

## The Ultrasound-Guided Intratissue Percutaneous Electrolysis (EPI®) for the Treatment of Refractory-Neovascular Patellar Tendinopathy

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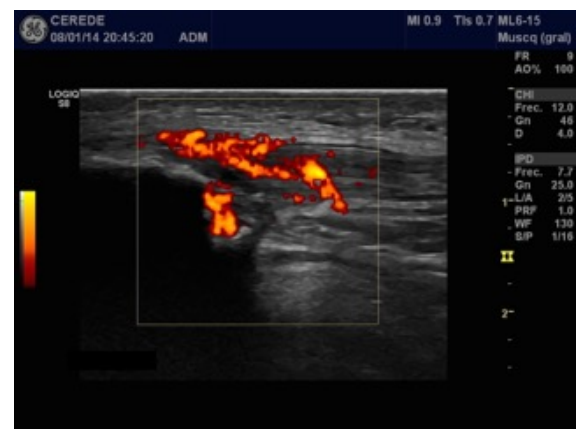
### Introduction

Refractory patellar tendinopathy (RPT) is a chronic disease with progressive degeneration of extracellular matrix, microtearing, and loss of tendon microarchitecture as a hallmark. The essential pathologic lesion of tendinopathy is often described as a failed healing response of the tendon, and persistence of the lesion is attributed to the tissue anchored in the proliferative or angiogenic phase, as shown in histopathology [1].

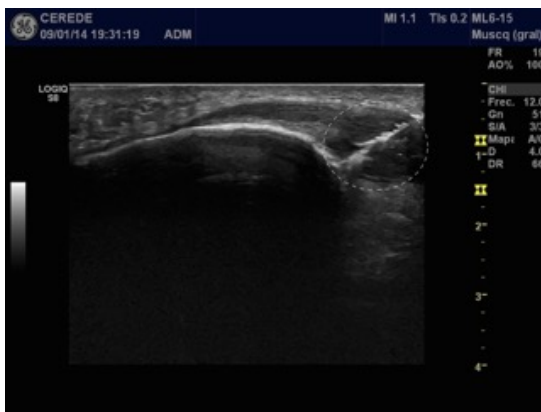
Structural findings of collagen degeneration and angiofibroblastic neoplasia have been well described and are now referred to as "neovascular tendinosis." The presence of neovascularization has been theorized to cause pain in patients with tendinopathy [2].

Recent studies have examined the role of neo-vessels and neo-innervation on chronic tendon pain and dysfunction, and interventions targeting this process have reported favorable outcomes in RPT (Figure 1) [3].

is effective in tendinopathy and sport muscular injuries (Figures 2-4) [5-7].



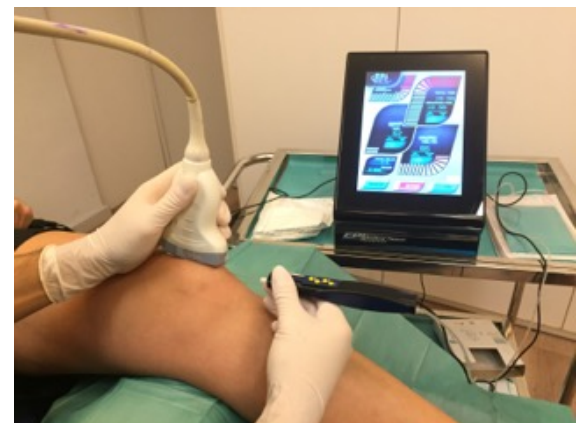
**Figure 2:** Patellar tendinopathy treatment using EPI® device (EPI Advanced S.L. Barcelona, Spain).



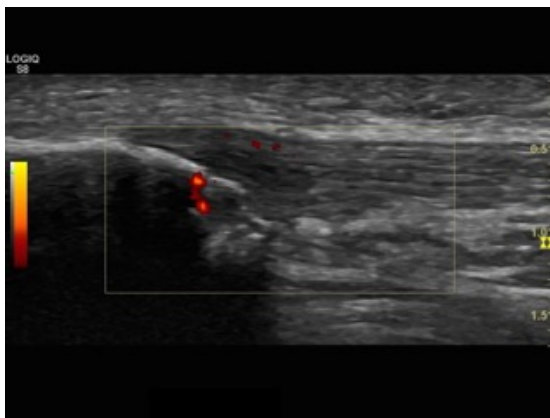
**Figure 1:** Ultrasound image with power Doppler. Longitudinal view of a Patellar neovascular tendinopathy, with thickening of the tendon and hyperechoic image.

Ultrasound-guided Intratissue percutaneous electrolysis (EPI®) treatment is the application of a direct current (DC) whose cathodic flow is transferred to the area of the degenerative tendon using an acupuncture needle [4].

This accumulated electrical charge (AEC) in the degenerative tissue will produce the activation of the molecular, cellular and biological processes necessary to restore the regeneration mechanisms of the tendon. In recent studies it has been demonstrated that EPI® technique



**Figure 3:** Hiperechoic image produced by the EPI® needle of 0.30 mm in the degenerative area of the tendon. This hiperechoic image corresponds to a gas density produced by the electrochemical response of the cathodic flow (CF) in the degenerative extracellular matrix.



**Figure 4:** Ultrasound image in longitudinal view and colour doppler two week after the EPI® technique treatment ultrasound-guided. It is observed the degenerated area of the tendon that is substituted by a new connective tissue and decrease the neovascular effect.

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