

Conservative treatment for recalcitrant Achilles tendinopathy in a soccer player: Case report and review of the literature

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Abstract

Background Achilles tendinopathy (AT) management remains a major challenge and a consensus about the optimal conservative treatment for AT is yet to be reached. In this case report we described a multimodal conservative treatment protocol for a recalcitrant chronic AT. Furthermore, we performed a short narrative review about the formulated pathophysiological hypothesis and the conservative therapies we used in our case report.

Materials and Methods Our patient was a 49-year-old, overweight, recreational soccer player who complained of pain at the left Achilles tendon that gradually increased week by week. The patient ascribed his pain to the use of low-quality soccer boots that he bought after the reopening of sports facilities after the COVID-19 pandemic. He also referred that he restarted playing soccer without any gradual progression. Clinical and ultrasound examination were suggestive of AT. We supposed an association between being overweight and the long detraining period and the development of AT as a possible pathophysiologic mechanism. Since the patient asked us for a rapid resolution of his symptoms, we then decided to set up a multimodal conservative treatment with focused extracorporeal shockwave therapy (f-ESWT), peritendinous hyaluronic acid (HA) injections, and eccentric exercises (EE). **Results and Conclusions** At the 45-day follow-up, significant improvements in pain, function, and ankle strength were found. There is no evidence about the effectiveness of a combined treatment (f-ESWT, HA and EE) for AT, so our multimodal protocol could be proposed as an effective approach in reducing AT in the short-term, especially for patients who need to get back to sport quickly.

Keywords: Achilles tendon; Achilles tendon pathology; Achilles tendinopathy; Achilles tendinopathy conservative treatment; Achilles tendinopathy rehabilitation

Introduction

The Achilles tendon is the thickest, strongest, and largest tendon in the human body, and it can undergo both degenerative and traumatic processes (Aicale et al., 2018b; Maffulli et al., 2018). Tendinopathies are among the most frequent orthopedic injuries (Loiacono et al., 2019), and the Achilles tendon is the most injured tendon in the human body, accounting for 20% of all tendon ruptures (Oda et al., 2017; Tarantino, Palermi, et al., 2020).

Achilles tendinopathy (AT) is characterized by pain and swelling in and around the tendon, mainly arising from overuse, and it is cause of disability to several athletes (Aicale et al., 2018a), especially those participating to track and field sports, volleyball, and soccer (Maffulli et al., 1998). AT is a common cause of disability in many athletes because of continuous prolonged intense functional demands imposed on the Achilles tendon. Pain is the main symptom of this pathology; it may occur throughout the entire exercise session and interfere with activities of daily living (Maffulli et al., 2020; Tarantino et al., 2021, 2023).

Two types of AT have been described: insertional and non-insertional (depending on the affected site), which are characterized by different pathophysiological features and treatment options (Aicale et al., 2019; Maffulli et al., 2020). The origin of pain remains unknown (Longo et al., 2009), and the soreness is usually experienced at the beginning and after a training session. However, as the pathological process advances, pain may occur throughout the entire exercise session and interfere with daily living activities (Aicale et al., 2017; Maffulli et al., 2015). A proper clinical examination is the cornerstone of AT’s diagnosis, and imaging techniques can be a valuable tool to provide additional clinical information (Maffulli et al., 2020; Tarantino, Palermi, et al.,

2020). Clinically, pain is, generally, reported at 2 to 6 cm above the tendon insertion into the calcaneus (Hutchison et al., 2013; Tarantino et al., 2021). Conservative treatment for AT lacks of strong evidence support, and affected patients have an increased risk of long-term morbidity with undefined clinical outcomes (Kader et al., 2002). Treatment options for AT are primarily conservative (i.e. nonsteroidal anti-inflammatory drugs (NSAIDs), eccentric exercises (EE), extracorporeal shockwave therapy (ESWT), injection therapies, etc.) (Abate et al., 2008; De Sire et al., 2022; Tedeschi, Platano, Donati, et al., 2024; Tedeschi, Platano, Melotto, et al., 2024a, 2024b), while surgery is indicated when conservative treatment fails (Aicale et al., 2018c; Maffulli et al., 2017). Growing evidence supports the use of biological therapies for the treatment of tendinopathies (Aicale et al., 2025; Di Meglio et al., 2020; Leopold, 2025; Palermi et al., 2023; Poenaru et al., 2025; Vascellari et al., 2024).

AT is a frequent condition that significantly impairs athletic performance and quality of life. Recalcitrant cases that fail to respond to single conservative therapies pose a particular management dilemma. Despite the availability of multiple conservative options—ranging from exercise therapy to ESWT and injective treatments—there is a lack of strong evidence guiding the combined or sequential use of these modalities.

The COVID-19 pandemic further complicated the rehabilitation landscape, as periods of detraining, weight gain, and sudden return to activity increased the incidence of tendon disorders. Our case involves a post-pandemic recreational athlete who developed a chronic AT condition likely due to an abrupt return to sport and inappropriate footwear, compounded by being overweight. This case highlights the need to identify and report feasible, rapid, and effective treatment strategies that address the complex pathophysiology of chronic AT, particularly in individuals eager to return to sport within a limited time. For this reason, we managed the patient with a multimodal conservative protocol over a 30-day period, combining EE, known to stimulate tendon remodeling, ESWT to induce mechanotransduction and promote tendon healing, and two peritendinous ultrasound-guided hyaluronic acid (HA) injections, aimed at reducing inflammation and improving tendon viscoelasticity.

The protocol was chosen based on pathophysiological reasoning, patient preference for non-surgical rapid recovery, and available literature suggesting additive effects of these modalities when used in combination.

Finally, we performed a short narrative review about the formulated pathophysiological hypothesis and the conservative therapies we used in our case report.

Materials and Methods

A 49-year-old Caucasian man referred at the Chiparo Physical Medicine and Rehabilitation outpatient in Lecce in October 2021 for chronic recalcitrant pain at his left Achilles tendon. He was 185 cm tall and weighed 98 kg (BMI 28.7 kg/m²), an administrator of a local sports facility, who plays soccer at an amateur level from ten years, three times a week. He was affected by asthma and allergic rhinitis, and he was taking antihistamines only when necessary. He had no history of previous major traumas or surgical interventions. Clinical complaints started in April 2021 with pain at the left Achilles tendon that gradually increased week by week. The patient attributed his pain to the use of a low-quality soccer boots that he bought just after the reopening of sports facilities following the COVID-19 pandemic. He also referred that he restarted playing soccer without any gradual progression. Even though the pain gradually increased over the weeks, he did not withdraw from playing soccer, reporting that the pain at the Achilles tendon usually started after ten minutes from the kick-off, and he continued to play for the entire game despite his pain.

Four weeks after the onset of pain, since it became very intense (the patient referred a pain of 8/10 on the Visual Analogue Scale (VAS)), he referred to a physiotherapist who treated him with ten daily sessions of physical therapy using low-level laser treatment, capacitive and resistive electric transfer (TECAR) therapy, and stretching exercises. Since his pain did not significantly decrease, the patient then referred to a Medical Doctor who treated him with acupuncture. Despite this treatment, pain reduction was not significant (VAS decreased to 7/10). Therefore, the patients decided to consult a physiatrist. The clinical case and the planning of the treatment protocol were discussed by three authors (D.T., F.S. and R.P.), while the physical and ultrasound (US) examination and treatment procedures were performed by one author (R.P.). On physical examination, the patient reported pain 6 cm above the tendon insertion into the calcaneus, which is typical of non-insertional AT. The “painful arc” sign (Willia, 1986) and Royal London Hospital test were both positive (Hutchison et al., 2013). We then performed an US examination which showed a thickening (1.09 cm) of the Achilles tendon in its mid-portion, with a heterogeneous organization of the tendon fibers and peritendinous edema (Figure 1).

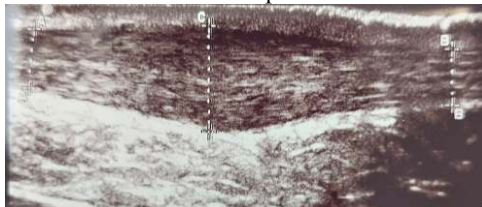


Figure 1. Ultrasound scanning of the affected Achilles tendon showing significant thickening and peritendinous edema.

Since the patient was very distressed due to the prolonged period of heel pain and requested a rapid resolution of his symptoms to return to playing soccer quickly, we then decided to set up a multimodal conservative treatment with f-ESWT, peritendinous HA injections, and EE following the Alfredson's protocol (Alfredson et al., 1998), in order to provide different biological stimuli to the Achilles tendon and enhance the healing process and pain resolution. The entire treatment period lasted one month. Three sessions (one per week for three weeks) of focused ESWT therapy were performed using the piezoelectric generator Swiss PiezoClast®, EMS, Nyon, Switzerland. For each therapeutic session with f-ESWT, 2000 pulses were emitted by the focused shock wave generator with an energy flux density ranging from 0.11–0.28 mJ/mm² and a frequency between six and eight Hz. Two US-guided peritendinous HA (Hyalotend®, Fidia Farmaceutici S.p.A., Abano Terme, Padova, Italy) injections were performed (Figure 2A and 2B), one week and 17 days after the end of the f-ESWT treatment. No anesthetic drugs were administered before or after the infiltrative treatment.



Figure 2. Ultrasound-guided hyaluronic acid injection.

The EE, following the Alfredson protocol (Figure 3), started on the first day of treatment (concomitant with the first f-ESWT session) and were performed daily until the last day of treatment (at one month) (Alfredson et al., 1998).



Figure 3. Alfredson's protocol of eccentric exercises.

To assess the effectiveness of the proposed conservative treatment, three outcomes were considered before and after the end of the treatment: the VAS, the Victorian Institute of Sports Assessment–Achilles (VISA-A) score (a 10-question score based on pain, functionality, and physical activity, with scores ranging from 0 to 100, where 100 represents a perfect score) (Maffulli et al., 2008), and both peak and mean strength using an electronic dynamometer specifically equipped for assessing foot muscle strength. The electronic dynamometer used was the Activeforce2® (Sixtus, Prato, Italy). Peak torque and mean strength were measured during plantarflexion maximal voluntary isometric contractions (MVICs) against manual resistance (Bandinelli et al., 1999). The dynamometric test consisted of three plantarflexion MVICs, with the patient lying on a bed in a prone position and with the knee fully extended. Fifteen seconds of rest were observed between MVICs. At baseline, VAS was 7/10 and VISA-A score was 40/100, while peak and mean strength were 101.31 N and 81.45 N, respectively (Figure 4).

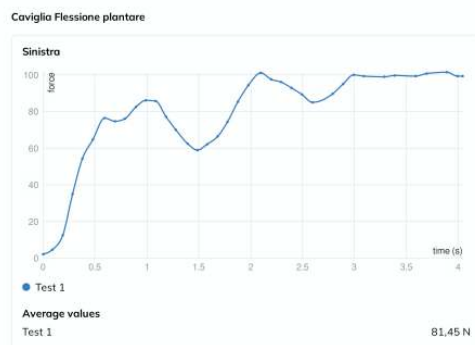


Figure 4. Peak and mean strength during ankle plantar flexion measured using the electronic dynamometer at baseline. The peak strength (101.3 N) was reached after two second of muscle performance.

At the final assessment, performed 15 days after the end of the conservative treatment (45 days from baseline), pain decreased by more than the minimal clinically important difference (MCID) (1.1 points) (Challoumas et al., 2023), as measured by VAS (from 7/10 to 3/10); function improved beyond the MCID reported in four studies (6.5, 8, 14, and 16 points) (Challoumas et al., 2023; Lagas et al., 2021; Macdermid & Silbernagel, 2015; McCormack et al., 2015), as measured with the VISA-A score (from 40/100 to 88/100); and ankle strength significantly increased (peak and mean strength increased to 218.58 N and 181.67 N, respectively) (Figure 5).

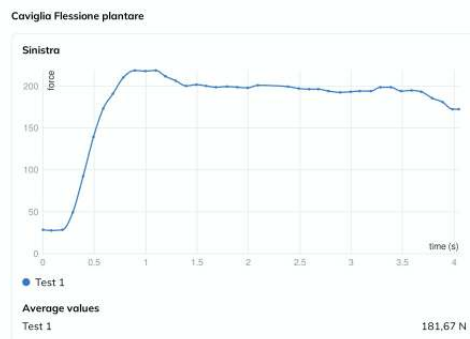


Figure 5. Peak and mean strength measured using the electronic dynamometer at final follow-up.

Discussion

AT management remains a major challenge; however, advances in the conservative approach have been made and have been supported by several studies regarding the pathologic changes due to overuse of the tendon (Aicale et al., 2018a). The natural course and clinical evolution of AT are still unclear, but this condition seems to be self-limiting in several patients (Riggin et al., 2015). Lesions present in AT occur when the healing response of the tendon fails, and differences are dependent on the lesion site (Riggin et al., 2015). Therefore, it is of crucial importance to understand whether many of the commonly used conservative treatments are effective (Longo et al., 2009). In this case report, we describe a multimodal conservative approach to chronic recalcitrant AT in a patient who suffered from heel pain for more than six months and sought a rapid resolution of symptoms. The patient manifested clinical symptoms and signs suggestive of AT (Maffulli et al., 2015), including pain when stretching the Achilles tendon fully over the edge of a step, pain during or immediately after performing 10 (single-leg) heel raises from a flat surface, and pain after 10 minutes from kick-off while participating in Achilles tendon-loading sports (soccer, in this case), without stopping soccer activity, as documented by the VISA-A questionnaire. VISA-A was developed as a tool to evaluate the severity of AT and to facilitate comparison of the effects of different rehabilitation regimens regarding symptoms, function, and activity in AT patients (Lagas et al., 2021). The questionnaire has been proven to be both a valid and reliable instrument (Challoumas et al., 2023; Maffulli et al., 2008; Silbernagel et al., 2005). Furthermore, the US examination revealed characteristic features of AT that correlated with the patient's symptoms, proving to be a useful adjunct to the clinical examination (Chimenti et al., 2024; Matthews et al., 2020). The use of an electronic dynamometer to assess ankle strength was found to be a reliable tool not only for detecting the loss of plantarflexion strength, which is a typical feature of AT (Quarmby et al., 2023), but also for providing an objective measure of the improvements in ankle strength after the completion of conservative treatment (Mulder et al., 2023; Radovanović et al., 2022).

Pathophysiological hypothesis

The patient attributed his pain to the use of low-quality soccer boots that he bought just after the reopening of sports facilities following the COVID-19 pandemic. There is no evidence that wearing low-quality soccer boots—or soccer boots in general—can lead to the development of AT. A comprehensive review by Blanchard et al. (2018) stated that athletes wearing cleated soccer boots have greater ankle dorsiflexion compared to running shoes, both in standing position and during the support phases of running (Walter & Ng, 2002). This initial ankle dorsiflexion decreases the functional range of motion (ROM) of the remaining available dorsiflexion and appears to be correlated with the high stress to which the sural/Achilles/plantar complex is exposed—twice as much in soccer boots compared to running shoes (Blanchard et al., 2018). The use of minimalist soccer boots could be helpful in increasing the cross-sectional area, stiffness, and impulse of the Achilles tendon compared with conventional shoes, as reported by Sun et al. (2020) in their systematic review about shoe construction effects on running biomechanics. The patient also reported restarting soccer without any gradual progression after a 2-year period of detraining. In this context, a systematic review by Frizziero et al. (2016) showed that long periods of detraining (>12 weeks) decrease the mean muscle fiber areas of both fiber types, reduce the cross-sectional area, and decrease the voluntary capacity to generate force. Prolonged exposure to mechanical unloading may also cause impairments in tendon structure and properties (Kubo et al., 2010). Even short periods of detraining can lead to reduced mitochondrial function and capacity (Hood, 2001), and only a 2-week period of detraining was found

to decrease lipoprotein lipase (LPL) regulation in the muscles of athletes and increase LPL activity in adipose tissue, contributing to adipose tissue storage (Simsolo et al., 1993). Moreover, significant deterioration in tendon mechanical properties (nearly 10% decrease in tendon stiffness and Young's modulus) was also observed after two weeks of unilateral lower limb suspension (de Boer et al., 2007). In our case report, the long period of detraining probably led to impairments in the Achilles tendon structure (as revealed by the US examination) and mechanical properties. These morphological and physiological remodeling adaptations underline the importance of movement and exercise to preserve the integrity of tendons and to reduce mechanical unloading, such as that experienced during the COVID-19 home confinement (Girardi et al., 2020; Heo et al., 2022; Kalkhoven et al., 2020; Silva et al., 2022). In our case, however, the patient did not perform any kind of home-based physical activity. Furthermore, the non-gradual return to physical activity (with the subsequent sudden increase in loading on the AT), along with being overweight (a BMI between 25.0 and 29.9 was found to be associated with a 2.6-fold increased risk of AT) (Franceschi et al., 2014; He et al., 2022), likely contributed to the development of AT.

Conservative treatment

Several conservative therapeutic options are available, but most of them lack a strong scientific foundation (Aicale et al., 2018c; Maffulli & Longo, 2008). EE is the most effective conservative treatment for non-insertional AT (Aicale et al., 2019; Križaj et al., 2022), with the most consistent evidence supporting its effectiveness (Ackermann et al., 2018; Aicale et al., 2019), leading to improvements in symptoms and function (Habets & van Cingel, 2015; Luan et al., 2019; Maffulli et al., 2015; Murphy et al., 2018); tendon properties (e.g., increased tendon volume, decreased tendon cross-sectional area, decreased free tendon diameter, reduced tendon post-capillary filling pressure and capillary blood flow, increased type I collagen synthesis, and reduced tendon neovascularization) (Luan et al., 2019; Murphy et al., 2018; Obst et al., 2013; Rabello et al., 2020); strength (Malliaras et al., 2013); ankle performance (Rabello et al., 2020); and patient satisfaction compared to baseline (Magnussen et al., 2009). The Alfredson protocol is the most commonly used protocol: exercises are performed in three sets of 15 repetitions, twice a day for 12 weeks (Alfredson et al., 1998). EE alone may not work in all patients (Sayana & Maffulli, 2007), and the mechanism of action is not completely understood (Maffulli et al., 2015). Nevertheless, the overall trend suggests a positive effect of EE, in the complete absence of adverse effects (Alfredson et al., 1998). Two to four weeks have been found to be sufficient for EE to decrease pain and improve function in patients with mid-portion AT, while peak effectiveness of EE is observed at the end of the 12-week protocol (Križaj et al., 2022). In our case report, significant improvements in pain and function were found at the 45-day follow-up. Where available, ESWT can be used as a second-line treatment option (Aicale et al., 2018a, 2019). It acts on two aspects of clinical response: tissue healing and pain transmission (Nazim B Tengku Yusof et al., 2022; Pellegrino, Di Iorio, et al., 2022). ESWT has been shown to produce similar improvements in function and pain reduction in non-insertional AT as EE (Mani-Babu et al., 2015; Meyer et al., 2009). ESWT generates high strains in tendon, producing analgesic effects and stimulating tissue healing (Chung & Wiley, 2002; Pellegrino, Brindisino, et al., 2022); however, there is no consensus regarding application method, generation type, energy level, number of sessions, or treatment frequency (Stania et al., 2019). ESWT treatments can be divided into two types based on energy level: low-energy ESWT and high-energy ESWT (Pellegrino et al., 2023; Speed, 2014). Several studies have shown that low-energy ESWT, when compared to EE, is more effective than EE alone for insertional AT (Rompe et al., 2008). Korakakis et al. found that a 12-week high-energy ESWT treatment improved function and reduced pain in patients with non-insertional AT, whereas low-energy ESWT did not (Korakakis et al., 2018).

However, Rowe et al. reported no difference between combined EE with low-energy ESWT and high-energy ESWT in terms of pain reduction at a 12-month follow-up (Rowe et al., 2012). It should be noted that when low-energy ESWT is not used according to the recommendations and modalities outlined in the scientific literature, results may be poor (Costa et al., 2005). Recently, the use of peritendinous injections of HA has been proposed for the treatment of AT (Frizziero et al., 2019; Khan et al., n.d.; Poenaru et al., 2025) and has been found to be safe and well-tolerated (Abate et al., 2014), improving pain and function along with amelioration of tendon structure and neovascularization (Crimaldi et al., 2021; Ferreira et al., 2022; Frizziero et al., 2019). The administration of peritendinous HA is associated with lubricating and anti-inflammatory properties (Ferreira et al., 2022), through a decrease in inflammatory marker levels in the peritendinous effusion, resulting in improved AT-related symptoms (Wu et al., 2017). Recent studies have reported favorable outcomes using HA for non-insertional AT in the short term (Ferreira et al., 2022; Fogli et al., 2017; Frizziero et al., 2019; Ohana et al., 2024). One of these recent studies also evaluated ankle strength using a dynamometer (Gervasi et al., 2021), similar to our procedure, and found a constant increase in MVIC until the final follow-up—45 days, as in our case. Lynen et al. compared the efficacy of two peritendinous HA injections with three ESWT sessions (both administered weekly) in patients with AT, and found significantly greater pain relief with HA (68.1% reduction vs. 47.9% for ESWT) at four weeks, as well as reductions at three- and six-month follow-ups (Lynen et al., 2017). In our case report, using a combined approach with the same number of HA injections and f-ESWT sessions, pain decreased by 57% at the 45-day follow-up. However, there is currently no evidence supporting the effectiveness of combined

HA and f-ESWT treatment for AT, with proof of efficacy reported only by Pellegrino et al. for the treatment of rotator cuff tendinopathy (Pellegrino, Paolucci, et al., 2022). For this reason, and given the excellent outcomes reported in our case report, our multimodal conservative treatment with f-ESWT, peritendinous HA injections, and EE could be proposed as an effective short-term approach to reduce AT symptoms, especially in patients who need or request a rapid return to sport.

Conclusions

This case report demonstrates that a multimodal conservative approach, incorporating EE, focused ESWT, and peritendinous HA injections, can produce rapid and clinically meaningful improvements in pain, function, and muscle strength in a case of recalcitrant mid-portion AT.

The short-term success of this protocol—achieving pain reduction beyond the MCID and functional improvements within 45 days—highlights its potential applicability, especially for recreational athletes seeking expedited return to sport. Notably, the objective increase in ankle plantarflexion strength reinforces the functional benefits of this approach beyond symptom relief.

Although evidence supporting the individual effectiveness of each modality is growing, there is currently no established consensus or high-level evidence on their combined use, particularly in a real-world, sport-related rehabilitation context. Our case provides initial support for a comprehensive, biology-driven, and patient-centered rehabilitation strategy.

In conclusion, although limited to a single case, our findings contribute to the evolving paradigm of multimodal tendon rehabilitation and advocate for the integration of mechanical, biological, and patient-driven factors in conservative management strategies for AT. Future controlled studies with larger sample sizes are needed to validate the efficacy and cost-effectiveness of such combination protocols, explore long-term outcomes, and identify subgroups of patients who may benefit most. Nonetheless, our findings suggest that personalized multimodal conservative treatment may offer a viable alternative to surgery in selected patients with chronic AT.

Conflicts of Interest: The authors declare no conflicts of interest.

References

- Abate, M., Pelotti, P., De Amicis, D., Di Iorio, A., Galletti, S., & Salini, V. (2008). Viscosupplementation with hyaluronic acid in hip osteoarthritis (a review). *Uppsala Journal of Medical Sciences*, 113(3), 261–278. <https://doi.org/10.3109/2000-1967-233>
- Abate, M., Schiavone, C., & Salini, V. (2014). The use of hyaluronic acid after tendon surgery and in tendinopathies. *BioMed research international*, 2014. <https://doi.org/10.1155/2014/783632>
- Ackermann, P. W., Phisitkul, P., & Pearce, C. J. (2018). Treatment of Achilles tendinopathy: State of the art. *Journal of ISAKOS*, 3(6), 367–376. <https://doi.org/10.1136/JISAKOS-2018-000202>
- Aicale, R., Savarese, E., Mottola, R., Corrado, B., Sirico, F., Pellegrino, R., Donati, D., Tedeschi, R., Ruosi, L., & Tarantino, D. (2025). Collagen Injections for Rotator Cuff Diseases: A Systematic Review. *Clinics and Practice*, 15(2), 28. <https://doi.org/10.3390/clinpract15020028>
- Aicale, R., Tarantino, D., & Maffulli, N. (2017). Basic science of tendons. *Bio-orthopaedics: A New Approach*, 249–273. https://doi.org/10.1007/978-3-662-54181-4_21/COVER
- Aicale, R., Tarantino, D., & Maffulli, N. (2018a). Overuse injuries in sport: A comprehensive overview. *Journal of orthopaedic surgery and research*, 13(1). <https://doi.org/10.1186/S13018-018-1017-5>
- Aicale, R., Tarantino, D., & Maffulli, N. (2018b). Surgery in Tendinopathies. *Sports Medicine and Arthroscopy Review*, 26(4), 200–202. <https://doi.org/10.1097/JSA.0000000000000214>
- Aicale, R., Tarantino, D., & Maffulli, N. (2019). Non-insertional achilles tendinopathy: State of the art. *Sports Injuries of the Foot and Ankle: A Focus on Advanced Surgical Techniques*, 359–367. https://doi.org/10.1007/978-3-662-58704-1_32/COVER
- Alfredson, H., Pietilä, T., Jonsson, P., & Lorentzon, R. (1998). Heavy-load eccentric calf muscle training for the treatment of chronic Achilles tendinosis. *The American journal of sports medicine*, 26(3), 360–366. <https://doi.org/10.1177/03635465980260030301>
- Bandinelli, S., Benvenuti, E., Del Lungo, I., Baccini, M., Benvenuti, F., Di Iorio, A., & Ferrucci, L. (1999). Measuring muscular strength of the lower limbs by hand-held dynamometer: A standard protocol. *Aging Clinical and Experimental Research*, 11(5), 287–293. <https://doi.org/10.1007/BF03339802>
- Blanchard, S., Palestri, J., Guer, J.-L., & BEHR, M. (2018). Current Soccer Footwear, Its Role in Injuries and Potential for Improvement. *Sports medicine international open*, 2(2), E52–E61. <https://doi.org/10.1055/A-0608-4229>
- Challoumas, D., Zouvani, A., Creavin, K., Murray, E., Crosbie, G., Ng, N., & Millar, N. L. (2023). Determining minimal important differences for patient-reported outcome measures in shoulder, lateral elbow, patellar and Achilles tendinopathies using distribution-based methods. *BMC musculoskeletal disorders*, 24(1). <https://doi.org/10.1186/S12891-023-06261-9>

- Chimentì, R. L., Hall, M. M., & Vosseller, J. T. (2024). Diagnostic Imaging for Achilles Tendinopathy: Unnecessary Scans? Valuable Insights? Multidisciplinary Clinician-Scientists Present a Nuanced View. *The Journal of orthopaedic and sports physical therapy*, 54(1), 1–4. <https://doi.org/10.2519/JOSPT.2023.12255>
- Chung, B., & Wiley, J. P. (2002). Extracorporeal shockwave therapy: A review. *Sports medicine (Auckland, N.Z.)*, 32(13), 851–865. <https://doi.org/10.2165/00007256-200232130-00004>
- Costa, M. L., Shepstone, L., Donell, S. T., & Thomas, T. L. (2005). Shock wave therapy for chronic Achilles tendon pain: A randomized placebo-controlled trial. *Clinical orthopaedics and related research*, 440, 199–204. <https://doi.org/10.1097/01.BLO.0000180451.03425.48>
- Crimaldi, S., Liguori, S., Tamburrino, P., Moretti, A., Paoletta, M., Toro, G., & Iolascon, G. (2021). The Role of Hyaluronic Acid in Sport-Related Tendinopathies: A Narrative Review. *Medicina (Kaunas, Lithuania)*, 57(10), 1088. <https://doi.org/10.3390/MEDICINA57101088>
- de Boer, M. D., Maganaris, C. N., Seynnes, O. R., Rennie, M. J., & Narici, M. V. (2007). Time course of muscular, neural and tendinous adaptations to 23 day unilateral lower-limb suspension in young men. *The Journal of Physiology*, 583(Pt 3), 1079. <https://doi.org/10.1113/JPHYSIOL.2007.135392>
- De Sire, A., Lippi, L., Mezian, K., Calafiore, D., Pellegrino, R., Mascaro, G., Cisari, C., & Invernizzi, M. (2022). Ultrasound-guided platelet-rich-plasma injections for reducing sacroiliac joint pain: A paradigmatic case report and literature review. *Journal of back and musculoskeletal rehabilitation*, 35(5), 977–982. <https://doi.org/10.3233/BMR-210310>
- Di Meglio, F., Sacco, A. M., Belviso, I., Romano, V., Sirico, F., Loiacono, C., Palermi, S., Pempinello, C., Montagnani, S., Nurzynska, D., & Castaldo, C. (2020). Influence of supplements and drugs used for the treatment of musculoskeletal disorders on adult human tendon-derived stem cells. *Muscles, Ligaments and Tendons Journal*, 10(3), 376–384. <https://doi.org/10.32098/MLTJ.03.2020.04>
- Ferreira, G. F., Caruccio, F. R. C., Guerrero Bou Assi, J. R., Pedroso, J. P., dos Santos, T. F., Arliani, G. G., & Filho, M. V. P. (2022). Ultrasound-guided hyaluronic acid injection for the treatment of insertional Achilles tendinopathy: A prospective case series. *Foot and ankle surgery : official journal of the European Society of Foot and Ankle Surgeons*, 28(7), 879–882. <https://doi.org/10.1016/J.FAS.2021.12.004>
- Fogli, M., Giordan, N., Mazzoni, G., M. F., N. G., & G. M. (2017). Efficacy and safety of hyaluronic acid (500-730kDa) Ultrasound-guided injections on painful tendinopathies: A prospective, open label, clinical study. *Muscles, Ligaments and Tendons Journal*, 7(2), 388. <https://doi.org/10.11138/mltj/2017.7.2.388>
- Franceschi, F., Papalia, R., Paciotti, M., Franceschetti, E., Martino, A. Di, Maffulli, N., & Denaro, V. (2014). Obesity as a risk factor for tendinopathy: A systematic review. *International journal of endocrinology*, 2014. <https://doi.org/10.1155/2014/670262>
- Frizziero, A., Oliva, F., Vittadini, F., Vetrano, M., Bernetti, A., Giordan, N., Vulpiani, M. C., Santilli, V., Masiero, S., & Maffulli, N. (2019). Efficacy of ultrasound-guided hyaluronic acid injections in achilles and patellar tendinopathies: A prospective multicentric clinical trial. *Muscles, Ligaments and Tendons Journal*, 9(3), 305–313. <https://doi.org/10.32098/MLTJ.03.2019.01>
- Frizziero, A., Salamanna, F., Della Bella, E., Vittadini, F., Gasparre, G., Nicoli Aldini, N., Masiero, S., Fini, M., Aldini, N. N., Masiero, S., & Fini, M. (2016). The Role of Detraining in Tendon Mechanobiology. *Frontiers in Aging Neuroscience*, 8(FEB). <https://doi.org/10.3389/fnagi.2016.00043>
- Gervasi, M., Barbieri, E., Capparucci, I., Annibellini, G., Sisti, D., Amatori, S., Carrabs, V., Valli, G., Zeppa, S. D., Rocchi, M. B. L., Stocchi, V., & Sestili, P. (2021). Treatment of Achilles Tendinopathy in Recreational Runners with Peritendinous Hyaluronic Acid Injections: A Viscoelastometric, Functional, and Biochemical Pilot Study. 10(7), 1397. <https://doi.org/10.3390/JCM10071397>
- Girardi, M., Casolo, A., Nuccio, S., Gattoni, C., & Capelli, C. (2020). Detraining Effects Prevention: A New Rising Challenge for Athletes. *Frontiers in physiology*, 11. <https://doi.org/10.3389/FPHYS.2020.588784>
- Habets, B., & van Cingel, R. E. H. (2015). Eccentric exercise training in chronic mid-portion Achilles tendinopathy: A systematic review on different protocols. *Scandinavian journal of medicine & science in sports*, 25(1), 3–15. <https://doi.org/10.1111/SMS.12208>
- He, L., Yu, T., Zhang, W., Wang, B., Ma, Y., & Li, S. (2022). Causal Associations of Obesity With Achilles Tendinopathy: A Two-Sample Mendelian Randomization Study. *Frontiers in endocrinology*, 13. <https://doi.org/10.3389/FENDO.2022.902142>
- Heo, S. J., Park, S. K., & Jee, Y. S. (2022). Detraining Effects of COVID-19 Pandemic on Physical Fitness, Cytokines, C-Reactive Protein and Immunocytes in Men of Various Age Groups. *International journal of environmental research and public health*, 19(3). <https://doi.org/10.3390/IJERPH19031845>
- Hood, D. A. (2001). Invited Review: Contractile activity-induced mitochondrial biogenesis in skeletal muscle. *Journal of applied physiology (Bethesda, Md. : 1985)*, 90(3), 1137–1157. <https://doi.org/10.1152/JAPPL.2001.90.3.1137>
- Hutchison, A. M., Evans, R., Bodger, O., Pallister, I., Topliss, C., Williams, P., Vannet, N., Morris, V., & Beard, D. (2013). What is the best clinical test for Achilles tendinopathy? *Foot and ankle surgery : official*

-
- journal of the European Society of Foot and Ankle Surgeons*, 19(2), 112–117.
<https://doi.org/10.1016/J.FAS.2012.12.006>
- Kader, D., Saxena, A., Movin, T., & Maffulli, N. (2002). Achilles tendinopathy: Some aspects of basic science and clinical management. *British journal of sports medicine*, 36(4), 239–249.
<https://doi.org/10.1136/BJSM.36.4.239>
- Kalkhoven, J. T., Watsford, M. L., & Impellizzeri, F. M. (2020). A conceptual model and detailed framework for stress-related, strain-related, and overuse athletic injury. *Journal of science and medicine in sport*, 23(8), 726–734. <https://doi.org/10.1016/J.JSAMS.2020.02.002>
- Khan, M., Shanmugaraj, A., Prada, C., Patel, A., Babins, E., & Bhandari, M. (s.d.). The Role of Hyaluronic Acid for Soft Tissue Indications: A Systematic Review and Meta-Analysis. *Sports health*, 15(1).
<https://doi.org/10.1177/19417381211073316>
- Korakakis, V., Whiteley, R., Tzavara, A., & Malliaropoulos, N. (2018). The effectiveness of extracorporeal shockwave therapy in common lower limb conditions: A systematic review including quantification of patient-rated pain reduction. *British journal of sports medicine*, 52(6). <https://doi.org/10.1136/BJSPORTS-2016-097347>
- Križaj, L., Kozinc, Ž., & Šarabon, N. (2022). The Outcomes of Conservative Nonpharmacological Treatments for Achilles Tendinopathy: An Umbrella Review. *Applied Sciences (Switzerland)*, 12(23), 12132.
<https://doi.org/10.3390/AP122312132/S1>
- Kubo, K., Ikebukuro, T., Yata, H., Tsunoda, N., & Kanehisa, H. (2010). Time course of changes in muscle and tendon properties during strength training and detraining. *Journal of strength and conditioning research*, 24(2), 322–331. <https://doi.org/10.1519/JSC.0B013E3181C865E2>
- Lagas, I. F., van der Vlist, A. C., van Oosterom, R. F., van Veldhoven, P. L. J., Reijman, M., Verhaar, J. A. N., & de Vos, R. J. (2021). Victorian Institute of Sport Assessment-Achilles (VISA-A) Questionnaire-Minimal Clinically Important Difference for Active People With Midportion Achilles Tendinopathy: A Prospective Cohort Study. *The Journal of orthopaedic and sports physical therapy*, 51(10), 510–516.
<https://doi.org/10.2519/JOSPT.2021.10040>
- Leopold, S. S. (2025). Editor's Spotlight/Take 5: Is Platelet-rich Plasma Effective in Treating Achilles Tendinopathy? A Meta-analysis of Randomized Clinical Trials. *Clinical Orthopaedics and Related Research*, 483(5), 775–778. <https://doi.org/10.1097/CORR.0000000000003478>
- Loiacono, C., Palermi, S., Massa, B., Belviso, I., Romano, V., Di Gregorio, A., Sirico, F., & Sacco, A. M. (2019). Tendinopathy: Pathophysiology, Therapeutic Options, and Role of Nutraceuticals. A Narrative Literature Review. *Medicina*, 55(8). <https://doi.org/10.3390/medicina55080447>
- Longo, U. G., Ronga, M., & Maffulli, N. (2009). Achilles tendinopathy. *Sports medicine and arthroscopy review*, 17(2), 112–126. <https://doi.org/10.1097/JSA.0B013E3181A3D625>
- Luan, X., Tian, X., Zhang, H., Huang, R., Li, N., Chen, P., & Wang, R. (2019). Exercise as a prescription for patients with various diseases. *Journal of sport and health science*, 8(5), 422–441.
<https://doi.org/10.1016/J.JSHS.2019.04.002>
- Lynen, N., De Vroey, T., Spiegel, I., Van Ongeval, F., Hendrickx, N. J., & Stassijns, G. (2017). Comparison of Peritendinous Hyaluronan Injections Versus Extracorporeal Shock Wave Therapy in the Treatment of Painful Achilles' Tendinopathy: A Randomized Clinical Efficacy and Safety Study. *Archives of physical medicine and rehabilitation*, 98(1), 64–71. <https://doi.org/10.1016/J.APMR.2016.08.470>
- Macdermid, J. C., & Silbernagel, K. G. (2015). Outcome Evaluation in Tendinopathy: Foundations of Assessment and a Summary of Selected Measures. *The Journal of orthopaedic and sports physical therapy*, 45(11), 950–964. <https://doi.org/10.2519/JOSPT.2015.6054>
- Maffulli, N., Aicale, R., & Tarantino, D. (2017). Autograft Reconstruction for Chronic Achilles Tendon Disorders. *Techniques in Foot & Ankle Surgery*, 16(3), 117. <https://doi.org/10.1097/BTF.0000000000000154>
- Maffulli, N., Aicale, R., & Tarantino, D. (2020). Tendinopathy of the Achilles Tendon. *Ankle Joint Arthroscopy*, 227–237. https://doi.org/10.1007/978-3-030-29231-7_31
- Maffulli, N., Aicale, R., Tarantino, D., Moretti, L., & Moretti, B. (2018). *Lesioni da sovraccarico*.
- Maffulli, N., Binfield, P. M., & King, J. B. (1998). Tendon problems in athletic individuals. In *The Journal of bone and joint surgery. American volume* (Vol. 80, Fascicolo 1, pp. 142–144).
- Maffulli, N., & Longo, U. G. (2008). Conservative management for tendinopathy: Is there enough scientific evidence? *Rheumatology (Oxford, England)*, 47(4), 390–391.
<https://doi.org/10.1093/Rheumatology/Ken011>
- Maffulli, N., Longo, U. G., Testa, V., Oliva, F., Capasso, G., & Denaro, V. (2008). Italian translation of the VISA-A score for tendinopathy of the main body of the Achilles tendon. *Disability and rehabilitation*, 30(20–22), 1635–1639. <https://doi.org/10.1080/09638280701785965>
- Maffulli, N., Via, A. G., & Oliva, F. (2015). Chronic Achilles Tendon Disorders: Tendinopathy and Chronic Rupture. *Clinics in sports medicine*, 34(4), 607–624. <https://doi.org/10.1016/J.CSM.2015.06.010>
-

- Magnussen, R. A., Dunn, W. R., & Thomson, A. B. (2009). Nonoperative treatment of midportion Achilles tendinopathy: A systematic review. *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*, 19(1), 54–64. <https://doi.org/10.1097/JSM.0B013E31818EF090>
- Malliaras, P., Barton, C. J., Reeves, N. D., & Langberg, H. (2013). Achilles and patellar tendinopathy loading programmes: A systematic review comparing clinical outcomes and identifying potential mechanisms for effectiveness. *Sports medicine (Auckland, N.Z.)*, 43(4), 267–286. <https://doi.org/10.1007/S40279-013-0019-Z>
- Mani-Babu, S., Morrissey, D., Waugh, C., Screen, H., & Barton, C. (2015). The effectiveness of extracorporeal shock wave therapy in lower limb tendinopathy: A systematic review. *American Journal of Sports Medicine*, 43(3), 752–761. <https://doi.org/10.1177/0363546514531911>
- Matthews, W., Ellis, R., Furness, J. W., Rathbone, E., & Hing, W. (2020). Staging achilles tendinopathy using ultrasound imaging: The development and investigation of a new ultrasound imaging criteria based on the continuum model of tendon pathology. *BMJ open sport & exercise medicine*, 6(1). <https://doi.org/10.1136/BMJSEM-2019-000699>
- McCormack, J., Underwood, F., Slaven, E., & Cappaert, T. (2015). The minimum clinically important difference on the VISA-A and LEFS for patients with insertional Achilles tendinopathy. *International journal of sports physical therapy*, 10(5), 639–644.
- Meyer, A., Tumilty, S., & Baxter, G. D. (2009). Eccentric exercise protocols for chronic non-insertional Achilles tendinopathy: How much is enough? *Scandinavian journal of medicine & science in sports*, 19(5), 609–615. <https://doi.org/10.1111/J.1600-0838.2009.00981.X>
- Mulder, C. F. L., van der Vlist, A. C., van Middelkoop, M., van Oosterom, R. F., van Veldhoven, P. L. J., Weir, A., Verhaar, J. A. N., & de Vos, R. J. (2023). Do physical tests have a prognostic value in chronic midportion Achilles tendinopathy? *Journal of Science and Medicine in Sport*, 26(8), 421–428. <https://doi.org/10.1016/J.JSAMS.2023.06.014>
- Murphy, M., Travers, M., Gibson, W., Chivers, P., Debenham, J., Docking, S., & Rio, E. (2018). Rate of Improvement of Pain and Function in Mid-Portion Achilles Tendinopathy with Loading Protocols: A Systematic Review and Longitudinal Meta-Analysis. *Sports medicine (Auckland, N.Z.)*, 48(8), 1875–1891. <https://doi.org/10.1007/S40279-018-0932-2>
- Nazim B Tengku Yusof, T., Seow, D., & Vig, K. S. (2022). Extracorporeal Shockwave Therapy for Foot and Ankle Disorders: A Systematic Review and Meta-Analysis. *Journal of the American Podiatric Medical Association*, 112(3). <https://doi.org/10.7547/18-191>
- Obst, S. J., Barrett, R. S., & Newsham-West, R. (2013). Immediate effect of exercise on achilles tendon properties: Systematic review. *Medicine and science in sports and exercise*, 45(8), 1534–1544. <https://doi.org/10.1249/MSS.0B013E318289D821>
- Oda, H., Sano, K., Kunimasa, Y., Komi, P. V., & Ishikawa, M. (2017). Neuromechanical Modulation of the Achilles Tendon During Bilateral Hopping in Patients with Unilateral Achilles Tendon Rupture, Over 1 Year After Surgical Repair. *Sports Medicine (Auckland, N.Z.)*, 47(6), 1221–1230. <https://doi.org/10.1007/s40279-016-0629-3>
- Ohana, N., Segal, D., Kots, E., Feldman, V., Nyska, M., Palmanovich, E., & Slevin, O. (2024). A pilot study exploring the use of hyaluronic acid in treating insertional achilles tendinopathy. *Journal of Orthopaedic Surgery (Hong Kong)*, 32(1), 10225536241242086. <https://doi.org/10.1177/10225536241242086>
- Palermi, S., Gnasso, R., Belviso, I., Iommazzo, I., Vecchiato, M., Marchini, A., Corsini, A., Vittadini, F., Demeco, A., Luca, M. D., Tarantino, D., Romano, V., Sacco, A., & Sirico, F. (2023). Stem cell therapy in sports medicine: Current applications, challenges and future perspectives. *Journal of Basic and Clinical Physiology and Pharmacology*. <https://doi.org/10.1515/jbcpp-2023-0200>
- Pellegrino, R., Brindisino, F., Barassi, G., Sparvieri, E., Di Iorio, A., de Sire, A., & Ruosi, C. (2022). Combined ultrasound guided peritendinous hyaluronic acid (500-730 Kda) injection with extracorporeal shock waves therapy vs. Extracorporeal shock waves therapy-only in the treatment of shoulder pain due to rotator cuff tendinopathy. A randomized clinical . *The Journal of sports medicine and physical fitness*, 62(9), 1211–1218. <https://doi.org/10.23736/S0022-4707.22.13924-1>
- Pellegrino, R., Di Iorio, A., Brindisino, F., Paolucci, T., Moretti, A., & Iolascon, G. (2022). Effectiveness of combined extracorporeal shock-wave therapy and hyaluronic acid injections for patients with shoulder pain due to rotator cuff tendinopathy: A person-centered approach with a focus on gender differences to treatment response. *BMC musculoskeletal disorders*, 23(1), 863. <https://doi.org/10.1186/S12891-022-05819-3>
- Pellegrino, R., Di Iorio, A., Filoni, S., Mondardini, P., Paolucci, T., Sparvieri, E., Tarantino, D., Moretti, A., & Iolascon, G. (2023). Radial or Focal Extracorporeal Shock Wave Therapy in Lateral Elbow Tendinopathy: A Real-Life Retrospective Study. *International journal of environmental research and public health*, 20(5). <https://doi.org/10.3390/IJERPH20054371>

- Pellegrino, R., Paolucci, T., Brindisino, F., Mondardini, P., Di Iorio, A., Moretti, A., & Iolascon, G. (2022). Effectiveness of High-Intensity Laser Therapy Plus Ultrasound-Guided Peritendinous Hyaluronic Acid Compared to Therapeutic Exercise for Patients with Lateral Elbow Tendinopathy. *Journal of Clinical Medicine*, 11(19), 5492. <https://doi.org/10.3390/jcm11195492>
- Poenaru, D., Potcovaru, C. G., Sandulescu, M. I., Constantinovici, M., & Cinteza, D. (2025). Injectables in the Therapy of Mid-Portion Achilles Tendinopathy, a Descriptive Review. *Life (Basel, Switzerland)*, 15(5), 824. <https://doi.org/10.3390/life15050824>
- Quarmby, A., Mönnig, J., Mugele, H., Henschke, J., Kim, M. H., Cassel, M., & Engel, T. (2023). Biomechanics and lower limb function are altered in athletes and runners with achilles tendinopathy compared with healthy controls: A systematic review. *Frontiers in sports and active living*, 4. <https://doi.org/10.3389/FSPOR.2022.1012471>
- Rabello, L. M., Van Den Akker-Scheek, I., Brink, M. S., Maas, M., Diercks, R. L., & Zwerver, J. (2020). Association Between Clinical and Imaging Outcomes After Therapeutic Loading Exercise in Patients Diagnosed With Achilles or Patellar Tendinopathy at Short- and Long-Term Follow-up: A Systematic Review. *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*, 30(4), 390–403. <https://doi.org/10.1097/JSM.0000000000000624>
- Radovanović, G., Bohm, S., Peper, K. K., Arampatzis, A., & Legerlotz, K. (2022). Evidence-Based High-Loading Tendon Exercise for 12 Weeks Leads to Increased Tendon Stiffness and Cross-Sectional Area in Achilles Tendinopathy: A Controlled Clinical Trial. *Sports medicine - open*, 8(1). <https://doi.org/10.1186/S40798-022-00545-5>
- Riggin, C. N., Morris, T. R., & Soslowsky, L. J. (2015). Tendinopathy II: Etiology, Pathology, and Healing of Tendon Injury and Disease. *Tendon Regeneration: Understanding Tissue Physiology and Development to Engineer Functional Substitutes*, 149–183. <https://doi.org/10.1016/B978-0-12-801590-2.00005-3>
- Rompe, J. D., Furia, J., & Maffulli, N. (2008). Eccentric loading compared with shock wave treatment for chronic insertional achilles tendinopathy. A randomized, controlled trial. *The Journal of bone and joint surgery. American volume*, 90(1), 52–61. <https://doi.org/10.2106/JBJS.F.01494>
- Rowe, V., Hemmings, S., Barton, C., Malliaras, P., Maffulli, N., & Morrissey, D. (2012). Conservative management of midportion Achilles tendinopathy: A mixed methods study, integrating systematic review and clinical reasoning. *Sports medicine (Auckland, N.Z.)*, 42(11), 941–967. <https://doi.org/10.1007/BF03262305>
- Sayana, M. K., & Maffulli, N. (2007). Eccentric calf muscle training in non-athletic patients with Achilles tendinopathy. *Journal of Science and Medicine in Sport*, 10(1), 52–58. <https://doi.org/10.1016/j.jsams.2006.05.008>
- Silbernagel, K. G., Thomeé, R., & Karlsson, J. (2005). Cross-cultural adaptation of the VISA-A questionnaire, an index of clinical severity for patients with Achilles tendinopathy, with reliability, validity and structure evaluations. *BMC musculoskeletal disorders*, 6. <https://doi.org/10.1186/1471-2474-6-12>
- Silva, I. A., da Silva Santos, A. M., Maldonado, A. J., de Moura, H. P. dos S. N., Rossi, P. A. Q., Neves, L. M., dos Santos, M. A. P., Machado, D. C. D., Ribeiro, S. L. G., & Rossi, F. E. (2022). Detraining and retraining in badminton athletes following 1-year COVID-19 pandemic on psychological and physiological response. *Sport sciences for health*, 18(4), 1427–1437. <https://doi.org/10.1007/S11332-022-00939-8>
- Simsolo, R. B., Ong, J. M., & Kern, P. A. (1993). The regulation of adipose tissue and muscle lipoprotein lipase in runners by detraining. *The Journal of clinical investigation*, 92(5), 2124–2130. <https://doi.org/10.1172/JCI116813>
- Speed, C. (2014). A systematic review of shockwave therapies in soft tissue conditions: Focusing on the evidence. *British journal of sports medicine*, 48(21), 1538–1542. <https://doi.org/10.1136/BJSPORTS-2012-091961>
- Stania, M., Juras, G., Chmielewska, D., Polak, A., Kucio, C., & Król, P. (2019). Extracorporeal Shock Wave Therapy for Achilles Tendinopathy. *BioMed Research International*, 2019. <https://doi.org/10.1155/2019/3086910>
- Sun, X., Lam, W. K., Zhang, X., Wang, J., & Fu, W. (2020). Systematic review of the role of footwear constructions in running biomechanics: Implications for running-related injury and performance. In *Journal of Sports Science and Medicine* (Vol. 19, Fascicolo 1, pp. 20–37).
- Tarantino, D., Aicale, R., & Maffulli, N. (2021). Achilles Tendinopathy. *Evidence-Based Orthopedics: Second Edition*, 849–852. <https://doi.org/10.1002/9781119413936.CH145>
- Tarantino, D., Mottola, R., Resta, G., Gnasso, R., Palmeri, S., Corrado, B., Sirico, F., Ruosi, C., & Aicale, R. (2023). Achilles Tendinopathy Pathogenesis and Management: A Narrative Review. *International Journal of Environmental Research and Public Health*, 20(17), Articolo 17. <https://doi.org/10.3390/ijerph20176681>

- Tarantino, D., Palerm, S., Sirico, F., Balato, G., D'addona, A., & Corrado, B. (2020). Achilles tendon pathologies: How to choose the best treatment. *Journal of Human Sport and Exercise*, 15(Proc4), 1300–1321. <https://doi.org/10.14198/JHSE.2020.15.PROC4.29>
- Tarantino, D., Palermi, S., Sirico, F., & Corrado, B. (2020). Achilles Tendon Rupture: Mechanisms of Injury, Principles of Rehabilitation and Return to Play. *Journal of Functional Morphology and Kinesiology*, 5(4), Articolo 4. <https://doi.org/10.3390/jfmk5040095>
- Tedeschi, R., Platano, D., Donati, D., & Giorgi, F. (2024). Functional approaches in tendinopathy rehabilitation: Exploring the role of tendon neuroplastic training. *Manuelle Medizin*. <https://doi.org/10.1007/s00337-024-01112-7>
- Tedeschi, R., Platano, D., Melotto, G., & Danilo, D. (2024a). Effectiveness of manual thoracic therapy in treating impingement syndrome: A systematic review. *Manuelle Medizin*, 62(3), 178–186. <https://doi.org/10.1007/s00337-024-01040-6>
- Tedeschi, R., Platano, D., Melotto, G., & Danilo, D. (2024b). Effectiveness of neurodynamic treatment in managing lateral epicondylitis: A systematic review. *Manuelle Medizin*, 62(4), 276–283. <https://doi.org/10.1007/s00337-024-01063-z>
- Vascellari, A., Demeco, A., Vittadini, F., Gnasso, R., Tarantino, D., Belviso, I., Corsini, A., Frizziero, A., Buttinoni, L., Marchini, A., Vecchiato, M., Zappia, M., Oliva, F., Maffulli, N., Sirico, F., & Palermi, S. (2024). Orthobiologics Injection Therapies in the Treatment of Muscle and Tendon Disorders in Athletes: Fact or Fake? *Muscles, Ligaments and Tendons Journal*, 14(2), 239–246. Scopus. <https://doi.org/10.32098/mltj.02.2024.02>
- Walter, J. H., & Ng, G. K. (2002). The evaluation of cleated shoes with the adolescent athlete in soccer. *The Foot*, 12(3), 158–165. <https://doi.org/10.1054/foot.2002.0729>
- Willia, J. G. P. (1986). Achilles tendon lesions in sport. *Sports medicine (Auckland, N.Z.)*, 3(2), 114–135. <https://doi.org/10.2165/00007256-198603020-00003>
- Wu, P. T., Kuo, L. C., Su, F. C., Chen, S. Y., Hsu, T. I., Li, C. Y., Tsai, K. J., & Jou, I. M. (2017). High-molecular-weight hyaluronic acid attenuated matrix metalloproteinase-1 and -3 expression via CD44 in tendinopathy. *Scientific reports*, 7. <https://doi.org/10.1038/SREP40840>