PM R 12 (2020) 516-517

www.pmrjournal.org

Clinical Letter

The Role of Extracorporeal Shockwave Therapy in Return to Competition for Endurance Runners: Two Case Reports

Maffulli et al defined tendinopathy as a clinical syndrome of pain, swelling, and impaired performance.[1] Histopathological features of tendinopathy include collagen fiber disorganization, angiofibroblastic hyperplasia, and increased mucoid ground substance.[1,2] First-line treatment is nonsurgical, involving physical therapy (PT) with an eccentric training program based on work by Alfredson et al.[3] Although PT is primary treatment, interventions may be considered to promote the healing process.[2] Few interventions exist that allow athletes to continue training throughout treatment. Radial shockwave therapy (R-SWT) is a lower energy form of shockwave and has been described in allowing elite athletes safe return to competition.[4-6] As compared to focused shockwave therapy, in which the greatest force generated occurs at a certain depth within the structure being treated, in R-SWT the maximum force occurs at the skin surface, with subsequent dispersion of force with increased depth.[4] We present two cases of chronic tendinopathy successfully treated in endurance runners using R-SWT.

Runner A was a 25-year-old female marathon runner who presented with an atraumatic 3-month history of left greater than right Achilles tendinopathy. She was preparing for the Chicago Marathon, running up to 110 km/wk. Pain was refractory to treatment of PT with an eccentric loading program and trial of a walking boot. On examination, she had pain on palpation and thickening of the midportion Achilles tendon. She was able to perform single leg calf raise but reported pain. Ultrasound examination revealed evidence of thickening and heterogenous echogenicity of the midportion of her bilateral Achilles tendon with no discrete tearing or retraction with dynamic plantar flexion. Color Doppler did not reveal abnormal signal overlying the Achilles tendon.

Runner B was a 25-year-old female ultramarathon runner who presented with a 3-month history of atraumatic right proximal hamstring tendinopathy (PHT). Initially, she could run 64-80 km/wk. However, she subsequently developed pain while sitting and bending forward to touch her toes. Symptoms were refractory to PT. Examination revealed focal tenderness to palpation over the proximal hamstring, a mild strength deficit with supine plank and 30° resisted hamstring curl, and intact strength with 90° resisted hamstring curl. Slump test was negative.

Runner A was offered PT and interventional treatment of injection (platelet rich plasma [PRP] or prolotherapy) or R-SWT to her primarily symptomatic left Achilles tendon. Runner B's options included PT along with possible R-SWT, peritendinous corticosteroid injection, or PRP injection. The use of injections would require modified activity to optimize treatment; no consensus for guidelines on postprocedure activity exist for R-SWT.

Each runner stated goals to continue running and both elected to proceed with R-SWT. Five weekly sessions of R-SWT for 3000 pulses each with C15 (ceramic) and D20 (standard oscillator) at 15 Hz were performed by the senior author. R-SWT was administered at 2.0-3.0 bars of air pressure for Runner A (Figure 1) and 4.5 bars for Runner B. The "clinical focusing" technique was employed, which directs treatment at the point of maximal tenderness as specified by the patient.[6] Postprocedure instructions included avoiding use of nonsteroidal anti-inflammatory drugs (NSAIDs) and minimizing ice. Each patient was recommended additional PT with eccentric components and to advance activity as tolerated. No insoles or orthotics were prescribed.

Each patient noted significant improvement in pain along with continued PT. Runner A reported ability to run 32 km/wk following first treatment. She advanced training and completed the Chicago Marathon 6 weeks after beginning treatment. Runner B reported ability to run 12-15 km per training session while receiving treatment. Four months following initial treatment, she finished second in the women's race over 100 km with 23 000 ft of elevation. Neither runner experienced worsening symptoms during the race. Runner A and Runner B are both back to full training without pain at 16 and 10 months from time of initial treatment, respectively.

https://dx.doi.org/10.1002/pmrj.12241

Figure 1. Example of Extracorporeal shockwave therapy applied to the Achilles tendon.

Runner A had subsequent milder return of pain in her left Achilles, and she was noted to have received fluoroquinolone antibiotics following her initial treatment and was not routinely performing eccentric exercises. Her symptoms improved significantly with 3 further treatment sessions of R-SWT.

Few options exist that offer athletes a safe method for expedited return to competition in refractory tendon disease. Standardized protocols for R-SWT do not exist; however, studies with treatment sessions separated by 1 week, with a total of 3-5 treatments, appear to be most effective.[4]

R-SWT is arguably best studied in treatment of Achilles tendon disease, with documented gains when combined with eccentric loading.[7,8] In one study of R-SWT in athletes with PHT, Cacchio et al[6] randomized 40 athletes to treatment with R-SWT or with NSAIDs and a structured PT and exercise program. At 3 months, 80% of the R-SWT group returned to preinjury level of sport, compared to 0% in the conservative group.[6] A recent review article analyzed this study and concluded moderate level of evidence for use of R-SWT for PHT.[9]

Common side effects of treatment with R-SWT include local swelling, transient pain, and erythema.[4] Two cases of Achilles tendon rupture were identified in a recent review; however neither patient was identified as an athlete and each received high energy focused SWT.[10] R-SWT is not routinely reimbursed by insurance companies; both patients incurred out-of-pocket costs for treatment. The individual patient goals and prior treatments were considered in decision-making. Both patients expressed high satisfaction with their treatment outcome.

These cases highlight the potential use of R-SWT for athletes who desire to remain active in sport during treatment. Larger studies may help to determine optimal treatment protocols and which athletes and conditions respond best.

Acknowledgments

We are grateful to both patients who provided consent to publish this case report.

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Disclosure

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Disclosure: none.

Funding: No funding was received to support this research.

Submitted for publication February 10, 2019; accepted April 19, 2019.