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Chronic Traumatic Injuries of the Triangular Fibrocartilage Complex: How Can They Be Dealt with?

Lesiones traumáticas crónicas del complejo fibrocartílago triangular: ¿Cómo enfrentarlas?

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Abstract

Chronic lesions of the triangular fibrocartilage complex (TFCC) are an entity that has not been described as such and there is no consensus on its management. The temporality of the injury and its potential for repair are fundamental aspects when indicating a treatment. We propose an approach to chronic TFCC traumatic injuries and describe a novel arthroscopically-assisted brachioradialis graft reconstruction technique. We show the results and follow-up of two patients operated with this technique.

Keywords
- triangular fibrocartilage complex
- wrist arthroscopy
- hand surgery

Resumen

Las lesiones crónicas del complejo fibrocartílago triangular (CFCT) son una entidad que no ha sido descrita previamente como tal y no existe consenso en su manejo. La temporalidad de la lesión y su potencial de reparación son aspectos fundamentales a la hora de indicar un tratamiento. Proponemos un esquema de enfrentamiento a lesiones traumáticas crónicas del CFCT y describimos una técnica novedosa de reconstrucción con injerto de *brachioradialis* con asistencia artroscópica. Mostramos los resultados y el seguimiento de dos pacientes intervenidos con esta técnica.

Palabras Clave
- complejo fibrocartílago triangular
- artroscopía de muñeca
- cirugía de mano

Introduction

The triangular fibrocartilage complex (TFCC) is an anatomical structure that functions as the main stabilizer of the distal radioulnar joint (DRUJ) and absorbs axial loads from the ulnar edge of the wrist. The volar and dorsal radioulnar ligaments, mainly in their foveal insertion, are of special importance to joint stability, especially in pronosupination movements.[1–8]

Palmer[9] initially classified TFCC injuries into two large groups: traumatic injuries and degenerative injuries. Degenerative lesions are usually generated in the context of an ulnocarpal impingement syndrome due to repeated low-energy traumas, usually in fist pronation, which lead to a chronic process with specific anatomical alterations.

Traumatic injuries may initially go unnoticed or even be underestimated, and they may manifest as persistent wrist pain, which is attributed to symptomatic instability of the

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DRUJ, and have a different clinical behavior than acute traumatic injuries.

The present article tries to establish what should be considered a chronic traumatic injury and thereby guide the diagnosis and propose a treatment algorithm, in which we include a novel surgical technique for TFCC reconstruction.

Anatomy and Biomechanics of the TFCC

The TFCC is an anatomical complex made up of fibrocartilaginous and ligamentous structures that extend from the ulnar margin of the distal radius towards the distal ulna. It is functionally related to the DRUJ and the ulnocarpal joint, and it is the main stabilizer of the DRUJ, providing anchorage for the fibers that confer stability to the ulnocarpal joint, thus participating in the transmission and distribution of axial loads on the ulnar edge of the carpus.[1–4]

This complex is composed of the dorsal and volar radioulnar ligaments, the ulnocarpal ligaments, the articular disc or fibrocartilage itself, the homologous meniscus or ulnocarpal meniscus (a structure of loose, vascularized tissue of variable shape and size), the ulnar collateral ligament, and the floor of the sheath of the extensor carpi ulnaris (ECU) (►**Fig. 1**). The volar and dorsal distal radioulnar ligaments are themselves the main stabilizers of the DRUJ, and their fibers in each fascicle are oriented longitudinally, which provides them resistance to tensile forces, and their rich peripheral vascularization enables them to have healing potential in the periphery. They originate from the volar and dorsal borders of the sigmoid fossa of the radius, and, on their way to the ulna, each divides in the coronal plane into two portions, deep and superficial. The deep portion of each inserts into the center of the ulna in a region called the fovea, at a point where there is synovial proliferation called the ligamentum subcruentum, while the superficial portion of each inserts into the superior portion of the ulnar styloid. From the distal radioulnar ligament, at its volar margin, the insertion of the ulnocarpal ligaments projecting distallly can be recognized, comprising three ligaments (the ulnotriquetral, ulnolunate and ulnocapitate ligaments), which additionally act as restrictors of the dorsal translation of the distal ulna relative to the carpus. The ulnar collateral ligament and the floor of the ECU sheath provide additional reinforcement to the dorsal capsule of the DRUJ, regardless of the dynamic stabilizing role of the ECU (►**Fig. 1**).[1–4]

From a kinetic point of view, the ulnocarpal joint transmits approximately 20% of the axial loads of the wrist proximally. Palmer and Werner[10] demonstrate in a cadaveric model that this ratio changes with ulnar variance, increasing for positive ulnar variance and decreasing for negative ulnar variance. Independently, with the excision of the articular disc, the loads that are transferred through the ulnar edge of the carpus decrease by up to 55%, in the context of neutral ulnar variance.[10]

The volar and dorsal radioulnar ligaments vary their tension in a complementary manner to restrict volar-dorsal rotational and translational movements. This is possible since the different portions of each radioulnar ligament have insertion sites and are differentially tensed due to their angle of insertion, with the deep portions having insertions with more obtuse angles than those of the superficial portions.[4,11–15] Thus, in supination, the fibers of the deep portion of the dorsal distal radioulnar ligament are tense and the superficial portion is lax, and the fibers of the volar superficial portion are tense and the deep portion is lax (►**Fig. 2**).

Time of occurrence of the Injury

It is important to try to define when the injury occurred, since the ability to heal can change over time and, consequently, the therapeutic approach.

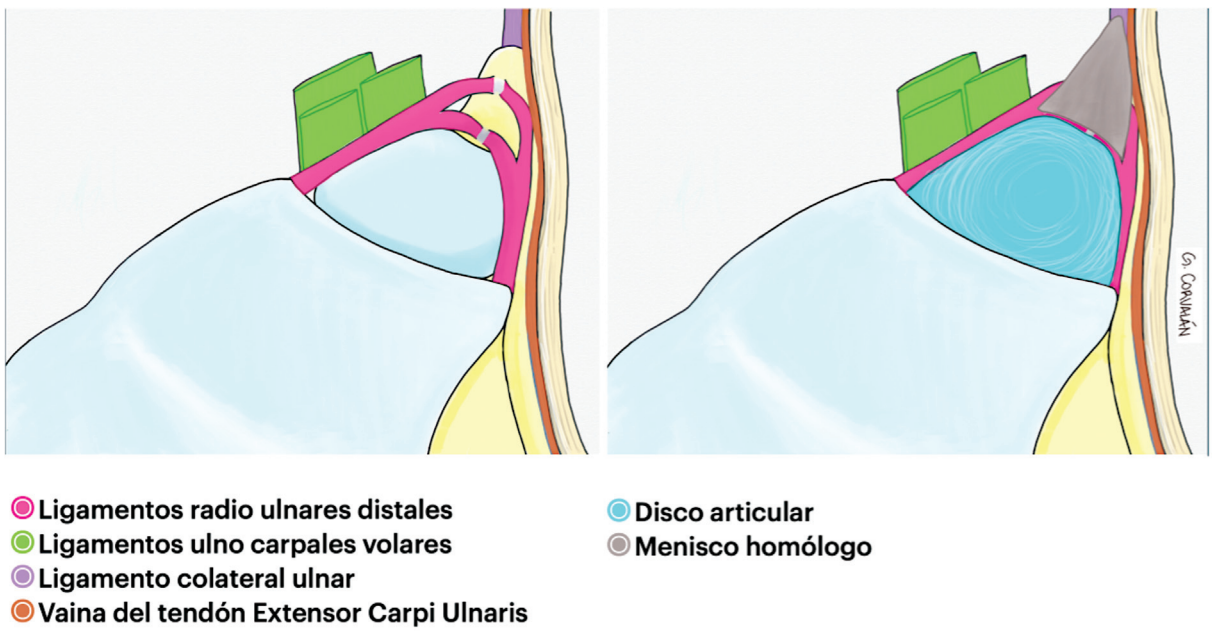

Fig. 1 Anatomy of the TFCC.

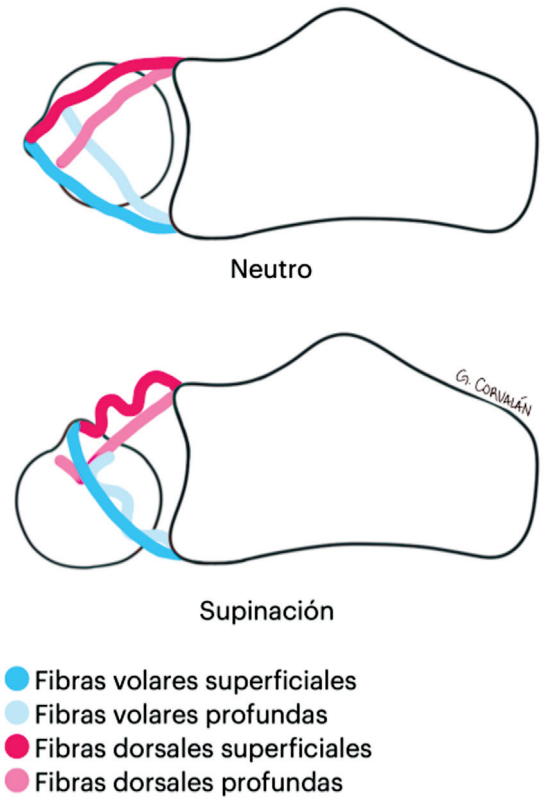

Fig. 2 Arrangement of the superficial and deep fibers of the TFCC in pronation and supination movements.

In the literature, there is no precise temporal definition to differentiate an acute traumatic injury from a chronic one. One way to approach this is primarily in relation to the clinical outcomes of patients undergoing TFCC repair surgeries.

There are multiple works in the literature that show good and excellent functional results in patients who were operated on for traumatic TFCC injuries with the foveal reinsertion technique through transosseous tunnels with an average injury time before surgery of 7 to 8 months.[16,17] Park et al.[18] carried out a comparative study of functional results in patients undergoing foveal insertion repair with different evolution times. The authors found no differences in the functional results of patients undergoing surgery before 6 months of evolution, between 6 and 12 months, and in patients with evolution time of more than 12 months. In a different study, Nakamura et al.[19] showed that patients who had an average of 19 months of evolution (range: 7 months to 4 years) had poor results compared to patients with shorter evolution times before repair. Takagi et al.[20] described a TFCC capsular repair technique in which they perform a suture without the use of transosseous tunnels, and they reported that patients with more than 15 months of evolution presented worse clinical results than those who were operated on earlier. These differences could be due to the potential benefit of techniques that include bone tunnels, which could expose a bloody bone bed that could favor the healing of the reinsertion of fibrocartilage in the fovea, with the potential to benefit patients with a longer duration of the injury.

Although there is not enough evidence to describe the chronicity of a TFCC lesion based on the time it occurred, according to the previously mentioned functional results, we can infer that patients with more than 15 months of evolution would have worse results when subjected to techniques of foveal reattachment that those patients who are operated on earlier, and that foveal reattachment techniques using transosseous tunnels could provide an additional biological factor, with a potential greater benefit in cases of delayed repair.

Repair Potential

The repair potential of an injury is related to its ability to achieve adequate healing so that the injured structure regain its functionality; when we refer to the TFCC specifically, this means re-establishing the stability of the DRUJ. In the case of detection of acute injuries, this could be achieved with conservative management, immobilizing the limb to achieve adequate in-situ healing of the TFCC, or surgically, performing a repair of the TFCC, and, in both situations, rehabilitation programs suitable for recovering neuromuscular control and the proprioceptive capacity of the joint are required.

The repair potential of a TFCC lesion may be conditioned by the irrigation of the TFCC, the precise site of the lesion and the quality of the remaining tissue.

TFCC Irrigation

The TFCC blood supply comes from dorsal and palmar branches of the radiocarpal arteries from both the ulnar artery and dorsal and palmar branches of the anterior interosseous artery[21] (►**Fig. 3**). It has been described that between 10% and 40% of the most peripheral portion of the TFCC is irrigated, leaving the central area avascular. In addition, the TFCC receives practically no blood supply from its radial border, which is why this region is also considered avascular. These findings enable us to infer that the more irrigated peripheral zones have greater healing potential than the central zone and the radial region, which are considered avascular.[22]

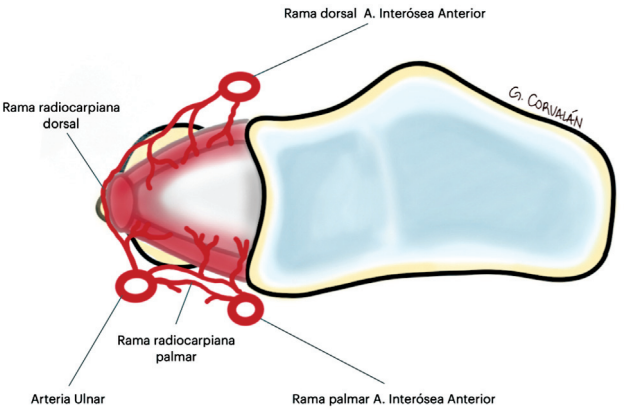

Fig. 3 Blood supply to the TFCC.

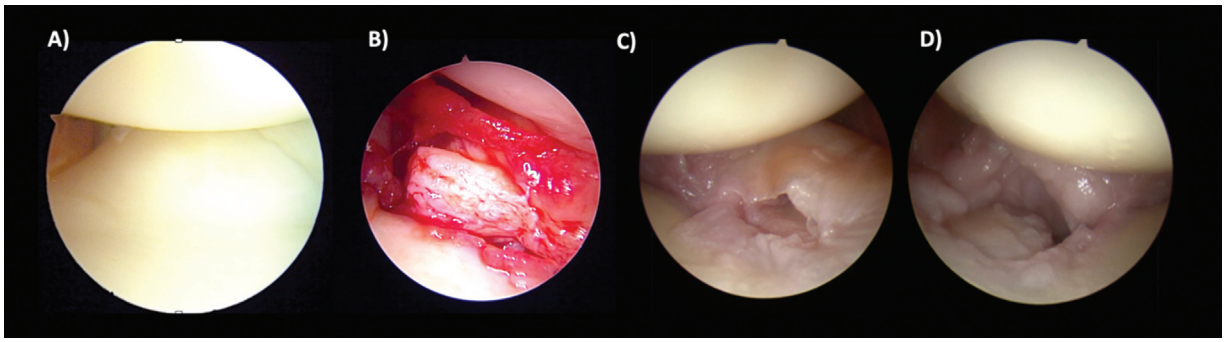

Fig. 4 Arthroscopic view of different TFCC lesions. (**A**) Acute foveal injury. (**B**) Massive acute injury. (**C**) Chronic central lesion. (**D**) Chronic TFCC destruction with no remaining tissue.

Remaining Tissue Quality

It is necessary to evaluate the quality of the remaining tissue against a TFCC lesion, since even when it is usual for them to be repairable, there are lesions that imply greater tissue damage, among which we can find massive acute or chronic lesions with insufficient residual tissue or whose edges are so friable that they cannot be repaired (►**Fig. 4**).

Atzei and Luchetti,[13] when presenting their classification and treatment of TFCC injuries, describe this type of injury as "irreparable", since they are injuries that do not have enough tissue to achieve a stable surgical repair. For the treatment of this type of injury, they propose the performance of TFCC reconstruction techniques with some form of tendon graft.

The gold standard for an adequate evaluation of the condition of the TFCC lesion and its repair potential is wrist arthroscopy. Although an adequate clinical examination and complementary imaging studies can bring us closer to the diagnosis, they are usually insufficient for the comprehensive evaluation of this type of injury, especially the evaluation of the quality of the remaining tissue, since, with the use of the tester and needles, the ability to withstand mechanical loads to accept sutures can be established and the outcome of a repair can be predicted.

Patient Consultation

The patient with a chronic TFCC traumatic injury generally presents after attending multiple prior consultations or with prolonged onset of discomfort. We frequently meet patients in the context of an ulnar wrist pain syndrome with multiple possible causes, so it is essential to take the time to take a thorough history and perform a detailed physical examination.[23]

The existence of traumatic history should be specifically investigated, which are usually falls with axial load with hyperextension and ulnarization of the wrist. However, this history may be absent since it may correspond to a traumatic event that is not so significant for the patient.

During the physical examination, the physician should look directly if there is an eventual or specific site of pain, the active ranges of motion of the wrist, the strength of the fist, and evaluate specifically and directly the stability of the DRUJ, with specific tests that we detail below.

The foveal sign is of special importance when examining the TFCC (►**Fig. 5**). It consists of reproducing the pain symptomatology when making a direct digital compression with the tip of the finger, usually the examiner's thumb, placed on the medial region of the wrist, in the space between the vertex of the ulnar styloid and the proximal region of the pyramidal bone, dorsal to the flexor carpi ulnaris (FCU) tendon. This sign has been shown to have a sensitivity of up to 95.2% and a specificity of 86.5% for TFCC and ulnocarpal ligament injuries.[24]

Regarding the provocation tests, the ulnocarpal stress test, which consists of axial compression in pronosupination and ulnarization movement, enables us to distinguish the pathology of ulnocarpal origin from the differential diagnoses.[25] A positive test suggests ulnocarpal pathology without being specific for TFCC traumatic injuries.

To evaluate DRUJ stability, we use the ballottement test, in which the ability to bear loads without pain or abnormal displacement of the segment is tested; therefore, it should always be performed in a standardized way and in comparison with the opposite side. It is necessary to repeat the test both in neutral rotation, pronation and supination. The wrist in neutral position and radialization tenses the ulnocarpal ligaments, increasing the stability of the DRUJ, significantly decreasing the translation of the ulna (►**Fig. 6**), thus enabling the differentiation of hypermobile patients from patients

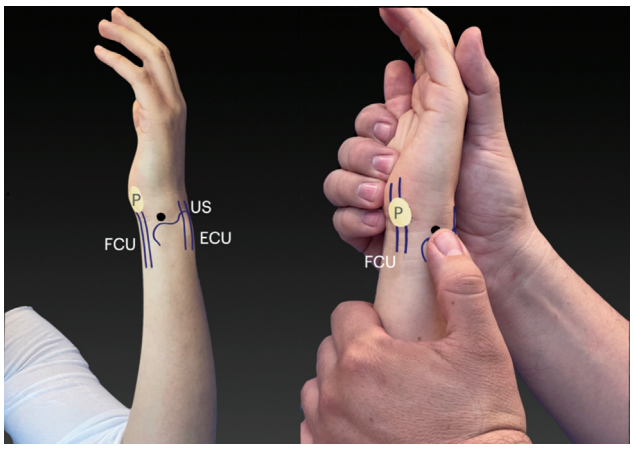

Fig. 5 Foveal sign.

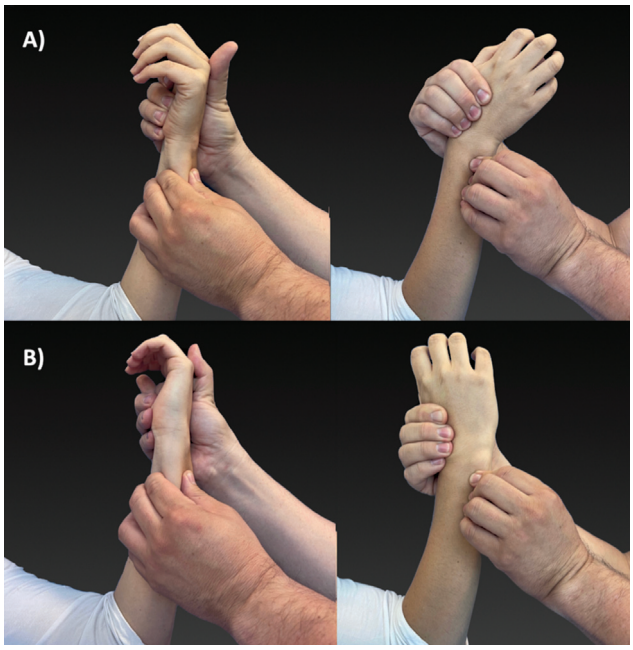

Fig. 6 Ballottement test for the evaluation of DRUJ stability. (**A**) In neutral position. (**B**) In radialization.

with complete injuries, in whom instability is present both with the wrist in neutral position and with radial deviation.

Complementary Imaging

Given the suspicion of a chronic TFCC traumatic injury, the study begins with plain radiographs of the wrist. These enable us to assess the presence of sequelae of old fractures of the distal radius and ulnar styloid, ulnar variance, suspect ulnar impaction syndrome, and assess the presence of DRUJ osteoarthritis. As a more advanced study, magnetic resonance imaging (MRI) is usually sufficient to evaluate TFCC lesions and define their location. In addition, it helps us rule out chronic degenerative pathology. It is always important to correlate the images with the patient's symptoms, since up to 38% of asymptomatic patients with stable DRUJs have TFCC lesions on MRI, and this percentage increases as the age of the subjects evaluated increases.[26,27]

Images with intra-articular injection of contrast medium (arthro-computed tomography [arthro-CT] and arthro-MRI) improve the performance of MRI scans without contrast both in terms of sensitivity and specificity, with no significant differences between the use of both contrasted techniques.[28] These tests enable a better characterization of the TFCC lesion and provide us with more anatomical information, but they involve an invasive technique, so they must be requested according to the degree of clinical suspicion.

It is important to remember that the gold standard remains direct or arthroscopic visualization of the lesion.

Therapeutic Alternatives

Once the diagnosis is established, all the aforementioned variables must be considered in order to make a correct therapeutic indication. In patients with clinically-stable DRUJs, the initial indication is to carry out conservative management with medical treatment,[29] since the natural history of a TFCC lesion in the presence of a stable DRUJ is complete recovery in 30% of the patients at 6 months and of up to 50% at 1 year of follow-up.[30]

Rest and initial immobilization and the use of non-steroidal anti-inflammatory drugs are suggested for symptomatic management. After that, rehabilitation with directed physical therapy is carried out in order to recover the dynamic stabilizers of the joint and improve their proprioceptive control.

Depot corticosteroids have not been widely used in this group of patients, and there is no evidence in the literature in this regard, so it is not a treatment that we routinely recommend. We suggest maintaining the conservative treatment for a period that fluctuates between 6 weeks and 6 months due to the aforementioned data and always considering the expectations and needs of the patient. In the event of failure of the medical treatment or in those patients with frank instability of the DRUJ, surgical management is indicated (►**Fig. 7**).

Surgical Treatment

The surgical treatment is initially indicated to patients with failed medical management or unstable injuries. The surgical alternatives will depend on the remaining tissue the patient has, and they may correspond to TFCC repair or reconstruction techniques. If the arthroscopic evaluation shows good-quality remnant tissue, it is managed as an acute injury; if, on the contrary, the tissue is irreparable or we are facing a failure of a previous repair, a reconstruction technique must be chosen (►**Fig. 8**).

Reconstruction of the TFCC

The techniques for TFCC reconstruction are indicated in symptomatic patients with irreparable lesions and usually in the context of DRUJ instability. It is very important to emphasize that these techniques are contraindicated in the presence of DRUJ arthrosis.[31,32]

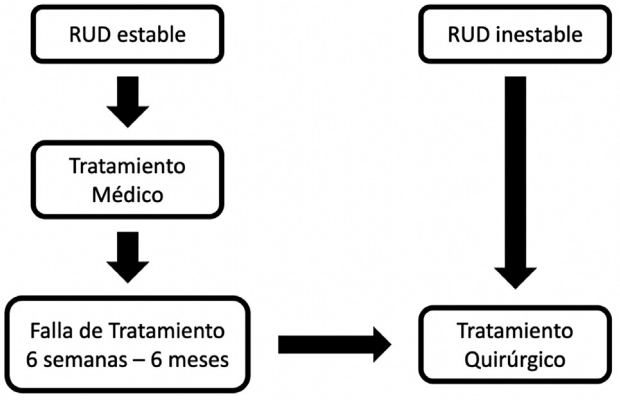

Fig. 7 Algorithm for the management of TFCC traumatic injuries.

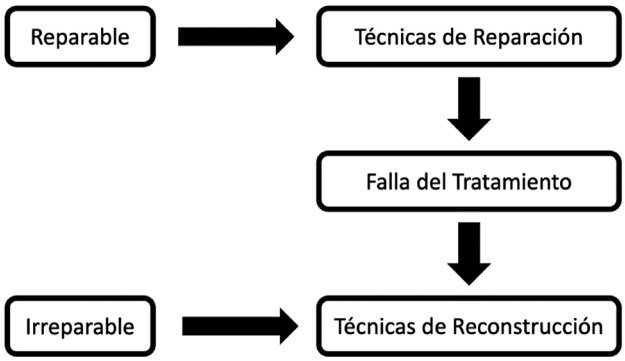

Fig. 8 Surgical treatment algorithm for chronic traumatic TFCC injuries.

There are multiple reconstructive techniques described to achieve DRUJ stability. They are divided into anatomical techniques, in which an attempt is made to reconstruct the volar and dorsal radioulnar ligaments with a tendon graft, and non-anatomical techniques, among which is the reconstruction of the oblique distal band of the interosseous membrane.[15,33–38]

The technique described by Adams[33] consists of reconstructing the volar and dorsal portions of the radioulnar ligament with an autologous (palmaris longus) tendon graft through a tunnel in the ulnar edge of the radius and subsequently a tunnel at the level of the fovea in the distal ulna. This technique has shown good and excellent results in the medium and long terms, achieving an overall success rate of up to 86% at 5 years, with 90.8% of patients maintaining DRUJ stability, 75.9% of them with mild or no residual pain.[39,40]

There are descriptions of the performance of this technique and of other similar ones with arthroscopic assistance, in an attempt to reduce the impact of the invasion of soft tissues and to keep unharmed other stabilizing structures of the DRUJ that can be compromised with the classic open surgery techniques.[15,35,37] These techniques have also been shown to have good and excellent clinical results similar to those found with open techniques, and there are even studies[15,35] that show that these techniques have advantages in terms of recovering better ranges of motion of the wrist.

Arthroscopically-Assisted Reconstruction of the TFCC with Brachioradialis Tendon Graft

Our working group has developed a reconstruction technique for the volar and dorsal radioulnar ligaments using the brachioradialis tendon with arthroscopic assistance, keeping its distal insertion on the radius fixed. (►**Fig. 9**)

Description of the Technique

We perform a diagnostic arthroscopy according to the classic technique with dry arthroscopy, using a 5-Kg traction tower and limb ischemia. We use 2.7-mm optics with an angle of 30°.

a) Diagnostic arthroscopy: we perform an arthroscopic diagnosis of the compromised structures of both the radiocarpal and midcarpal joints through the 3-4, 6R, radial midcarpal (MCR), and ulnar midcarpal (MCU) portals. Then, we evaluate the presence and quality of the remnant tissue of the TFCC and test its stability by palpation and traction with the arthroscopic tester. In this step, the surgical decision is made, since the indication for reconstruction will be determined by the irreparability of the lesion under arthroscopic visualization. If an injury is considered irreparable, the reconstruction continues. In this step, joint cleaning is performed with a shaver, as well as a thorough resection of the TFCC remnants, to prepare the joint for subsequent reconstruction.

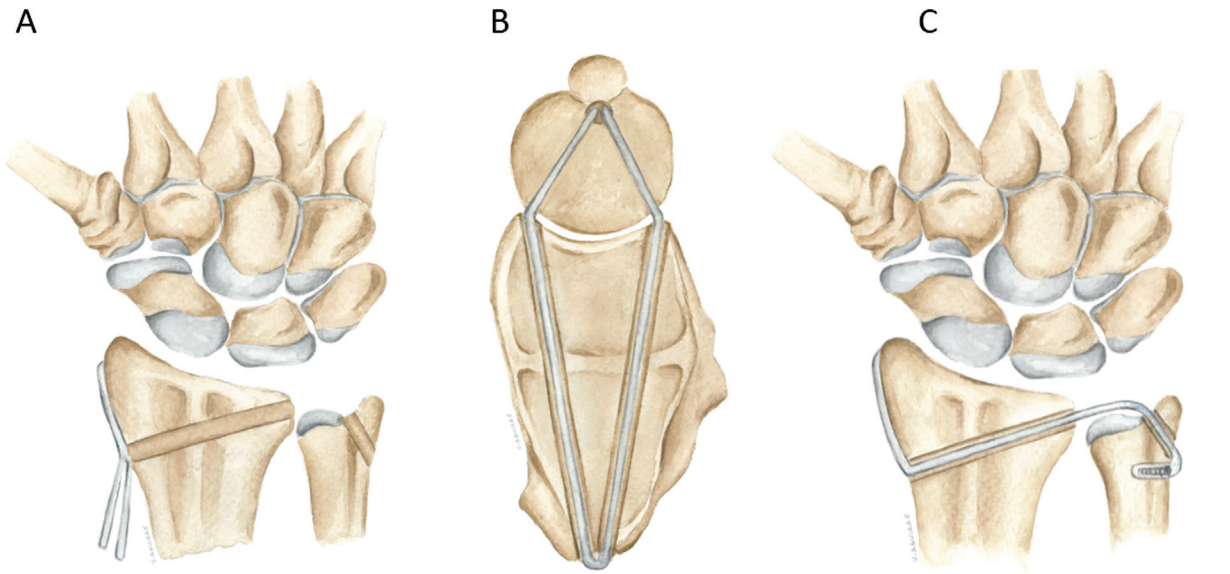

Fig. 9 Scheme of the arthroscopic reconstruction technique with brachioradialis graft. (**A**) Brachioradialis graft fixed at its insertion and divided into two strands. (**B**) Axial diagram of the radial tunnels and posterior cubital tunnel. (**C**) Final scheme with fixed graft with interference screw in the ulna.

b) Graft harvesting: we remove the traction and perform a wide inclined "s" approach on the distal middle segment of the brachioradialis tendon. We make a careful dissection respecting the branches of the superficial radial nerve. Then, we take the graft by sectioning the tendon at the level of the proximal myotendinous junction, achieving a graft of approximately 12 cm in length, leaving its distal insertion in the radius intact (►**Fig. 9**,**10**,**11**)

c) Tunnel carving: under arthroscopic assistance, two radial tunnels are carved from the lateral margin of the radius 0.2 cm below the apex of the radial styloid. For this, a guide needle is initially used, and then the canal is carved with a cannulated drill of progressive diameter until sufficient space is achieved for an easy passage of the graft, which is usually achieved with diameters between 2.5 and 3.0 mm. Each tunnel leads to the dorsal ulnar and volar ulnar corners respectively. Under arthroscopic visualization from the 6R portal, the correct position of the tunnels in the ulnar edge of the radius is confirmed (►**Fig. 12**). A bone tunnel is then made in the ulna, from the medial margin, about 2 cm below the ulnar styloid, directed towards the foveal region, using a 3.0-mm drill bit.

d) Graft passage: under arthroscopic assistance, a grasper is passed from the 6U portal through each of the tunnels in the radius, and the tendon graft strand is retrieved. This step must be careful to avoid damaging the graft (it is performed from the 6U portal and not from the 6R, since the angle of the radial tunnels does not allow it). Subsequently, both strands of the graft are rescued from the 6U portal to the ulnar tunnel using the lasso or loop technique, to position the graft in the fovea. (►**Fig. 13**)

e) Fixation of the graft in the ulna: both strands of the graft are fixed with a Fastlock-type (GMReis, Campinas, SP, Brazil) screw at the ulnar edge, 1 cm proximal to the exit of the tunnel (►**Fig. 14**). After this step, the stability of the graft is tested thorugh arthroscopy and the stability of the DRUJ is confirmed clinically.

f) Postoperative rehabilitation: we use a removable wrist immobilizer for the first two weeks until the removal of the skin stitches, and gentle finger exercise is recommended since the first postoperative day. We then use an antebrachiopalmar cast for an additional four weeks. At six weeks postoperatively, the cast is

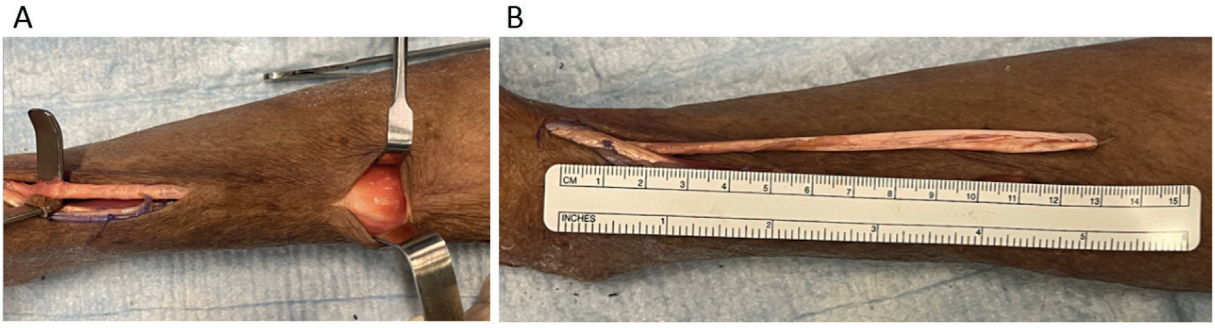

Fig. 10 Images of the technique to harvest the brachioradialis tendon graft. (**A**) Graft harvesting, leaving its distal insertion fixed and up to the myotendinous union. (**B**) Total length of the graft obtained after rescuing it from the distal incision. (**C**) Graft preparation: the graft is held fixed at its origin and divided proximally into two strands of equal size. It is increased with FiberWire (Arthrex, Naples, FL, US) 2.0 with a Krakow suture in each of the strands.

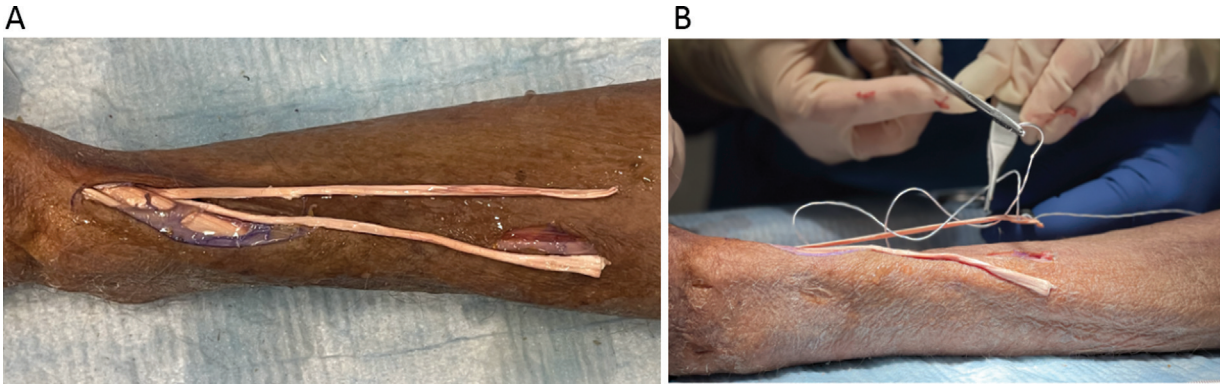

Fig. 11 Images of the graft preparation. (**A**) Division of the tendon into two strands. (**B**) Augmentation with FiberWire 2.0.

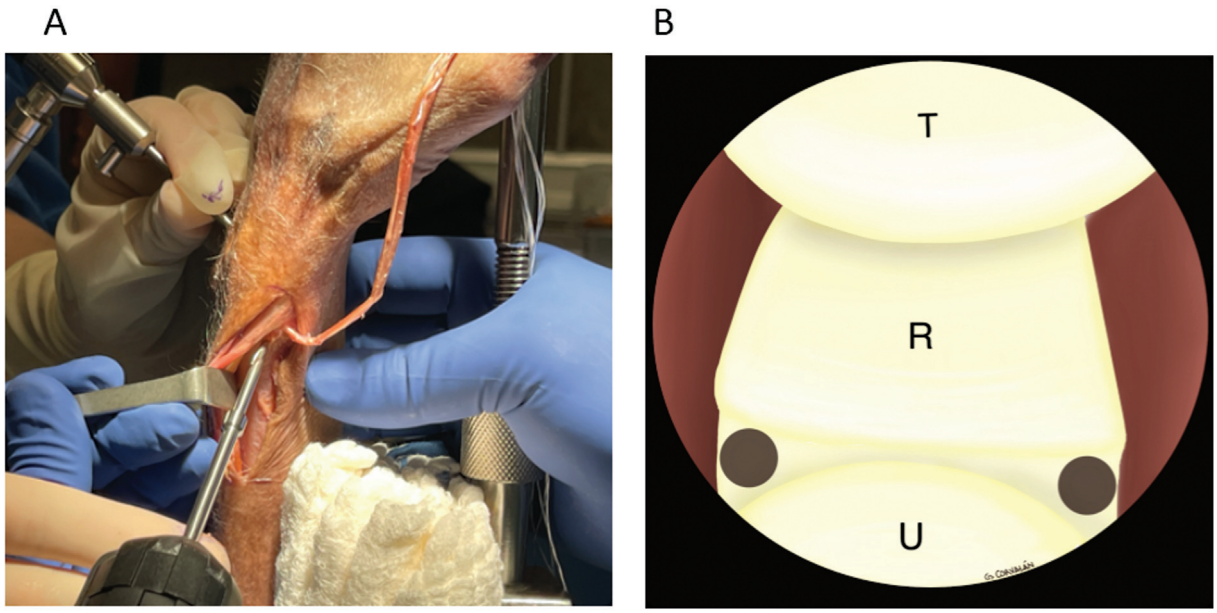

Fig. 12 Carving of the radius tunnels. (**A**) Carving of the radial tunnels under arthroscopic view. (**B**) Scheme of the arthroscopic visualization of the exit of the radial tunnels through the 6R portal.

removed, and a progressive rehabilitation scheme begins with targeted physical therapy.

Results and Patients

We have operated two patients with this technique with a follow-up longer than 2 years.

Patient 1: a 19-year-old female patient with a history of arthroscopic cleaning surgery and TFCC stabilization of her left wrist at 14 years of age. She had persistent pain in the ulnar region of the wrist that worsened with pronosupination activities and axial load. The physical examination highlighted an asymmetrical lump compared to the contralateral and positive foveal signs. The preoperative score on the Patient-Rated Wrist Evaluation (PRWE) was of 66 (40/26). Diagnostic arthroscopy was performed, and we found practically non-existent remaining TFCC tissue, so we decided on the previously-described reconstruction technique with autologous brachioradialis graft. The patient evolved favorably. At the 3-year postoperative follow-up, the patient maintained a painless wrist, with a stable DRUJ, with return to activities without limitation. The postoperative PRWE score was of 35 (14/21) at 4 months, of 6 (4/2) at 8 months, and of 4.5 (4/0.5) at the completion of the 3-year follow-up (►**Fig. 15**).

Patient 2: a 61-year-old female patient who had long-standing pain in the ulnar edge of the left wrist after a car rollover several years prior to consultation. She was evaluated at another center, where ulnocarpal impingement syndrome was diagnosed, and she underwent ulnar shortening surgery without arthroscopic visualization of the radiocarpal joint or the DRUJ. The patient evolved with persistent pain and non-union of the osteotomy focus. She was evaluated by

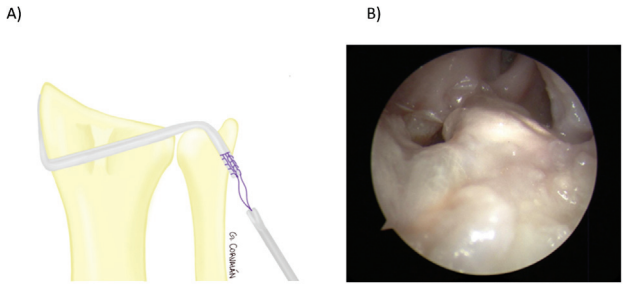

Fig. 13 Passage of the graft through the tunnels. (**A**) Diagram of the passage of the graft strands from the 6U portal to the ulnar tunnel. (**B**) Arthroscopic view of both graft strands in their final position.

Fig. 14 Graft fixation with the Fastlock system.

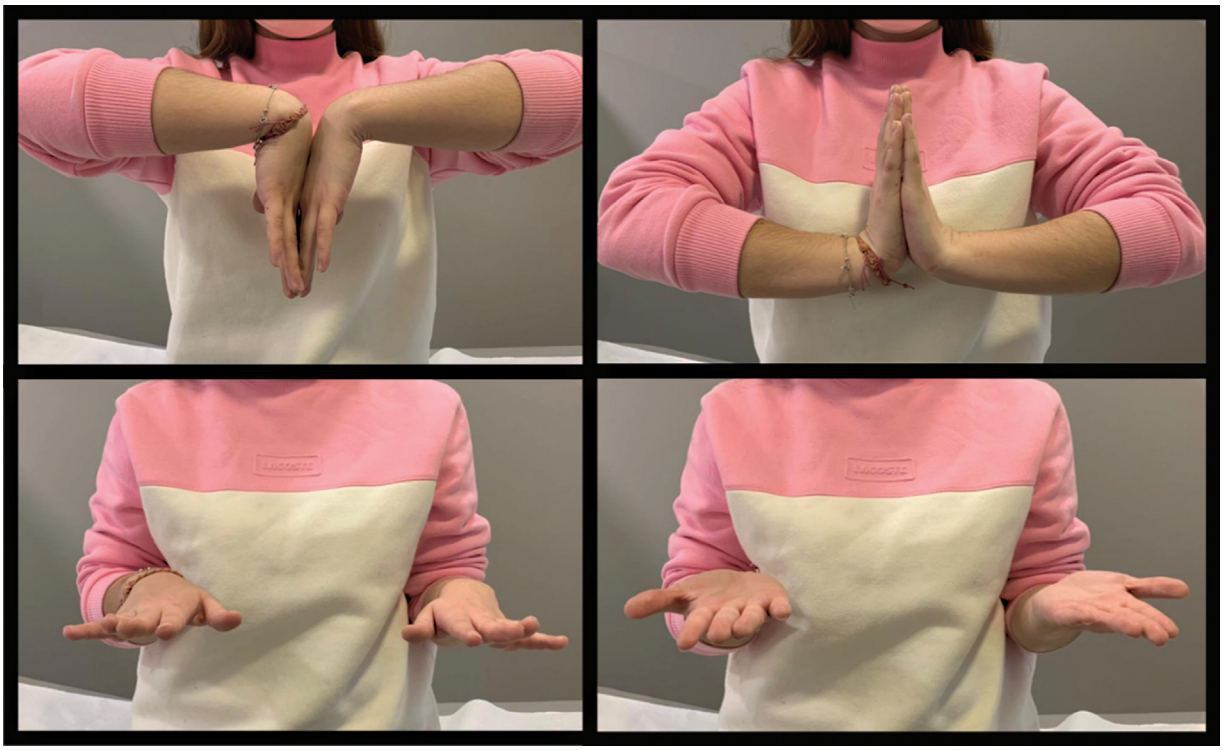

Fig. 15 Clinical images of patient 1.

our team, who observed, in addition to the nonunion of the ulna, severe distal radioulnar instability. We decided to carry out the management sequentially. In the first stage, the nonunion was managed by performing a new osteosynthesis, with cruentation of the non-union focus and the contribution of a non-vascularized autologous graft, and an arthroscopic evaluation of the wrist was carried out to evaluate the remaining TFCC tissue and to define the management of the fracture instability once the osteotomy was consolidated. The arthroscopy showed irreparable tissue, so the reconstruction of the TFCC was performed with the brachioradialis technique, and the patient presented a favorable evolution in pain (score of 2/10 on the Visual Analog Scale) and in joint range (►**Fig. 16**).

Fig. 16 Clinical images of patient 2.

Discussion

Chronic traumatic TFCC injuries have not been defined as such in the literature. These are injuries that behave differently from an acute traumatic injury and from those degenerative injuries in the context of ulnocarpal impaction syndrome.

To understand these injuries and be able to correctly manage them, it is important to understand the aforementioned concepts. The time since the occurrence of the injury, although it does not exactly distinguish an acute traumatic injury from a chronic one, it indicates to us that those injuries with a longer evolution time would have less predictable results compared to repair surgeries, such as foveal reinsertion techniques with transosseous tunnels, in which lesions with an average evolution of 7 to 8 months have categorically better results than those with 15 to 19 months of evolution, especially if the techniques are performed without bone scaling.[16,17,19,20]

The repair potential is determined by the site of the lesion, according to the areas of irrigation of the TFCC and the quality of the remaining tissue. Patients with poor-quality tissue, friable edges, massive lesions, or nonexistent residual tissue are deemed to have irreparable lesions, which should be managed as such.[13] It is important to know these concepts given that, when making a surgical decision, one must take into account that the physical examination and imaging are not sufficient to provide an adequate estimate of the real state of the remaining tissue, and, in the event of performing a surgical indication, one must be prepared for the different scenarios.

It is essential to have a high clinical suspicion to deal with our patients correctly. Advanced imaging techniques are of great diagnostic help, but the current gold standard is arthroscopic visualization of the lesion.

To correctly indicate the management, it is imperative to carry out a correct evaluation of the DRUJ, specifically seeking the presence of degenerative signs and osteoarthritis and clinical and functional stabilities in activity. The repairability of the TFCC lesion and the stability of the DRUJ are key to the correct indication of treatment.

The techniques for TFCC reconstruction are complex, but they have been shown to yield good long-term results.[39] The arthroscopic TFCC reconstruction techniques described by Luchetti and Atzei[15] and Carratalá Baixauli et al.[41] seem to be reproducible, and good clinical results were observed in their case series. In both cases, they follow principles similar to those of the technique herein described, using an autologous graft, attempting to reconstruct the volar and dorsal radioulnar ligaments, and fixing them in a tunnel at the level of the distal ulna to achieve DRUJ stability.

The technique proposed in the present review with brachioradialis tendon graft and arthroscopic assistance is an alternative to the previously-described techniques, and the results in the two patients we have operated on are promising, although we recognize that it is necessary to carry out a series with a larger number of patients and a longer follow-up than those presented so far.

Conclusion

Chronic TFCC lesion has not been previously described as such. It requires a comprehensive evaluation geared towards the patient to carry out the correct management. The state of the TFCC remnants is crucial when making surgical decisions, and it will be affected by the time since the occurrence of the injury and its repair potential. Arthroscopy seems to be essential to perform a correct evaluation of the TFCC and guide the surgical technique. The proposed arthroscopy-assisted reconstruction technique is a therapeutic alternative with good results.

Conflict of interests
The authors have no conflict of interests to declare.

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