
Could the pilates method be used effectively in the rehabilitation of the achilles tendinopathy?

Aikaterini Sivrika¹, Dimitrios Stasinopoulos²

1. Physiotherapist, MSc, PhD(c), Faculty of Health and Caring Sciences, University of West Attica, Athens, M:6974000267 2. Assistant Professor, Faculty of Health and Caring Sciences, Laboratory of Neuromuscular and Cardiovascular Study of Motion (LANECASM), University of West Attica

<https://doi.org/10.55742/WRSN6229>

Achilles tendinopathy (AT) is one of the most common tendon pathologies caused by excessive and repetitive loading [1], affecting both high and medium-level athletes as well as the general population [2,3]. It is a degenerative disorder resulting from a failed tendon healing response [4]. The exact pathophysiology remains unknown and is considered a disorder of a multifactorial aetiology [5] involving both endogenous and exogenous factors [2,6,7]. Clinical symptoms include pain, swelling and decreased function [3,7,8,9]. AT has a considerable negative impact on quality of life, work productivity, and participation in sports. These factors, along with increasing healthcare expenses, highlight the requirement for optimizing the therapeutic strategy [10].

The first line of AT management is conservative. Physiotherapeutic intervention includes a wide variety of electrotherapeutic and non-electrotherapeutic modalities. Among the various physiotherapeutic options, cryotherapy [11], low level laser therapy [11], iontophoresis [7,11], shockwave [12,13,14], deep transverse friction massage [15], dry needling [16], elastic bandaging, manual therapy, night splints [17,18] are applied. However, exercise is the intervention with the highest level of evidence [3,7,9,19,20]. In addition to the structural changes in the tendon, exercise affects symptom management, strength and functional capacity, neuromuscular adaptations while it is likely to positively influence the central mechanisms of pain causation [21]. Exercise rehabilitation involves various combinations of exercise, dosage and frequency [22,23,24], with published results showing that after 5 years of follow-up the majority of patients recover fully when treated with exercise alone [25]. Eccentric strengthening was until recently the therapeutic intervention with the highest level of evidence [19,20]. In recent published studies, isometric contractions

have shown better results in the initial stage of rehabilitation, while heavy slow resistance exercises and stretching promise positive results in a context of progressive loading and an holistic-individualized approach to rehabilitation [3]. Despite the plethora of options available, there is no general consensus as to the most effective conservative method and treatment protocol, and success rates vary, indicating the need for alternative treatments. Currently, despite the increasing number of healthcare professionals using Pilates in musculoskeletal rehabilitation, there is a lack of supporting literature [26] and an absence of clinical studies on the effect of this method in TA.

Pilates has been associated with a better quality of life [27] and is increasingly used in the rehabilitation of musculoskeletal conditions such as osteoarthritis, osteoporosis, low back pain as well as cartilage and ligament damage [26,28]. It consists of a combination of exercises through which strength is enhanced and flexibility of muscle groups is improved by activating the lumbopelvic area while combining breathing techniques and functional movement patterns. In this way, it is possible to improve strength, flexibility, balance, neuromuscular coordination and coordination of movements in a harmonious coexistence of the biokinetic chain with full connection between mind and body [29,30]. Several systematic reviews have shown quantitative positive improvements in pain, quality of life and functionality [31,32]. However, high levels of heterogeneity in terms of patient sample, exercise selection, frequency of treatment are reported in randomized controlled trials. Furthermore, qualitative research evaluating Pilates as a therapeutic approach is limited, focusing mainly on patients with other musculoskeletal conditions [33].

Despite the knowledge gap in understanding the pathophysiology of AT, which is the main reason for the absence of well-documented targeted therapies, exercise therapy presents the highest evidence, lower cost and fewer complications and should therefore form the basis of AT management. The variety of different forms of Pilates exercises (isometric, eccentric, high resistance exercises performed at a slow pace, balance and neuromuscular coordination exercises, stretching) and the potential for progressively increasing the load on the tendon, justifies the need for further research with an alternative form of exercise that could be suitable for all patients with AT.

In this context, a PhD thesis study will be carried out to evaluate the effect of the method on AT rehabilitation. The ultimate goal is to integrate the results into therapeutic algorithms for the treatment of the disease.

BIBLIOGRAPHY

1. Sobhani S., Dekker R., Postema K., Dijkstra P.U. Epidemiology of ankle and foot overuse injuries in sports: A systematic review. *Scand. J. Med. Sci. Sports.* 2013; 23:669–686. doi: 10.1111/j.1600-0838.2012.01509. x.
2. Järvinen TA, Kannus P, Maffulli N, Khan KM. Achilles tendon disorders: etiology and epidemiology. *Foot Ankle Clin.* 2005 Jun;10(2):255-66.
3. Silbernagel KG, Hanlon S, Sprague A. Current Clinical Concepts: Conservative Management of Achilles Tendinopathy. *J Athl Train.* 2020;55(5):438-447. doi:10.4085/1062-6050-356-19.
4. Maffulli N., Longo U.G., Denaro V. Novel approaches for the management of tendinopathy. *J. Bone Jt. Surg. Am.* 2010;92: 2604–2613. doi: 10.2106/JBJS.I.01744.
5. de Vos, R. J., van der Vlist, A. C., Zwerver, J., Meuffels, D. E., Smithuis, F., van Ingen, R., van der Giesen, F., Visser, E., Balemans, A., Pols, M., Veen, N., den Ouden, M., & Weir, A. (2021). Dutch multidisciplinary guideline on Achilles tendinopathy. *British journal of sports medicine*, 55(20), 1125–1134.
6. Kaux JF, Forthomme B, Goff CL, Crielaard JM, Croisier JL. Current opinions on tendinopathy. *J Sports Sci Med.* 2011;10(2):238-253. Published 2011 Jun 1.
7. Martin RL, Chimenti R, Cuddedord T, et al. Achilles pain, stiffness and muscle power deficits: midportion achilles tendinopathy revision 2018. *J Orthop Sports Phys Ther.* 2018; 48(5): A1- A38.
8. Khan K.M., Cook J.L., Bonar F., Harcourt P., Astrom M. Histopathology of common tendinopathies. Update and implications for clinical management. *Sports Med.* 1999; 27:393–408.
9. Silbernagel KG, Roland Thomeé, Bengt I Eriksson, Jon Karlsson. Continued sports activity, using a pain-monitoring model, during rehabilitation in patients with Achilles tendinopathy: a randomized controlled study. *Am J Sports Med* 2007;35(6):897-906

10. Sleeswijk Visser, T., van der Vlist, A. C., van Oosterom, R. F., van Veldhoven, P., Verhaar, J., & de Vos, R. J. (2021). Impact of chronic Achilles tendinopathy on health-related quality of life, work performance, healthcare utilisation and costs. *BMJ open sport & exercise medicine*, 7(1), e001023.
11. Chimenti RL, Cychosz CC, Hall MM, Phisitkul P. Current Concepts Review Update: Insertional Achilles Tendinopathy. *Foot Ankle Int* [Internet]. 2017 [cited 2020 Jul 29];38(10):1160–1169.
12. Feeney K. M. (2022). The Effectiveness of Extracorporeal Shockwave Therapy for Midportion Achilles Tendinopathy: A Systematic Review. *Cureus*, 14(7), e26960. <https://doi.org/10.7759/cureus.26960>.
13. Mansur NS, Faloppa F, Belloti JC, et al.: Shock wave therapy associated with eccentric strengthening versus isolated eccentric strengthening for Achilles insertional tendinopathy treatment: a double-blinded randomised clinical trial protocol. *BMJ Open*. 2017, 7: e013332. 10.1136/bmjopen-2016-013332
14. Vahdatpour B, Forouzan H, Momeni F, Ahmadi M, Taheri P: Effectiveness of extracorporeal shockwave therapy for chronic Achilles tendinopathy: a randomized clinical trial. *J Res Med Sci*. 2018, 23:37. 10.4103/jrms.JRMS_413_16
15. Stefansson, S. H., Brandsson, S., Langberg, H., & Arnason, A. (2019). Using Pressure Massage for Achilles Tendinopathy: A Single-Blind, Randomized Controlled Trial Comparing a Novel Treatment Versus an Eccentric Exercise Protocol. *Orthopaedic journal of sports medicine*, 7(3), 2325967119834284.
16. Stoychev, V., Finestone, A. S., & Kalichman, L. (2020). Dry Needling as a Treatment Modality for Tendinopathy: a Narrative Review. *Current reviews in musculoskeletal medicine*, 13(1), 133–140.
17. De Jonge S, De Vos RJ, Van Schie HTM, Verhaar JAN, Weir A, Tol JL. One-year follow-up of a randomised controlled trial on added splinting to eccentric exercises in chronic midportion Achilles tendinopathy. *Br J Sports Med* [Internet]. 2010 [cited 2020 Jul 29];44(9):673–677.

18. Stasinopoulos D. Exercise for tendinopathy. *World J Methodol.* 2015;5(2):51-54. Published 2015 Jun 26. doi:10.5662/wjm. v5.i2.51.
19. Ackermann, P.W., Phisitkul, P., & Pearce, C.J. (2018). Treatment of Achilles tendinopathy: state of the art. *Journal of ISAKOS*, Volume 3, Issue 6, November 2018, Pages 367-376
20. 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.
21. Irby, A., Gutierrez, J., Chamberlin, C., Thomas, S. J., & Rosen, A. B. (2020). Clinical management of tendinopathy: A systematic review of systematic reviews evaluating the effectiveness of tendinopathy treatments. *Scandinavian journal of medicine & science in sports*, 30(10), 1810–1826.
22. Abat F, Alfredson H, Cucchiarini M, et al. Current trends in tendinopathy: consensus of the ESSKA basic science committee. Part I: biology, biomechanics, anatomy and an exercise- based approach. *J Exp Orthop.* 2017;4(1):18. doi:10.1186/s40634-017-0092-6.
23. dos Santos Franco YR, Miyamoto GC, Franco KFM, de Oliveira RR, Cabral CMN. Exercise therapy in the treatment of tendinopathies of the lower limbs: a protocol of a systematic review. *Syst Rev.* 2019;8(1):142. Published 2019 Jun 15. doi:10.1186/s13643-019-1058-9.
24. Habets, B., van Cingel, R., Backx, F., van Elten, H., Zuithoff, P., Huisstede, B. No Difference Clinical Effects When Comparing Alfredson Eccentric and Silbernagel Combined Concentric-Eccentric Loading in Achilles Tendinopathy: A Randomised Controlled Trial. *Orth J of Sports Med.*