

A STUDY ON EFFECTIVENESS OF DIADYNAMIC CURRENT IN TENNIS LEG AMONG ATHLETES

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ABSTRACT

BACKGROUND: Tennis leg” refers to acute mid-calf pain, which is a common sports-associated injury, usually experienced by middle-aged persons, incurred with extension of the knee and forced dorsiflexion of the ankle. This entity can occur during many activities, but was first described in a tennis player in 1883, where it was attributed to rupture of the plantaris tendon. Its function is to assist the larger calf muscles in plantar flexing the ankle or pointing the foot down. This muscle is actually absent in up to 15% of the population.

OBJECTIVE OF THE STUDY: To determine prove the effectiveness of Diadynamic current to relieve pain in the tennis leg among athletes.

METHODOLOGY: A convenient sample of 20 Athletes was solicited from Saveetha medical college and hospital, Chennai. Participants were n=30 and age range = 35 - 50 years. Subjects were then allocated in two groups. Each group had a physiotherapist who carried out all interventions. Group A (experimental group) in this group Diadynamic current with Calf strengthening with were given for 20 minutes continuously 1 week. Group B (control group) in this group were given calf strengthening exercises Interferential therapy.

STUDY DESIGN: Randomized clinical trial, Experimental design.

OUTCOME MEASURES: Numerical Pain Rating Scale, oxford muscle power grading

RESULTS: The data obtained was tabulated and statistically analyzed. Due to nature of outcome measures of Pain and muscle strength were calculated and compare pre and post intervention, parametric statistical tests, dependent t sample test and un paired t test were used. The two tailed p value is less than 0.0001 by conventional criteria this difference is considered to be extremely statistically significant in the experimental group..

CONCLUSION: The tennis leg is often seen in the intermittently active athlete. Medial calf injuries occur more commonly in men than in women, and these injuries usually afflict athletes and others in the fourth to sixth decade of life. The Diadynamic current was very effective treatment of tennis leg among athletes.

KEYWORDS: Diadynamic current. Tennis leg

INTRODUCTION:

This condition has been termed "tennis leg" because of its prevalence in this particular sport, but medial calf injury can happen in a variety of sports or other activities. One mechanism that occurs is on the back leg during a lunging shot, in which the knee is extended while the foot is dorsiflexed. This action puts maximal tension on the gastrocnemius muscle as the lengthened muscle is contracted at the "push off," resulting in a tennis leg injury. This is the common position of the back leg in a tennis stroke, and it results in the greatest force to the muscle unit; but tennis leg injury can also occur during a typical contraction of ankle plantar flexion, especially if the athlete is pushing or lifting a large weight or force. Medial calf injuries occur more commonly in the middle-aged recreational athlete. This population typically continues to be physically active at a moderate to high intensity but not on a regular basis, and these individuals are also likely to have maintained a moderate degree of the muscle mass from their more active days. The term Tennis Leg refers to an acute medial head of the gastrocnemius muscle tear in the older athlete characterized by sudden onset of severe calf pain and significant disability. The injury is invariably associated with extensive bruising and swelling, and can be mistaken for a deep venous thrombosis. The most common site is the medial head of gastrocnemius, but occasionally the plantaris muscle is involved. Symptoms are a sudden, sharp or burning pain in the leg, sometimes accompanied by an audible sound. In most cases, the player is unable to continue play because of the severe pain. Depending on the severity of the injury, recovery may take between a few days and six weeks. This injury occurs commonly in sports activities (e.g, hill running, jumping, tennis), but it can occur in any activity. A medial calf injury is often seen in the intermittently active athlete. Medial calf injuries occur more commonly in men than in women, and these injuries usually afflict athletes and others in the fourth to sixth decade of life. Medial calf injuries are most commonly seen acutely, but up to 20% of affected patients report a prodrome of calf tightness several days before the injury, thus suggesting a potential chronic predisposition. A calf strain or tennis leg begins as a sudden sharp burning pain, initially concentrated along the inside of the calf muscle or behind the knee. In some cases a tearing or

snapping noise is heard during the injury. In most instances a calf strain will mean that the player or runner is unable to continue. The tear or rupture will be accompanied by severe swelling and bruising that will be incredibly tender to touch. In cases of rupture there will possibly be an inability to move the ankle. Pain levels will be aggravated by any foot movements making weight bearing and walking excruciating and impossible in a rupture case with specific weakness when trying to stand on tip toes. In partial tear cases patients can still fully use their lower leg with stiffness and a feeling of discomfort on weight bearing, resulting in a mild limp. Once healing has started the severe pain will be replaced with dull aches and discomfort felt on plantar flexion of the foot or when the calf muscles are stressed. Stiffness and dull aches are normally experienced during the night and most intense early in the mornings. Many physiotherapeutic modalities are treated tennis leg. The low frequency modality of diadynamic current to relieve pain and numbness of calf and the calf muscles strengthening is to improve the calf strength among athletes.

OBJECTIVE OF THE STUDY: To determine prove the effectiveness of Diadynamic current to relieve pain in the tennis leg among athletes.

METHODOLOGY:

A convenient sample of 30 subjects was solicited from Saveetha medical college and hospital, Chennai. Participants were older athletes age range between 35 - 50 years. Subjects were then allocated in two groups. Each group had a physiotherapist who carried out all interventions. Group A (experimental group) in this group Diadynamic current with Calf strengthening with were given for 20 minutes continuously 1 week. Group B (control group) in this group were given calf strengthening exercises Interferential therapy.

STUDY DESIGN: Experimental design, Randomized clinical trial.

MEASUREMENT TOOLS: Numerical Pain Rating scale and Oxford muscle power grading.

PROCEDURE:

Population

Individuals with unilateral or bilateral Tennis leg who were referred to the Department of Physiotherapy

Sampling

Convenience Random Sampling, Subjects were selected in accordance to a predetermined inclusion and exclusion criteria to ensure homogeneity of the subjects. The subjects were then randomly assigned into two groups,

Group A and Group B.

Sample Size

Total: 30 Subjects.

Group A: 15 Subjects (Diadynamic currents and calf strengthening). Diadynamic currents are alternating low frequency currents, having frequency of 50 Hz and pulse duration of 10 m sec, providing 100 stimuli / sec. this type of current given to the calf region patient is comfortable side lying position supported the knee with pillow, snycopal rhythm effect of diadynamic current will be given. It comprises 1-sec phase of MF, followed by a 1-sec rest phase. This treatment given for 15 minutes, electrode will be placed over the medial side of calf region. Group B: 15 Subjects (conventional physiotherapy alone Interferential therapy with calf strengthening). Interferential therapy quadripolar method used to given 15 minutes.

Calf strengthening exercises:

1. Sit with your injured leg straight out in front of you. Start with the knee bent slightly (gradually working towards a straight knee) and loop a towel around the base of your foot holding each end in your hands. Gently pull the towel toward yourself until you feel a stretch in your calf. This should be feeling of discomfort and not a sharp pain. DO NOT OVERSTRETCH INTO PAIN. Hold for approximately 5 - 10 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable
2. Active ankle range of movement Lying on your back or sitting bend and straighten your ankles gently as far as you can. Build up to completing this with your knees straight to also stretch your calf muscle. Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.
3. Ankle ABC Moving only the foot and the ankle write the alphabet out using the big toe as a pencil. Build up to making the letters as large as possible. Repeat 5 times and aim to complete 2 – 3 sets each day as comfortable.
4. Knee straightening in lying face down on a bed with your knees and ankles to rest over the edge of the bed. Relax and allow the weight of your legs to straighten your knees. Hold for approximately 5 minutes and aim to repeat 2 – 3 times a day.

SELECTION OF CRITERIA:

Inclusion Criteria

- Age: 20-50 Years
- Sex: Both Males and Females
- Subjects with unilateral or bilateral tennis leg
- Subjects having pain in the medial side of calf region.
- Pain on at least two of the following evaluations
- Subjects having symptoms for at least 1 month and pain level >3 and <8 on Numerical pain rating Scale.

Exclusion Criteria

- Severe calf pain 10 on Visual Analogue Scale (VAS)
- Referred pain from ankle or knee
- Recent history of medications for pain relief (within 3 months)
- Recent knee surgeries
- Central or Peripheral neurologic pain
- Severe knee deformities or misalignment of lower extremities
- Deep vein thrombosis
- Cardiac pacemakers
- Hematoma
- Above age group of 50

RESULTS:

The values were statistically analyzed using paired 't' test and independent 't' test. There was statistically significant improvement both within the groups and in between the groups on all the 3 outcome measures. Group- A had greater improvement than Group- B.

Table 1:

S.NO	Statistical measures	NPRS		Oxford grading	
		Group A	Group B	Group A	Group B
1.	Mean	8.3	8.4	0.67	0.70
2.	Standard Deviation	0.72	0.73	2.2	2.2

Fig 1 : Pre Intervention

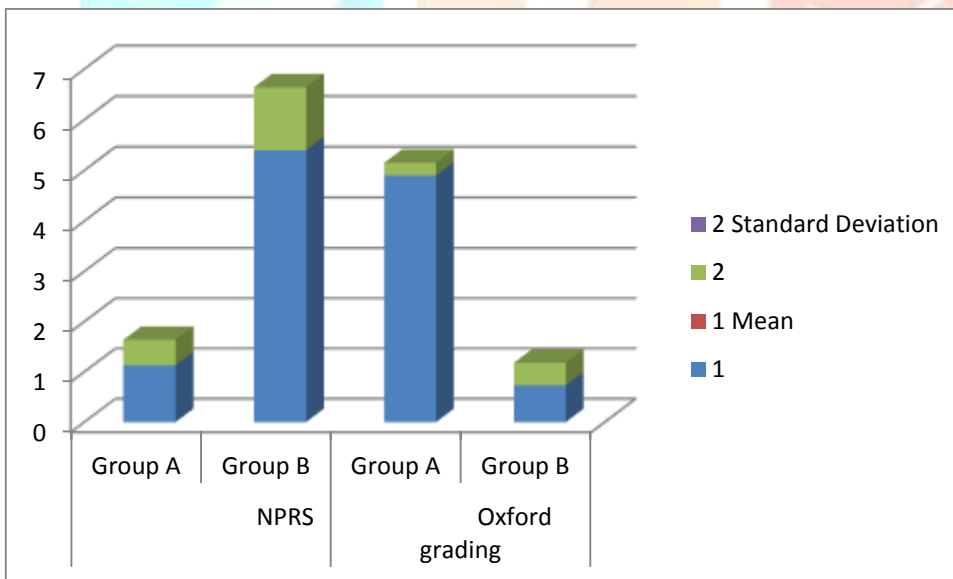
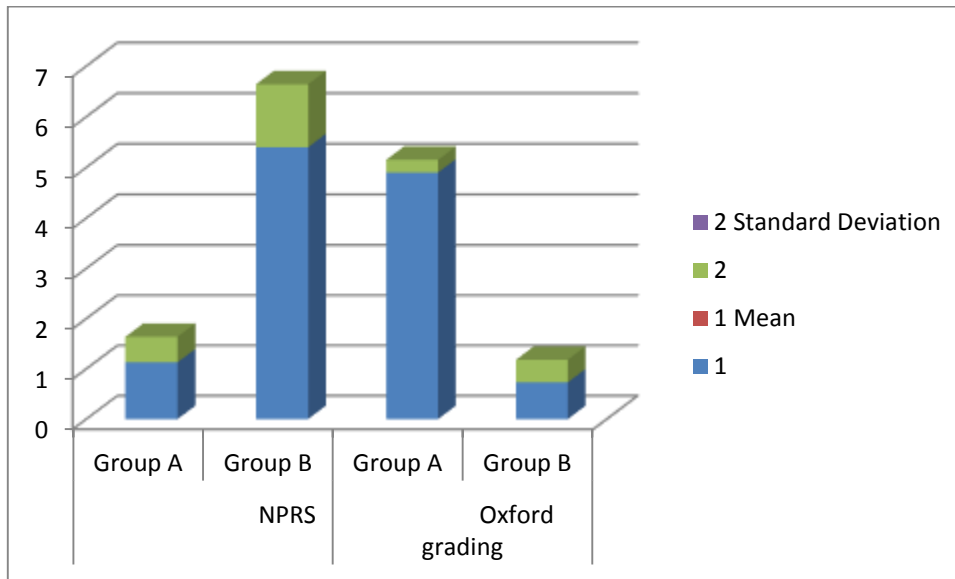


Table 2 post intervention:

S.NO	Statistical measures	NPRS		Oxford grading	
		Group A	Group B	Group A	Group B
1.	Mean	1.13	5.4	4.9	0.73
2.	Standard Deviation	0.51	1.24	0.25	0.45

Fig .2 Post intervention:



The results shows pre and post intervention statistically proved to experimental group was very effective intervention for tennis leg.

S.NO	VARIABLES	DIFFERENCE	STANDARD ERROR	C INTERVAL	T VALUE	DF	P VALUE SIGNIFICANT LEVEL
1.	NPRS	4.270	0.346	95%	12.33	28	P < 0.0001
2.	OXFORD GRADING	4.170	0.133	95%	31.37	28	P < 0.0001

DISCUSSION:

The purpose of this study is to describe the clinical outcome of conservative in patients with rupture of the medial head of the gastronemus ("tennis leg") occurring calf exercise and Diadynamic current to analyse the effect of the treatment. The results were compared by pre and post intervention for two variables like pain and strength of tennis leg patients. The data obtained was tabulated and statistically analyzed. Due to nature of outcome measures of Pain and muscle strength were calculated and compare pre and post intervention, parametric statistical tests, dependent t sample test and un paired t test were used. The two tailed p value is less than 0.0001 by conventional criteria this difference is considered to be extremely statistically significant in the experimental group In the pre intervention phase the results shows NPRS scale receiving Group A of Mean and SD (8.3±0.73) and Group B(8.3± 0.73) Muscle strength of Group A (0.67 ±2.2) and Group B (0.70±2.2). There are no significant changes in the both control and experimental group.

In the post intervention phase results were analysed by paired t test and to compare Group A of Pain (Mean 1.13 ± SD 0.51) muscle strength (Mean4.9 ± SD 0.25) and Group B of pain (Mean 5.4 ± SD 1.24) Muscle strength (Mean 0.73 ± SD 0.45).The results shows that the significant changes in the both groups.

During tennis, the patient heard a bang from his left calf. The inferior edge of the calf muscle at the musculotendinous junction of the medial branch of m. gastronemus was tender to pressure, indicating a rupture called as "tennis leg". Foot movements are usually normal, but moving about is painful. The finding is confirmed by ultrasonography. First aid will limit the injury, and when the pain allows, active exercise therapy is initiated. Healing occurs in 2 to 6 weeks, the more difficult ones in 3 to 4 months. Return to the court may take place gradually with a bandaged calf. Kivi et al.

In the t test calculation shows that the two tailed P value equals 0.0035 by conventional criteria this difference is considered to be very statistically significant in the Group A experimental. In the pain scale (NPRS) of standard error 0.346 and 95% confidential interval , t value was 12.33 , P value is less than 0.0001there is statistically significant in the Group A. In the muscle strength of oxford grading results were the standard error 0.133 and 95% confidential interval, t value is 31.37 . P value is less than 0.0001, there is extremely statistically significant in the experimental Group A. Finally the results showed that Diadynamic current with calf strengthening exercises was very effective treatment of tennis leg among athletes.

SUGGESTIONS AND LIMITATIONS

- This study was done in a short-time period with a small number of subjects. Therefore to make the results more valid, long-term study with a larger sample size is recommended.
- This study does not include EMG analysis or Biofeedback training. So further studies utilizing EMG analysis of muscle activity, EMG Biofeedback training can be carried out.
- Inclusion of a control group would be helpful in validating the results.
- Further studies are recommended to analyze the effect some other modified exercise regimen.
- This study does not include muscle morphology measurement. So, further studies with muscle morphology as an outcome measure are recommended.

CONCLUSION:

Tennis leg happens when lunging or pushing off one leg to get to a wide ball or serve. May also happen with daily activities, such as running to catch a bus or climbing stairs. It feels like being kicked in the leg from behind. The tennis leg sufferer feels a quick severe sharp pain, turns around to see who kicked them, only to discover that no one is there. At one time, the typical tennis leg symptoms of soleus pain, swelling, and walking difficulty were thought to be the result of a plantaris tear. Recent studies have shown that this is a cause in rare instances only. Treatment is deferred to basic rest and ice packs until pain and swelling are reduced. The tennis leg injury requires Diadynamic current with calf strengthening exercises very effective management of tennisleg.

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