

Combination of shockwave and rehabilitation for thigh muscle partial tear injury recovery

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1. Introduction

Extracorporeal Shock Wave Therapy (ESWT) has emerged as a prevalent non-surgical intervention for patients experiencing musculoskeletal disorders. A study examining the worldwide trends in ESWT utilization between 2000 and 2021 revealed that South Korea ranks among the top ten nations employing this therapeutic modality. Presently, ESWT is applied across various disciplines, with its most frequent applications observed in low-intensity extracorporeal shock wave therapy (LI-ESWT), rehabilitation, and physiotherapy as of 2018. ESWT can be classified into two primary approaches: focused shockwave and radial shockwave. The focused shockwave technique is characterized by its high energy and extensive penetration depth, rendering it suitable for targeting deep-seated ligaments and muscles. This method, however, may cause an increase in pain at the site of treatment. Conversely, the radial shockwave technique utilizes lower energy and exhibits shallower penetration, making it ideal for addressing superficial structures, such as ligaments and muscles situated near the surface. This approach typically results in decreased pain at the treatment site.

2. ESWT in Sports Medicine

ESWT demonstrates versatility in its application to a range of medical conditions. Within the realm of sports medicine, this treatment modality is particularly useful for addressing tendon pathologies, such as rotator cuff tendinopathy and lateral epicondylopathy. Additionally, ESWT is effective in managing osteopathies, including delayed healing and non-union, as well as muscle pathologies like muscle strains without discontinuity.

3. Biological effect

In the application of ESWT, numerous biological effects are observed, including neovascularization at the tendon-bone junction, destruction of calcifications, enhanced collagen synthesis, and tissue remodeling. Two prominent effects of ESWT are analgesia and tissue regeneration. Substance P, a neurotransmitter, mediates pain transmission via C-fibers. By decreasing the concentration of substance P, the stimulation of afferent nociceptive fibers is reduced, leading to diminished pain. The acoustic waves generated by shock wave therapy contribute to a lowered substance P concentration, thereby facilitating pain relief. Furthermore, ESWT promotes tissue regeneration by enhancing blood supply to the affected area through the upregulation of endothelial nitric oxide synthase (eNOS), vascular endothelial growth factor (VEGF), and proliferating cell nuclear antigen (PCNA) production.

4. Clinical application

Clinical applications of ESWT encompass a variety of techniques, including transverse friction, longitudinal friction, circular stimulation, targeted trigger point application, trigger point application during stretching or painful motion, and post-treatment stabilization with taping following ESWT or NSAID administration. The transverse friction technique involves applying consistent friction perpendicular to the direction of muscle fiber movement, while the longitudinal friction technique entails friction application parallel to the direction of muscle fiber movement. Circular stimulation consists of applying pressure to muscle fibers in a circular motion along their movement direction.

Targeted trigger point application focuses on intensively treating the trigger point (TrP). Trigger point application during stretching involves targeting the muscle while it is being stretched, whereas trigger point application during painful motion concentrates on the painful area while repeatedly performing the movement that elicits pain. Both stabilization with taping after ESWT and stabilization with taping after NSAIDs represent combined treatment approaches aimed at stabilizing the affected area and alleviating pain following ESWT.

5. Summary

In the field of sports medicine, the efficacy of Extracorporeal Shock Wave Therapy (ESWT) relies on the careful determination of suitable intensity and frequency parameters, tailored to the specific post-injury condition. Furthermore, it is imperative to thoroughly evaluate the optimal timing, methodology, and decision-making process for treatment application, ensuring a comprehensive and well-informed approach to ESWT implementation.