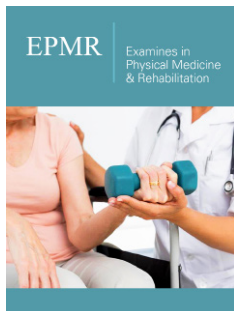


A Mini-Review of Current Conservative Treatment of Tennis Elbow

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ISSN: 2637-7934



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Submission:  January 17, 2023

Published:  February 21, 2023

Volume 4 - Issue 1

How to cite this article: Chia Lin Lee.
A Mini-Review of Current Conservative
Treatment of Tennis Elbow. Examines Phy
Med Rehab. 4(1). EPMR. 000578. 2023.
DOI: [10.31031/EPMR.2023.04.000578](https://doi.org/10.31031/EPMR.2023.04.000578)

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Keywords: Tennis elbow; ESWT; Acupuncture; Laser

Abbreviations: ECRB: Extensor Carpi Radialis Brevis; NSAIDs: Nonsteroidal Anti-Inflammatory Drugs; TENS: Transcutaneous Electrical Nerve Stimulation; ESWT: Extracorporeal Shock Wave Therapy; HA: Hyaluronic Acid; PRP: Platelet-Rich Plasma

Introduction

Tennis elbow is a common disease that presents with pain and local tenderness around the common extensor origin of the elbow, and the Extensor Carpi Radialis Brevis (ECRB) has often been implicated as the major structure in tennis elbow [1]. There are many methods could be used to treat the tennis elbow, but no one golden standard procedure was agreed by the all clinics. Based on the current literature reviewing and our therapeutic experience, we recommend several treatment modalities for tennis elbow. In the past, tennis elbow was proposed to be an inflammatory condition at common extensor origin of the elbow. In recent years, the repetitive of microtrauma and improper healing that occurs is thought to lead to tendinosis and eventual structural failure in tennis elbow [2]. The treatment guideline changes with the alternation of pathophysiology of tennis elbow. Oral nonsteroidal anti-inflammatory drugs (NSAIDs) and steroid injection were still commonly used for a first line treatment, and they both provide some efficiently result. However, side effect of oral NSAIDs and steroid injection should be concerned, and some patients are not so effective. We introduced other modalities to treat the tennis elbow, and list below:

Activity modification and orthosis

Tennis elbow was reported to be self-limited condition, and activity modification, like rest, could make the symptoms resolving spontaneously [2]. But many patients cannot follow the suggestion of activity modification due to the need of occupation or housework. The counterforce armband was often applied for the tennis elbow, and the report revealed to improve for grip strength, but not have a significant difference for pain decrease [3].

Peace and love rule

In the daily life of patients with tennis elbow [4], following the PEACE and LOVE rule is suggested. In acute stage, after-completing the labor work or homeworking every day, inflammatory condition may be developed. The PEACE could be applied for control the inflammatory. P is protection, E is elevation, A is anti-inflammatory modalities, C is compression, and E is education. At the end of day, before the sleep or getting up in the morning, LOVE could be applied for tissue healing. L is loading, O is optimism, V is vascularization, and E is exercise.

Stretch and eccentric exercise

The appropriate stretch posture for tennis elbow is that elbow in full extension with forearm in pronation, and wrist in flexion and with ulnar deviation, and holding this stretching position for seconds according to the patient's tolerance [5]. Most clinicians agree that eccentric contractions appear to have the most beneficial effects for the treatment of

tennis elbow, especially at extensor tendons of the wrist, including the ECRB tendon [5].

Transcutaneous Electrical Nerve Stimulation (TENS) and ultrasound:

In a randomized controlled trial, TENS help to reduce pain in the early stages of tennis elbow without the risk of side effects and/or recurrence in the long-term [6]. Ultrasound therapy has been used traditionally for treatment of tennis elbow for a long time, but the treatment results is variable [7].

Acupuncture

Acupuncture was reported to has effects against sham acupuncture [8], and a systematic review has shown the effectiveness and safety of acupuncture for the tennis elbow. Unfortunately, the evidence of acupuncture comparing to conventional interventions is insufficient [9].

Extracorporeal Shock Wave Therapy (ESWT)

ESWT was reported to offer more effective therapy for tennis elbow than ultrasound therapy [10]. Either radial or focus ESWT gradually reduced the pain, and they both cannot improve the function of affected tissues quickly. ESWT could initiate a chain reaction for restoring elbow physiological function [11]. Thiele S et al. [12] conclude the evidence is adequate to support the use of ESWT for tennis elbow with symptoms beyond three months [12].

Laser therapy

Laser irradiation have been shown to an increase in blood circulation, the increase in the production of ATP and collagen, and enhancement of tissue repair. Both low-power or high-power with conventional physiotherapy treatment were effective on the reduction of pain and increase in the grip force of the patients with tennis elbow [13].

Prolotherapy (Hypertonic dextrose injection)

A meta-analysis reported Hypertonic dextrose injection is superior to active controls at 12 weeks for decreasing pain intensity and functioning in the treatment of tennis elbow [14].

Hyaluronic acid (HA) injection

Patrella et al. [15] reported peri-articular HA injection for tennis elbow was significantly better than control in improving pain at rest and after maximal grip testing [15].

Platelet-Rich Plasma (PRP) injection

Karaduman et al. [16] reported the PRP injection has superior effect than operation group on the treatment of tennis elbow [16], and PRP injection was reported to have better results of relieve pain compared to triamcinolone or placebo injection without side effect of pigmentation or subcutaneous fat atrophy [17].

The cervical radiculopathy and psychological factor [18] should be considered if the symptoms cannot be resolved after series treatment. The fifth or sixth cervical radiculopathy have to be

checked, and it makes the symptoms worse due to motor function impairment. Psychological factors were reported to associated to the tennis elbow, so mind support is also an important role for a successful therapy. In summary, no single method could treat tennis elbow totally successful, and the treatment guide is variable to each individual. Activity modification and orthosis application were firstly suggested to the patient and the PEACE and LOVE rule in the daily life followed. Some patients can resolve the symptoms, if not, the series treatment could be started to perform. The conventional physical modality, like TENS or ultrasound, were reported to have some benefit to treat of tennis elbow, and shock wave and laser treatment could be aggressively used due to their tissue healing potential. Acupuncture was also reported to be efficient to the tennis elbow and may be used widely in the tennis elbow cases with cervical radiculopathy or psychological problem. The injection therapy could be second line for treatment of tennis elbow, and whatever steroid, hypertonic dextrose, hyaluronic acid or PRP have each benefit and side effect. The clinicians can decide which injection regiment depend on consultation with each patient. Because tennis elbow is almost always self-limiting condition [19], most patients with tennis elbow could be well controlled after the conservative treatment, and rare patients have to undergo the surgical treatment.

Acknowledgement

I am grateful to Dr. Chin Hsien, Wu for guidance of the report.

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