, and the 20% of tendon that remained unruptured was essential to keep all the musculature in place; for this reason, avoiding loading added further disability to the situation.

The day before the operation, I had an appointment with the anesthesiologist, who made me sign the informed consent form and conducted a pre-operative clinical interview to corroborate that there were no contraindications or unforeseen risks for the reparatory surgery.

As a complementary and preventive treatment, I had to have subcutaneous injections of bemiparin sodium (low molecular weight heparin, which prevents thromboembolic diseases) every 24 hours, until one month after the surgery. I will explain the technique on how to apply it later, in the nursing care section. The value of doing so will be your great contribution.

Surgical intervention

The same day of the operation I went to the Hospital de Son Llàtzer on an empty stomach, first thing in the morning.

After passing through the main reception, I was allocated a bed in the MOS (Major Outpatient Surgery) unit.

An orderly (stretcher-bearer in some countries) transferred me to the operating room around 9am, and the operation began half an hour later.

Image 6. The day of the intervention.

I was first placed in the supine position (on my back), a peripheral line was placed in my left hand (I was glad I didn't have to ask them to avoid bending my elbow), and if my memory serves me correctly, I was injected with 2cc of midazolam (a benzodiazepine or anxiolytic), before putting me in prone position (face down).

With regard to the midazolam that was injected, my intention was not to receive it, as I felt calm and was encouraged by the fact that I was finally starting the first phase of improvement, as well as willing to live

the experience as conscious as possible. And although I did not have time to refuse it, I discussed it with the nurse and the anaesthetist, who nodded and told me that they would not give me any more than that, although it did serve to numb me for a while.

During this period, and with no memory of what had happened, intrathecal anaesthesia was applied (inside the spinal cord) and the operation was performed using the percutaneous technique.

Once I was fully conscious, and still in the middle of the intervention, I tried to listen to the conversation about what was happening, without much success, while at the same time I felt the slight tractions and manipulations in the area that had been operated on. Finally, I was fitted with a new posterior splint with my foot in an equinus position to keep the Achilles tendon relaxed and transferred to the Re-animation Unit (in some places called the Awakening Room). I have to say that the equinus position of the splint on my foot was not very pronounced, so I was not too uncomfortable, as it was positioned with some relaxation. Thanks to this intermediate position, I was able to mobilize more easily up to ninety degrees when the splint was changed two weeks later.

Immediate postoperative period

I was in the Reanimation Unit for about one and a half hours, when my legs began to have mobility; my level of consciousness and vital signs (I was monitored for blood pressure, oxygen saturation and heart rate, in addition to temperature controls) were normal, so it only depended on the descent of the effect of anaesthesia to take me back to the MOS room.

In the meantime, I was given two or three bags of Ringer's Lactate (the midazolam won't let me be that specific) to replenish the fluids and ions I may have lost during the procedure.

Once I started to bend my knees and toes, and had an acceptable sensation in my legs, I was transferred back to the MOS Unit, where I

spent the rest of the day until I was discharged.

During those first few hours, the anaesthesia began to wear off, and not only could I begin to mobilize the entire lower extremity, but also my sensation became reasonably normal. Of course, as the sensation returned to normal, I also began to feel the pain of the operation, which was increasing and being worse tolerated. In the first instance I was given a dose of intravenous paracetamol, which by then was like drinking water, but I had to wait for it to take effect.

During this waiting time, I was able to urinate spontaneously. This is always an important point after surgery, as one of the objective data that the effect of anaesthesia is being eliminated is the need to urinate. We must bear in mind that a complication caused by the effect of anaesthesia may be postoperative urinary retention or PUR[3].

One way to understand if you are having signals of urinary retention is when you have discomfort or pain in your lower abdomen, which may even be described as having gas. This is a good time to call the nurse to assess whether you have a bladder balloon (full, palpable bladder) and to check for signs of urinary retention. If this is the case, you will be catheterised so that there is no distension or injury to the bladder walls. Before that, you will be given a few minutes to try to urinate.

In summary, I performed the urination, and then tolerated fluids and diet correctly.

However, the pain persisted and increased, so the nurse had to escalate to an intravenous opioid analgesic, tramadol, which was not what I would have wanted, but I could no longer tolerate the symptom. A while later, after the pain had subsided, and the tramadol had given me no side effects such as nausea, dizziness or low blood pressure, I was discharged, and could go home.

That first night was the one that could give more problems regarding the pain; however, everything went smoothly until dawn, when I had to take a dose of metamizole (also called dipyrone).

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[3] Kowalik U, Plante MK. Urinary Retention in Surgical Patients. Surg Clin North Am. 2016 Jun; 96(3):453-67. doi: 10.1016/j.suc.2016.02.004. PMID: 27261788.

I must explain that in many cases I disagree with the administration of painkillers or anti-inflammatory drugs in a systematic and fixed way. The first reason lies in the fact that, on the one hand, I usually tolerate pain well; each one has its own threshold or tolerance limit and it is not necessary to be brave, but coherent. On the other hand, as a physiotherapist I consider that an inflammation exists for a reason, and it is the response that the body has to solve an existing problem; in some cases an excess of inflammation may not be helpful, but if it is self-limited and does not offer great complications, it is not necessary to apply drugs that reduce it.

Furthermore, when the body has to stop and heal a tissue, the blood flow increases so that all the repair substances can easily reach that area of the body. So, if what we do after a surgery is to reduce inflammation continuously -that is one of the functions of these drugs - every eight or even every four hours, if you alternate two different drugs, the arrival of those substances that are so necessary for tissue repair could be hindered, as well as the elimination of waste substances that cause pain could be affected. There is even evidence that states that non-steroidal anti-inflammatory drugs are not effective in the treatment of pain (NSAIDs) and corticosteroids can adversely affect structural healing of tendons[4] [5].

Definitely, my recommendation is that you can discuss with your referring doctor whether to take the painkillers only when you need them or to take them strictly.

The next day, as I had been discharged after an intravenous dose of tramadol, I received a call from the MOS nurse to check that I had spent the night as expected.

During the whole first weekend I had no complications or pain not tolerated; it is true that I felt pain at rest almost constantly, but I did not

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[4] Chan KM, Fu SC. Anti-inflammatory management for tendon in juries - friends or foes? Sports Med Arthrosc Rehabil Ther Tech nol. 2009 Oct 13; 1(1):23. doi: 10.1186/1758-2555-1-23. PMID: 19825161; PMCID: PMC2770552.

[5] Jomaa G, Kwan CK, Fu SC, Ling SK, Chan KM, Yung PS, Rolf C. A systematic review of inflammatory cells and markers in human tendinopathy. BMC Musculoskelet Disord. 2020 Feb 6; 21(1):78. doi: 10.1186/s12891-020-3094-y. PMID: 32028937; PMCID: PMC7006114.

need painkillers, although it increased when I had to go to the bathroom or change my position.

The only thing left to do was to wait until the following Monday, when the first treatment of the surgical wound would be performed in the hospital's dressing room, and the appointment of the rehabilitation doctor a few days later.

I added, already from this weekend and as a complement to the diet, capsules of vitamin A (retinol) and capsules of Omega 3 fatty acids (from fish oil), in order to ensure a sufficient supply of the raw material necessary for tendon healing.

First week. The return home

Once the first weekend had passed, I went for the first treatment of the surgical wound at the Hospital de Son Llàtzer, in Palma; although the scar was still fresh, it looked excellent; there was no major redness, no bleeding and no bad smell.

In this case I had a resorbable suture instead of the usual staples, so the scar had a very clean appearance, what helped to avoid adhesions, as it is not the same as a suture with staples, whose scar tends to be more irregular and sometimes even thicker.

Image 7. Treatment room

However, as expected, there was still oedema and a slight bruise, but they were part of the normal recovery. All this made me feel very encouraged, as the first step had been well taken. And here came the first setback. That Monday, when I went for the first wound treatment, it was raining. When I got back home, I was walking carefully with my crutches and without resting my foot. We lived on the ground floor, and we had to walk past the elevator door in the middle of the hallway to get to our front door. During this walk and at the elevator door, a neighbour might have put the umbrella down while waiting for the elevator, because the rubber base of my left crutch slid abruptly, causing me to go straight to my left foot, the operated one, with all the body weight.

Although the splint cushioned some of the weight, it was still fresh and soft - remember it was made of plaster - and not as hard as it could have been a few hours later. The greatest pain of the whole process was at that moment; it was as if the suture was tearing my tissues, and the pain and burning sensation were instantaneous. To make matters worse, my head ended up brushing against the wall at the end of the hallway, and I watched as my wife opened the door to call my mother in-law, who was with my son, called the ambulance to come and get me, and assisted me as I writhed on the floor in deep pain. It was like a scene from a movie, and I thought my mother in-law was going to faint with my son in her arms. A very unpleasant moment. Luckily, after ten minutes, the pain had subsided about fifty percent, and I could tolerate it; then I decided to cancel the ambulance ride to the hospital. But the thought of that great traction I had felt when I stepped on it wouldn't leave my mind, nor would the pain I felt (I'll explain later how to determine the intensity of your pain). Because of this, I finally decided to go to the hospital to be examined. After being seen by the ER orthopaedic surgeon, I had an ultrasound that confirmed that everything was OK and in its place, which put my mind at ease. Then, as the splint had bent slightly after the fall, they had to change it for a new one.

That same night, my wife, who is a nurse too, had to remove the bandage that was wrapped around the splint to decompress it, as I was in intense compressive pain, and it was necessary to take pressure off it. The next day we had to go to the hospital treatment room, as the splint was not comfortable and needed to be modified; that would be the last one they would put on me until the use of the boot; I have to say that it was a work of art - thanks to its comfort- and that I looked after it as if it were my daughter during all those days. In the following days and the second week, the pain was intermittent and very mild throughout the day, but in the afternoons it was perceived as an inflammatory pain, constant and of varying intensity depending on the day, but without the need to take rescue painkillers from the seventh day onwards. My choice in those early days was always metamizole, for its analgesic but not anti-inflammatory properties.

Regarding the exercises, in this first week I was able to do very little for what I wanted to do, but I began to mobilize the toes, small isometric contractions (without movement) of the calf muscles, as well as activation of the quadriceps with knee flexion and extension. You will see all the exercises in detail in the rehabilitation chapter.

Understand your pain

When faced with a disease or pathology, health professionals speak of signs and symptoms. A sign is an objectifiable parameter that can be measured, such as a decrease in the range of movement in a joint; on the other hand, a symptom is subjective and cannot be quantified with certainty, such as nausea or dizziness, but we can approximate it with reference values or images.

Pain, then, is included in the so-called symptoms, and cannot be objectified as we would like, since each person has their own threshold, their own perception of what pain represents for them, and their own beliefs that

affect them positively or negatively. There are even people, especially

those who have never exercised before, who perceive pain, all kinds of pain -including the one that occurs after physical activity- as something totally negative.

In your case, and especially in the first few weeks, it is important that you understand that there may be pain from mild stimuli, as there is an inflammatory and healing process that is repairing the affected tissue. It is also likely that you will even feel a non-specific or localised pain at rest, especially during the first few days, which in some cases increases at night.

After a few days, the pain will be better tolerated and you will begin to feel discomfort due to more movements such as going to the toilet, or standing for a few minutes, caused the increased blood flow in that area, which is usually described as a tightness in the ankle and/or calf region accompanied by discomfort.

In some cases there may be knee symptoms, in the posterior area, where the gastrocnemius (calf) muscles are inserted.

We must not forget, moreover, that if the pain is burning, irritative, localized in a very specific point, it could be ischemic pain -due to lack of blood supply and because of excessive compression of the splint or bandage - and would be a reason to go to your referral centre for assessment and change the splint if necessary, as sometimes there can be small irregular surfaces or folds that exert excessive pressure on a particular area of your skin and cause a pressure sore or ulcer, thus adding a complication to your recovery. On the other hand, and in order to determine at what point of pain you are in, there are various scales that you can use, such as the best known for its simplicity, the Visual Analogue Scale (VAS). You can take as a reference that a five will be a moderate but very tolerable pain; seven, a pain between moderate and intense that can still be endured but often needs painkillers, and that ten is the maximum pain you can handle, the one that makes you cry.

For my patients, I compare ten to the pain of renal colic for men and

labour pain for women, although mothers say that labour pain, from one to ten, is a twenty, and it must be true.

Image 8. Visual Analogue Scale (VAS).

Second Week

Around the twelfth postoperative day, I went back to the hospital's trauma treatment room to have the wound treated and to see the orthopaedic surgeon. The wound continued to heal in the best possible way, and the swelling and bruising that were visible at first were gradually diminishing.

As I already had the prescription to get a Walker-type boot (at my request) -which would allow me to mobilize my ankle and foot-, I was lucky that I did not have to put on a new 90° splint, but started wearing the boot straight away.

I could start bathing without a bag over my whole leg, although the padding of the boot in the heatwave was not the most pleasant thing in the world.

The boot was adjusted to 90°, but we had to make the transition from the equine position. It is likely that your doctor will want to move your foot abruptly; if you ask the professional, you may get a few minutes to reduce that position yourself.

Try sitting with the base of your toes on the floor and swing with one hand from the thigh horizontally and at a good pace but without abruptness, while pressing very gently until the heel is lowered to the floor. It Takes several minutes to achieve it.

IF YOU ARE READING THESE WORDS

Hi!
Now you are here, trying to move forward with your recovery, but waiting until someone calls you to start rehabilitation.

Did you know that you can do a lot of safe exercises and health care from the first day of your injury?

Maybe not.

That´s why I´m here.
To help you deal with that.

You can click on the next link to read the ultra detailed index of the book.

https://www.fisiodue.com/improve-your-achilles-tendon-rupture/

My goal is to empower you to do the best rehabilitation program you can do.
I know you will be proud of yourself.
Physio hug,
Carlos Espósito.