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Association of Achilles Tendinitis and Tendinopathy with Knee Osteoarthritis among Older Adults

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ABSTRACT

Background: Achilles tendon is a band of connective tissue, in some cases due to overuse activity, tendon may inflame which causes pain and irritation. Achilles tendinitis and tendinopathy is common in osteoarthritis because calf muscles become weak due to additional support they are providing to inflamed joint. **Objective:** The objective was to determine the prevalence and association of achilles tendinopathy and tendinitis in patients with knee osteoarthritis among older adults. **Study Design:** Cross sectional survey. **Settings:** Allied Hospital, District Headquarter Hospital, Madinah Teaching Hospital Faisalabad and Tehsil Headquarter, Jaranwala Pakistan. **Duration:** February to June 2023. **Methods:** Study was conducted on 80 diagnosed knee osteoarthritic participants and onetime data was collected analyzed to check the association of Achilles tendinitis and tendinopathy with knee osteoarthritis among older adults. Data was assessed by using the VISA-A questionnaire to rule out the pain and functional limitations and Thompson test to evaluate the association of Achilles tendinopathy. **Results:** Descriptive statistics and frequency distribution was used for the demographic data. Correlation test was applied to analyze the association between Achilles tendinopathy and knee osteoarthritis. It showed that 16 out of 80 patients have Achilles tendinitis and tendinopathy when Thompson test was performed. Change in gait cycle, Pain and functional limitations were present in most patient according to score of visa-a questionnaire. **Conclusion:** The study revealed that there is no association between knee osteoarthritis and Achilles tendinopathy but association present on the basis of visa-a questionnaire.

Keywords: *Osteoarthritis, Achilles, Tendinopathy, Tendinitis.*

INTRODUCTION

Tendinopathy is a catch-all term for a non-rupture injury to a tendon or Para tendon which is more increased by mechanical loading. The term is frequently used to refer to the same conditions that were previously identified as tendinitis. Some people prefer the term tendinitis to tendinitis to shift the focus away from inflammation. Tenosynovitis is abnormality of a fully formed synovial sheath which manifests as intense thickening with or without crepitus. Para tendinitis refers to the involvement of Para tendon either alone or in conjunction with tendinitis. The clinical features of Para tendinitis may be equivalent as that of tendinitis.[1,2]

Musculoskeletal injuries are very common in which acute tendon rupture is most common. It increases with past few decades; it's more common in active participants having male gender and with increasing age. It's about in 5 to 50 persons per hundred thousand people and cause major disability. A randomized control trial was conducted to check the comparative effect of non-surgical treatment with the open respire of to treat the acute tear of Achilles tendon it shows similar results when it checked through patient reported outcome and while checking the physical performance.[3]

Due to Achilles tendinopathy many changes occur in tendon structure and mechanical properties which

change the function of lower extremity and increase movement fear. These type of impairment limit the participation and performance in sports, with this treatment plan required for complete tendon sheet recovery as a result to reduce the risk of injury. Commonly it consider that it is consider that tendinopathy is cause by changes in structure of tendon and mechanical properties, altering lower extremity function and fright of movement. Result show patient not able to perform social activities. Through complete evaluation and proper treatment plan progression is require to ensure full recovery and minimize again injury chances. Evidence based proper evaluation, assessment band treatment plan will be provided.[4]

Osteoarthritis of the knee is a common progressive multifactorial joint disease and is characterized by chronic pain and functional impairment. Knee OA accounts for nearly four-fifth of the OA burden worldwide and rises with obesity and age. To date, knee OA is incurable, with the exception of total knee arthroplasty, which is considered an effective treatment in advanced phases of disease, but has significant healthcare costs. Many researches have been conducted for the prevention of the disease on early stages rather than treatment of the disease, for hat it is very important that we should know about occurrence and it's different modifiable factors of the osteoarthritis of knee joint in order to provide effective prevention strategies.[5]

In the development of Achilles tendinopathy, intrinsic and external causative factors interact. Intrinsic risk factors include age, gender, height and weight. Local anatomical risk factors involve leg length discrepancy, misalignment and decrease flexibility. Extrinsic factors include therapeutics environmental conditions and factors that relate to physiological activity such as training instances, strategy and tools.[6,7]

Round about 6 % people reports Achilles tendinopathy any time during their life. Insertional Achilles tendinopathy causes stiffness that provokes with rest and pain start with physical activity. Due to sensitivity and pain person struggle with show wear.[8,9]

Achilles tendon disorders occur frequently in both athletes and general population. Disorders are classified into two types acute and chronic overuse injuries. Tendon ruptures most common in man between ages of 30 to 40. Despite being regarded an acute procedure, histological analysis have shown that degenerative changes within the tendon are usually detected even during the setting of acute rupture. Tendon refers to more sluggish and chronic condition caused by repetitive overuse.[10]

Athletes are more commonly exposed to tendon rupture due to their high physical activity such as running, but there is lack in general population. In clinical diagnosis patient mostly present with pain that worse with loaded activities. Disability is one of the most common causes of Achilles rupture. Many factors have influenced on Achilles tendon. Failed healing response to Achilles tendon and increase in matrix rate and less stable tendon is susceptible to damage. History and clinical examination is necessary for diagnosis.[11]

Research was performed to estimate the validity of the Thompson test. Ten subjects were taken and divided into 2 groups. In one group sectioning of Achilles tendon was into 25% increments. After the complete release of each tendon we performed a Thompson test while in group 2 it was vice versa. Result showed that Thompson sign was positive after sectioning 25%, 50% and 75% of tendon. But it was absent after complete release of tendon. For diagnosis of complete Achilles tendon rupture Thompson test considered an accurate test.[12,13]

Tendon injuries are extremely common in sports. Physical activities place a significant amount of strain and pressure on the proximal portion of the muscular tendon unit, which increases the risk of tendon injury. In all sports injuries around 50 % injuries occurred due to overuse, with the significant proportion of these involving tendons.[14]

METHODS

A cross-sectional design was use to conduct this study. Ethical protocol (TUF/IRB/313/24) was follow while collecting data. Data was collected from Allied Hospital Faisalabad, District Headquarter Faisalabad and Tehsil Headquarter Jaranwala. The study was completed in 4 months after the approval of synopsis from February to June 2023. The sample size of 80 older adults with diagnosed knee osteoarthritis were enrolled in this study.

The participants were selected by using purposive sampling technique. The participant were included in the study are both male and females with all grades of active knee osteoarthritis, having muscle spasm of lower leg and tenderness on calf muscles of age group between 45-65 years. And the participant were excluded from the study who were having any trauma of lower limb, any bone fracture of lower limb, any active wound on lower limb, using any orthotic device and refused to sign consent. Signed consent were taken from those who met the inclusion criteria and after that they were screened and filled the VISA-A questionnaire

First of all consent form was signed from all participants. Screening form was used to screen the diagnosed osteoarthritis patients, which was based on inclusion and exclusion criteria. VISA-A which rule out the pain and functional limitations. Thompson test was performed to

evaluate the association of Achilles tendinopathy with knee osteoarthritis.

Statistical analysis was performed by statistical (SPSS) version 20. Frequency of age, gender, pain on walking, activities, rest, morning stiffness, stiffness later on day, swelling on heel and other functional limitations were found. Frequency of VISA-A questionnaire was finding out on basis of mild, moderate and severe. Frequency of Thompson test was find out that how many patients from total sample size are positive having indication of Achilles tendinopathy.

RESULTS

The total of 80 participant out of which 21 are male and 59 were female. The mean age of the participant was 56.15 ± 6.41024 with minimum age of 45 years and maximum age was 65 years. The maximum participant fall in the age group of 65 years. The table 1 shows that most of the patient feel pain in walking, running, stair climbing, and weight barring activities while less pain on rest. More number of patient Feels morning stiffness while less feel stiffness after that.

Figure 1: Gender distribution of the patients

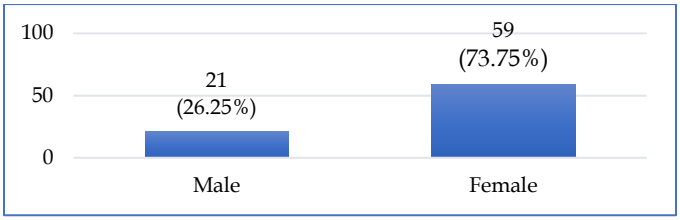

Table 1: Showing the age distribution pain on walking, running, stair climbing, rest, weight baring and stiffness of the patient

Age of the Patient		
Mean Age	**Maximum Age**	**Minimum Age**
56.15	65	45
Pain on walking and running		
Total	**Patient having pain**	**Patient having no pain**
80	51(63.7%)	29(36.3%)
Pain on stair Climbing		
Total	**Patient having pain**	**Patient having no pain**
80	60(75%)	20(25%)
Pain on rest		
Total	**Patient having pain**	**Patient having no pain**
80	24(30%)	56(70%)
Pain on weight bearing activities		
Total	**Patient having pain**	**Patient having no pain**
80	64(80%)	16(20%)
Patient feels morning stiffness		
Total	**Patient having pain**	**Patient having no pain**
80	71(88.8%)	09(11.3%)
Stiffness occurring later in the day		
Total	**Patient having pain**	**Patient having no pain**
80	25(31.3%)	55(68.8%)

Table 2: Showing the data of pain in Achilles tendon and heel on touch, calf stretching, Swelling and hard knots cracking, show pressure, weakness, pointing show, standing up on toe and currently doing any physical activity

Pain in Achilles tendon and heel when touched		
Total	**Patient having pain**	**Patient having no pain**
80	43(53.8%)	37(46.3%)
Pain feels on calf stretching		
Total	**Patient having pain**	**Patient having no pain**
80	65(81.8%)	15(18.3%)
Swelling and hard knots along Achilles tendon or at the back of your heel		
Total	**Patient having pain**	**Patient having no pain**
80	33(41.3%)	47(58.8%)
Creaking sound while moving the ankle or pressing on the Achilles tendon		
Total	**Patient having Cranking sound**	**Patient having no Cranking sound**
80	**39(48.8%)**	**41(51.3%)**
Pain with pressure from shoes		
Total	**Patient having pain**	**Patient having no pain**
80	48(60%)	32(40%)
Weakness in affected leg		
Total	**Patient having pain**	**Patient having no pain**
80	72(90%)	08(10%)
Feel pain on pointing the foot		
Total	**Patient having pain**	**Patient having no pain**
80	52(65%)	28(35%)
Currently doing sports or any physical activity		
Total	**Patient doing activity**	**Patient doing no activity**
80	12(15%)	68(65%)
Patient feels difficulty in standing up on one toe		
Total	**Patient having difficulty**	**Patient having no difficulty**
80	68(85%)	12(15%)

Frequency distribution show that more than 50% of the patient feels pain in Achilles tendon and in heel when touched, 80% population feels pain while calf muscle stretching, few persons having Swelling and hard knots along Achilles tendon, less than 50 % experience Creaking sound while moving the ankle or pressing on the Achilles tendon and pain with pressure & pointing shows, maximum participant experience calf muscle weakness and having difficulty in standing up on one toe and out of these few persons involve in physical activity.

Table 3: Showing the result of Thompson test for tendinopathy that shows the association with knee osteoarthritis

Thompson test for tendinopathy		
Test	**N**	**Percent**
Positive	16	20%
Negative	64	80%

The prevalence of Achilles tendinopathy and tendinitis among older adults assessed by VISA-A questionnaire

and Thompson test was evaluated for correlation and association with knee osteoarthritis. There is a significant relationship between knee osteoarthritis and Achilles tendinopathy when it was assessed on symtom basis by VISA questionnaire.

On thar hand there is no association or relationship found between knee osteoarthritis and Achilles tendinopathy when it is assessed by Thompson test.

We rely upon results of Thompson test because it has high validity and sensitivity. There is literature gap in study because thompson test indicates that there is no association between knee osteoarthritis and Achilles tendinitis and tendinopathy but still there is pain and functional limitations in heel area.

DISCUSSION

This study was conducted to check association of Achilles tendinopathy and tendinitis with knee osteoarthritis. Research was focused on patients with knee osteoarthritis between ages of 45-65. A cross sectional survey was conducted on 80 participants on both gender. Current study result showed that Achilles tendinopathy had no association with knee osteoarthritis when it checked through Thompson test. Therefore association percent on the basis of pain and functional limitations that was checked through VISA-A Questionnaire.

A previous study published in 2016 conducted on 56 participants of Rheumatology Unit, Barzilai Medical Center, Ashkelon, Israel in which the ultrasound thickness was performed to evaluate the Achilles thickness that associate with knee osteoarthritis. The result of the study showed non-significant relationship between Achilles thickness and knee osteoarthritis.[15,16]

Another study was conducted on 93 participant in which, observed the changes in Achilles tendon thickness in indicial with knee osteoarthritis and found the correlation between the tendon thicknesses with the severity of Knee OA. Out of these 93 participant 63 were active knee OA patient and 30 control participant. The result showed the participant those who have knee OA have more tendon thickness as compare to the non OA participant furthermore it shows a positive correlation between the tendon thickness and knee OA.[17,18]

CONCLUSION

The study revealed that there is no association present between knee osteoarthritis and Achilles tendinopathy and tendinitis. But the association present on the basis of sign and symptoms.

LIMITATIONS

Most of the osteoarthritis patients don't report in clinical settings so it was difficult to find diagnosed OA patients.

SUGGESTIONS / RECOMMENDATIONS

More settings should be visited. Results may be different when the sample size and settings of data collection will be large. Researcher can further work to check inter and intrareliability of Thompson test and VISA-A Questionnaire. Researcher should investigate other factors that could be influencing the lack of association or they can use different methodology to investigate that what is the cause of pain and functional limitations occurring in Achilles tendon area.

CONFLICT OF INTEREST / DISCLOSURE

There is no conflict of interest.

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REFERENCES

1. Scott A, Backman LJ, Speed C. Tendinopathy: update on pathophysiology. journal of orthopaedic & sports physical therapy. 2015 Nov;45(11):833-41.
2. Tarantino D, Mottola R, Resta G, Gnasso R, Palermi S, Corrado B, et al. Achilles tendinopathy pathogenesis and management: a narrative review. International Journal of Environmental Research and Public Health. 2023 Aug 30;20(17):6681.
3. Myhrvold SB, Brouwer EF, Andresen TK, Rydevik K, Amundsen M, Grün W, et al. Nonoperative or surgical treatment of acute Achilles' tendon rupture. New England Journal of Medicine. 2022 Apr 14;386(15):1409-20.
4. Silbernagel KG, Hanlon S, Sprague A. Current clinical concepts: conservative management of Achilles tendinopathy. Journal of athletic training. 2020 May 1;55(5):438-47.
5. Cui A, Li H, Wang D, Zhong J, Chen Y, Lu H. Global, regional prevalence, incidence and risk factors of knee osteoarthritis in population-based studies. EClinicalMedicine. 2020 Dec 1;29:100587.
6. Kozlovskaia M, Vlahovich N, Ashton KJ, Hughes DC. Biomedical risk factors of achilles tendinopathy in physically active people: a systematic review. Sports Medicine-Open. 2017 Dec;3:1-4.
7. Xergia SA, Tsarbou C, Liveris NI, Hadjithoma M, Tzanetakou IP. Risk factors for Achilles tendon rupture: an updated systematic review. The Physician and Sportsmedicine. 2023 Nov 2;51(6):506-16.
8. Chimenti RL, Cychosz CC, Hall MM, Phisitkul P. Current concepts review update: insertional Achilles tendinopathy. Foot & ankle international. 2017 Oct;38(10):1160-9.
9. Zhi X, Liu X, Han J, Xiang Y, Wu H, Wei S, Xu F. Nonoperative treatment of insertional Achilles tendinopathy: a systematic review. Journal of orthopaedic surgery and research. 2021 Dec;16:1-2.
10. Li HY, Yasui Y, Han SH, Miyamoto W, Hua YH. Achilles tendinopathy: from the basic science to the clinic. BioMed Research International. 2017;2017.
11. Longo UG, Ronga M, Maffulli N. Achilles tendinopathy. Sports medicine and arthroscopy review. 2009 Jun 1;17(2):112-26.
12. Cuttica DJ, Hyer CF, Berlet GC. Intraoperative value of the Thompson test. The Journal of Foot and Ankle Surgery. 2015 Jan 1;54(1):99-101.

13. Nilsson N, Brorsson A, Helander KN, Karlsson J, Carmont M. Evaluation of the Achilles Tendon. The Art of the Musculoskeletal Physical Exam: Springer; 2023. p. 539-46.
14. Loiacono C, Palermi S, Massa B, Belviso I, Romano V, Di Gregorio A, Sirico F, Sacco AM. Tendinopathy: pathophysiology, therapeutic options, and role of nutraceutics. A narrative literature review. Medicina. 2019 Aug 7;55(8):447.
15. Reitblat T, Reitblat O, Lerman T, Kalichman L. The Association between Knee Osteoarthritis and Changes in the Achilles Tendon: A Cross-sectional Study. British Journal of Medicine and Medical Research. 2016 Jan 10;17(4):1-7.
16. Chen Z, Ye X, Shen Z, Wang Y, Wu Z, Chen G, Guan Y, Wu J, Jiang T, Wu H, Liu W. Comparison of the asymmetries in foot posture and properties of gastrocnemius muscle and achilles tendon between patients with unilateral and bilateral knee osteoarthritis. Frontiers in bioengineering and biotechnology. 2021 Oct 14;9:636571.
17. Elbaz A, Magram-Flohr I, Segal G, Mor A, Debi R, Kalichman L. Association between knee osteoarthritis and functional changes in ankle joint and Achilles tendon. The Journal of Foot and Ankle Surgery. 2017 Mar 1;56(2):238-41.
18. Lu Z, Sun D, Kovács B, Radák Z, Gu Y. Case study: The influence of Achilles tendon rupture on knee joint stress during counter-movement jump–Combining musculoskeletal modeling and finite element analysis. Heliyon. 2023 Aug 1;9(8).