International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Impact of the Use of Combination of Transcutaneous Electrical Nerve Stimulation and Therapeutic Ultrasound in the Treatment of Patients with Achilles Tendinopathy

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Abstract

Achilles tendinopathy is a common condition that results from overuse and causes pain, stiffness, and decreased range of motion. Although regular exercise has been considered as a primary means to deal with the condition, studies on the advantages of electrical treatment approaches have been still conducted.

Case Summary: A 29-year-old male suffering from Achilles tendinopathy came to physiotherapy because of constant pain in the back part of his ankle for the last three weeks.

Intervention: A detailed physiotherapy program for three weeks was carried out involving Transcutaneous Electrical Nerve Stimulation (TENS), pulsed therapeutic ultrasound, and a series of exercises.

Outcomes: The patient felt a notable decrease in pain, and he evaluated the level of pain according to the Visual Analogue Scale (VAS), decreasing from seven to two. Also, there has been an increase in flexibility of the patient's ankle joint.

Conclusion: The combination of electrical and exercise therapies seems to be efficient in dealing with early stages of Achilles tendinopathy.

Introduction

Achilles tendinopathy is a disorder caused by chronic strain and inadequate rest. It affects both physically active people and those who do not engage in any sports activities once they increase their level of physical activity.

Tissue alterations can be characterized by the disruption of the structural organization of collagen fibres, the presence of an increased amount of ground substance, and angiogenesis as a sign of inadequate response rather than inflammation.

Eccentric loading exercises are regarded as the most effective ways of treating patients; however, there are many other modalities (TENS, therapeutic ultrasound) that may also be used for pain relief and tissue healing.

Currently, there is a lack of knowledge regarding the combination of these modalities; therefore, this case report will attempt to determine if there is any benefit to using multiple therapies together.

Case presentation

Patient's Profile

Age: 29 years old male

Occupation: Office Worker

Chief Complaint

Pain at the back of his ankle joint lasting for three weeks.

Present Medical History

The patient related that he developed the pain gradually following an increase in walking and going up and down stairs; there were no previous injuries noted.

Features of the Pain:

Dull and aching sensation.

It is worsened by walking and ascending staircases.

It improves with rest.

Clinical Findings

There is slight swelling around the Achilles tendon.

There is tenderness in the middle part of the tendon.

Ankle movement to pull toes up is reduced.

Pain is felt when pushing down against resistance.

The strength of the calf muscles is slightly weak (Grade 4/5).

The heel raise test showed positive results.

Diagnosis Assessment

Prior to referral to physiotherapy, the patient was already diagnosed with Achilles Tendinopathy by an orthopedic physician.

This diagnosis was made based on physical testing, including:

Pain at a localized spot in the tendon.

Pain at palpation of the tendon.

Pain on resisted motion and daily activities.

There were no imaging studies done during physiotherapy assessment; however, the symptoms were consistent with the diagnosis made earlier.

The patient was referred to physiotherapy for treatment based on the findings from functional assessment.

Baseline Results

Visual Analog Scale (VAS): 7/10

Functional impairment: Walking and going up stairs

Intervention

The physiotherapy intervention adopted was diversified.

Transcutaneous Electrical Nerve Stimulation (TENS)
Frequency: 80-100 Hz
Intensity: Sensory level
Duration: 15 to 20 minutes

Therapeutic Ultrasound
Modality used: Pulsed (on/off ratio is 20%)
Frequency: 1 MHz
Intensity: 0.8 to 1.0 W/cm²
Duration: 5-7 minutes
Exercise Therapy
Stretching:
Gastrocnemius (calf muscles)
Soleus (lower calf)
Strengthening:
Heel drop eccentric contraction
Mobility:
Active exercises for the ankle joint
Therapy Schedule
Number of interventions per week: 5
Duration of intervention: 3 weeks
Result
Parameter before and after interventions
Pain (VAS) 7/10 to 2/10
Ankle Dorsiflexion ROM Reduced to Improved
Strength of muscles 4/5 to 5/5
Functional capacity Impaired Improved

Outcome
The patient made impressive improvements in all areas considered after three weeks. There was a marked reduction in the level of pain experienced, there was improved mobility in the ankle, and the muscles returned to their normal strength. The patient was able to perform daily activities with no difficulty at all. There were no adverse reactions observed during therapy.

Discussion
Discussion Section
Exercise therapy is often a major part of treating this condition; however, additional treatment options may also need to be used to achieve the best outcome.
Research has shown that lower limb eccentric exercises promote tendon healing and improvement in athletic performance. TENS offers a short-term pain reduction; however, therapeutic ultrasound plays a significant role in tendon healing, despite lack of consistency in the data.
Current literature has many weaknesses because research has mainly looked into specific intervention modalities. There is little literature that addresses how effective different forms of electrotherapy combin-

ned with exercise therapy would be.

Research Contribution

Combination use of TENS, ultrasound and exercise therapy Management of a condition in the earlier stages Rapid clinical improvement in a short period of time.

Mechanisms for Improvement

TENS reduced pain levels, therefore allowing the patient to perform exercises Ultrasound promoted healing of the tissue Exercise allows for proper remodeling of the tendon Utilizing the combination maximized the effects.

Comparison to Prior Literature

The following improvements over prior studies have demonstrated:
Faster and more effective pain reduction
Faster functional improvement
Greater compliance to therapeutic regimes

Clinical Implications

It would appear that combining more than one form of rehabilitation therapy would yield beneficial results
Electrotherapy should be utilized as an adjunct to exercise therapy, not as a replacement
If an early intervention is executed, this may prevent persistent conditions from developing.

Limitations

Single case report
No Imaging support
No long-term follow up.

Conclusion

use of therapeutic ultrasound in conjunction with a TENS unit combined with a structured exercise program appears to provide a non-invasive way to treat patients with Achilles tendinopathy. The results demonstrated significant improvement in patient pain, range of motion, and functional performance following treatment with this intervention.

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