Comparison of Effectiveness of Interferential Therapy and Transcutaneous Electrical Nerve Stimulation in Construction Workers having Cervical Spondylosis Using McGill Pain Questionnaire

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Abstract

Background: Degeneration can occur as a result of moisture loss and decreased flexibility in the neck’s spinal discs over time. Cervical spondylosis can also be brought in addition to recurrent neck motions, prior neck injuries, bad posture, and genetic factors and by poor posture.

Purpose: The study objective was comparison of the efficiency of interferential therapy and transcutaneous electrical nerve stimulation in construction workers having cervical spondylosis using the short form of the McGill pain questionnaire.

Methodology: 50 subjects participated in the study from Mars India Builds and selected based on the inclusion and exclusion criteria. Subjects assigned into interferential therapy group (n=25) and transcutaneous electrical nerve stimulation group (n=25). Along with this, static neck exercises were given to both groups. The treatment period was given for 40 mins and 6 days per week and continued for 2 weeks. The entire study process is conducted from November 2022 to April 2023.

Result: From the finding of this study interferential therapy group post-test mean was 8.88 and whereas the transcutaneous electrical nerve stimulation group was 11.72. This strongly suggests that interferential therapy in construction workers having cervical spondylosis along with static neck exercises is more effective than transcutaneous electrical nerve stimulation.

Conclusion: In this study interferential therapy with static neck exercises among construction workers was found to be more effective than transcutaneous electrical nerve stimulation.

Keywords: Cervical spondylosis, construction worker, IFT, TENS, static neck exercise.

Introduction

Degenerative disc leads to cervical spondylosis, which frequently results in random neck pain. Activities should be changed, the neck should be immobilized, modalities can be given should typically help this pain. Rarely, patients who have congenital spinal stenosis will experience neurologic symptoms. Consultation with a neurologist is indicated to rule out
other neurologic illnesses because of the involvement of neurologic structures. Surgery is typically not recommended for spondylotic radiculopathy until the pain persists or there is a growing neurologic deficit because the results of conservative treatment are typically so good\textsuperscript{1-2}.

The movements of the neck muscles were strongly impacted by the weight being elevated as well as the posture of the neck. The neck muscles were much more engaged when the weight was heavier\textsuperscript{3-4}.

In cervical spondylosis, it is a major symptom. In some cases, certain body positions may be linked to the vertigo. Such as changing positions from a seated to a standing position, from a supine to a left or right lateral, or from a sitting position to an upright one. It is also occasionally noticed while moving the head or neck to any side\textsuperscript{5}.

Spondylosis usually impacts people with no symptoms. Neck discomfort, cervical radiculopathy, and/or cervical myelopathy are the three symptoms most frequently experienced by patients who are symptomatic and are typically older than 40 years old. A clear precipitating event is frequently absent, and the neck pain might be short-term or chronic\textsuperscript{6-7}.

Lifting big objects is necessary for many construction work tasks. Traditional mortar or grout mixing includes lifting massive cement bags. 80–100 pounds are the approximate weight of full cement bags. Concrete blocks must be raised to shoulder level or higher during routine masonry works. The weight of 0.2 x 0.2 x 0.4 m standard-weight concrete blocks is around 16.3 kg. The lifting, holding, and carrying of large structures is a necessity for these and many other construction-related tasks\textsuperscript{8}.

Since lifting weights and maintaining awkward positions require maintaining muscle force for a prolonged amount of time, these are the two risk factors for WMSDs that are most essential to consider. Worker pain and muscle ache are obviously brought on by extended, repetitive lifting jobs, which also inevitably raises the risk of WMSDs.

Although appropriate lifting positions (such as stooping and squatting) have been widely suggested by prior studies, it is still unknown how these postures affect the biomechanics of the spine. Major factors affecting a construction worker’s capacity to perform their job and contributing to an elevated proportion of occupational impairment are musculoskeletal conditions and external causes\textsuperscript{9-10}.

When two medium-frequency currents [1–10 kHz] interfere, it combines to produce a low frequency [1 kHz], which is the essence of interferential therapy. Utilizing either a bipolar or quadripolar application, interference therapy is delivered transcutaneously using electrode pads\textsuperscript{11}.

Transcutaneous electrical nerve stimulation seems to lessen the duration and intensity of cervical pain, both acute and chronic, particularly within the near future\textsuperscript{12}.

Exercises that strengthen weak muscles by isometric contractions (static exercises) are more agreeable to patients since they don’t irritate joints, ligaments, tendons, or other pain-sensitive tissues. They can also be performed anywhere without any equipment because of their elegance and effectiveness. Patients can commit to the program well because isometric neck exercises are simple, simple to do, and convenient\textsuperscript{13-14}.

The short form of the McGill Pain Questionnaire (SF-MPQ) has a condensed form. The SF-MPQ’s major component is made up of 15 descriptors, 11 of which are sensory and 4 of which are affective, and which on a scale of 0 to 3 depending on their seriousness. Three pain scores are generated by adding the intensity rank scores of the terms selected to reflect the sensory, affective, and overall descriptions. A visual analog scale (VAS) is included in the SF-MPQ in addition to the Present Pain Intensity (PPI) index from the conventional MPQ\textsuperscript{15}.

Aim

To find the effectiveness of interferential therapy and transcutaneous electrical nerve stimulation in construction workers having cervical spondylosis.

Material and Method

Subjects who have been working on construction sites were taken according to inclusion and exclusion criteria. The research utilized a Convenient sampling technique. The sample size was 50. Each group 25. The entire study procedure was conducted from November 2022 to April 2023.
Inclusion Criteria

• Adults aging from 30 to 60.
• Both male and female.
• Pain diagnosed with cervical spondylosis.
• Person who works in a construction site.
• People who lift above 5kg.

Exclusion Criteria

• Under 18.
• person with vertigo.
• Person undergone any Previous trauma – cervical spine injury, spine surgery, cervical fusion.

Outcome Measure

Before and after the study’s first two weeks, assessments were done.

Short Form of the McGill Pain Questionnaire

Procedure

Following the inclusion and exclusion criteria, participants were chosen. The subject was given a description of the procedure before being requested to sign the consent form. Before the treatment, an evaluation was conducted. Participants were allocated into two groups at random, including interferential therapy group and transcutaneous electrical nerve stimulation group. Assessment was taken after 2 weeks of study.

Intervention protocol for interferential therapy group

Subject position: sitting or prone lying. Electrode placement: the four pads were placed on the painful area of the cervical region. Type - continuous, duration - 15 Minutes, Intensity - as per patient tolerance. The intensity of the interferential therapy was increased gradually until the patient reported a comfortable tingling sensation and it was given for 15 mins to the subjects. After finishing transcutaneous electrical nerve stimulation, static neck exercises were given. Session: 6 days per week and continued for 2 weeks.

Intervention protocol for transcutaneous electrical nerve stimulation group

Subject position: sitting or prone lying. Electrode placement: the four pads were placed on the painful area of the cervical region. Type - continuous, duration - 15 Minutes, Intensity - as per patient tolerance. The intensity of the interferential therapy was increased gradually until the patient reported a comfortable tingling sensation and it was given for 15 mins to the subjects. After finishing transcutaneous electrical nerve stimulation, static neck exercises were given. Session: 6 days per week and continued for 2 weeks.

Intervention protocol for static neck exercise

Subject position: sitting. In this, the subject was instructed to use their hands to move their head in a certain direction. For instance, to balance the force of their hands, they should pull their head backward while concurrently pushing their hands forward. Neck flexion - The position was sustained for 8–10 seconds in each of the following ways: neck lateral flexion for 8–10 seconds and then the identical motions were done on the left side, neck extension for 8–10 seconds. For two weeks, there will be ten repetitions each day.

Ergonomics advices

Neck should not be held in a fixed posture for a longer duration. Good postures should be maintained during work.

Data Analysis

The data gathered were tabulated and analyzed using descriptive and inferential statistics. Each parameter was subjected to the mean and standard deviation (SD). An unpaired t-test was used to analyze the differences that were significant between the IFT group and the TENS group. The threshold for statistical significance was defined as a p-value of <0.0001.

Graph-1: Comparison of Pre-test and Post-test values of Interferential therapy Group
Graph -2: Comparison of Pre-test and Post-test values of Transcutaneous electrical nerve stimulation Group

Graph -3: Comparison of Post-test values of Interferential therapy Group and Transcutaneous electrical nerve stimulation Group

Result

A statistically significant difference between the interferential therapy group and transcutaneous electrical nerve stimulation group as well as within each group was found by statistical analysis of quantitative data.

Using the short form of the MC Gill pain questionnaire, the interferential therapy group’s post-test mean was 8.88 and the transcutaneous electrical nerve stimulation group’s was 11.72. This demonstrates that the transcutaneous electrical nerve stimulation group received a higher score than the interferential therapy group.

This strongly suggests that interferential therapy in construction workers having cervical spondylosis along with static neck exercises is more effective than transcutaneous electrical nerve stimulation.

Discussion

In this study, 50 subjects were assigned, 25 were in the interferential therapy group and 25 in transcutaneous electrical nerve stimulation group. Interferential therapy group received interferential therapy along with static neck exercises and transcutaneous electrical nerve stimulation group received transcutaneous electrical nerve stimulation along with static neck exercises in the course of two weeks. These two groups both got Ergonomic Advice. The outcome measures were a short form of the MC Gill pain questionnaire completed both at start and two weeks after the research. The P Value pertaining to both groupings were less than 0.0001. Which leads to the conclusion that Interferential therapy is statistically significant and more advantageous than Transcutaneous electrical nerve stimulation.

An early study by Sutariya N et al., stated that, the effectiveness of a high frequency current and a medium frequency current for pain relief will be compared. By using convenient sequential sampling, two groups of the 30 patients were created. Six people left the research without finishing it. There were two groups made up of 24 patients total. Six people left the research without finishing it. 12 patients were split between each group. Traditional therapeutic exercise plus SWD, IFT group combined with a Traditional therapeutic exercise group. The use of interferential therapy can be viewed as more beneficial based on the study’s results, which are statistically significant and offer greater benefits to function and discomfort\(^\text{11}\).

An early study by Sadeghi A et al., stated that the study intended to determine the impact examines the effects of isometric exercise on discomfort and impairment caused by cervical spondylosis. With neck discomfort and cervical osteoarthritis, 24 patients were enrolled, and they were randomly split into 2 arms: one receiving conservative therapy without exercise and the other receiving neck isometric strengthening exercises. For the examination of the patients, both the Neck Disability Index (NDI) and the Neck Pain and Disability Scale (NPAD) were used. The exercise arm significantly outperformed the control arm in terms of both NDI and NPAD, with mean scores of 17.41 and 25.33, respectively, and P-values of 0.035 and 0.001, respectively. Our study suggests that cervical spondylosis-related pain and
disability may be effectively alleviated by isometric exercise\textsuperscript{13}.

An early study by Albornoz-Cabello M et al., concluded that therapeutic exercises versus therapeutic exercises + interferential therapy Chronic illnesses patients with specific neck pain to assess the severity of the immediate therapeutic effect. 49 adults suffering from persistent with specific neck pain were taken. The therapeutic exercises with the participants were split into two groups based on the severity of their neck pain (grades I or II), which persisted for more than 12 weeks: the group that solely does therapeutic exercises (N = 24) and the interferential currents group (N = 25). The 11-point Numeric discomfort Rating Scale’s primary outcome was the degree of neck discomfort that was currently experienced. The NNT for neck pain and disability and neck flexion Treatment benefit was analyzed at 2, with a 95\% confidence interval of 2 to 4. P\(0.001\)) and 3 (95\% CI: 2 to 11, P=0.029), respectively. To significantly reduce neck pain and impairment, interferential therapy is clinically more effective when combined with therapeutic exercises. However, persons with chronic neck pain did not have active cervical range-of-motion\textsuperscript{16}.

An early study by Rampazo ÉP et al., stated that Low- and medium-frequency currents are frequently utilized in the management of pain using transcutaneous electrical stimulation. The medium frequency alternating current therapy known as interferential current (IFC) therapy can penetrate deeper tissues and is said to lower skin resistance. IFC therapy has been shown in the literature to provide significant analgesic effects in individuals with neck discomfort, back discomfort, arthritis in the knees, and post-operative knee pain. Activating large-diameter, low-threshold nerve fibers with a 100 Hz IFC frequency has been hypothesized to cause analgesia by using the “pain-gating" system\textsuperscript{17}.

**Conclusion**

In this study interferential therapy with static neck exercises among construction workers was found to be more successful than transcutaneous electrical nerve stimulation and therefore reduce sickness absenteeism and improve quality of life in subjects.

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**Conflict of Interest:** Nil.

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