Case report: TENEX[®] – minimally invasive ultrasound-guided treatment of lateral epicondylitis

Key words:

lateral epicondylitis, tennis elbow, minimally-invasive treatment, ultrasound-guided tenotomy

Introduction

Not only tennis players suffer from lateral epicondylitis ("tennis elbow"), even in normal population the treatment of this pathology is a persistent challenge in upper limb orthopedic surgery. It is 7-10 times more frequent than medial epicondylitis¹, and one of the most common musculoskeletal disorders, affecting 1-3% of the adults each year². It is most prevalent in the working age population and usually affects the dominant arm³. It is caused by the angiofibroblastic tendinosis of the extensor carpi radialis brevis muscle (ECRB).

In 75%-90%, conservative treatments are generally effective. Anyway, 10%-25% of all patients remain symptomatic following non-surgical treatment⁴. In these cases - especially for professionals in sports like tennis players in competition periods - persistent pain is an unsolved problem.

Recent studies show that patients who have not responded after 6 months of conservative therapy may not further relieve from non-operative methods for 24 months.

There are some surgical techniques described to treat tendinosis. All describe several modifications of open resection of the damaged tissue. During the past 20 years, different arthroscopic techniques have also been used for this type of resection. Ultrasound is commonly used for diagnostic issues whereas therapeutic usage is not well-established yet.

In TENEX[®], ultrasound is used for diagnostic issues one the one hand to identify the pathologic hypoechoic area of the ECRB and by usage of percutaneous ultrasound with a specific wavelength for therapeutic issues on the other hand. With the TENEX[®] device, a resection and aspiration of the damaged tissue is performed. This allows a less invasive treatment under a local anesthetic that is well tolerated with minimal morbidity. This procedure resects the diseased tendon with no effect on normal tendons. Indications include point tenderness over the lateral epicondyle at the insertion of the ECRB without

¹ Hoogvliet P et al. (2013) Does effectiveness of exercise therapy and mobilisation techniques offer guidance for the treatment of lateral and medial epicondylitis? A systematic review. Br J Sports Med 47: 1112-1119.

² Mattie R et al. (2017) Percutaneous needle tenotomy for the treatment of lateral epicondylitis: A systematic review of the literature. PMR 9: 603-611.

³ Dimitrios S (2016) Lateral elbow tendinopathy: Evidence of physiotherapy management. World J Orthop 7: 463-466.

⁴ Baker C. Ultrasound-guided tenotomy can effectively treat lateral epicondylitis. Ortho Today, May 2016.

relief for conservative treatment for at least 4 months. Contraindications include local infections or open wounds.

Case study

A 45-year old engineer from Costa Rica was suffering from persistent pain in his right elbow since 4 years. He did not recall a specific injury. He was already exhausting conservative treatment options including steroid injections without any long-term effects. He now asked for surgical treatment options.

He was presenting with a sportive attitude, playing tennis regularly. In the clinical examination he showed local palpation pain in the lateral epicondyle of his right elbow. VAS-score was 6/10. Full extension of the elbow and wrist flexion was painful. Cozen's test was positive. He did not take any medication and had no further disorders.

After brief examination, further treatment options were discussed. According to good results in these cases in the past, TENEX[®] procedure was considered as a suitable option in this case.

The procedure itself was explained to the patient with all possible benefits and risks. He consented in the procedure and was scheduled.

Procedure and postoperative outcome

The procedure was performed in the operation room right next to the office. The patient was placed with the affected arm loosely at the chest. The site of maximum tenderness was palpated (Figure 1) and marked after being confirmed by ultrasound as an area of hypoechoic signal (Figure 4).

Right before the procedure, the elbow was prepped and draped in a sterile fashion. The ultrasound device was placed in a gel-filled sterile sleeve on the sterile field (Figure 2). The area was anesthetized with lidocaine. A skin incision was made 1.5 cm from the point of maximum tenderness followed by careful preparation into the area of hyper-tenderness. The needle should go down to the bony insertion of the tendon.

The sterile ultrasound was used to identify the inflamed tissue again, and the needle was inserted through the puncture portal. The probe can usually be seen in the long axis, though it can also be viewed in the short axis. The needle was visualized in the ultrasound and when it reached the area of pathology, a foot pedal was depressed. This activated the ultrasonic energy to be delivered at the tip, which in turn cuts the diseased tendon. The needle oscillates nearly 20000 cycles per second. Through continuous irrigation and aspiration, the resected tissue was removed. This is employed as a safety feature so no unwanted heat is generated. Treatment modalities can be adjusted via Monitor (Figure 3). The needle was advanced in a linear manner in and out of the lesion. When the hypoechoic area was no longer seen, in this case after 5-6 minutes of treatment, the needle was removed. The wound was closed with Steristrips and a Tegaderm dressing.

The complete procedure took about 20 minutes. After postoperative recovery for about another hour, he was able to be discharged.

In the 48-hour-follow up he was already pain free. He was able to use the arm without any restriction 3 days after, while strengthening is recommended 3 weeks after the procedure. In a further case, a professional tennis player, who was treated in the office, was successfully returning to competition 4 weeks after the procedure was performed.

Discussion

Lateral epicondylitis is a common pathology not only in sportive people. In many cases, conservative treatment is a sufficient treatment.

If conservative treatment of lateral epicondylitis fails, there is demand for further options. While many invasive surgical options in the past we used, TENEX[®] represents a minimally-invasive treatment procedure to improve symptoms with short-term recovery.

Possible complications are wound infections and injury of local structures such as nerves and blood vessels.

Recent studies show improvement of pain (VAS-score) and function (DASH-score) immediately after the procedure and long term after 12 months⁵.

In conclusion, TENEX[®] might be an effective and safe treatment for chronic and refractory lateral epicondylitis.



Figure 1. Palpating point of maximum tenderness



Figure 2. Preoperative positioning

⁵ Battista, Christopher T. MD*; Dorweiler, Matthew A. MD*; Fisher, Michael L. DO†; Morrey, Bernard F. MD‡; Noyes, Matthew P. MD, PT§. Ultrasonic Percutaneous Tenotomy of Common Extensor Tendons for Recalcitrant Lateral Epicondylitis. Techniques in Hand & Upper Extremity Surgery: March 2018 - Volume 22 - Issue 1 - p 15-18 doi: 10.1097/BTH.00000000000178



Figure 3. Monitor and Parameters



Figure 4. Ultrasound-guided positioning of the needle



Figure 5. Removal of diseased tendon



Figure 6. Wound closure