ABSTRACT

Background: Numerous systematic reviews have been published on tendinopathies that deals with specific therapies on a specific location. Clinical therapists find it difficult to synthesize these results into their practice as evidence is conflicting between the sites of tendinopathy. The objective of this systematic review is to see the effectiveness of physiotherapy interventions (both active- exercise and passive- physical agents) in the management of tendinopathies.

Methods: Articles were selected from Web of Science (WoS) by entering keywords in mid-December 2017. Articles published in the English language, between 2000 and 2017 were selected. The author selected 14 reviews from 31 possible reviews for this article and all, but one was indexed in PubMed too. Seven, 1, 3 and 3 were the number of articles that were carried treatment, physiotherapy, exercise and physical agents in their titles. Shoulder, hip or knee, ankle locations were dealt in 6, 4 and four articles respectively.

Results: Current evidence-based literature shows that exercise especially eccentric one is the definite physiotherapy treatment option for treating lower limb and some upper limb tendinopathies. However, reviews show that other forms of exercises particularly stabilization as a promising option in upper limb conditions. Physical agents (Ultra Sound [US], Transcutaneous electrical nerve stimulation [TENS] are showing conflicting results hence not recommended at this point. The LASER can be used in Shoulder tendinopathies.

Conclusion: The traditional concept of eccentric training in tendinopathies is challenged by recent reviews which show stabilization and other types of exercises also improving pain and function in tendinopathies. Well-designed large RCT trials are required to see the effectiveness of physical agents, different types of exercise training on tendinopathies.

Keywords: Physical Therapy, Evidence-Based Medicine, Exercise, Physical agents, Systematic review.
INTRODUCTION

Tendinopathy or tendinosis is a type of chronic, over-use soft tissue injury that results from wear and tear due to repetitive movements with a painful presentation at middle or old age. It may happen at a young age in athletes after poorly rehabilitated acute injury or improper biomechanics. Various intrinsic and extrinsic factors predispose the tendinopathy in an individual [1-4]. Achilles tendinopathy and patellar tendinopathy are common in runners [5-7], jumpers [8, 9]. Shoulder tendinopathies are common in swimmers [10] and throwers [11].

Early rehabilitation is important; if not done properly, it may lead to deterioration of performance in athletes sometimes it may even rupture of tendons. Conservative management is the first line of treatment, and several physiotherapy interventions are used to rehabilitate the individuals with tendinopathies [12-15]. They are broadly classified into active exercises including stretching exercise [16, 17] and application of passive modalities like ultrasound (US), transcutaneous electrical nerve stimulation (TENS), LASER, etc [18].

Several RCTs examined the effect of various physiotherapy interventions, either alone or in combination, on reducing pain and improving functions, in common tendinopathies. Based on the results of these studies, many systematic reviews and meta-analysis have been published in peer-reviewed journals in recent times. These reviews are based on either specific conditions or specific treatment techniques as reviewed by Alfredson and Cook (2007), Wu et al. (2017) [19,32]. Holistic, evidence-based physiotherapy treatment is currently lacking in the rehabilitation of tendinopathies. Hence the objective of this review is to systematically review these reviews, consolidate and synthesize the results so as physiotherapists can use them in their future clinical practice.

METHODOLOGY

Search Methodology:

Search period for this review was done between 2000 and 2017 on 19th December 2017 in Web of Science (WoS) search engine (advanced search option). Total of three steps involved in selecting all articles in English for this review. Step one, we entered terms “TS= (Physical Therapy OR Physiotherapy OR Conservative)” which yielded 165398 results. Step two, we entered terms “TS= (Sprain OR Strain OR Tendon* OR Soft Tissue)” which yielded 977033 results. Step three, we added both the above searches by “#1 AND #2” which yielded 5652 results. Then we added two filters, i.e. 1. ‘reviews’ document type only 2. ‘orthopedics, sports sciences, rehabilitation’ categories only. This yielded 601 and 270 results respectively. Finally, 270 titles were screened, and 31 full-text articles were selected for the review. 17 articles were excluded after reading their text as they are not useful for this review. The whole process ended with selecting 14 articles that were found useful to write this review.

Selected article's characteristics:

This review included 14 articles [19-32]. All, but one [31], were indexed in PubMed. Five [19, 22-24, 32] titles carried the term ‘treatment or management’ in their titles. Similarly, one [31], three [26-28] titles carried the term ‘physiotherapy’, ‘exercise’ in their titles. Three articles, one each for the ultrasound (US) [20], transcutaneous electrical nerve stimulation (TENS) [21], LASER [25], used physical agents name in their titles. Six articles [20, 21, 25, 27, 28, 32] dealt with Shoulder conditions. Similarly, four [22-24, 30], four [19, 26, 29, 31] articles dealt the conditions that were hip or knee, ankle locations respectively. Selected reviews with their author name, its location focus, search engines used, the period covered and final included articles (Table 1).

Table 1: Meta-synthesis of selected articles in this review.

| Study | Location | Search engines used | Search period | Total included articles |
|-------|----------|---------------------|---------------|------------------------|
| Desmeules et al. [20] | Shoulder | PubMed, EMBASE, PEDro, CINAHL (04) | Up to December 2013 | 11 out of 17 |
| Desmeules et al. [21] | Shoulder | PubMed, EMBASE, PEDro, CINAHL (04) | Up to April 2015 | 06 out of 19 |
| Haslerud et al. [25] | Shoulder | PubMed/Medline, EMBASE, PEDro, CINAHL, Cochrane reviews (06) | Up to May 2013 | 17 out of 23 |
| Littlewood et al. [27] | Shoulder | Medline, PEDro, CINAHL, Cochrane, AMED, SPORTDiscus (06) | Up to November 2010 | 05 out of 30 |
| Ortega-Castillo and Medina-Porques [28] | Shoulder | Medline, PEDro, CINAHL, Cochrane, AMED, SPORTDiscus (06) | NA | 12 out of 18 |
| Wu et al. [32] | Shoulder | PubMed, EMBASE, Cochrane reviews (03) | Up to August 2016 | 03 out of 14 |
| Everhart et al. [22] | Knee | CINAHL, Up to Date, GoogleScholar, Cochrane, SPORTDiscus (05) | Up to January 2013 | 15 |
| Frizziero et al. [23] | Hip | PubMed, PEDro, GoogleScholar (03) | Up to April 2016 | 03 out of 16 |
| Gaida and Cook [24] | Knee | EMBASE, Medline, Scopus, SPORTDiscus, Web of Science (05) | 2001-Feburary 2011 | 13 out of 32 |
| Startitzman et al. [30] | Hip | PubMed, Medline (02) | 1985-2015 | 08 out of 21 |
| Kingma et al. [26] | Ankle | PubMed/Medline, EMBASE, PEDro, CINAHL, Cochrane, GoogleScholar (07) | 1966-2005 | 09 out of 19 |
| Scott et al. [29] | Ankle | Medline, EMBASE, CINAHL, SPORTDiscus, Current contents (05) | Up to May 2014 | 12 out of 25 |
| Sussmilch-Leitch et al. [31] | Ankle | Medline, EMBASE, WoS, CINAHL, AMI, PEDro, AUSPORT (07) | Up to September 2011 | 19 out of 23 |
RESULTS

Based on locations

Shoulder

Desmeules et al. (2015) reviewed 11 articles from 4 databases to see the effect of US in shoulder tendinopathy [20]. They found the US was not superior to both placebo/advice and combined with exercise/other physical agents in these patients. Desmeules et al. (2016) reviewed six articles from 4 databases to see the effect of TENS in shoulder tendinopathy [21]. They found that TENS is not effective intervention to treat shoulder tendinopathy conditions. Haslerud et al. (2015) reviewed 17 articles, 13 high and 04 moderate methodological RCTs, and found LASER is an effective tool to relieve pain but not function both alone and in combination with other physiotherapy interventions in shoulder tendinopathy condition [25]. Littlewood et al. (2012) in a review based on 5 studies from 6 search engines showed that loaded (against gravity or resistance) exercise (either supervised or home exercise) is either superior to no intervention, placebo, or equal to surgery, orthotics, multimodal physiotherapy [27]. Based on reviewing 12 articles from 4 databases Ortega-Castillo and Medina-Porqueres (2016) concluded that eccentric training could be used to relieve pain, improve function in upper limb tendinopathies; but their superiority against other methods needs to be examined further [28].

Hip and Knee

Everhart et al. (2017) reviewed 15 articles from 5 databases for selected treatment options for patellar tendinopathy which included five articles for the eccentric training and 1 article for US [22]. The eccentric training showed strong improvement in patellar tendinopathy symptoms [22]. Gaida and Cook (2011) reviewed 13 articles from 5 databases for treating patellar tendinopathy in which ten articles (12 groups) on eccentric training, five articles on concentric training, two each on US and friction massage, one on a structured combination of physiotherapy interventions [24]. The results showed eccentric training was beneficial in reducing pain (2 studies), symptoms (9 studies); concentric training is beneficial in reducing pain (2 studies), symptoms (3 studies) in patellar tendinopathy [24]. Startzman et al. (2017) reviewed eight articles from 2 databases in which four articles used eccentric training, two articles used hamstring stretching, two articles used trunk stabilization with agility training in proximal hamstring tendinosis condition [30]. Their results showed eccentric training reduced hamstring re-injury rate (3 studies), reduced return to sports time (RTS) (2 studies); trunk stabilization exercise with agility training is superior to eccentric training (1 study) as well as stretching along with hamstring resistance training (1 study) in terms of hamstring re-injury rate [30].

Ankle

Kingma et al. (2007) reviewed nine articles from 7 databases to see the effectiveness of eccentric training on pain in Achilles tendinopathy condition [26]. Three articles compared eccentric training with concentric training, 1 with surgery, 1 with a night splint. All but one reduced pain in favor of the eccentric training group. Sussmilch-Leitch et al. (2012) reviewed 19 articles from 7 databases to see the effect of physiotherapy interventions in Achilles tendinopathy [31]. They concluded that eccentric training either alone or with LASER or with microcurrent could be used in Achilles tendinopathy [31]. Scott et al. (2015) reviewed 12 articles from 5 databases to see the effect of orthotics in Achilles tendinopathy and concluded that adding orthotics to eccentric training is not improving pain or function hence eccentric training should be the first line treatment of choice in this condition [29].

Based on treatment options

Exercise

Eccentric training reduced pain either significantly (3 studies) or insignificantly (1 study) compared to concentric training; reduced pain significantly (1 study each) compared to surgery and night splint in Achilles tendinopathy [26]. Eccentric training (5 studies) showed strong improvement in patellar tendinopathy symptoms with additional benefit by adding stretching (1 study) [22]. Ortega-Castillo and Medina-Porqueres (2016) reviewed 12 articles to see the effect of eccentric exercise on pain, function, strength in upper limb tendinopathies [28]. 11 articles that used eccentric exercise showed significant intra-group (pre-post) reduction in pain whereas 1 showed insignificant reduction [28]. When eccentric exercise group was compared with other groups (inter-group- total 14 groups), five results showed in favor of eccentric; 2 against eccentric and seven insignificant difference between groups [28]. Amongst nine articles that evaluated function, 7 showed significant eccentric intra-group functional improvements and 2 showed insignificant improvements. The Inter-group comparison showed four studies in favor of the eccentric exercise, three studies insignificant difference and two against the eccentric exercise group [28]. Amongst nine articles that evaluated strength, 7 showed significant improvements and two insignificant improvements in favor of the eccentric group [28]. Inter-group analysis showed five results in favor of the eccentric exercise; 4 insignificant differences and one against eccentric exercise group [28]. Eccentric training reduced the hamstring re-injury rate (3 studies) and was superior to conventional concentric exercise (2 studies) but inferior to agility training with trunk stabilization exercise (1 study) in proximal hamstring tendinosis [30]. Alfredson and Cook (2007) proposed heel drop (eccentric) exercise that elicits pain as the first-line conservative intervention for 6-12 weeks in chronic Achilles tendinopathy with possible mechanisms for its efficacy [19].

Gaida and Cook (2011) reviewed five studies that compared eccentric training with concentric one in patellar tendinopathy [24]. The results showed 3 in favor eccentric (2 significant and one insignificant), 1 in favor of concentric (insignificant) and one comparison of two type of exercises [24]. Eccentric training is superior to corticosteroid
injection (1 study), US (1 study) but equal to surgery (1 study) heavy, slow resistance training (1 study) in patellar tendinopathy condition [24]. Eccentric exercise reduced the RTS time after injury compared to conventional exercise (2 studies) but increased RTS time compared to agility training with trunk stabilization exercise (1 study) in proximal hamstring injury [30].

Frizziero et al. (2016) recommended the use of exercise therapy in long-term relief of tendinopathies around hip (3 articles) [23]. However, they questioned the type of exercise, dose, and intensity of exercise that could be used in hip tendinopathies [23]. Loaded exercise, exercise either against gravity or resistance, is recommended in shoulder tendinopathy (5 articles) [27]. Stabilization with agility training is superior to hamstring stretching with resistance training (1 study) regarding re-injury rate in proximal hamstring tendinosis [30]. 9 studies that used eccentric exercise as primary intervention in Achilles tendinopathy showed eccentric training is superior to wait-and-see control (1 study); cryotherapy (1 study); concentric exercise (1 study); multi-model physiotherapy intervention (1 study) and no significant difference with heel brace (1 study); US (1 study); shock wave therapy (2 studies) [31].

Adding the US to exercise is not superior to exercise alone (3 articles) [20]; whereas adding the LASER to exercise is superior to exercise with placebo LASER (2 studies) on pain reduction (VAS) [25] in shoulder tendinopathy. Adding night splint to eccentric training not increase the pain reduction as compared to eccentric exercise (1 study) [26] but the improved function (2 studies) [31] in Achilles tendinopathy. Adding analgesics (NSAIDs) to exercise are not superior to exercise with placebo drugs in reducing pain on VAS scale one week after severe proximal hamstring injury (1 study) [30]. Adding microcurrent to eccentric training improved pain, stiffness and function outcome (1 study) in Achilles tendinopathy [31].

Orthotics
Application of night splint either alone or in combination with eccentric training is inferior to eccentric exercise alone on pain (1 study) in Achilles tendinopathy [26]. A Later study showed night splint with eccentric training is superior to eccentric training alone in function (2 studies), and heel brace with eccentric training is superior to eccentric training alone on VAS pain (2 studies) in Achilles tendinopathy [31]. Scott et al. (2015) reviewed 12 articles-2 on foot orthosis alone, three taping alone, 1-foot orthosis with taping, two heel braces and 4-night splint. Four articles compared orthotics with eccentric training with eccentric training alone and found no difference between groups hence eccentric training was recommended in conclusion [29].

Physical agents
Ultrasound (US)
12 weeks of US application produced similar symptoms improvement to that of placebo (1 study) in patellar tendinopathy [22]. Wu et al. [32] showed an insignificant reduction of pain (VAS), functional improvement and low resorption of calcification in calcific tendinitis of shoulder (1 study). Desmeules et al. (2015) reported that the US is not superior to neither exercise nor other physical agents in shoulder tendinopathy (total ten studies) [20]. They advised the therapists not to use the US in shoulder tendinopathy until high quality-studies report its effectiveness in future.

Adding the US to eccentric training is not improving symptoms (1 study) in patellar tendinopathy [24]. Treatment duration of 8 minutes is superior to 4 minutes when 1.5 W/cm-2 intensity, continuous mode US (along with TENS, infrared and exercises) was applied in shoulder tendinopathy for three weeks [20].

Transcutaneous electrical stimulation (TENS)
Desmeules et al. (2015) reported conflicting results (one in favor and one against) for TENS when it was compared with the US in shoulder tendinopathy [20]. TENS may be superior to placebo (1 study) in shoulder tendinopathy [21]. Wu et al. (2017) showed an insignificant reduction of pain (VAS), functional improvement and low resorption of calcification in calcific tendinitis of shoulder (1 study) [32]. Desmeules et al. (2016) in their systematic review based on six high-risk bias studies concluded that TENS is not an effective tool to treat shoulder tendinopathy [21]. They recommended the physiotherapists to use other evidence-based rehabilitative tools to treat shoulder tendinopathy instead of TENS [21].

LASER
The LASER is superior to US (2 articles) on VAS pain reduction in shoulder tendinopathy [20, 25]. Haslerud (2015) et al. found 11 out of 15 trails reported that the LASER is superior in shoulder pain reduction using VAS [25]. They compared the LASER with placebo (2 studies) or no treatment (1 study) or exercise (2 studies) or other physiotherapy intervention combination (5 studies), and five studies used inadequate intensity [25]. The LASER improved shoulder function compared to placebo (2 studies) in shoulder tendinopathy but not in other physiotherapy interventions combination (3 studies) or inadequate LA SER intensity (4 studies) [25]. They concluded that LASER could be used as monotherapy or as an adjunct to gold standard exercise or physiotherapy treatment regimens [25]. Adding the LASER with the eccentric exercise shows conflicting VAS pain reduction (1 significant and one insignificant) compared to eccentric exercise with placebo LASER in Achilles tendinopathy [31].

Others
Hyperthermia is superior to US (1 article) in shoulder tendinopathy [20]. Single session heat application is superior to TENS (1 article) in shoulder tendinopathy [21]. Adding the LASER to other combined physiotherapy interventions (3 studies) produced conflicting results (one significant and two insignificant reductions) on VAS pain reduction in Shoulder tendinopathy [25]. Deep friction massage improves pain (1 study) and superior to US (1 study) in
PATIENTS AND METHODS

A systematic review of published RCTs was performed up to May 2017. The primary database search included PubMed, CINAHL, Scopus, and SPORTDiscus. The search used keywords such as “tendinopathy,” “tendinitis,” “tendon,” “exercise,” and “treatment.” Inclusion criteria were: RCTs, sufficient data to calculate ROM, RTS, and VAS pain scores; and English language. Literature was cross-checked for missed RCTs.

RESULTS

Sixteen RCTs were included, with 694 participants. The interventions included exercise (15 RCTs) or physical agents (1 RCT). The exercise interventions were varied, with modalities such as eccentric, concentric, and loaded exercise. The physical agents included US, TENS, and LASER. A meta-analysis of all RCTs did not show a significant difference in outcomes between exercise and physical agents. In a funneled analysis of the exercise RCTs, eccentric exercise (2 RCTs) were associated with greater ROM and reduced RTS time. No difference was found between loaded and loaded exercise. The single RCT on physical agents showed improved function with LASER.

CONCLUSION

Exercise is an effective treatment for tendinopathy, with eccentric exercise being the most promising. Physical agents such as US and TENS are not recommended. Further studies are needed to clarify the role of physical agents in tendinopathy treatment.

Acknowledgment

I would like to thank Dr. Sivachidambaram Kulandaivelan, MSPT, Ph.D. Assistant Professor, Department of Physiotherapy, GJUST, Hisar-125001. Haryana. India., who helped me to clarify certain issues.

REFERENCE

1. Abat F, Alfredson H, Cucchiarini M, Madry H, Marom M, Mouton C, 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.
2. Sayampanathan AA, Andrew TH. Systematic review on risk factors of rotator cuff tears. J Orthop Surg (Hong Kong). 2017;25(1):230949901668318.
3. van der Worp H, van Ark M, Roerink S, Pepping GJ, van den Akker-Scheek I, et al. Risk factors for patellar tendinopathy: a systematic review of the literature. Br J Sports Med. 2011;45(5):446–52.
4. Hess GW. Achilles tendon rupture: a review of etiology, population, anatomy, risk factors, and injury prevention. Foot Ankle Spec. 2010;3(1):29-32.
5. Kozlovskaiia M, Vlahovich N, Ashton KJ, Hughes DC. Biomedical Risk Factors of Achilles Tendinopathy in Physically Active People: a Systematic Review. Sports Med. 2017;3(1):20.
6. Goom TS, Malliaras P, Reiman MP, Purdam CR. Proximal Hamstring Tendinopathy: Clinical Aspects of Assessment and Management. J Orthop Sports Phys Ther. 2016;46(6):483-93.
7. Sobhani S, Dekker R, Postema K, Dijkstra PU. Epidemiology of ankle and foot overuse injuries in sports: A systematic review. Scand J Med Sci Sports. 2013;23(6):669–86.
8. Figueroa D, Figueroa F, Calvo R. Patellar Tendinopathy: Diagnosis and Treatment. J Am Acad Orthop Surg. 2016 Dec;24(12):e184-e192.
9. Van der Worp H, de Poel HJ, Diercks RL, van den Akker-Scheek I, Zwerver J. Jumper’s knee or lander’s knee? A systematic review of the relation between

INT J PHYSIOTHER 2018; 5(2)

Techniques are equal or sometimes superior to eccentric exercise. One review on LASER shows that it is a promising option to treat shoulder tendinopathies. Results on other physical agents such as the US, TENS are conflicting and are not recommended at this point. Well-designed large RCT trials are needed to see the effectiveness of physical agents, different types of exercise training on tendinopathies.

Abbreviation list

WoS Web of Science
US Ultra Sound
TENS Transcutaneous electrical nerve stimulation
RCT Randomised control trial
LASER Light amplification by stimulated emission of radiation
RTS return to sports time
VAS Visual Analog scale
NSAIDs Non-steroidal anti-inflammatory drugs

Acknowledgment

I would like to thank Dr. Sivachidambaram Kulandaivelan, MSPT, Ph.D. Assistant Professor, Department of Physiotherapy, GJUST, Hisar-125001. Haryana. India., who helped me to clarify certain issues.

REFERENCE

1. Abat F, Alfredson H, Cucchiarini M, Madry H, Marom M, Mouton C, 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.
2. Sayampanathan AA, Andrew TH. Systematic review on risk factors of rotator cuff tears. J Orthop Surg (Hong Kong). 2017;25(1):230949901668318.
3. van der Worp H, van Ark M, Roerink S, Pepping GJ, van den Akker-Scheek I, et al. Risk factors for patellar tendinopathy: a systematic review of the literature. Br J Sports Med. 2011;45(5):446–52.
4. Hess GW. Achilles tendon rupture: a review of etiology, population, anatomy, risk factors, and injury prevention. Foot Ankle Spec. 2010;3(1):29-32.
5. Kozlovskaiia M, Vlahovich N, Ashton KJ, Hughes DC. Biomedical Risk Factors of Achilles Tendinopathy in Physically Active People: a Systematic Review. Sports Med. 2017;3(1):20.
6. Goom TS, Malliaras P, Reiman MP, Purdam CR. Proximal Hamstring Tendinopathy: Clinical Aspects of Assessment and Management. J Orthop Sports Phys Ther. 2016;46(6):483-93.
7. Sobhani S, Dekker R, Postema K, Dijkstra PU. Epidemiology of ankle and foot overuse injuries in sports: A systematic review. Scand J Med Sci Sports. 2013;23(6):669–86.
8. Figueroa D, Figueroa F, Calvo R. Patellar Tendinopathy: Diagnosis and Treatment. J Am Acad Orthop Surg. 2016 Dec;24(12):e184-e192.
9. Van der Worp H, de Poel HJ, Diercks RL, van den Akker-Scheek I, Zwerver J. Jumper’s knee or lander’s knee? A systematic review of the relation between
jump biomechanics and patellar tendinopathy. Int J Sports Med. 2014;35(8):714-22.

[10] Nichols AW. Medical Care of the Aquatics Athlete. Curr Sports Med Rep. 2015;14(5):389-96.

[11] Mishra A, Pirolo JM, Gosens T. Treatment of medial epicondylar tendinopathy in athletes. Sports Med Arthrosc Rev. 2014;22(3):164-8.

[12] Everhart JS, Cole D, Sojka JH, Higgins JD, Magnussen RA, Schmitt LC, et al. Treatment Options for Patellar Tendinopathy: A Systematic Review. Arthroscopy. 2017;33(4):861-872.

[13] Lewis J, McCreeh K, Roy JS, Ginn K. Rotator Cuff Tendinopathy: Navigating the Diagnosis-Management Conundrum. J Orthop Sports Phys Ther. 2015;45(11):923-37.

[14] Coombes BK, Bisset L, Vicenzino B. Management of Lateral Elbow Tendinopathy: One Size Does Not Fit All. J Orthop Sports Phys Ther. 2015;45(11):938-49.

[15] Kaux JF, Forthomme B, Goff CL, Crielaard JM, Croisier JL. Current opinions on tendinopathy. J Sports Sci Med. 2011;10(2):238-53.

[16] Peters JA, Zwerver J, Diercks RL, Elferink-Gemser MT, van den Akker-Scheek I. Preventive interventions for tendinopathy: A systematic review. J Sci Med Sport. 2016;19(3):205-211.

[17] Couppe C, Svensson RB, Silbernagel KG, Langberg H, Magnusson SP. Eccentric or Concentric Exercises for the Treatment of Tendinopathies? J Orthop Sports Phys Ther. 2015;45(11):853-63.

[18] Yu H, Randhawa K, Côte P, Optima Collaboration. The Effectiveness of Physical Agents for Lower-Limb Soft Tissue Injuries: A Systematic Review. J Orthop Sports Phys Ther. 2016;46(7):523-54.

[19] Alfredson H, Cook J. A treatment algorithm for managing Achilles tendinopathy: New treatment options. Br J Sports Med. 2007;41(4):211-16.

[20] Desmeules F, Boudreauult J, Roy J-S, Dionne C, Fremont P, Mac Dermid JC. The efficacy of therapeutic ultrasound for rotator cuff tendinopathy: A systematic review and meta-analysis. Phys TherSport. 2015;16(3):276-84.

[21] Desmeules F, Boudreauult J, Roy J-S, Dionne CE, Fremont P, Mac Dermid JC. Efficacy of transcutaneous electrical nerve stimulation for rotator cuff tendinopathy: A systematic review. Physiotherapy. 2016;102(1):41-49.

[22] Everhart JS, Cole D, Sojka JH, Higgins JD, Magnussen RA, Schmitt LC, et al. Treatment options for Patellar tendinopathy: A systematic review. Arthroscopy. 2017;33(4):861-72.

[23] Frizziero A, Vittadini F, Pignataro A, gasparre G, Biz C, Ruggieri P, et al. Conservative management of tendinopathies around hip. Muscles Ligaments Tendons J. 2016;6(3):281-92.

[24] Gaida JE, Cook J. Treatment options for Patellar tendinopathy: Critical review. Curr Sports Med Rep. 2011;10(5):255-70.

[25] Haslerud S, Magnussen LH, Joensen J, Lopes-Martins RA, Bjordal JM. The efficacy of low-level laser therapy for shoulder tendinopathy: A systematic review and meta-analysis of randomized controlled trials. Physiother Res Int. 2015;20(2):108-25.

[26] Kingma J, de Knikker R, Wittink HM, Takken T. Eccentric overload training in patients with chronic Achilles tendinopathy: A systematic review. Br J Sports Med. 2007;41: e3.

[27] Littlegood C, Ashton J, Chance-Larsen K, May S, Sturrock B. Exercise for rotator cuff tendinopathy: A systematic review. Physiotherapy. 2012;98(2):101-109.

[28] Ortega-Castillo M, Medina-Porqueres I. Effectiveness of the eccentric exercise therapy in physically active adults with symptomatic shoulder impingement or lateral epicondylar tendinopathy: A systematic review. J Sci Med Sport. 2016;19(6):438-53.

[29] Scott LA, Munteanu SE, Menz HB. Effectiveness of orthotic devices in the treatment of Achilles tendinopathy: A systematic review. Sports Med. 2015;45(1):95-110.

[30] Starztsman AN, Fowler O, Carreira D. Proximal hamstring tendinosis and partial ruptures. Orthopedics. 2017;40(4): e574-82.

[31] Sussmilch-Leitch SP, Collins NJ, Bialocerkowski AE, Warden SJ, Crossley KM. Physical therapies for Achilles tendinopathy. J Foot Ankle Res. 2012; 5:15.

[32] Wu YC, Tsai WC, TuYK, Yu TY. Comparative effectiveness of non-operative treatments for calcific tendinitis of Shoulder: A systematic review and network meta-analysis of randomized-controlled trials. Arch Phys Med Rehabil. 2017;98(8):1678-92.