Assessing the Efficacy of Combining Dry Needling and Soft Tissue Mobilization for Treating Cervical Radiculopathy

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Abstract

Introduction

Cervical Radiculopathy (CR) is caused by malfunction of the cervical nerve roots, which causes pain to radiate from the neck to the afflicted nerve root. The present study is aimed to identify the impact of combining dry needling with Soft Tissue Mobilization in the management of CR.

Methodology

The study was conducted at the physiotherapy OPD of tertiary care hospital. A Quasi Experimental study was conducted, and the sample consisted of twenty patients (N=20) with cervical radiculopathy (CR). The inclusion criteria for the study were patients aged 25 to 65 years with neck and arm pain for at least 3 months and corresponding herniation involving one cervical nerve root (C6 or C7) or spondylosis involving C6 and/or C7. Pain intensity of arm pain was required to be at least 4 on a scale from 0 to 10, and the Neck Disability Index (NDI) score had to be greater than 30.

Results

The study's findings revealed a considerable reduction in pain intensity, as measured by the Visual Analogue Scale (VAS). Patients' pain ratings decreased significantly, with A mean difference of 4.25 ± 1.25, at a statistically significant p-value of <0.05. Furthermore, at a p-value of <0.05, the Global Rating of Change (GROC) ratings revealed a statistically significant difference between pre and post-treatment circumstances, with an average change of 9.6 ± 1.60 points. This emphasizes the significant improvement in patients' overall opinion of their condition following the intervention.

Conclusion

In conclusion, the results of this study support the use of dry needling, combined with soft tissue mobilization, as an effective intervention for managing neck pain and disability in patients with unilateral cervical radiculopathy. The significant reduction in pain intensity, improved Global Rating of Change scores, and decreased Neck Disability Index scores highlight the positive impact of this intervention on pain management and functional outcomes.

Keywords

Neck Disability Index, Dry Needling, Pain, Cervical Radiculopathy

Introduction

Cervical radiculopathy (CR) is caused by malfunction of the cervical nerve roots, which causes pain to radiate from the neck to the afflicted nerve root[1]. However, there is no agreement on its precise meaning. Some studies describe CR as neck and shoulder pain associated with sensory and motor function loss, whilst others offer a new definition that includes radiating arm pain associated with motor, reflex, and sensory abnormalities induced by certain neck postures or motions[2].The annual incidence of CR varies between 63.5 and 107.3 per 100,000 persons, with the C6 and C7 segments being the most typically afflicted[3]. There are two basic techniques to treating CR: conservative treatment and surgery. Conservative therapies, such as exercises, physical therapy, and nonsteroidal anti-inflammatory medicines (NSAIDs), are recommended as the initial strategy in current clinical guidelines from 2011 and 2018[4-5]. If conservative therapy do not produce relief within 4 to 8 weeks, analgesic/anti-inflammatory medicines may be administered, and surgery may be considered if the patient's symptoms are severe.Cervical radiculopathy (CR) is treated using both surgical and nonsurgical methods[6]. However, the surgical therapy is still debatable because to possible problems such as neighboring segment degeneration and loss of intervertebral disc height that might occur after the procedure.Conservative approaches, rather than surgery, have been used to effectively control CR. Manual treatment, exercise, traction, cervical collar use, and nonsteroidal anti-inflammatory medicines (NSAIDs) are examples of nonsurgical therapies. These non-invasive therapies attempt to alleviate pain and enhance neurological function in CR sufferers.Among the conservative treatments being considered is the use of dry needling as a potential therapy option for cervical radiculopathy. Dry needling is a technique that includes inserting small needles into particular trigger points or tight muscle bands in order to relieve pain and enhance muscle function[7].There have been few studies that have looked at the effectiveness of dry needling in the treatment of cervical radiculopathy, but the results have been encouraging. These studies demonstrate that dry needling may help individuals with CR by lowering pain, increasing mobility, and recovering function[8-9].Clinicians routinely employ dry needling to treat cervical radiculopathy (CR) by targeting trigger points and non-trigger point structures[10]. This skillful operation entails putting tiny filiform needles into the skin to activate underlying tissues without injecting anything. Dry needling deactivates trigger points, improves local blood flow and tissue response, releases endorphins and neurochemicals for pain relief, modulates the nervous system,

facilitates myofascial release, and promotes both local and systemic immune responses in CR management[11-12]. The use of dry needling in the treatment of cervical radiculopathy (CR) demands a quasi-experimental investigation[13]. A quasi-experimental examination of an intervention with potential advantages for CR can give useful insights into its effectiveness and safety in a real-world situation. Hence present study is aimed to identify the impact of combining dry needling with Soft Tissue Mobilization in the management of CR.

Methodology

The study was conducted at the physiotherapy OPD of tertiary care hospital. A Quasi Experimental study was conducted, and the sample consisted of twenty patients (N=20) with cervical radiculopathy (CR). The inclusion criteria for the study were patients aged 25 to 65 years with neck and arm pain for at least 3 months and corresponding herniation involving one cervical nerve root (C6 or C7) or spondylosis involving C6 and/or C7. Pain intensity of arm pain was required to be at least 4 on a scale from 0 to 10, and the Neck Disability Index (NDI) score had to be greater than 30. Patients with previous cervical fractures or surgeries, signs of myelopathy, pregnancy, infection, cancer, generalized pain syndrome, serious psychiatric or somatic diseases, shoulder disorders, or abuse of medication/narcotics were excluded from the study.

Outcome Measures

The outcome measures used for assessment were the Visual Analogue Scale (VAS) for pain intensity, NDI for functional disability, and the Global Rating of Change Measure (GROC) for assessing the severity of radicular symptoms. The treatment sessions were conducted over four weeks, with a total of eight visits. Patients received dry needling and soft tissue mobilization.The following muscles were tested: Subscapularis, Teres minor, Supraspinatus, Infraspinatus, Deltoid (anterior, middle, and posterior), Trapezius (upper, middle, lower), Levator scapulae, Pectoralis Major, Latissimus Dorsi, Rhomboids (major, minor), Biceps Brachii, and Coracobrachialis. To select which muscles needed therapy during each session, the therapist employed clinical reasoning based on findings from physical and clinical tests. Seirin J-type steel needles with diameters ranging from 0.30 mm 40 mm for thin muscles (e.g., infraspinatus) to 0.30 mm 60 mm for bigger muscles (e.g., latissimus or pectoralis major) were utiliZed. The needle was put directly into the myofascial trigger point at a depth of 10-40 mm, depending on the thickness of

the muscle.To induce a local twitch response, the needle was moved up and down roughly 3-5 mm at a frequency of 1 Hz using a sparrow pecking approach. In the trial, dry needling was done twice a week for a total of eight weeks.The study was approved by the Institutional Review Board of Al Shifa Medical Hospital, Hyderabad (IRB#PT-0213/17/2022)and informed consent was obtained from all participants. Non-probability purposive sampling technique was used to select the participants, and data collection took place during a six-month duration after obtaining approval for the study. The statistical analysis was performed to compare the outcomes between the two groups to determine the efficacy of the interventions in managing CR.

Results

A total of 20 patients participated in the study, with 5 (25%) of them being male and 15 (75%) female with a mean age of 45.2±2.5years as shown in table 1

Table 1 Demographic Characteristics of Participants

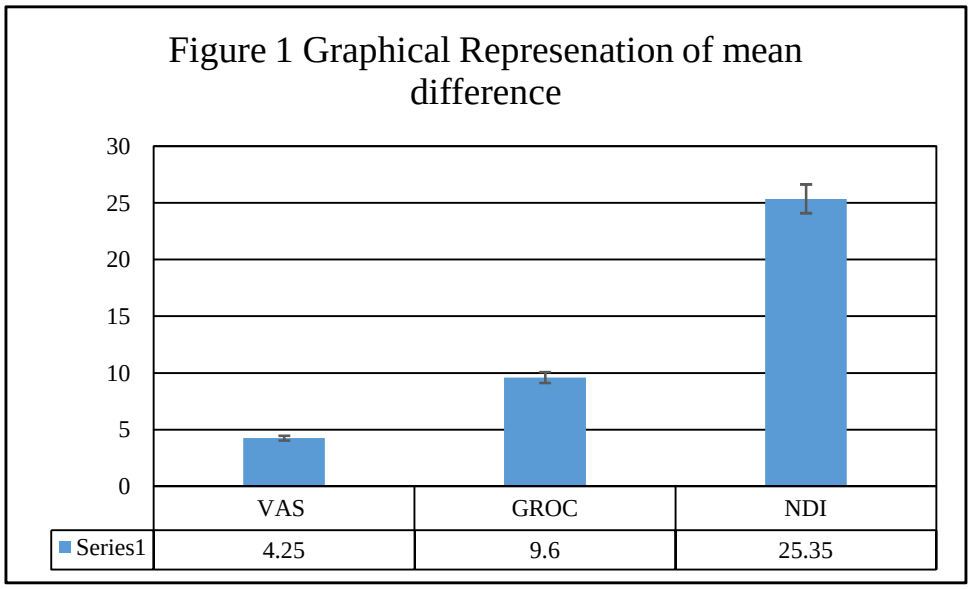
Variables	**Mean Age in years**	**Number of males (%)**	**Number of females (%)**
Values	45.2±2.5	5 (25%)	15 (75%)

Inferential Statistics

The study's findings revealed a considerable reduction in pain intensity, as measured by the Visual Analogue Scale (VAS). Patients' pain ratings decreased significantly, with A mean difference of 4.25 ± 1.25, at a statistically significant p-value of <0.05. Furthermore, at a p-value of <0.05, the Global Rating of Change (GROC) ratings revealed a statistically significant difference between pre and post-treatment circumstances, with an average change of 9.6 ± 1.60 points. This emphasizes the significant improvement in patients' overall opinion of their condition following the intervention. Furthermore, dry needling resulted in a considerable reduction in neck impairment, as measured by the Neck impairment Index (NDI).The NDI scores of the patients were considerably lower, with a mean difference of 25.35 ± 6.52 at a p-value of <0.05. These findings support the use of dry needling to treat neck pain and improve functional outcomes in individuals with unilateral cervical radiculopathy. (Table 2)

Table-2 Paired t-test to identify the effects of pre and post intervention on outcome measures				
Variables	**Pre mean ± SD**	**Post mean ± SD**	**Mean Differences**	**Level of Sig.**
VAS	6.40 ±1.60	2.15 ±0.98	4.25 ± 1.25	<0.05
GROC	-4.55 ±1.35	5.05 ±1.14	9.6 ± 1.60	<0.05
NDI	45.85 ±7.70	20.5 ±4.83	25.35 ± 6.52	<0.05

Graphical representation of the difference in mean as observed in the outcome measures were demonstrated in figure 1 as under



Discussion

The findings of this study indicate that dry needling, along with soft tissue mobilization, is an effective intervention for managing neck pain and disability in patients with unilateral cervical radiculopathy. The results showed a significant reduction in pain intensity, as evidenced by the Visual Analogue Scale (VAS) scores. Patients experienced a substantial decrease in pain levels

with a mean difference of 4.25 ± 1.25, highlighting the positive impact of dry needling on pain management.

Moreover, the Global Rating of Change (GROC) scores demonstrated a statistically significant difference between pre and post-treatment conditions. The average change of 9.6 ± 1.60 points on the GROC scale suggests that patients experienced a notable improvement in their overall condition following the intervention. This underscores the effectiveness of dry needling in enhancing patients' perception of their radiculopathy symptoms.

Additionally, the Neck Disability Index (NDI) scores showed a significant reduction in neck disability after the intervention. Patients' NDI scores were considerably lower, with a mean difference of 25.35 ± 6.52. This finding indicates that dry needling, in conjunction with soft tissue mobilization, contributes to improved functional outcomes and reduced disability in patients with unilateral cervical radiculopathy. The positive outcomes observed in this study highlight the potential of dry needling as a valuable treatment option for patients with CR. These findings suggest that dry needling can be an effective addition to conservative management approaches for individuals experiencing neck pain and disability due to cervical radiculopathy. In a randomized clinical study, the researchers aimed to evaluate the effects of kinesiotaping (KT) and dry needling (DN) on patients with mechanical neck pain (MNP)[14]. Seventy-two patients were randomly assigned to either the DN or KT treatment groups[14]. The study assessed various outcome measures, including Numeric Rating Scale (NPS-11) for pain intensity, Neck Disability Index (NDI) for functional disability, range of motion (ROM), Short Form-36 Quality of Life Scale, and Beck Depression Inventory (BDI) before the intervention and one month after the treatment. Both KT and DN demonstrated effectiveness in improving pain, mood, and quality of life in patients with MNP. However, the study found that KT was superior to DN in terms of increasing range of motion and reducing disability. The KT group showed greater improvement in ROM and NDI compared to the DN group. Both groups showed better results after treatment in terms of pain, disability, mood, and quality of life[14]. In another study that was performed with the objective to evaluate the medium-term effects of combining myofascial trigger point (MTrP) dry needling (DN) with pain neuroscience education (PNE) versus DN alone versus control care as usual (CUC) in patients with chronic neck pain[15]. Sixty patients were randomly divided into three groups: TrPDN + PNE group (6 sessions of DN with 3 sessions of PNE), TrPDN group (6

sessions of DN alone), and CUC group (10 sessions of usual care). The primary outcome was neck pain intensity, and secondary outcomes included neck disability, medication intake, and psychological factors. The variables were measured at baseline, post-treatment, and at 1 month and 3 months after treatment.The results showed that both TrPDN + PNE and TrPDN groups had greater reductions in pain intensity and disability compared to the CUC group. Additionally, the TrPDN + PNE group showed greater improvements in kinesiophobia, pain anxiety, and pain-related beliefs compared to the TrPDN group and CUC group. However, there were no differences between the groups in medication intake, quality of life, catastrophizing, depression, or fear of pain[15].The discussion suggests that the provision of PNE and DN in the management of chronic neck pain was associated with greater improvements in psychological factors than DN therapy alone. The conclusion highlights that DN alone was more effective in reducing chronic non-specific neck pain and disability than CUC at the 3-month follow-up. However, the inclusion of PNE combined with DN resulted in even greater improvements in kinesiophobia, pain anxiety, and pain-related beliefs.This study suggests that combining PNE with DN can be an effective management tool for chronic neck pain, particularly in addressing psychological factors associated with pain[16-17]. These findings have important implications for the treatment of chronic neck pain and highlight the potential benefits of a multidimensional approach to pain management[18].

Strengths of the Study: The study's inclusion of a Quasi Experimental design allowed for the evaluation of interventions in real-world settings, enhancing external validity. The use of clinically relevant outcome measures, such as the Visual Analogue Scale (VAS), Neck Disability Index (NDI), and Global Rating of Change Measure (GROC), provided comprehensive assessments of pain intensity, functional disability, and symptom severity. The study's approval by the Institutional Review Board and obtaining informed consent from all participants demonstrated ethical considerations. The combination of dry needling and soft tissue mobilization provided a multidimensional approach to manage cervical radiculopathy, enhancing the clinical relevance of the findings.

Weaknesses of the Study: The study's small sample size of only twenty participants may limit the generalizability of the results to a broader population with cervical radiculopathy. The lack of a control group receiving a placebo or sham treatment hinders the ability to assess the true

effectiveness of the interventions compared to no treatment. Additionally, the non-probability purposive sampling technique may introduce selection bias, affecting the representativeness of the sample. The short duration of the treatment and follow-up period may not fully capture the long-term effects of the interventions on managing cervical radiculopathy. Moreover, the absence of blinding in the study, considering the physical nature of the interventions, may influence outcome reporting. These limitations should be considered when interpreting the results, and further research with larger sample sizes and controlled designs is needed to strengthen the evidence on the efficacy of dry needling and soft tissue mobilization in the management of cervical radiculopathy.

Conclusion

In conclusion, the results of this study support the use of dry needling, combined with soft tissue mobilization, as an effective intervention for managing neck pain and disability in patients with unilateral cervical radiculopathy. The significant reduction in pain intensity, improved Global Rating of Change scores, and decreased Neck Disability Index scores highlight the positive impact of this intervention on pain management and functional outcomes. These findings underscore the potential of dry needling as a valuable treatment option for individuals suffering from cervical radiculopathy. However, it is essential to acknowledge the limitations of the study, including the small sample size and the absence of a control group. Further research with larger samples and controlled designs is necessary to validate these results and explore the long-term effects of dry needling in the management of cervical radiculopathy. Overall, this study contributes valuable evidence to support the efficacy of dry needling as a complementary approach in the comprehensive management of patients with cervical radiculopathy.

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