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Immediate effect of dry needling versus strain counterstrain technique on elbow pain and functional disability among lateral epicondylitis patients: A comparative study

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Abstract
Tennis Elbow is one of the most often diagnosed disorders of the upper extremity with an incidence of about 1% and a prevalence of 13% of adults, most commonly in age group 30-50. Dry needling is a technique to treat pain in any body part using needles of different sizes. Strain counterstrain technique is a passive positional intervention given to reduce musculoskeletal pain. Both of this techniques are given to reduce pain and applied on tender points and trigger points. The aim of this study is to find out the immediate effect of dry needling versus strain/counterstrain technique on elbow pain and functional disability among lateral epicondylitis patients. There is significant increase in both Dry Needling and Strain Counterstrain immediately in both groups. But group receiving Dry Needling showed more powerful improvement in pain and disability in tennis elbow patients.

Keywords: tennis elbow, functional disability, lateral epicondylitis

Introduction
Lateral epicondylitis/Tennis elbow (TE) is regarded as a repetitive overuse injury in the tendons that attach the extensor carpi radialis brevis (ECRB), and the extensor digitorumcommunis muscles to the lateral epicondyle. It is a painful condition on and around the bony prominence on the lateral side of the elbow. This location gives TE its technical name: lateral elbow tendinopathy. With an incidence of about 1% and a prevalence of 13% of adults. Symptoms of the condition generally include a tenderness over the aspect of the lateral epicondyle of the humerus, pain in the extensor muscles of the forearm induced by gripping or resistive movements in the wrist, and localized path in the olecranon region induced by carrying weight.

Dry-needling is a technique that uses needles to treat myofascial pain in any body part, including Lateral Epicondylitis [7, 13]. Myofascial pain syndrome is a disease of muscle that produces local and referred pain. It is characterized by a motor abnormality (a hard band within the muscle) and by sensory abnormalities tenderness and referred pain [8]. Dry needling involves the insertion of a needle (it can be an acupuncture needle or any other injection needle without injecting any liquid) at these trigger points [10]. Dry needling might not change some central sensitization aspects, also it is probable that referred and local pain is reduced, range of motion and patterns of muscle activation is improved and trigger points' of chemical environment is changed (Dommerholt, 2011). Randomized controlled studies have failed to demonstrate meaningful effects of dry needling for chronic elbow disability [13].

Strain/counterstrain technique or positional release therapy is a passive positional intervention aimed at relieving musculoskeletal pain and related dysfunction. The classical description of this technique was made by Jones in 1981 who recommended the adoption of a position of comfort for dysfunctional tissue exhibiting tender points [14]. Tender points are defined as small, dense and hypersensitive points found within the subcutaneous, muscular or fascial tissues [15]. Tender points and myofascial trigger points [16] are usually associated in the literature, [17] although the two disorders have different features.

Need of study
Research in protocols for the immediate effect on elbow pain and functional disability among lateral epicondylitis patients has been investigated. Much less emphasis has been placed on study that shows which of these therapy is more effective. A need for study arises to see which therapy is more effective in elbow pain and functional disability among lateral epicondylitis patients.

Aims & objectives
The aim of this study is to find out the immediate effect of dry needling versus strain/counterstrain technique on elbow pain and functional disability among lateral epicondylitis patients.

Objectives
- To find immediate effect of Dry Needling on elbow pain and disability among lateral epicondylitis patients.
- To find immediate effect of Strain/Counterstrain technique on elbow pain and disability among lateral epicondylitis patients.
- To compare the immediate effect of dry needling with Strain/Counterstrain technique on elbow pain and disability among lateral epicondylitis patients

Methodology

- **Study Design:** Comparative Study.
- **Sample Size:** 30.
- **Sampling Design:** Simple random sampling.
- **Study Setting:** various hospitals and clinics in and around Pune.
- **Duration of Study:** 6 months.

Inclusion criteria

- Age group;-30-50.
- Both male and female subjects.
- Subjects with lateral epicondylitis (Cozens test '+'ve).
- Lateral epicondylitis present for more than 2 months.
- Trigger points at common extensor muscles.
- NPRS: <3/10.

Exclusion criteria

- Any history of fracture or dislocation at elbow and any musculoskeletal injury to upper limb in past 2 months.
- Neurological conditions contraindicating the interventions.
- Participants with needle phobia.
- Local injection of steroid or local anaesthetic in the past 6 months.
- History of elbow surgery.

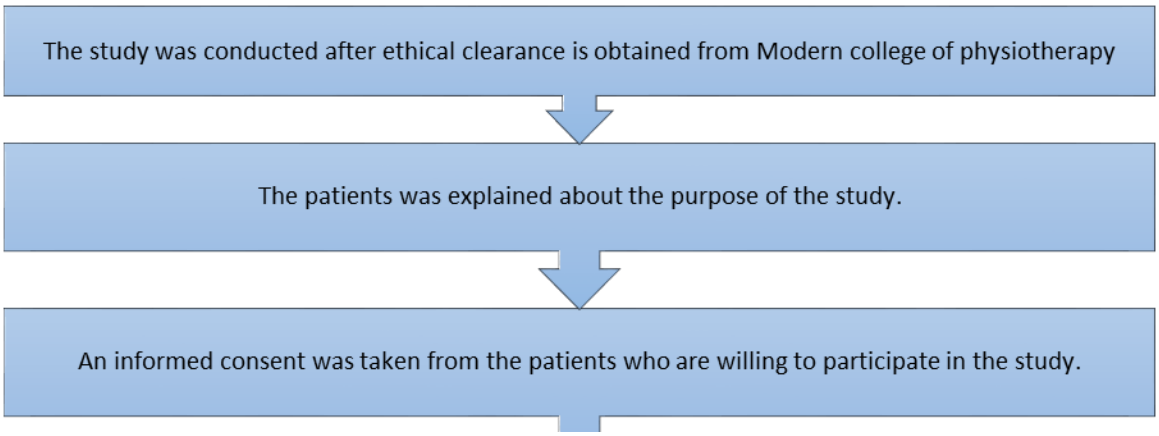
Materials

- Needles (Sterile Acupuncture Needles, made by Suzhou tianxie acupuncture instruments Co.Ltd.)
- Gloves.
- Cotton.
- Sanitizer.
- Biomedical waste disposal.
- Band-aids.
- Hand held dynamometer (Baseline)
- Ice pack.

Outcome measure

1. Numerical pain rating scale (NPRS)
2. Patient-rated Tennis Elbow Evaluation (PRTEE)

Procedure



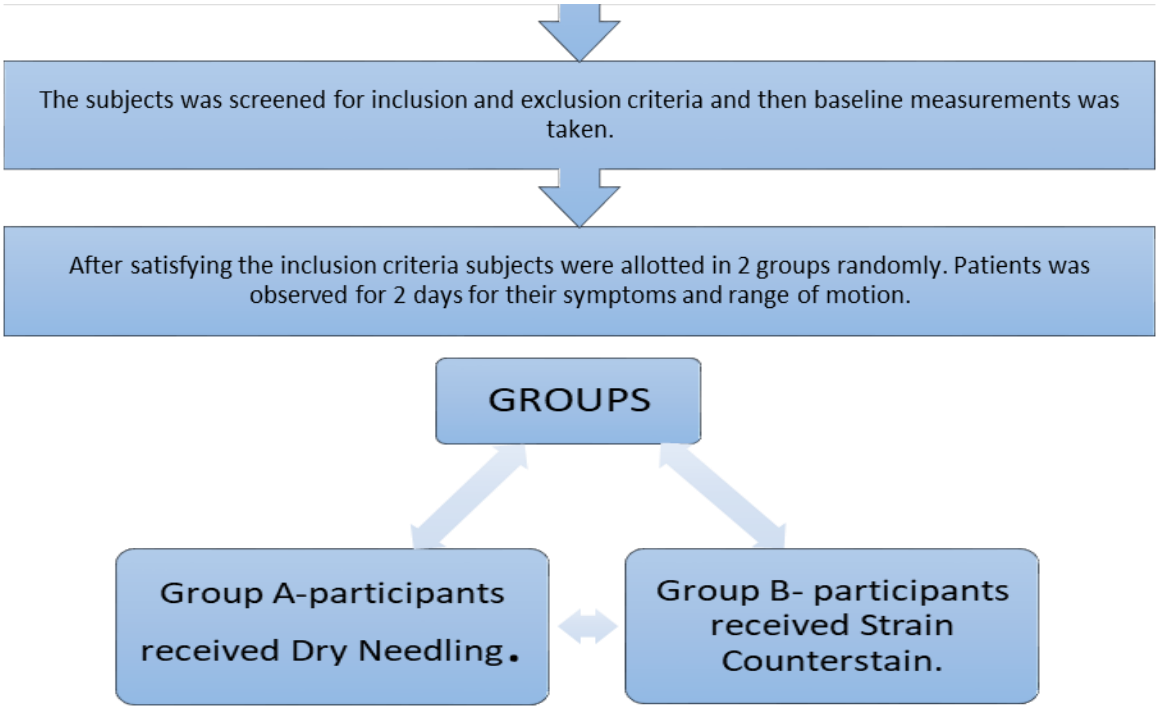
Group A: Dry needling for tennis elbow

Application of dry needling: The muscles dry needled was, brachioradialis, extensor carpi radialislongus (and sometimes brevis), extensor digitorum, anconeus, and supinator [36]. This technique was carried out with the patient in sitting position with forearm rested. The patient was priorly told about the needling procedure [37]. The needle length used was 30mm and 50 mm. The diameter of the needle used was 0.25 mm [38]. The area to be needled was cleaned with sterilium and cotton. The needling was done with use of gloves to avoid any infection at that area. Dry needling of an MTrP was palpated and done, an appropriate response i.e. local twitch response (LTR) - brisk contraction of muscle fibers in its taut band was seen [36]. Following insertion, the needle was withdrawn partially and advanced repeatedly to produce an appropriate response. Once an appropriate response was elicited and tolerated by the participant, the needle was left in skin for 2 minutes [39]. Proper care was taken to avoid any bleeding at that particular area. After needling to avoid any muscle soreness, ice pack was applied [40, 41].

Group B: Strain/Counterstrain Technique

The patient is in sitting position with pillow under the elbow for support and tender point was palpated on the extensors.
The therapist walk stands on the side of the tender point and patient. The therapist placed his thumb on the tender point and confirms the patient for the same.

The tender points were located on the lateral aspect of the elbow joint on the extensors origin. Pressure is applied on the tender points directly first at elbow flexed position and then in fully extended position with ulna deviation passively for 90 sec. The patients elbow is slowly taken in elbow flexion passively and relaxed.



Data analysis

Table 1: Shows the effectiveness of dry needling (GROUP A) on all the outcome measure

	Mean ± SD	t value	P value	Significance
Nprs pre	5.86±1.50	16.83	<0.0001	Extremely significant
Nprs post	2.26±1.03			
Prtee pre	51.2±8.53	16.18	<0.0001	Extremely significant
Prtee post	30.8±9.81			

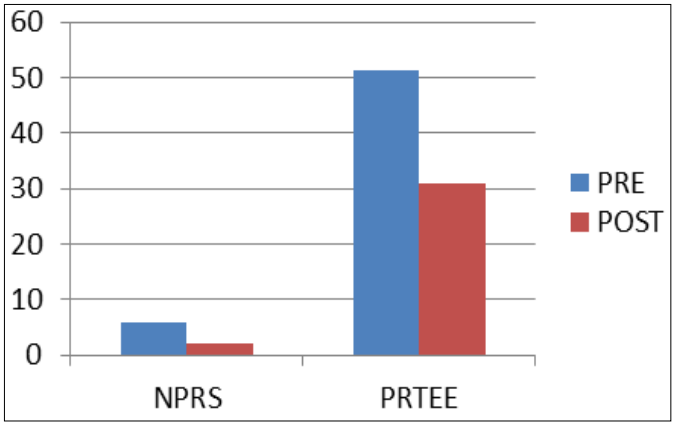


Fig 1: Gender ratio for group A

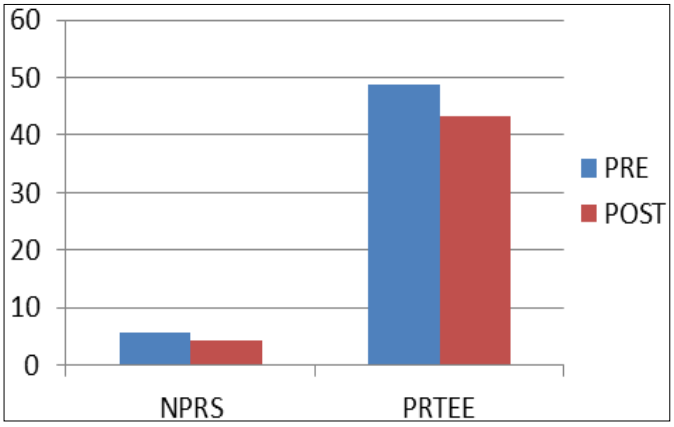


Fig 2: Gender ratio for group B

Table 2: Shows the effectiveness of strain counterstrain (GROUP B) on all the outcome measure

	Mean ± SD	t Value	p value	Significance
Nprs pre	5.66±1.23	6.205	<0.0001	Extremely significant
Nprs post	4.2±1.14			
Prtee pre	48.86±6.67	10.07	<0.0001	Extremely significant
Prtee post	43.26±5.91			

Table 3: Showing comparison between dry needling and strain counter strain across all outcome measures.

	Mean ± SD	T value	P value	Significance
Nprs a	2.26±1.033	4.853	<0.0001	Extremely significant
Nprs b	4.22±1.14			
Prtee a	30.8±9.81	4.215	<0.0002	Extremely significant
Prtee b	43.26±5.91			

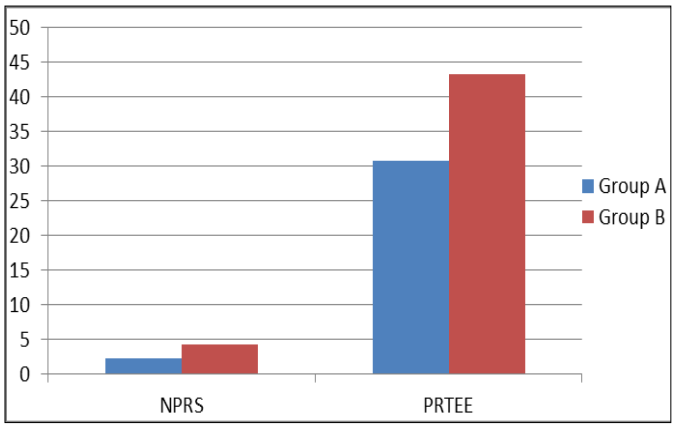


Fig 3: Mean difference between Group A and Group B

Results

The results of the study showed that the following:

- Dry needling is significantly effective to decrease the numerical pain rating scale and patient rated tennis elbow evaluation in tennis elbow patients.
- Strain counterstrain is significantly effective to decrease the numerical pain rating scale and patient rated tennis elbow evaluation in tennis elbow patients.
- Both groups (A & B) were statistically effective to decrease the numerical pain rating scale and patient rated tennis elbow evaluation in tennis elbow patients.
- Group A Dry needling and Group B Strain counterstrain.
- Clinically, Group A had greater effectiveness to decrease the numerical pain rating scale and patient rated tennis elbow evaluation in tennis elbow patients.

Discussion

The present study was done to see the effectiveness of dry needling and strain counterstrain technique in chronic tennis elbow patients for pain and disability assessed by using numerical pain rated scale and patient rated tennis elbow evaluation.

For the study 30 subjects were divided into 2 groups of 15 each. Group A received dry needling and group B received strain counterstrain technique. Patients with chronic elbow pain were selected having trigger points present on extensor origin muscles for use of both the techniques. Other types of systemic conditions, Fracture of upper extremities, cervical radiculopathy, operated cases of hand/ hand surgery were excluded. Study was done in hospital and various health centres in and around pune for 1week. Data was collected pre and post treatment. Pain was measured using numerical pain rating scale and disability using patient rated tennis elbow evaluation.

The present study result demonstrates that subjects with tennis elbow receiving dry needling experienced greater improvement in pain and disability when compared with subjects receiving *G*roup A underwent Dry Needling. Patients were assessed by Numerical Pain Rating Scale and Patient Rated Tennis Elbow Evaluation. After the completion of study the patients were reassessed by Numerical Pain Rating Scale and Pain Rated Tennis Elbow Evaluation and the result showed the significant improvement in pain and disability in tennis elbow patients.

Here, in this study Group A which received Dry needling improved numerical pain rating scale with pre test mean 5.86 to post test 2.26 SD 1.50 to 1.03.This shows that individuals who received Dry needling decreased their intensity of pain on numerical pain rating scale significantly. Table-1 and Graph-1 shows the Mean and Standard Deviation (SD) of Group-A..

Strain/counterstrain technique or positional release therapy is a passive positional intervention aimed at relieving musculoskeletal pain and related dysfunction. The classical description of this technique was made by Jones in 1981 who recommended the adoption of a position of comfort for dysfunctional tissue exhibiting tender points. A number of studies have reported the use of strain/counterstrain in combination with other interventions for treat.

Here, in this study Group B which received Strain counterstrain decreased numerical pain rating scale with pre test mean 5.66 to post test 4.2 SD 1.23 to 1.14 and decrease in scores of patient rated tennis elbow evaluation with pre test mean48.86 to post test43.26 SD 6.67 to 5.91.This shows that individuals who received Strain counterstrain decreased their pain and disability significantly. Table-2 and Graph-2 shows the Mean and Standard Deviation (SD) of Group-B. This shows that individuals who received Dry needling decreased their pain and disability significantly. Table-3 and Graph-3 shows the Mean and Standard Deviation (SD) of Group- A and Group B.

Conclusion

There is significant increase in both Dry Needling and Strain Counterstrain immediately in both groups. But group receiving Dry Needling showed more powerful improvement in pain and disability in tennis elbow patients.

Summary

The objective of the study was to study the effect of Dry Needling and Strain counterstrain on elbow pain and disability in the age group of 30-50 years. The primary data was collected from various hospitals, clinics and health centres in and around pune. The participants for this comparative study were recruited based on the inclusion and the exclusion criteria.

A total of 30 subjects having elbow pain for more than 2 months were a part of the study. Prior to the study, written informed assent was taken from the subjects. The subjects were randomly allocated into 2 study groups with 15 participants in each group. Group A received Dry Needling Group B received Strain counterstrain. Baseline assessment of elbow using (NPRS) and (PRTEE) was obtained before. The session was immediate. On statistical analysis, it was noted that Dry needling showed better improvement in terms of pain and disability compared to strain counterstrain. Therefore, it is recommended that Dry needling must be included in the treatment protocol of tennis elbow.

Limitation

- The Study consisted of a small number of Subjects.

- Study duration was of 6 months & no further follow up was taken.

Future research

- Future studies should be done on larger sample size in both the groups.
- The duration of the study should be elongated for the better effectiveness of both interventions.

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