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Use of Combined Shockwave Therapy and Platelet-Rich Plasma Injection for Management of Chronic Plantar Fasciitis in Runners: Two Case Reports

Kombinierte Stoßwellentherapie und Injektion mit plättchenreichem Plasma zur Behandlung der chronischen Plantarfasziitis bei Läufern: Zwei Fallberichte

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Summary

- ▶ **Plantar fasciitis** is one of the most common causes of foot and heel pain in adults. Extracorporeal shockwave therapy (ESWT) and platelet-rich plasma (PRP) have each been described as effective treatments for plantar fasciitis; however, the combined use has not been adequately described.
- ▶ **This report** characterizes successful return to sport in two runners with plantar fasciitis who were treated with ESWT combined with PRP. Patient-reported outcomes were measured using the Foot and Ankle Ability Measure (FAAM). A 69-year-old female had 8 months of pain refractory to physical therapy (PT). A 73-year-old male presented with recent onset of 3 weeks of symptoms. Both runners had exam findings of plantar fasciitis and MRI confirmation.
- ▶ **Each elected** to complete ESWT along with PT using a foot core program and met functional improvements for both sport and ADL subscales of FAAM after initial ESWT treatment. However, each runner had worsening pain when attempting to run and both elected to proceed with a single leukocyte-poor PRP injection combined with ESWT.
- ▶ **This allowed** for successful return to running. Both cases highlight how combined ESWT and PRP with a foot core PT progression may be effective in managing plantar fasciitis in running athletes.

Zusammenfassung

- ▶ **Die Plantarfasziitis** ist eine der häufigsten Ursachen für Fuß- und Fersenschmerzen im Erwachsenenalter. Die extrakorporale Stoßwellentherapie (ESWT) und plättchenreiches Plasma (PRP) wurden jeweils als wirksame Behandlungsmethoden für die Plantarfasziitis beschrieben; die kombinierte Anwendung hingegen noch nicht.
- ▶ **Dieser Fallbericht** beschreibt die erfolgreiche Rückkehr zum Sport bei zwei Läufern mit Plantarfasziitis, die mit ESWT in Kombination mit PRP behandelt wurden. Die von den Patienten berichteten Ergebnisse wurden mit dem Foot and Ankle Ability Measure (FAAM) gemessen. Eine 69-jährige Frau litt seit 8 Monaten unter Schmerzen, die auf Physiotherapie (PT) nicht ansprachen. Ein 73-jähriger Mann stellte sich mit vor kurzem aufgetretenen Symptomen vor, die seit 3 Wochen bestanden. Bei beiden Läufern wurde bei der Untersuchung eine Plantarfasziitis diagnostiziert und im MRT bestätigt.
- ▶ **Beide Läufer** entschieden sich für eine ESWT zusammen mit einer physiotherapeutisch-angeleiteten Stärkung der intrinsischen Fußmuskulatur und erzielten nach der anfänglichen ESWT-Behandlung funktionelle Verbesserungen in den Unterskalen Sport und Aktivitäten des täglichen Lebens des FAAM. Bei beiden Läufern verschlimmerten sich jedoch die Schmerzen beim Versuch zu laufen, und beide entschieden sich für eine einzige leukozytenarme PRP-Injektion in Kombination mit einer weiteren ESWT.
- ▶ **Dies ermöglichte** eine erfolgreiche Rückkehr zum Laufen. Beide Fälle verdeutlichen, wie eine Kombination aus ESWT und PRP mit einer physiotherapeutisch-angeleiteten Stärkung der intrinsischen Fußmuskulatur bei der Behandlung von Plantarfasziitis bei Laufsportlern wirksam sein kann.

KEY WORDS:

Regenerative Medicine, Running, Extracorporeal Shockwave Therapy (ESWT), Foot and Ankle Ability Measure (FAAM)

SCHLÜSSELWÖRTER:

Regenerative Medizin, Laufen, Extrakorporale Stoßwellentherapie (ESWT), Foot and Ankle Ability Measure (FAAM)

Introduction

Plantar fasciitis is one of the most common causes of foot and heel pain in adults (9). The diagnosis of plantar fasciitis is primarily based on clinical history and physical examination (6) and imaging findings may demonstrate thickening and potential tear of the plantar fascia (6). While most patients respond to initial non-surgical treatment, some may have persistent symptoms beyond one year (9).

Runners are commonly affected by plantar fasciitis and may have trouble returning to their preferred running level (4). Extracorporeal shockwave therapy (ESWT) and platelet-rich plasma (PRP) intralesional injections have each been proposed as effective treatments; however, the combined use has not been previously described (1, 3, 6, 11). We present two cases that describe the combined benefits of



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PRP with ESWT in facilitating return to running.

Intervention Background

The two primary forms of ESWT used in orthopedics are focused shockwave therapy (F-ESWT) and radial shockwave therapy (R-ESWT). F-ESWT has the capacity to generate a higher amplitude positive phase of shockwave whereas the R-ESWT generates a lower energy pressure wave that is more sinusoidal. Both forms of ESWT may work to promote tissue healing and disrupt pain and are best combined with physical therapy to optimize functional outcomes (5). PRP consists of an autologous concentrate of platelets and associated growth factors that may contribute to tissue healing. The thought is that the combination of the ESWT and PRP will create a synergistic effect of tissue healing and could play a role in treating difficult cases that are refractory to current standard of care.

Presentation and Treatment Course

Case 1

A 69-year-old female presented with an eight-month history of right plantar foot pain. Exam revealed pain over the plantar fascia origin. Imaging with initial x-ray demonstrated plantar calcaneal bone spur and MRI demonstrating evidence of plantar fasciitis. Prior treatment included three months of physical therapy and relative rest. Due to persistent pain, she elected to proceed with ESWT. ESWT was combined with physical therapy (PT). PT focused on intrinsic

and extrinsic foot core strengthening, calf stretching and increasing ankle mobilization. Foot and Ankle Ability Measure (FAAM) scores (ADL and Sport sub-scores) were used at baseline and throughout treatment to monitor progress. FAAM scores were used to calculate minimal clinically important differences which have been previously validated for foot



Figure 1

Panel A: Line graph showing results of Case 1 and Case 2 FAAM ADL subscales over time. The red star indicates time point at which patients received PRP injection. Panel B: Line graph showing results of Case 1 and Case 2 FAAM Sports subscales over time. The red star indicates time point at which patients received PRP injection.



Figure 2

A captured image of an ultrasound-guided PRP injection targeting the 69-year-old female's plantar fascia origin.



Figure 3

A depiction of radial shockwave device targeting the plantar fascia origin.

and ankle musculoskeletal disorders (2). By week 12, following 4 sessions of ESWT, she met MCID on both FAAM sub-scores (figure 1), however, she was still having difficulty returning to running due to foot pain and elected to have a single leukocyte-poor PRP injection (week 28) into the plantar fascia origin. At her follow-up appointment, she reported 90% overall improvement in symptom burden. Over the course of the next month, the patient received 2 additional ESWT treatments, while continuing physical therapy. At 42 weeks following the initial ESWT treatment (9 total treatments) and 11 weeks after the PRP injection, she met MCID on both FAAM subscales and was able to proceed with a successful return to run program.

Case 2

A 73-year-old male presented with right foot pain localized to the heel and MRI findings consistent with plantar fasciitis. He had a gradual increase in current pain over several runs and three weeks of activity limiting pain prior to starting ESWT. ESWT was combined with PT. He completed five sessions of ESWT and met MCID for both subscales at week 21. (Figure 1.) However, he was unable to return to running due to heel pain. repeat MRI revealed worsening fascia thickening and partial tearing. He subsequently completed a single leukocyte-poor PRP injection at week 29 followed by two more sessions of ESWT. He was able to start return to run progression 7 weeks following PRP and has returned to racing.

Discussion

The two cases illustrate the potential benefits of combined ESWT with PRP (figure 2) for management of refractory plantar fasciitis. Despite meeting initial functional gains as quantified on FAAM, each runner was unable to advance to the desired activity of running. The addition of PRP and subsequent ESWT was associated with further gains in functional status and ability to return to running. In both cases, continued physical therapy with foot core was performed to optimize intrinsic and extrinsic foot strength to help with tissue healing and reduce loads through the plantar fascia. Foot core

exercises include towel curls, and short foot exercises (SFE) that require elevating one's arch without curling the toes and avoiding elongation of long toe flexors. SFE focus is directed on techniques to activate the intrinsic foot muscles rather than power (12). The decision to add PRP was based on inability to return to the level of desired activity of running. Limitations in this report include inability to determine the effects of each form of treatment on achieving outcomes, and treatment performed in runners with more advanced plantar fascia disease. Age as a predictor for outcomes from both ESWT and PRP are currently being investigated. Early studies have shown that older patients may have a less robust healing response to ESWT (10). Studies of the composition of PRP have shown that older age may be a predictor of lower concentration of platelets and WBC (8). However, studies have yet to uncover if this leads to meaningful clinical difference in outcomes (7). Both patients felt that the overall treatment was effective to allow return to sport. These two cases highlight how ESWT and PRP may be effective in challenging cases of refractory plantar fasciitis in running athletes. Further research may help substantiate these findings in other patient populations and develop algorithms based on degree of tissue damage and in other forms of injury, including tendon and bone. ■

Conflict of Interest

The authors have no conflict of interest.

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