Effect of Dry Needling in Patient with Cervical Radiculopathy in Reducing Pain and Increasing Rom Compared to Interferential Therapy

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Abstract

Background: This study was designed to inspect the effectiveness of Dry needling and interferential therapy on cervical radiculopathy patients.

Purpose: To compare the effectiveness of dry needling and interferential therapy in patients with cervical radiculopathy.

Materials and methods: It is an experimental study from November 2022 to April 2023. In this study, 30 subjects were allocated randomly using a randomization method (computer-generated random numbers) according to inclusion and exclusion criteria. Group A was allocated for interferential therapy with neck exercise (n=15) and Group B was allocated for dry needling with neck exercise (n=15). Outcome measures are NPRS (Numerical pain rating scale), Goniometer. Informed consent was obtained from the patient.

Result: From the statistical analysis, both groups showed extremely satisfied statistical significance between their pre- and post-test values (p<0.0001) Also, there is a significant difference in the post-test values of both groups (p<0.0001) which denotes that dry needling therapy with neck exercises values are higher than the IFT with neck exercises values for reducing pain and increasing ROM of cervical joint for cervical radiculopathy.

Conclusion: In this study, Dry needling with Neck exercise activities was found to be more beneficial than IFT with neck exercise in reducing cervical pain and increasing ROM.

Keywords: Cervical radiculopathy, Dry needling, Interferential therapy, Neck exercise, NPRS, Goniometer

Introduction

Pain that originates in the neck and travels to the area where the damaged root is distributed is the classic sign of cervical radiculopathy. There is no dermatomal distribution of pain, and the precise location and pattern of pain might vary greatly. Due to compression of the nerve, this type of condition occurs¹.

The nerve root is most susceptible to compression in the starting side of the intervertebral foramen because the entry of the root is conical, these originate in the dural sac which is at the central and this is the biggest component.³,³² Dry needling” entails driving a needle directly through the skin and into the muscle. Despite the use of an acupuncture needle, the therapy is grounded in conventional Western medical theory.
Any basic anatomy education will teach you where the needle insertion sites are in the skeletal muscles. It refers to the insertion of medication

Interferential therapy (IFT) is a frequent electrotherapeutic procedure used to relieve pain. To create a new current at the frequency of medium, two currents at medium frequency must interfere with one another. The descending pain suppression system (DPSS), physiological block of nerve conduction, enhanced circulation, and placebo mechanism make up the other potential mechanism. Interferential therapy are used to reduce pain by the mechanism of pain gate theory.

**Aim**

To compare the effectiveness of dry needling and interferential therapy in patients with cervical radiculopathy in reducing pain and increasing ROM.

**Materials and Methods**

It is an experimental study. In this study, 30 subjects were allocated randomly using a randomization method (computer-generated random numbers) according to inclusion and exclusion criteria. Group A was allocated for interferential therapy with neck exercise (n=15) and Group B was allocated for dry needling with neck exercise (n =15). Outcome measures are NPRS (Numerical pain rating scale), Goniometer. Informed consent was obtained from the patient.

Study period: November 2022 to April 2023

**Inclusion criteria:**

- Both male and female
- between the age group 30 to 50 years
- Symptoms positive for cervical radiculopathy
- Positive for Spurling’s test
- Subjects with pain 8 or less than 8 in NPRS

**Exclusion criteria:**

- Any neck surgeries
- Pain more than 8 in NPRS
- Severe osteoporosis
- Neck instability

**Outcome measure:**

- Goniometer.
- Numerical pain rating scale [NPRS].

**Spurling test:**

Spurling test are used to assess the presence of cervical radiculopathy, usually it aggravates the pain. The patient is usually seated or standing upright during the test. The physiotherapist explains the procedure to the patient, including its purpose and what sensations or symptoms the patient may experience during the test.

Test Execution: The physiotherapist performs the Spurling’s test by gently tilting the patient’s head to one side (typically towards the affected side) and then applying a downward pressure or axial load on the patient’s head.

Observation of Symptoms: The physiotherapist closely observes the patient’s response during each step of the test. The patient is asked to report any sensations or symptoms, such as pain, tingling, or numbness, that they experience during the test.

**Procedure**

In this study, 30 subjects were allocated randomly to either Group A or Group B using a randomization method (computer-generated random numbers) according to inclusion and exclusion criteria. This study is a Single-blind study design where the subjects were unaware of which group they are assigned to and blinding of the therapist performing the interventions may not be possible due to the nature of the intervention. Group A was allocated for interferential therapy with neck exercise (n=15) and Group B was allocated for dry needling with neck exercise (n =15).

**Group A: Interferential therapy with neck exercise.**

**Interferential therapy:**

The purpose and procedure of interferential therapy were explained to the subject and informed consent was obtained from the patient. The subject was made to sit comfortably and four carbon electrodes...
with conductive gel were placed in the neck region\textsuperscript{11}, The parameters of Interferential therapy:

- Frequency: 80 to 120 Hz
- Intensity: as per the subject tolerance
- Duration: 20 minutes, 5 times/week

**Group B: Dry needling with neck exercise.**

**Dry needling:**

The subject was placed prone. To lower the resident microflora of the skin by 80–91% before inserting the needle(s), 70% isopropyl alcohol\textsuperscript{11} was applied to the regions and allowed to dry for at least ten seconds. Needles were discarded after one-time use because re-applying the same needle in different areas will harm the subject by causing adverse effects like an infection. The dominant hand of the therapist is used to hold the needle. The needle was placed 5 to 10 mm deep and held there for 30 seconds.

Muscles involved:

- Upper trapezius \textsuperscript{12,13}
- Deltoid

**Home exercise program:**

The subject was made to sit comfortably and neck isometric exercises were given actively by placing the subject hand on the forehead and asking them to give resistance for cervical flexion, cervical extension, lateral flexion isometrics also given). Duration: 5 to 10-second hold, 5 reps on a daily basis.

**Data Analysis**

![IFT with neck exercise](image1.png)

**Fig - 1: Comparison of pre and post-test values of IFT with neck exercise**

![IFT vs Dry Needling](image2.png)

**Fig - 3: Comparison of Post-test values of IFT and Dry needling with neck exercise.**

**Result**

After statistical analysis of data, it was found that there were statistically significant disparities between the values of the two groups. Fig 1 contrasts the pre and post-test of IFT with neck exercise subjects. The Mean and SD value of NPRS in the pretest is 7.13 & 0.22 and the post-test value of mean and SD is 4.80 and 0.33. with p-value<0.0001. The pre-test value of cervical flexion was mean 66.33 and SD 1.54, whereas the post-test value was mean 72.40 and SD 1.40 with p-value<0.0001. The pre-test value of cervical extension was mean 54.20 and SD 1.37 whereas the post-test value is mean 63.33 and SD 1.29 with p-value<0.0001.

Fig 2 contrasts the pre and post-test of dry needling with neck exercise subjects. The Mean and SD value of NPRS in the pre-test is 6.87 & 0.19 and
the post-test value of mean and SD is 3.9 and 0.21. with p-value<0.0001. The pre-test value of cervical flexion was mean 65.40 and SD 1.80, whereas the post-test value was mean 78.33 and SD 1.45 with p-value<0.0001. The pre-test value of cervical extension was mean 53.67 and SD 1.72 whereas the post-test value is mean 68.60 and SD 1.12 with p-value<0.0001.

Fig 3 contrasts the Comparison between IFT with neck exercise and dry needling with neck exercise. The mean and SD value of IFT and dry needling in NPRS was (2.87 and 0.74) and (3.87 and 0.83). In cervical flexion the mean and SD values of IFT and dry needling were (5.87 and 1.92) and (12.80 and 1.74). In cervical extension the mean and SD values of IFT and dry needling were 98.80 and 1.52) and (14.93 and 2.55).

As a result, Dry needling with neck exercise has been found more significant than IFT with neck exercise in cervical radiculopathy to reduce pain and increase range of motion.

**Discussion**

The goal is to determine the efficacy of dry needling with neck exercise in cervical radiculopathy compared to interferential therapy with neck exercise to increase ROM and reduce pain. It is unattainable to anticipate at the outset of symptoms in which a certain participant would not respond to the Treatment. According to Rhee JM, Yoon T, Riew KD et. al (2007) study, “Cervical Radiculopathy.” Therefore, for the majority of individuals with cervical radiculopathy, nonsurgical therapy should be tried until there is a severe or worsening neurologic deficit. Despite the fact that numerous nonsurgical management techniques are thought to provide at least some short-term pain relief, none of the commonly used nonsurgical therapies have been proved to affect the natural history of the condition in a controlled, prospective manner.

According to the study by Kietrys DM, (2013) they advise dry needling, as opposed based on the best currently available evidence (grade A), for reducing pain immediately following treatment and at 4 weeks in patients with upper-quartile MPS15. A single TrPDN therapy session for individuals with acute mechanical neck pain decreases the discomforts and scattered pain16 and increases cervical range of motion., according to a study by Mejuto-Vazquez MJ et al (2004). Johnson MI et al. (2006) came to the conclusion that there were similarities in the IFT parameters and pain-relief regimes utilized by respondents, according to Tabasam G. The majority of responders established IFT parameters through a process of trial and error based on patient17 feedback regarding IFT comfort. Additionally, IFT equipment is large, expensive, and typically used in physiotherapy clinics, which could be why respondents typically deliver IFT for fewer than 30 minutes when the patient is present.

Interferential current(IFC) flowed through the tissues of our body in the largest amount of voltage reported in superficial tissue and in muscular structures there was reduced voltage recorded, according to Beatti A., et. al (2011) analysis. In ‘real’ IFC, larger voltages are passed outside of the electrodes then the junction of the electrodes is placed over the skin18. In line with one circuit, the modulated IFC had the maximum voltage. When aiming at deeper tissues, ‘genuine’ IFCs outperformed the premodulated IFC in terms of higher observed voltages. However, additional research with larger samples is necessary to verify the findings of this study. Proponents of dry needling believe that it can help alleviate the symptoms of cervical radiculopathy by releasing muscular tension, reducing inflammation, and improving blood flow to the affected area. The precise mechanism of action is not yet fully understood, but it is thought to involve local biochemical and neurological effects Critics of dry needling argue that the evidence supporting its effectiveness for cervical radiculopathy is limited and mixed. While some studies have shown positive outcomes in terms of pain reduction and functional improvement, others have reported no significant differences compared to sham or placebo treatments. Additionally, the lack of standardized protocols and variations in needling techniques make it challenging to draw definitive conclusions.

The study “Cervical radiculopathy” by Rhee JM, et al. (2007) found that it is impossible to know at the time of the onset of symptoms whether a particular patient will not react well to nonsurgical treatment or whether the patient has a poor natural history. Therefore, for the majority of individuals with cervical radiculopathy, nonsurgical therapy should be tried until there is a severe or worsening neurologic deficit.19 None of the frequently used nonsurgical therapies has been demonstrated to change the natural history of the condition in a controlled, prospective fashion,
despite the fact that many nonsurgical management methods are assumed to give at least some short-term pain reduction.

**Conclusion**

As a result of the findings, it has been proven that Dry needling with neck isometric exercise is more effective than IFT with neck isometrics exercise. That is, in cervical radiculopathy, though the IFT with neck exercises had a good outcome in reducing pain and disability, Dry needling plays a significant role in preventing and relieving pain and disability, and neck exercise also aids in pain relief.

**Ethical Clearance:** Taken from the institutional committee.

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**Conflict of Interest:** Nil

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