

# Vacuum Myofascial Therapy Device in Treatment of Muscle Fibrosis

**Marcelo Potolicchio<sup>1</sup>, Jorge Góngora-Rodríguez<sup>2</sup> and Manuel Rodríguez-Huguet<sup>3,4\*</sup>**

<sup>1</sup>Dadisa Cádiz Medical Centre, iSalud, Spain

<sup>2</sup>Policlínica Santa María Clinic, Spain

<sup>3</sup>Department of Nursery and Physiotherapy, University of Cádiz, Spain

<sup>4</sup>Andalusian Regional Public Health Service Hospital, Universitario Puerta del Mar, Spain

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## Abstract

24-year-old professional soccer player presented severe pain in the right quadriceps muscle after a 10-month evolution of muscle rupture occurred during sports practice. The objective is analyze the effects of vacuum therapy for improve the pain, the tissue elasticity, and the functionality in muscle fibrosis. The physical treatment was based in vacuum therapy with PHYSIUM System®, and the evaluation was done with shear-wave elastography. Treatment and evaluation were performed once a week for three weeks. Baseline, there were strong fibrillar distortion and fibrosis in elastography. Finally, fibrillar restoration has been verified, and patient could return to sports practice. Vacuum myofascial therapy applied with a device improves in the treatment of muscle fibrosis and it allows precise and reproducible parameters to be applied every time.

**Keywords:** Soft tissue injuries; Fibrosis; Vacuum; Cupping therapy; Physiotherapy

**\*Corresponding author:** Manuel Rodríguez-Huguet, Faculty of Nursery and Physiotherapy, Avda. Ana de Viya 52, Cádiz, 11009, Spain

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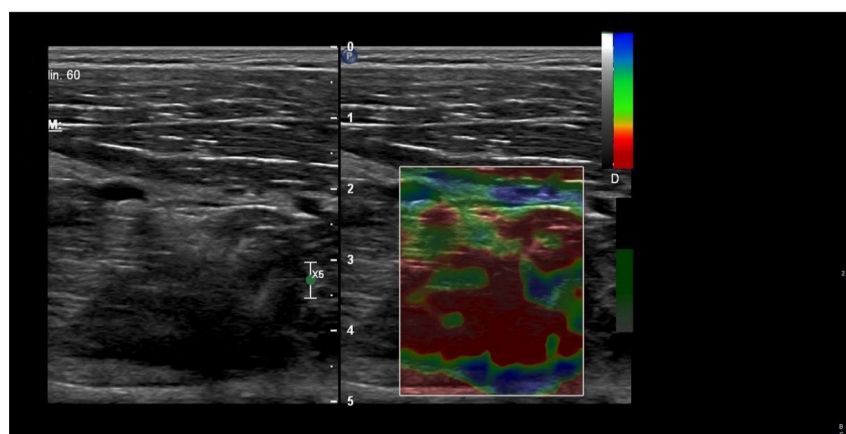
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## Case Story

We present the case of a 24-year-old professional soccer player, with no personal history of interest, who came to the X-Ray diagnosis service due to severe pain in the right quadriceps muscle after a 10-month evolution of muscle rupture occurred during sports practice. On examination: painful tumefaction on deep palpation in the proximal quadriceps region and the impossibility of practicing sports. By live-stream ultrasound a strong fibrillar distortion was diagnosed and the finger-in-glove sign of fibrosis were observed (Figure1).

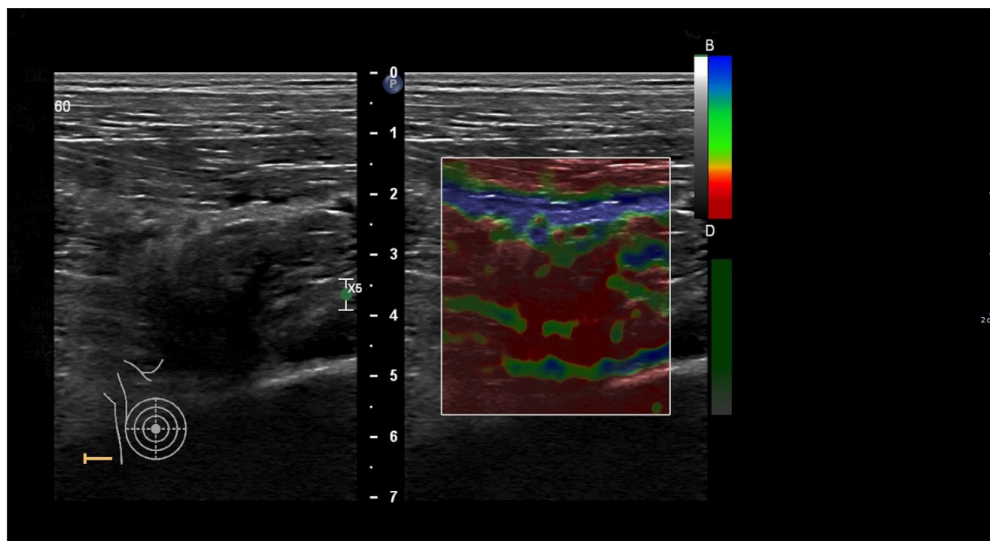


**Figure 1:** Stream ultrasound image of muscle fibrosis.

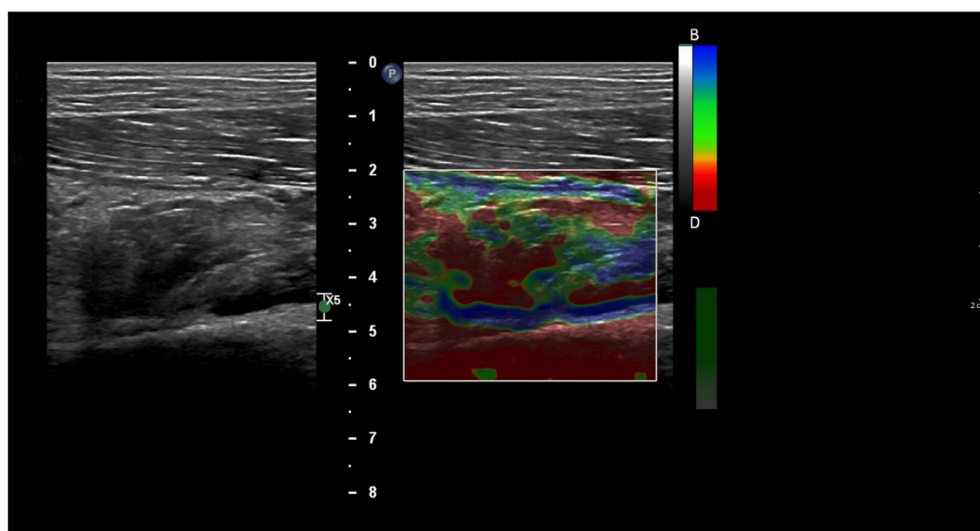
The treatment with the non-invasive device PHYSIUM System® was carried out. PHYSIUM System® provides standardized negative pressure massage for 15 minutes with the analgesic program and 15 minutes with the trigger points program at 80 millibars with eight adjustable arms, both in the entire muscle and in muscle fibrosis.

Seven days later, after PHYSIUM System® session with the same parameters of the previous treatment, ultrasound elastography was performed. The partial restoration of the fibrillar pattern with a decrease in initial hypoecogenecity was observed, and smaller sonic attenuation and initial tension was noted (Figure 2). After fourteen days, a new ultrasound

elastography was performed after the Physiotherapy session with the same treatment parameters and fibrillar restoration has been verified, and patient could return to sports practice (Figure 3).



**Figure 2:** Stream ultrasound image after Physiotherapy treatment.



**Figure 3:** Stream ultrasound image at the end of the physiotherapy treatment.

The aim of this case is analyze the effects of vacuum therapy with PHYSIUM System® for improve the pain, the tissue elasticity, and the functionality in a soccer player with fibrosis post muscle rupture.

### Discussion

Muscle tears are the most frequent sports injuries, after ankle sprains, represent 30% of all sport-related injuries [1]. Most muscle injuries occur in the eccentric phase, with the largest number of cases involving the hamstrings, followed by ruptures of the quadriceps anterior rectum and tennis leg [2]. Physiotherapy is the basis of conservative treatment in these injuries, the final objective of treatment is recover the functionality [2,3]. Shear-

wave elastography is a shear wave technique that provides high-resolution, quantitative information about tissue elasticity. To obtain a quantitative elastographic evaluation, shear waves are created in the tissue, then tracked and measured. Complex equipment is used to generate them and to make high-resolution measurements of their propagation speed [4].

Quadriceps muscle injuries have a high incidence rate in sports that require repetitive kicks and sprints and are common in soccer in its different forms around the world [5]. Currently there is no generally accepted classification system. The Munich muscle classification demonstrates a positive prognostic validity for return to sports activity in male professional soccer players with muscle

injuries [6] and the turnaround time for different types of muscle injuries in elite male soccer players in Europe, which has been concluded as an average absence of 12 days [7]. Previous injury seems not to be a risk factor; however functional asymmetries have a higher risk of recurrence. Systematic isokinetic evaluation of the lower extremities during the preseason period can provide valuable data of the predictive elements of non-contact hamstring strains in professional soccer players for therapists and coaches [8].

Therefore, quadriceps muscle injuries represent an important problem in sports performance, it is necessary to design physiotherapy treatments that are effective for recovery and return to play. Usually, the fibrillar restoration is difficult to achieve, however, it is possible through negative pressure. Keeping in mind that negative pressure reduces pain and improves functionality [9]. The physiotherapy treatment with PHYSIUM System® is based in negative pressure [9-11]. The application of negative pressure changes the sensitive perception on the myofascial tissue, improves the local vascularization and reduces the pain on the injury area. Therefore, the patient feel less pain, and have more range of motion after the treatment [9,12-14]. The main advantage of this therapy is the quantification of the applied pressure in comparison with other cupping therapies. PHYSIUM System® provides strength, time and rhythm of treatment [9].

The results obtained in this intervention confirm that vacuum therapies can be effective on the symptoms and functionality in this type of pathologies, also finding changes in the ultrasound elastography follow-up. The effects achieved can be linked to soft tissue mobilization, improved circulatory and nerve conduction levels.

In the same way, the positive results coincide with what has been observed with this type of procedure in other pathologies or on different anatomical locations [9,15,16]. PHYSIUM System® treatment allows quantifiable control of the intervention. The possibility of reproducing the parameters is the main strength of this research [17]. In addition, the pulsatile application and the control of the parameters prevent redness and the appearance of bruises on the skin, compared to conventional cupping [18].

## Conclusion

In conclusion, the treatment based on vacuum myofascial therapy improves muscle fibrosis (with precise and reproducible parameters to be applied every time) and provides the means to achieve full recovery.

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