Achilles Pain (third revision) CPG 2024

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Clinical Practice Guidelines
Linked to the International Classification
of Functioning, Disability, and Health
from the Academy of Orthopaedic Physical Therapy and American Academy of Sports Physical Therapy of the
American Physical Therapy Association

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SUMMARY OF RECOMMENDATIONS

INTERVENTIONS

Exercise

A: Clinicians should use tendon loading exercise, with loads as high as tolerated, as a first-line treatment to improve function and decrease pain for individuals with midportion Achilles tendinopathy who do not have presumed frailty of the tendon structure.

F: Patients should exercise at least twice weekly at an intensity as high as tolerated by the patient.

Stretching

C: Clinicians may use stretching of the ankle plantar flexors with the knee flexed and extended to reduce pain and improve satisfaction with outcome in patients with midportion Achilles tendinopathy who exhibit limited ankle dorsiflexion range of motion.

Neuromuscular Re-Education

F: Clinicians may use neuromuscular exercises targeting lower extremity impairments that may lead to abnormal kinetics and/or kinematics, specifically eccentric overload of the Achilles tendon during weight-bearing activities.

Patient Education and Counseling

B: Clinicians should provide education and counseling on Achilles tendinopathy, with either a pain science or a pathoanatomic focus, in combination with tendon-loading exercise for Achilles tendinopathy. Education can be provided either in-person or via telehealth according to the patient preference.

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B: Clinicians should advise that complete rest is not indicated and that they should continue with their recreational activity within their pain tolerance while participating in rehabilitation.

Manual Therapy

F: Clinicians may use manual therapy directed at manipulating and/or mobilizing muscles, joints, and/or connective tissues in those with midportion Achille tendinopathy and ROM restrictions.

Dry Needling

F: Clinicians may use dry needling to treat calf related muscle pain and tightness, particularly in those with more acute symptoms and/or in those who do not tolerate a progressive loading program.

Heel Lifts

D: Because contradictory evidence still exists, no recommendation can be made for the use of heel lifts in patients with midportion Achilles tendinopathy.

Night Splints

C: Clinicians should not use night splints to improve symptoms in patients with midportion Achilles tendinopathy.

Orthoses

B: Because contradictory evidence exists, no recommendation can be made for the use of orthoses in patients with midportion Achilles tendinopathy.

Taping

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F: Clinicians should not use therapeutic elastic tape to reduce pain or improve functional performance in patients with mid-portion Achilles tendinopathy.

F: Clinicians may use rigid taping to decrease strain on the Achilles tendon and/or alter foot posture in patients with midportion Achilles tendinopathy.

Physical Agents – Iontophoresis

B: Clinicians should use iontophoresis with dexamethasone to decrease pain and improve function in patients with acute midportion Achilles tendinopathy.

Physical Agents – Low-Level Laser Therapy

C: Clinicians should not use low level laser therapy for patients with midportion Achilles tendinopathy.

Physical Agents – Therapeutic Ultrasound

C: Clinicians should not use therapeutic ultrasound alone to treat Achilles tendinopathy.

Multimodal Interventions

C: Clinicians may include multimodal treatment, including a variety of modalities, combined with exercise for those with midportion Achilles tendinopathy.

INTRODUCTION

Aim of the Guidelines

The AOPT has an ongoing effort to create evidence-based practice guidelines for orthopaedic physical therapy management of patients with musculoskeletal impairments described in the

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World Health Organization's International Classification of Functioning, Disability and Health (ICF).[44] The purposes of these clinical guidelines are to:

- Describe evidence-based physical therapy practice, including diagnosis, prognosis, intervention, and assessment of outcome, for musculoskeletal disorders commonly managed by orthopaedic and sports physical therapists
- Classify and define common musculoskeletal conditions using the World Health Organization's terminology related to impairments of body function and body structure, activity limitations, and participation restrictions
- Identify interventions supported by current best evidence to address impairments of body function and structure, activity limitations, and participation restrictions associated with common musculoskeletal conditions.
- Identify appropriate outcome measures to assess changes resulting from physical therapy interventions in body function and structure as well as in activity and participation of the individual
- Provide a description to policy makers, using internationally accepted terminology, of the practice of orthopaedic and sports physical therapists
- Provide information for payers and claims reviewers regarding the practice of orthopaedic and sports physical therapy for common musculoskeletal conditions
- Create a reference publication for orthopaedic physical therapy clinicians, academic instructors, clinical instructors, students, interns, residents, and fellows regarding the best current practice of orthopaedic and sports physical therapy

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Statement of Intent

These guidelines are not intended to be construed or to serve as a standard of medical care *for physical therapists.* Standards of care are determined based on all clinical data available for an individual patient and are subject to change as scientific knowledge and technology advance and patterns of care evolve. These parameters of practice should be considered guidelines only. Adherence to them will not ensure a successful outcome in every patient, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgment regarding a particular clinical procedure or treatment plan must be made considering the clinical data presented by the patient; the diagnostic and treatment options available; and the patient's values, expectations, and preferences. However, we suggest that significant departures from accepted guidelines should be documented in the patient's medical records at the time the relevant clinical decision is made.

Scope and Rationale

The 2024 Achilles Pain, Stiffness, and Muscle Power Deficit: Midportion Achilles Tendinopathy Clinical Practice Guideline (CPG) is a revision of the 2018 CPG and represents the third CPG from the Academy of Orthopaedic Physical Therapy (AOPT) on this topic. The terminology used to describe and diagnose tendon injuries has been adapted with current consensus statement so that 'tendinopathy' is specifically defined as local pain in the tendon associated with tendon-loading activities.[59] This definition attempts to avoid confusion over any inferred presence of

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inflammation or degeneration, while noting the specific location and mechanism of pain provocation.

This 2024 CPG update will focus on the clinical entity of midportion Achilles tendinopathy and include articles published after the search date of November 2017 for the 2018 revision. A review of midportion Achilles tendinopathy as it relates to the topics addressed in the 2018 CPG revision are included, while focusing on new or updated research related to interventions. The question: “what is the evidence to support physical therapy interventions directed at patients with midportion Achilles tendinopathy?” will be answered in this 2024 CPG update. The research related to the interventions for midportion Achilles tendinopathy continues to grow with 26 new articles ultimately contributing to this topic.

Prevalence and pathoantomical features were reviewed in detail in both the original CPG and 2018 CPG revision and therefore are briefly reviewed in this 2024 update. Midportion Achilles tendinopathy remains a relatively common overuse lower extremity tissue injury for individuals who participate in sports and/or have an increase in their activity level. The overall prevalence of midportion Achilles tendinopathy has been reported between 4% to 7% in a recent meta-analysis with increasing age and higher levels of athletic involvement being associated with a greater prevalence.[69] While the condition affects both athletic and non-athletic populations, the incidence is reportedly higher among individuals who participate in sports that load the Achilles tendon. Runners reportedly have a 40-52% chance (cumulative incidence) of having an Achilles tendon injury in their lifetime.[31] Overall the symptoms associated with Achilles tendinopathy tend to be longstanding and functionally limiting which leads to the need for medical intervention.

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Midportion Achilles tendinopathy pain is localized >2cm above the Achilles tendon attachment while insertional Achilles tendinopathy is identified when pain in localized in the lower portion closer to the attachment of the tendon to the calcaneus. Consensus over key health domains of interest for Achilles tendinopathy include; patient rating of the condition, pain on activity/loading, participation (daily activities, work, sport), function, psychological factors, disability, physical function capacity, quality of life, and pain over a specified timeframe.[68] These domains include physical, psychosocial, and overall status/life impact to reflect the nature of Achilles tendinopathy for both the patient and physical therapist. The Victorian Institute of Sports Assessment – Achilles (VISA-A) questionnaire has been historically used as a reliable and valid patient-reported outcome measure for the perceived impact of Achilles tendinopathy.[56] However, recent concerns over the methodology used to establish its validity has led to the development of newer instruments, such as the (TENDINopathy Severity assessment-Achilles) TENDINS-A and the VISA-A sedentary.[40, 43] These newer instruments may influence the reporting and interpretation of clinical outcomes for those with midportion Achilles tendinopathy.[14, 40]

The primary intent of this third CPG on the topic of midportion Achilles tendinopathy is to focus on updating recommendations for interventions to be used in physical therapist practice. Therefore, a systematic review was only conducted for the evidence on physical therapist interventions for those with the diagnosis of midportion Achilles tendinopathy. This CPG excludes interventions outside the scope of physical therapist practice, including but not limited to pharmacological and surgical interventions, unless directly compared to physical therapy

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management. Although it is used by some physical therapists outside the United States, extracorporeal shockwave therapy (ESWT) was also considered outside the scope of physical therapist practice for this update. The International Scientific Tendinopathy Symposium (ISTS) provides a source of information in the form of consensus documents to generally inform practice on all topics and serves as an additional source of information.[18, 37, 55, 59, 68]

METHODS

Content experts were appointed by the Academy of Orthopaedic Physical Therapy (AOPT) to conduct a review of the literature and develop an updated CPG for Achilles tendinopathy. This revision aims to provide a concise summary of the contemporary evidence since the publication of the original guideline and to develop new recommendations or revise previously published recommendations to support evidence-based practice. The authors of this guideline revision worked with the CPG editors and medical librarians for methodological guidance. One author (R.L.M.) served as the team's methodologist. The research librarian was chosen for their expertise in systematic review and rehabilitation literature searching and performed systematic searches regarding intervention strategies for Achilles tendinopathy. Briefly, the following databases were searched from November 2017 to March 2024: MEDLINE, CINAHL, Cochrane Library, and PEDro (see **APPENDIX A** for full search strategies and **APPENDIX B** for search dates and results, available at **www.orthopt.org**).

The authors declared relationships and developed a conflict management plan, which included submitting a conflict-of-interest form to the AOPT. Articles that were authored by a reviewer were assigned to an alternate reviewer. Funding was provided to the CPG development team for travel and expenses for CPG development training by the AOPT. The CPG development team

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maintained editorial independence from funding agencies, including the AOPT Board of Directors.

Articles contributing to recommendations were reviewed based on specified inclusion and exclusion criteria, with the goal of identifying evidence relevant to physical therapist clinical decision making for patients with Achilles tendinopathy. The title and abstract of each article were reviewed independently by two members of the CPG development team for inclusion (see **APPENDIX C** for inclusion and exclusion criteria, available at **www.orthopt.org**). Full-text review was then similarly conducted to obtain the final set of articles for contribution to recommendations. The team leader (R.L.M.) provided the final decision on discrepancies that were not resolved by the review team (see **APPENDIX D** for the flow chart of articles, available at **www.orthopt.org**). Data extraction and assignment of level of evidence were also performed by two members of the CPG development team. Evidence tables for this CPG are available on the Clinical Practice Guidelines page of the AOPT website (www.orthopt.org).

This guideline was issued in 2024 based on the published literature through March 7, 2024 and will be considered for review in 2029, or sooner if new evidence becomes available. Any updates to the guideline in the interim period will be noted on the AOPT website (**www.orthopt.org http://www.orthopt.org**).

Levels of Evidence

Individual clinical research articles were graded according to criteria adapted from the Centre for Evidence-Based Medicine, Oxford, UK (**http://www.cebm.net**) for the studies related to interventions.[46] In teams of two, each reviewer assigned a level of evidence and evaluated the

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quality of each article using a critical appraisal tool (see **APPENDICES D** and **E** for the levels-of-evidence table and details on procedures used for assigning levels of evidence, available at **www.jospt.org**). If the two content experts did not agree on a grade of evidence for a particular article, a third content expert was used to resolve the issue. The evidence update was organized from the highest level of evidence to the lowest level of evidence. An abbreviated version of the grading system is provided in **TABLE 1**.

TABLE 1. LEVELS OF EVIDENCE FOR INTERVENTION STUDIES

I	Evidence obtained from systematic reviews, high-quality diagnostic studies, prospective studies, or randomized controlled trials
II	Evidence obtained from systematic reviews, lesser-quality diagnostic studies, prospective studies, or randomized controlled trials (e.g. weaker diagnostic criteria and reference standards, improper randomization, no blinding, less than 80% follow-up)
III	Case-control studies or retrospective studies
IV	Case series
V	Expert opinion

Strength of Evidence and Grades of Recommendation

The strength of the evidence supporting the recommendations was graded according to the established methods provided below (**TABLE 2**). Each team developed recommendations based on the strength of evidence, including how directly the studies addressed the question relating to Achilles tendinopathy. In developing their recommendations, the authors considered the

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strengths and limitations of the body of evidence and the health benefits, side effects, and risks associated with the interventions.

TABLE 2: GRADES OF RECOMMENDATION

Grades of Recommendation		**Strength of Evidence**	**Level of Obligation**
A	Strong Evidence	A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study	Must or should
B	Moderate Evidence	A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendation	Should
C	Weak Evidence	A single level II study or a preponderance of level III and IV studies, including statements of consensus by content experts, support the recommendation	May
D	Conflicting Evidence	Higher-quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies	

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E	Theoretical/ Foundational Evidence	A preponderance of evidence from animal or cadaver studies, from conceptual models/principles, or basic sciences/bench research supports this conclusion	May
F	Expert Opinion	Best practice based on the clinical experience of the guideline development team	May

Guideline Review Process and Validation

The AOPT selected consultants from the following areas to serve as reviewers throughout the development of these CPGs:

- Athletic training
- Claims review
- Coding
- Guideline methodology
- Pain rehabilitation
- Medical practice guidelines
- Manual therapy
- Movement science
- Orthopaedic physical therapy clinical practice
- Orthopaedic physical therapy residency education
- Orthopaedic surgery

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- Outcomes research
- Patients with midportion Achilles tendinopathy
- Physical therapy academic education
- Physical therapy patient perspective
- Rheumatology
- Sports physical therapy residency education
- Sports rehabilitation

Identified reviewers who are experts in the management and rehabilitation of those with Achilles tendinopathy reviewed a prepublication draft of this CPG content and methods for integrity, accuracy, validity, usefulness, and impact. Any comments, suggestions, or feedback from the expert reviewers were delivered to the author and editors for consideration and appropriate revisions. These guidelines were also posted for public comment on the AOPT website (**www.orthopt.org**), and a notification of this posting was sent to the members of the AOPT. Any comments, suggestions, and feedback gathered from public commentary were sent to the authors and editors to consider and make appropriate revisions in the guideline prior to submitting them for publication to the *Journal of Orthopaedic & Sports Physical Therapy* (*JOSPT*).

Dissemination and Implementation Tools

In addition to publishing these guidelines in the *JOSPT*, these guidelines will be posted on CPG (free access) areas of the *JOSPT* and AOPT websites and submitted for free access on the ECRI Guidelines Trust (**guidelines.ecri.org**) and the Physiotherapy Evidence Database (**www.PEDro.org.au**). The planned implementation tools for patients, clinicians, educators,

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payers, policy makers, and researchers, and the associated implementation strategies are listed in **TABLE 3**.

TABLE 3. PLANNED STRATEGIES AND TOOLS TO SUPPORT THE DISSEMINATION AND IMPLEMENTATION OF THIS CPG.

Tool	**Strategy**
JOSPT's "Perspectives for Patients" and "Perspectives for Practice" articles	Patient- and clinician-oriented guideline summaries available at www.jospt.org
Mobile app of guideline-based exercises for patients/clients and health care practitioners	Marketing and distribution of the app via www.orthopt.org and www.handpt.org
Clinician's Quick-Reference Guide	Summary of guideline recommendations available at www.orthopt.org and www.handpt.org
JOSPT's Read for CreditSM continuing education units	Continuing education units available for physical therapists at www.jospt.org
Webinars and educational offerings for healthcare practitioners	Guideline-based instruction available for practitioners at www.orthopt.org and www.handpt.org
Mobile and web-based app of guidelines for training of health care practitioners	Marketing and distribution of the app via www.orthopt.org

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Non-English versions of the guidelines and guideline implementation tools	Development and distribution of translated guidelines and tools to JOSPT's international partners and global audience via www.jospt.org
APTA CPG+	Dissemination and implementation aids

Organization of the Guideline

Prevalence and pathoanatomical features for midportion Achilles tendinopathy are briefly reviewed in the introduction. The 2018 CPG summaries are restated for risk factors, clinical course, diagnosis, and imaging and followed by an evidence update and new 2024 summaries. The 2018 summary differential diagnoses as well as the examination recommendations for outcome measures, activity/participation restriction measures, and physical impairment measures are not updated and therefore restated. Related to physical therapy interventions for those with midportion Achilles tendinopathy, a systematic review was conducted to identify randomized controlled trials (RCTs) or systematic reviews and meta-analyses of RCTs that support specific actionable recommendations. When appropriate the prior 2018 recommendation was provided, followed by a summary of updated literature with the corresponding evidence levels, synthesis of evidence, and rationale for the recommendation(s) with harms and benefits statements, gaps in knowledge, and updated recommendation(s).

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Classification

The International Classification of Diseases (ICD-10) code associated with Achilles tendinopathy is M76.6 Achilles tendinitis/Achilles bursitis. The corresponding primary ICD-9-CM code, commonly used in the United States, is 726.71Achilles bursitis or tendinitis. The primary ICF body function codes associated with Achilles tendinopathy are b28015 Pain in lower limb, b7300 Power of isolated muscles and muscle groups, and b7800 Sensation of muscle stiffness. The primary ICF body structures codes associated with Achilles tendinopathy are s75012 Muscles of lower leg and s75028 Structure of ankle and foot, specified as Achilles tendon. The primary ICF activities and participation codes associated with Achilles tendinopathy are d4500 Walking short distances, d4501 Walking long distances, d4552 Running, d4553 Jumping, and d9201 Sports. A comprehensive list of codes was published in the previous guideline.

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CLINICAL GUIDELINES

Impairment/Function-Based Diagnosis

Risk Factors

2018 Condensed Summary

The body's response to loading will be influenced by health conditions, drug use, and genetic factors. An individual with any number of lower extremity impairments that lead to abnormal kinetics and/or kinematics that specifically produce an eccentric overload of the Achilles tendon may be at risk for Achilles tendon injury.

Evidence Update

While Achilles tendinopathy is common, its etiology remains unclear and risk-factors leading to the condition remain understudied. The risk of developing midportion Achilles tendinopathy is likely multifactorial and related to an interaction of intrinsic and extrinsic factors that lead to tendon overloading. A systematic review by van der Vlist et al.[66] included 10 cohort studies and identified nine risk factors. The nine risk factors included: (1) prior lower limb tendinopathy or fracture, (2) use of ofloxacin (quinolone) antibiotics, (3) an increased time between heart transplantation and initiation of quinolone treatment for infectious disease, (4) moderate alcohol use, (5) training during cold weather, (6) decreased isokinetic plantar flexor strength, (7) abnormal gait pattern with decreased forward progression of propulsion, (8) more pressure on the lateral side of the plantar surface of the foot while running, and (9) creatinine clearance of <60 mL/min in heart transplant patients.[66] It is interesting to note that twenty-six other commonly identified risk factors were not associated with Achilles tendinopathy in this

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systematic review.[66] These noncontributory risk factors included being overweight, static foot posture, and physical activity level.[66] Overall, there remains a high risk of bias in studies identifying risk factors making definitive clinical recommendations difficult, but quinolone treatment, alcohol consumption, and ankle plantar flexor strength are modifiable factors that may be useful for patient education purposes.

2024 Summary

The body's response to loading is influenced by health conditions, drug use, and genetic factors. An individual with any number of lower extremity impairments that lead to abnormal kinetics and/or kinematics that specifically produce an overload of the Achilles tendon may be at risk for Achilles tendon injury.

Clinical Course

2018 Condensed Summary

Recovery time can vary from brief to many months and is probably dependent on the severity of the injury and influenced by intrinsic factors. While most patients will improve, mixed levels of recovery can be anticipated.

Evidence Update

There is still a gap in information on the typical course of recovery for individuals with midportion Achilles tendinopathy and factors, such as sex, that may influence the magnitude and timing of recovery. A cohort study by Hanlon et al.[22] found that individuals with acute midportion Achilles tendinopathy (≤3 months duration) had a similar level of improvement in symptoms, function, tendon structure, and psychological factors as individuals with chronic

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midportion Achilles tendinopathy (symptom duration categorized as ≥3 to <6 months, between ≥6 months and <12 months, and ≥12 months). Therefore, symptom duration (acute versus chronic) may not be a key factor in predicting the response to tendon loading exercise. Tissue irritability can be a specifically relevant factor clinicians need to recognize when developing exercise prescription for Achilles tendinopathy. For example, aggressive high tendon loading programs may be poorly tolerated in the early stages for patients with high tissue irritability. Progressive loading programs that consider total loading throughout the day may be ways to achieve increased loading as tissue irritability changes with treatment.

Psychosocial factors may also influence recovery, yet to date most research on the effect of psychosocial factors on pain is from other musculoskeletal pain conditions.[37] The international tendinopathy consensus group (ICON tendinopathy) has included psychosocial factors as one of the nine core health-domains for tendinopathy, indicating consensus on the importance to assess for psychological factors.[68] An international Delphi study including expert clinicians, researchers, and individuals with Achilles tendinopathy identified four key psychosocial factors to consider in individuals with tendinopathy: fear of movement, pain beliefs, pain-related self-efficacy, and fear avoidance.[65] To date fear of movement, known as kinesiophobia, has been the factor most studied in individuals with Achilles tendinopathy. Studies have shown mixed results about how kinesiophobia, affects people with Achilles tendinopathy. A cross-sectional study by Murakawa et al.[38] found no relationship between kinesiophobia and severity of Achilles tendinopathy symptoms on the VISA-A. In contrast, a cross-sectional study by Janowski et al.[24] reported that individuals with higher kinesiophobia had higher movement-evoked pain with tendon-loading activities. In a longitudinal study by Alghamdi et al.[4] higher kinesiophobia

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was associated with worse symptom severity at baseline yet did not predict recovery. In summary, the influence of psychosocial factors on the recovery from Achilles tendinopathy is still not fully understood. However, it should be acknowledged that psychosocial factors may affect the recovery process, which is different for each person.

2024 Summary

While most patients will improve, the extent of recovery and time to recover can vary based on the severity of tendinopathy. Recovery from Achilles tendinopathy is likely influenced by a combination of intrinsic biological factors (e.g., sex, age), extrinsic factors (e.g., training environment), and psychosocial factors (e.g., fear of movement, self-efficacy).

Diagnosis

2018 Recommendation

In addition to the arc sign and Royal London Hospital test clinicians can use a subjective report of pain located 2 to 6 cm proximal to the Achilles tendon insertion that began gradually and pain with palpation of the midportion of the tendon to diagnose midportion Achilles tendinopathy.

Evidence Update

A multi-disciplinary guideline for the diagnosis of midportion Achilles tendinopathy was developed by de Vos et al.[15] The diagnosis of midportion Achilles tendinopathy is made using the presence/absence of the following four criteria.[15]

1. Symptoms are localized to the midportion of the Achilles tendon
2. Achilles tendon pain is provoked by tendon-loading activities

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3. Pain with palpation of the Achilles tendon midportion
4. Localized thickening of the Achilles in the midportion region of the tendon in more chronic conditions (may be absent)[61]

The above diagnostic criteria are consistent with the 2018 recommendation with criteria 3 and 4 aligning with the special tests of the Royal London Hospital test and Arc Sign. Further localized thickening may help with ruling in a diagnosis of Achilles tendinopathy, but may be absent in approximately a quarter of individuals with Achilles tendinopathy.[61] An important addition to the diagnostic criteria is that Achilles tendinopathy pain is provoked by tendon-loading activities, indicating an emphasis on movement-evoked pain.[15]

2024 Summary

The diagnosis of midportion Achilles tendinopathy is primarily based on clinical exam with symptoms located in the midportion of the Achilles tendon, pain provoked by tendon-loading activities, tenderness in the midportion region of the Achilles tendon that change with ankle plantar and dorsiflexion (i.e. positive arc sign and Royal London Hospital test). Localized thickening of the tendon also assists with ruling in the diagnosis but may be absent in some individuals with Achilles tendinopathy.

Differential Diagnosis

2018 Summary

Clinicians should consider diagnostic classifications other than midportion Achilles tendinopathy when the patient's reported activity limitations or impairments of body function and structure are not consistent with those presented in the Diagnosis, Classification, and

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Clinical Course sections of this updated guideline, or when the patient's symptoms are not resolving with interventions aimed at normalization of the patient's impairments of body function. The following conditions should be considered in the differential diagnosis of patients presenting with non-traumatic posterior ankle pain:

- Partial tear of the Achilles tendon[10, 28]
- Retrocalcaneal or subcutaneous bursitis[27]
- Posterior ankle impingement[8]
- Irritation or neuroma of the sural nerve[3]
- Tibial or calcaneal stress fractures
- Os trigonum syndrome[36]
- Accessory soleus muscle[32]
- Achilles tendon ossification[54]
- Systemic inflammatory disease[5]
- Plantaris tendon involvement[47]
- Paratenonitis[21]
- Fascial tears[47]
- Insertional Achilles tendinopathy

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Examination

Outcome Measures

2018 Recommendation

Clinicians should use the VISA-A to assess pain and stiffness, and either the Foot and Ankle Ability Measure (FAAM) or the Lower Extremity Functional Scale (LEFS) to assess activity and participation in patients with a diagnosis of midportion Achilles tendinopathy.

Activity Limitations

2018 Recommendation

Clinicians should use physical performance measures, including hop and heel-raise endurance tests as appropriate, to assess a patient's functional status and document findings.

Physical Impairments

2018 Recommendation

When evaluating physical impairment over an episode of care for those with Achilles tendinopathy, one should measure ankle dorsiflexion range of motion, subtalar joint range of motion, plantar flexion strength and endurance, static arch height, forefoot alignment, and pain with palpation.

Foot and Ankle Examination Outline

To assist with the collection of body structure limitation measures, the authors of this CPG recommend the components of the foot and ankle specific examination outlined in the Heel Pain-Plantar Fasciitis Revision.[30] It should be noted that a comprehensive lower quarter screen can be performed if needed based on the individual's presentation.

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Supine range of motion (ROM)*	Dorsiflexion knee extended Dorsiflexion knee flexed Plantar flexion Supination/Inversion Pronation/Eversion Great toe extension *Joint mobility assessment when deficits are identified
MMT	Anterior tibialis Posterior tibialis Fibularis longus and brevis
Weight-bearing Testing*	Functional Loading Testing: - Drop landing - Hopping - Seated heel rises with loads Heel raise (repetition and height) (gastroc-soleus muscle strength) Dorsiflexion lunge test/ Tibio-pedal dorsiflexion ROM Foot Posture Index (FPI)-6 Single leg squat Gait

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	*Movement-evoked pain can be assessed with tendon loading activities by asking patients to rate pain in the Achilles tendon (Verbal Numeric Rating Scale: 0 to 10).
Special tests	Royal London Hospital Test Painful Arc Sign
Palpation	Pain and thickening along the course of the Achilles tendon Body of the calcaneus- for stress fracture Posterior aspect of the calcaneus- for insertional Achilles tendinopathy

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IMAGING

2018 Condensed Summary

Ultrasound (US) imaging and magnetic resonance imaging (MRI) may be useful in assessing for differential diagnoses and identifying co-existing pathology, such as partial ruptures, bursitis, paratenonitis, plantaris involvement, and/or fascial tears, in patients with signs and symptoms inconsistent with Achilles tendinopathy or who have chronic pain not responding to conservative intervention.

2024 Update

Imaging is not required to diagnose Achilles tendinopathy,[15, 59] but recommended when the diagnosis is uncertain, there is a delayed response to care, or when invasive treatments are being considered.[15] Diagnostic imaging can rule in Achilles tendinopathy by visualizing the tendon tissue to evaluate for other diagnoses, such as a partial tear or paratenonitis. A common sign of pathology is increased tendon thickness, which is present in 73% of individuals with Achilles tendinopathy.[61] Yet the positive identification of increased tendon thickness is not specific to Achilles tendinopathy, as up to a quarter of asymptomatic adults have increased Achilles tendon thickness.[20, 50, 61] Notably, normative values for Achilles tendon thickness take into account age, height, body mass index (BMI), and sex.[61] Therefore, imaging findings should be interpreted within the context of an individual's demographics and clinical exam findings. The multi-disciplinary guideline by de Vos et al.[15] recommends imaging for Achilles tendinopathy when there is uncertainty in the diagnosis, if there is a delayed recovery, negative change in symptoms over the course of care, or if a procedure is being considered. Ultrasound,

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radiographs, and MRI are commonly used diagnostic imaging techniques for Achilles tendinopathy. Each technique has its own advantages and disadvantages, depending on the patient's clinical presentation and response to conservative care. Ultrasound is the recommended imaging method by de Vos et al.[15] Ultrasound imaging can visualize soft tissues in real-time, with low cost, low-risk, and high accessibility. For ankle pain in general, radiographs are the first-line imaging method, according to the American College of Radiology (ACR, https://www.acr.org/Clinical-Resources/ACR-Appropriateness-Criteria). Radiographs can identify any bone-related problems, such as calcaneal fractures, os trigonum, enthesophytes and Haglund's morphology, which may contribute to differential diagnoses particularly around the insertion of the Achilles tendon. If the radiographs are normal and tendon abnormality is suspected, then the ACR guidelines recommend ultrasound or MRI without IV contrast. Because MRI is relatively expensive and less accessible, this technique is commonly reserved for specific situations, such as surgical planning. Thus, ultrasound imaging or radiographs may be used to enhance clinical examination, ultimately the selection of will depend on the benefits, risks, cost, and accessibility of each imaging option.

2024 Summary

Imaging, in the form of ultrasound and radiographs, for Achilles tendinopathy is recommended when there is uncertainty in the diagnosis, if there is a delayed recovery, negative change in symptoms over the course of care, or if a procedure is being considered.

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DRAFT

INTERVENTIONS

Exercise

2018 Recommendation

A: Clinicians should use mechanical loading, which can be either in the form of eccentric or a heavy-load, slow-speed (concentric/eccentric) exercise program, to decrease pain and improve function for patients with midportion Achilles tendinopathy without presumed frailty of the tendon structure.

F: Patients should exercise at least twice weekly within their pain tolerance.

Evidence Update

Exercise for this 2024 CPG update is described as tendon loading. These tendon loading exercises encompass eccentric, concentric, isometric, isotonic, and plyometric use of the plantar flexors. A progressive tendon loading exercise program increases the exercise intensity based on an individual's pain tolerance and/or functional capacity.

<u>Exercise vs. Wait-and-see</u>

II: Tendon loading exercise improved function more than a wait-and-see approach in three systematic reviews. [42, 53, 67] A total of 13 RCTs were included in the most recent systematic review by van der Vlist et al.[67] This network meta-analysis reported that that exercise improved function by 20-points (95% CI: 11 to 30 points) more on the VISA-A than a wait-and-see approach.

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Exercise vs. Non-exercise

I: An RCT by Al-ani et al.[2] (N=38, Age=49.2±8.8 years, 55% women) found that radiofrequency microtenotomy decreased pain to a lower intensity (1.1±1.4 on a 0 to 10 numeric rating scale [NRS]) than eccentric exercise (3.1±1.8) at 2-year follow-up.

I: An RCT by Gatz et al.[16] reported a similar level of improvement in function when comparing ESWT combined with tendon-loading exercise versus exercise alone (N= 66, Age= 46 years (range 22 to 73), 61% men). The study compared two different active ESWT techniques to a placebo ESWT technique and all participants were instructed in tendon-loading exercise (eccentric and isometric) and stretching by a physician. No statistically significant differences in improvement in function were found between groups with improvements ranging from 15 to 23 points on the VISA-A and high variability (SD from 17 to 18 per group).[16]

II: A systematic review by Charles et al.[11] reported that tendon loading exercise results in similar improvements in function (standardized mean difference (95% confidence interval) = 0.39 (-0.13 to 0.91) favoring ESWT) and pain (-0.34 (-0.83 to 0.15) favoring ESWT) compared to extracorporeal shockwave therapy (ESWT) alone based on findings from six studies.[11] Similarly, a network meta-analysis by van der Vlist et al.[67] reported no difference in function between exercise versus ESWT (mean difference on the VISA-A: -5 (95% CI: -15 to 5), favoring exercise).

II: In a systematic review, Murphy et al.[42] identified two RCTs with a combined sample size of 45 participants comparing exercise to passive treatments. The analysis indicated that eccentric exercise led to a 17.7-point greater improvement (95% CI: 3.8 to 31.7) on the VISA-A compared to deep friction massage and ultrasound.[42]

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II: Van der Vlist et al.[67] conducted a network meta-analysis reporting that acupuncture improved function more than tendon loading exercise (15-points on the VISA-A, 95% CI: 11 to 19).

II: A systematic review by Maetz et al.[34] reported no differences in functional improvement on the VISA-A between exercise and non-exercise interventions (pooled mean difference (95% confidence interval) at short-term follow-up= -7.9 (-16.0 to 0.2) and at long-term follow-up= -6.8 (-14.2 to 0.7), favoring exercise). Non-exercise interventions provided a higher level of pain relief (VAS, 0 to 100 scale) in the short-term (pooled mean difference (95% confidence interval)= 10.2 (2.2 to 18.3)) than exercise interventions.[34] Yet this difference may not be clinically meaningful and the statistical significance of this effect was not maintained at mid-term (10.0 (-2.7 to 22.6)) or long-term (9.6 (17.0 to 36.2)) follow-up.[34] The number of studies included at each time point ranged from 2 to 5 studies and non-exercise interventions were a mix of non-invasive and invasive treatments, including radiofrequency ablation, passive stretching plus a dietary supplement, therapeutic ultrasound, platelet-rich plasma, heel lift, prolotherapy, and acupuncture.

<u>Exercise vs. exercise</u>

II: Tendon loading exercise provided a moderate to large benefit on function and pain across a variety of the exercise dosing parameters and loading types, as reported in two systematic reviews that each included seven clinical trials.[23, 71] Similarly, a meta-analysis by Prudencio et al.[49] found no differences in pain between eccentric and other types of exercise (mean difference (95% confidence interval)= -1.2 (-2.7 to 0.30)). In line with those systematic reviews, a more recently published low level RCT by Habets et al.[19] on 40 recreational athletes (Mean

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age= 47.3 years, 45% women) reported no differences in clinical outcomes between the Alfredson eccentric exercise protocol compared to the Silbernagel progressive tendon loading exercise protocol (VISA-A: 2.4 [95% CI: –8.5 to 13.3]).

II: An RCT by Radovanovic et al.[52] compared high-load isometric exercise (n=15) to eccentric exercise (n=15) and passive treatments only (n=14) in men with chronic Achilles tendinopathy (Age= 40.3 years (range 24 to 55), 100% men). The study found that the high-load isometric exercise had the greatest improvement in maximum voluntary contraction (mean (SD)= 7.2% (9.9)), increase in tendon stiffness (20.1% (20.5)), decrease in maximum tendon strain (-12.4% (10.3)), and increase in tendon cross sectional area (9.0% (5.8)) compared to the other groups.[52] Interestingly, all three groups had a similar level of improvement in function (VISA-A increased by 19.8, SD=15.3) and pain (verbal numeric rating scale decreased by 0.6, SD=0.9).[52]

II: Specific to plantar flexor muscle structure and/or function, a systematic review by Murphy et al.[41] included 17 studies and 25 cohorts, with only 4 cohorts reported improvement.

II. A systematic review by Kim et al.[29] found that improvements in peak torque and jump height were most commonly reported in eccentric exercise programs. Yet the authors noted that there was insufficient evidence comparing different types of exercise (eccentric only, concentric only, combined) to conclude that one type of exercise provided superior benefits on motor outcomes.[29] The review included ten studies that were only summarized qualitatively due to heterogeneity.

Evidence synthesis

The positive effects of exercise on function are clinically meaningful, with studies showing improvement as soon as two weeks and an improvement of 18 to 21 points on the VISA-A scale

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by 12 weeks.[39, 42, 53, 67] Tendon loading exercise is effective at reducing pain and improving function for individuals with Achilles tendinopathy, despite variation in the type of loading (eccentric, heavy-load, slow-speed, progressive, and isometric) and dosing (exercise frequency, number of sessions, duration of care).[23, 39, 42, 53, 67, 71] Therefore clinicians are not restricted to only using eccentric exercise as multiple types of exercise are effective, as further supported by two recent meta-analyses, not included in the current summary due to overlap of studies reported in previous guidelines.[42, 45, 70] Moreover, exercise frequency (range: once per day to three times per week), total number of sessions (range: 24 to 168), and duration of care (range: six weeks to six months) did not seem to influence clinical outcomes.[71] Exercise provides a high level of benefit with minimal risks as an intervention for chronic Achilles tendinopathy, with the most commonly reported harm being temporary symptom aggravation.[12, 25]

Exercise appears to be better than a wait-and-see approach or the use of passive treatments alone.[42, 53, 67] Exercise may provide a similar level of benefit compared to ESWT.[11, 16] Invasive techniques, including microtenotomy and acupuncture, may provide superior benefits compared to exercise.[2, 67] Yet the level of evidence provided by systematic reviews comparing exercise to other treatments are commonly limited by a single study being used to estimate the effect of the comparison intervention, the included studies having a high risk of bias and/or small sample sizes.[34, 42, 49, 53, 67]

Gaps

The efficacy of exercise over a wide range of exercise types and dose combined with inconsistent improvements in plantar flexor muscle structure and function highlights the need for further research.[41] Exercise likely provides multidimensional benefits on tendon structure,[2,

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[7, 52] motor function,[29, 52] and psychological factors.[12] There is a gap in the literature on which parameters of exercise are most important to maximize the short-term improvement in symptoms and maintain long-term tendon health and function.

The benefits of tendon-loading exercise for pain and function are well-established, yet there is variability in the degree of improvement between individuals. To date, studies mostly represent non-acute Achilles tendinopathy with pain >3 months, males, and athletes, therefore generalization is limited for the effectiveness of tendon loading exercise to acute presentations, women, and non-athletes. Future work is needed to determine if the identification of specific patient subgroups, based on demographics, types of impairment and/or pain mechanisms, can be used to optimize the selection and timing of treatments.

2024 Recommendation

A: Clinicians should use tendon loading exercise, with loads as high as tolerated, as a first-line treatment to improve function and decrease pain for individuals with midportion Achilles tendinopathy who do not have presumed frailty of the tendon structure.

F: Patients should exercise at least twice weekly at an intensity as high as tolerated by the patient.

STRETCHING

2018 Recommendation

C: Clinicians may use stretching of the ankle plantar flexors with the knee flexed and extended to reduce pain and improve satisfaction with outcome in patients with midportion Achilles tendinopathy who exhibit limited ankle dorsiflexion range of motion.

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DRAFT

Evidence Update

None.

2024 Recommendation

Unchanged

Neuromuscular Re-Education

2018 Recommendation

F: Clinicians may use neuromuscular exercises targeting lower extremity impairments that may lead to abnormal kinetics and/or kinematics, specifically eccentric overload of the Achilles tendon during weight-bearing activities.

Evidence Update

None.

2024 Recommendation

Unchanged

Pain Education and Counseling

2018 Recommendation

B: For patients with non-acute mid-portion Achilles tendinopathy, clinicians should advise that complete rest is not indicated and that they should continue with their recreational activity within their pain tolerance while participating in rehabilitation.

E: Clinicians may counsel patients with midportion Achilles tendinopathy. Key elements of patient counseling could include (1) theories supporting use of physical therapy and role of mechanical loading; (2) modifiable risk factors, including BMI and shoe wear; and (3) typical time course for recovery from symptoms.

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Evidence Update

For this 2024 CPG patient education is operationally defined as interactive learning aimed at the following: 1) knowledge about the condition, treatments, and preventative measures; 2) attitudes toward treatment and behavioral change; 3) engagement in care decisions and adherence to treatment plans; and 4) skill development to promote self-care to maximize health outcomes. For this CPG education and counseling were combined.

I: The type of education provided along with exercise did not alter clinical outcomes for individuals chronic Achilles tendinopathy.[12] In an RCT by Chimenti et al. (N=66, 44% midportion Achilles tendinopathy, Age= 43.4±15.5 years, 56% women), there were no differences between those randomized to pain science education (PSE) or pathoanatomic (PAE) education in the reduction in pain at 8-weeks (NRS 0 to 10, PSE: -3.0 (95% CI: -3.8 to -2.2), PAE: -3.6 (-4.4 to -2.8)) or improvement in function at 12-weeks (VISA-A, PSE: 23.4 (95% CI: 17.1 to 29.7), PAE: 20.0 (95% CI: 13.6 to 26.3)). Education likely contributed to positive outcomes, as greater improvements in self-efficacy and in knowledge gain were associated with greater pain relief (β= -0.06 (95% CI: -0.10 to -0.02) and higher function (β=3.87 (95% CI: 1.68 to 6.06), respectively. Additionally, compared to in-person, providing this intervention via telehealth or a hybrid approach was not inferior (mean difference in pain for in-person vs. telehealth= 0.5 (-1.1 to 2.0) vs. hybrid= 0.5 (-1.0 to 1.9), favoring telehealth/hybrid).[48]

II: An RCT by Cil et al. reported that a web-based rehabilitation program, delivered through a web or smartphone interface, was as effective as in-person information delivery with or without hands on manual therapy (N=38, Age=33.0±10.1 years, 58% men).[13] All three groups

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learned home-based progressive exercises, performed stretches, and had manual therapy (either self-myofasical release or manual therapy provided by a physical therapist).

Evidence synthesis

Patient education that emphasizes biopsychosocial aspects of Achilles tendinopathy pain is equally as effective as education that emphasizes biomedical aspects.[12] Education combined with exercise can be effectively delivered in-person, virtually via telehealth, and/or using a hybrid approach.[13, 48] Together these findings indicate that clinicians can tailor educational content and format to enable individualization of care to the patient and their preferences.

Gaps in Knowledge

While education is considered a key component of rehabilitation for Achilles tendinopathy,[15] there is a lack of guidance on best practices for content and duration of education. Education topics commonly include: 1) terminology (e.g. tendinopathy vs. tendinitis vs. rupture), common symptoms, diagnosis, and expected recovery timeline,[39] 2) the importance of exercise over complete rest[60] and the benefits of physical activity for decreasing and managing pain long-term,[12] 3) self-management strategies for symptom relief, such as pain monitoring to guide level of activity and activity modification,[60] 4) how biological, psychological, and social factors interact to influence pain,[12] 5), alternative and adjunct treatment options.[15]

2024 Recommendation

B: Clinicians should provide education and counseling on Achilles tendinopathy, with either a pain science or a pathoanatomic focus, in combination with tendon-loading exercise for Achilles tendinopathy. Education can be provided either in-person or via telehealth according to the patient preference.

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DRAFT

B: Clinicians should advise that complete rest is not indicated and that they should continue with their recreational activity within their pain tolerance while participating in rehabilitation.

Manual Therapy

2010 Recommendation

F: Clinicians may use joint and soft tissue mobilization to reduce pain and improve mobility and function in patients with midportion Achilles tendinopathy

2018 Recommendation

F: Clinicians may consider using joint mobilization to improve mobility and function and soft tissue mobilization to increase range of motion for patients with midportion Achilles tendinopathy

Evidence Update

II: A randomized controlled trial by Stefansson et al.[64] compared eccentric exercise (n=19), pressure massage (n=21) and both eccentric exercise and pressure massage (n=20) (Age=44.8±11.3 years, 80% men). There was a similar level of improved function with the mean VISA-A score above 80 out of 100 by 24-weeks for all three groups.[64] There was not a consistent improvement in ankle dorsiflexion (mean increase < 3 degrees for all follow-up time points and groups).[64] This study only reported p-values.

Evidence Synthesis

There continues to be an absence of evidence to either support or contradict the effectiveness of manual therapy directed at manipulating and/or mobilizing muscles, joints, and/or connective tissues. One low level RCT found pressure massage, defined as massage focused on three to four tender and/or trigger points in the plantar flexor muscles, as a stand-alone to be

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beneficial.[64] Based on expert opinion and an impairment driven treatment model, it is believed that manual therapy is appropriate to address ROM restrictions in the foot and ankle region in those with mid-portion Achille tendinopathy. No major harms for manual therapy applied to the lower extremities have been reported.

Gaps in Knowledge

High quality studies are needed to study the effectiveness of manual therapy in those with midportion Achilles tendinopathy.

2024 Recommendation

F: Clinicians may use manual therapy directed at manipulating and/or mobilizing muscles, joints, and/or connective tissues in those with midportion Achille tendinopathy and ROM restrictions.

Dry Needling

2018 Recommendation

F: Clinicians may use combined therapy of dry needling with injection under ultrasound guidance and eccentric exercise to decrease pain for individuals with symptoms greater than three months and increased tendon thickness.

Evidence Update

For this 2024 CPG dry needling is operationally defined as a therapeutic technique that involves inserting a thin, solid needle to release a muscle trigger point or muscle tenderness.

II: In an RCT by Solomons et al.[1], individuals were assigned to either intramuscular stimulation (muscle individualized for each participant based on their assessment) (n=25), sham intramuscular stimulation (n=19), or exercise only (n=8). All groups received a standardized 12-

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week progressive eccentric exercise program. There were no differences in improvement in the VISA-A between any of the groups at weeks 6, 12, 26, or 52.[1]

Evidence Synthesis

One small RCT found that there was no additional benefit of adding dry needing, with or without intramuscular stimulation, to tendon loading exercise. No severe harms were reported in this study.[62] Most participants experienced a deep ache and/or muscle contraction with needle insertion. Occasionally, minor bruising was associated with dry needling.[62] There is currently a lack of high quality studies specific to the Achilles tendinopathy population on this intervention.[17, 26] Dry needing may have a place in improving pain and ROM, particularly in those with more acute symptoms, myofascial trigger points in the calf and/or in those who do not tolerate a progressive loading program.

Gaps in Knowledge

Dry needling has not been tested in conjunction with other modalities or as a stand-alone treatment. Additionally, high-quality studies that assess a variety of dry needing dosages are needed to determine the potential risks and benefits of this intervention for midportion Achilles tendinopathy.

2024 Recommendation

F: Clinicians may use dry needling to treat calf related muscle pain and tightness, particularly in those with more acute symptoms and/or in those who do not tolerate a progressive loading program.

Heel Lifts

2018 Recommendation

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D: Because contradictory evidence exists, no recommendation can be made for the use of heel lifts in patients with midportion Achilles tendinopathy.

Evidence Update

II: Rabusin et al.[51] compared the efficacy of heel lifts to an eccentric exercise program in a randomized controlled trial (N=100, Age=45.9±9.4 years, 52% women). Participants received instructions for completing the intervention by a handout. By 12-weeks the heel lift group reported a higher level of function (83.0±16.9 on the VISA-A) and less pain (18.1±23.2 on the visual analog scale (VAS), scale 0 to 100mm) compared to the eccentric exercise group (VISA-A: 70.7±22.2, VAS: 37.6±31.1).[51] The heel lift group also reported a higher level of adherence (91%) compared to the eccentric exercise group (60%).[51] There were no adverse events from participating in either intervention. There was a similar adverse event rate in both groups with 45% of participants self-reporting the development of a new pain in the low back and/or lower extremities.

Evidence Synthesis

Although the study by Rabusin et al.[51] suggests some benefit, this one study is not enough evidence to draw significant conclusions. Compared to tendon loading exercise, heel lifts are easier to adhere to and have a similarly low level of risk.

Gaps in Knowledge

There are very few high-quality studies from which to draw any new evidence to refute the current clinical practice guidelines.

2024 Recommendation

D: Because contradictory evidence still exists, no recommendation can be made for the use of

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heel lifts in patients with midportion Achilles tendinopathy.

Night Splints

2018 Recommendation

C: Clinicians should not use night splints to improve symptoms in patients with midportion Achilles tendinopathy

Evidence Update

None.

2024 Recommendation

Unchanged

Orthoses

2018 Recommendation

B: Because contradictory evidence exists, no recommendation can be made for the use of orthoses in patients with midportion Achilles tendinopathy.

Evidence Update

No new studies investigated the effectiveness of orthoses and therefore the recommendation is unchanged. It should be noted that for this CPG, foot orthoses are defined as off the shelf or custom (i.e. fitted) shoe inserts that support the feet, influence motion of the foot, and alter the interface between the plantar surface of the foot and the shoe.

Gaps in Knowledge

There are many gaps in understanding how orthoses affect Achilles tendinopathy, such as comparing different orthoses and their combination with exercise. New theories on how and

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why orthoses work are needed to spark interest in new orthotic approaches that could benefit patients with Achilles tendinopathy.

2024 Recommendation

B: Because contradictory evidence exists, no recommendation can be made for the use of orthoses in patients with midportion Achilles tendinopathy.

Taping

2018 Recommendation

F: Clinicians should not use therapeutic elastic tape to reduce pain or improve functional performance in patients with mid-portion Achilles tendinopathy.

F: Clinicians may use rigid taping to decrease strain on the Achilles tendon and/or alter foot posture in patients with midportion Achilles tendinopathy.

Evidence Update

None.

2024 Recommendation

Unchanged

PHYSCIAL AGENTS

INTOPHORESIS

2018 Recommendation

B: Clinicians should use iontophoresis with dexamethasone to decrease pain and improve function in patients with acute midportion Achilles tendinopathy.

Evidence Update

None.

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DRAFT

2024 Recommendation

Unchanged

LOW-LEVEL LASER THERAPY

2018 Recommendation

D: Because contradictory evidence exists, no recommendation can be made for the use of low-level laser therapy in patients with midportion Achilles tendinopathy.

Evidence Update

For this 2024 CPG low-level laser therapy is operationally defined as a light source treatment that is also called photobiology or biostimulation. The light source is a single wavelength of light, varying from 632 to 904 nm. It emits no heat, sound, or vibration. Theories suggest low-level laser therapy exposure of tendons may influence tendon cells (fibroblasts) accelerating connective tissue repair. An output power of less than 0.5 Watts is classed as low-level laser therapy (class III in the USA).[33]

II: Low level laser therapies showed no significant effects on function or pain in patients with midportion Achilles tendinopathy. Martimbianco et al.[35] conducted a systematic review of the effects of low-level laser therapy combined with exercise compared to sham laser combined with exercise in patients with midportion Achilles tendinopathy. Four RCT's (N= 119 participants) were included, all considered low quality. Data was evaluated at short-term (1-3 months) and long-term (13 month) follow-up. Functional assessment using the VISA-A was included using two studies at 1 month, 3 months and 13 months.[35] The only significant difference was at 1 month (2 studies (n=56); -9.19, 95% CI -16.16 to −2.23) favoring the placebo group.[35] The authors concluded that the certainty of evidence to be low to very low, and the

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results did not support the use of low-level laser therapy for Achilles tendinopathy. A more recent systematic review by Rocha et al.[57] included the same RCTs as Martimbianco et al.[35] plus one additional RCT (n=5). Similarly, there was no benefit of low-level laser therapy compared to a control treatment on midportion Achilles tendinopathy pain (standardized mean difference in pain: 0.28, 95% CI:-0.45–1.01).

Evidence Synthesis

The systematic review in the evidence update incorporated three studies that were not part of the 2018 CPG.[35, 57] While there is still minimal evidence suggesting that low-level laser therapy might not benefit patients with midportion Achilles tendinopathy, the quality of this evidence is low. Additionally, the high heterogeneity among the studies limits the strength of conclusions that can be drawn from meta-analyses. No severe harms of low-level laser therapy were reported.[35] The most common minor adverse events were likely related to exercise, such as muscle soreness.[35]

Gaps in Knowledge

Despite numerous gaps, such as the comparison of different dosages of low-level laser therapy, in understanding the clinical effects of this treatment on Achilles tendinopathy, there has been limited research activity addressing these gaps since the last clinical practice guideline.

2024 Recommendation

C: Clinicians should not use low level laser therapy for patients with midportion Achilles tendinopathy.

THERAPEUTIC ULTRASOUND

2018 Recommendation

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None.

Evidence Update

I: A RCT by Stania et al.[63] compared the effectiveness of ESWT (N=13, Age=42.0±11.4 years,15% women), ultrasound therapy (N=13,Age 36.7±11.6 years, 31% women), and placebo ultrasound (N=13, Age=34.0±11.3 years; 62% women) on pain with activity.[63] The ESWT group received one treatment session every seven days (three treatment sessions in total) while the ultrasound (frequency 3 MHz; intensity 1.0 W/cm2; duty cycle 50%) group received treatment five days a week (10 treatment sessions in total). Intensity of pain decreased gradually over 1 to 6 weeks after the intervention in the experimental and placebo groups. The percent reduction in activity-related pain from baseline to 6 weeks was greater in the ESWT group (73.4±25.5%) when compared to the ultrasound (38.7±36.0%). Yet there was no difference in improvement between the ultrasound and placebo (23.7±27.8%) groups.[63]

Evidence Synthesis

Therapeutic ultrasound as a standalone passive treatment is no more effective than a placebo,[63] suggesting it may not offer significant therapeutic benefits for Achilles tendinopathy. Risks of therapeutic ultrasound were not reported in this RCT.[63]

Gaps in Knowledge

There is little evidence available to determine the benefits of therapeutic ultrasound for Achilles tendinopathy.

2024 Recommendation

C: Clinicians should not use therapeutic ultrasound alone to treat Achilles tendinopathy.

OTHER-VIBRATION

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2018 Recommendation

None.

Evidence Update

II: In a lower level RCT eccentric exercise plus vibration (N=30, Age= 41.1±9.2 years, 87% women) was compared to eccentric exercise plus cryotherapy (N=31, Age=42.1±8.2 years; 84% women) at 4- and 12-weeks follow-up.[58] Both groups demonstrated a similar level of improvement in function over time (VISA-A at 12-weeks, Exercise plus Vibration= 72.8±10.5, Exercise plus Cryotherapy= 77.7±12.0). No differences were found between groups in VISA-A scores and multifidus thickness. Multifidus cross sectional area at rest (1094.3mm^2 ±171 vs 1173.8mm^2 ± 192.2) and with contraction (1143.6mm^2 ± 202.4 vs 1235mm^2 ± 208.1) were significantly (p=0.001; p=0.01) greater after the 12 weeks of treatment in the eccentric exercise plus vibration group when compared to eccentric exercise plus cryotherapy.[58]

Evidence Synthesis

The addition of one modality versus another (vibration, cryotherapy) to tendon loading exercise for Achilles tendinopathy did not alter functional outcomes.[58] Although these modalities pose minimal risk, they might divert time from treatments with stronger evidence of effectiveness.

Gaps in Knowledge

There is little evidence available to determine the benefits of vibration and/or cryotherapy for Achilles tendinopathy.

2024 Recommendation

C: Clinicians may include physical agents, such as vibration or cryotherapy, combined with exercise as part of an intervention for individuals with midportion Achilles tendinopathy.

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DRAFT

Multimodal Interventions

2018 Recommendation

None.

Evidence Update

In this 2024 CPG, a multimodal intervention is defined as a therapeutic approach that combines multiple treatments. The design of the randomized controlled trials in this section does not permit the determination of the effects of each treatment individually.

II: Arora et al.[6] completed a systematic review evaluating physical modalities combined with eccentric exercise. Physical modalities that were combined with exercise included extracorporeal shock wave therapy, low-level laser therapy, orthoses, night splint, augmented soft-tissue mobilization (a specialized treatment that utilizes a handheld instrument to transfer shear stresses and pressure to the soft tissue). Studies were only included if the comparison group involved an eccentric training group. When eight different physical modalities were each combined with eccentric exercise there were no greater benefits for function (VISA-A: short-term- pooled standardized mean difference (SMD)= 0.03, 95% CI= 0.46 to 0.53; long-term- pooled SMD= 0.43, 95% CI= -0.05 to 0.92) or pain (numeric pain rating scale: short-term- pooled SMD=-0.16, 95% CI=-0.72 to 0.40; long-term- pooled SMD= -0.46, 95% CI= -1.08 to 0.15).[6]

II: van der Vlist et al.[67] reported the outcome of a network meta-analysis for a range of treatments and treatment combinations for midportion Achilles tendinopathy. A total of 29 RCT's with 65 treatment arms, of which 40 included exercises. The data at 3 months supported exercise combined with another treatment (rank 2= exercise + extracorporeal shockwave therapy, rank 3= exercise + mucopolysaccharides, rank 4= exercise + injections, rank 8=

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exercise+ placebo injection) compared to a rank of 7 for exercise alone.[67] At 12 months the data supported exercise combined with another treatments (rank 2= exercise + injection OR exercise + night splint) compared to exercise alone (rank 4).[67] A caution for interpreting the ranks is that there were no statistical differences between most treatment categories. Challoumas et al.[9] completed a living systematic review and network meta-analysis comparing the effectiveness of exercise interventions with or without adjunct treatments to other treatments or no treatments (31 RCTs, N=1,792 patients, mean age 46 years). Similarly, exercise plus adjunct treatments (injections, low level laser therapy, orthoses) were all ranked higher than eccentric exercise alone on improvements in the VISA-A at short-term follow-up.[9] At long-term follow-up, exercise plus an injection (prolotherapy, high volume injection with corticosteroid, PRP) were also ranked higher than eccentric exercise alone.[9]

Evidence Synthesis

The new systematic reviews and network meta-analyses include a wide variety of treatments and comparisons; therefore, it is difficult to assess an optimal set of treatments. However, eccentric exercise alone was ranked in the bottom half of treatments based on effect sizes of existing studies, suggesting although exercise is a first line treatment with positive outcomes, combining exercise with a variety of other treatments may have greater effectiveness.[9, 67] In contrast, a systematic review that did not include injections found no additional benefit from using modalities. There was considerable uncertainty around the ranks and analysis because of limited available data (small samples and few studies) and risk of bias among included studies. Therefore, the meta-analyses caution that findings should be interpreted as having a low strength of evidence.[9, 67]

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Gaps in Knowledge

There is a need for more high-quality randomized controlled trials that assess specific combinations of treatments.

2024 Recommendation

C: Clinicians may include multimodal treatment, including a variety of modalities, combined with exercise for those with midportion Achilles tendinopathy

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DECISION TREE

Component 1: Medical screening

- Appropriate for physical therapy evaluation and intervention
- versus
- Appropriate for physical therapy evaluation and intervention along with consultation with another healthcare provider
- versus
- Not appropriate for physical therapy evaluation and intervention

Consultation with appropriate healthcare provider

Component 2: classify condition through differential evaluation of clinical findings suggestive of musculoskeletal impairments of body functioning (ICF) and the associated tissue pathology/disease (ICD)

Patient Examination

Diagnosis of Midportion Achilles Tendinopathy

Pain 2-6 cm proximal of Achilles insertion[C]
Pain with tendon palpation[C]
Pain with Achilles tendon loading activities[F]
Possible localized thickening in the Achilles tendon midportion [C]

No →

Differential Diagnosis

Consider other foot or ankle conditions in differential diagnosis or symptoms from lumbopelvic region
Consider systemic or medical conditions that may impact diagnosis and management

Component 3: Determination of irritability stage

Diagnosis of tissue irritability is important for guiding the clinical decisions regarding treatment frequency, intensity, duration, and type, with the goal of matching the optimal dosage of treatment to the status of the tissue being treated. There are cases where the level of tissue irritability and the duration of symptoms does not match (e.g. high irritability with chronic duration), requiring clinicians to make judgments when applying time-based research results on a patient-by-patient basis. The level of tissue irritability (low vs. high) can be classified using the diagnostic indicators outlined in component 5.

Component 4: Outcome measures

Measures to Assess Level of Functioning, Presence of Associated Physical Impairments to Address with Treatment, and Response to Treatment

- The VISA-A as a measure of symptom severity and FAAM or LEFS as a measure of self-reported activity limitation and participation restriction [A]
- Clinical performance measures, such as hop and heel-rise endurance tests [B]
- Numeric pain rating scale (0 to 10) to assess movement-evoked pain [F]
- Restrictions in ankle motion (talocrural joint, flexibility of gastrocnemius and/or soleus muscles) [F]
- Body mass index in nonathletic individuals [F]
- Psychosocial factors, including fear of movement and self-efficacy of managing symptoms [F]
- Lower quarter musculoskeletal and biomechanical assessment, to include the following elements of gait: [F]
  - 1st metatarsophalangeal joint range of motion and accessory mobility - to attain 65° of extension at pre-swing
  - Tibialis posterior strength and movement coordination to control mid-tarsal joint motion at loading response
  - Talocrural dorsiflexion range of motion, accessory mobility, gastrocnemius/soleus muscle length and tissue mobility to attain 10° of dorsiflexion at terminal stance
  - Gastrocnemius/soleus strength and movement coordination to control tibial advancement at mid stance and propulsion at terminal stance
  - Hip joint mobility and muscle flexibility to attain 10° of extension at terminal stance
  - Trunk, buttock, and thigh muscle strength and movement coordination to control lower limb internal rotation at loading

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Component 5: Intervention strategies

High Irritability: Diagnostic Indicators

- Redness, warmth, and swelling
- High levels of pain limiting low level activity (ie, walking)

Findings/interventions:

- AT pain provoked by low-level tendon-loading activities
  - Low mechanical loading exercises: isometrics, bilateral concentric and/or eccentric[A]
- Pain and inflammation
  - Iontophoresis[B]
  - Other modalities[C]
- Loss of motion
  - Stretching[C]
  - Joint and/or soft-tissue mobilization[F]
- Painful motion
  - Rigid taping or other range of motion protective treatment (ie bracing) [F]

Include patient education[B] and counseling[E]

Low Irritability: Diagnostic Indicators

- No redness, warmth, and swelling
- Pain after the onset of or after completing higher level activity (ie, jumping and running)

Findings/interventions:

- AT pain provoked by high-level tendon-loading activities
  - High mechanical loading exercises: eccentric, concentric-eccentric or heavy load slow speed[A]
- Pain
  - Multimodal treatments[C]
  - Dry Needling[F]
- Loss of motion
  - Stretching[C]
  - Joint and/or soft-tissue mobilization[F]
- Painful motion
  - Rigid taping or other range of motion protective treatment (ie, bracing) [F]
- Abnormal lower quarter musculoskeletal and biomechanical findings
  - Neuromuscular exercises targeting lower extremity impairments that may lead to abnormal kinetics and/or kinematics[F]

Include patient education[B] and counseling[E]

Re-evaluate

Refer

Consultation with other providers (extracorporeal shockwave therapy, injection, invasive procedures, etc)

Not Improving

Patient Goals Met

Discharge to Self-Management

Successful Recovery at 6-12 Months

- VISA –A > 80
- Tolerable intermittent pain
- Resumed primary activities
- Patient goals met

A- Guidelines based on strong evidence
B- Guidelines based on moderate evidence
C- Guidelines based on weak evidence
D- Conflicting evidence
E- Guidelines based upon theoretical/foundational evidence
F- Guidelines based on expert opinion

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