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The Efficacy of Endurance Trainings over Traditional Physiotherapy in Managing Postural Neck Pain Related to Digital Ergonomics in Software Professionals

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ABSTRACT

Postural neck pain is prevalent among IT professionals due to prolonged sitting and poor posture. Although conventional physiotherapy has been effective in treating this condition, its impact on muscle endurance and long-term relief remains limited. This study aimed to assess the effectiveness of combining endurance exercises with conventional physiotherapy for managing postural neck pain among IT professionals. A randomized controlled study was conducted at the Krupanidhi Clinic and Hospitals, Bangalore, involving 30 IT professionals aged 25-35 years with postural neck pain lasting over two weeks. The participants were divided into two groups: Group A (conventional physiotherapy) and Group B (endurance exercises with conventional physiotherapy). Pain intensity was measured using the Visual Analogue Scale (VAS), and neck disability was assessed using the Neck Disability Index (NDI). Data were analyzed using paired and independent 't' tests. Both treatment approaches led to significant improvements in the VAS and NDI scores. Group B, which received endurance exercises combined with conventional physiotherapy, showed a greater reduction in pain (VAS: 1.67 $\pm$ 0.72) and disability (NDI: 4.33 $\pm$ 3.03) compared to Group A (VAS: 4.73 $\pm$ 0.88, NDI: 12.2 $\pm$ 4.00), with p-values $\leq$ 0.0001. This study highlights the enhanced effectiveness of combining endurance exercises with conventional physiotherapy, offering a more comprehensive approach for treating postural neck pain in IT professionals.

Keywords: Postural neck pain; IT professionals; Endurance exercises; Physiotherapy; Neck disability

1 INTRODUCTION

Postural neck pain is a prevalent musculoskeletal condition, especially among individuals who spend long hours engaged in sedentary activities such as IT professionals. With increasing reliance on computers and technology, IT workers are particularly prone to developing neck pain due to poor posture, prolonged sitting, and inadequate ergonomics. This type of neck pain, often categorized as postural neck pain, can lead to discomfort, reduced productivity, and long-term disability, if not managed appropriately.

Conventional physiotherapy, which typically includes techniques such as manual therapy, stretching, and strengthening exercises, has been widely used to treat musculoskeletal disorders including postural neck pain. However, its effectiveness may be limited in certain cases, particularly when addressing the underlying muscle endurance deficits that contribute to poor posture and chronic pain. Conventional physiotherapy, which often includes postural correction and stabilization exercises, has been effective in reducing pain intensity and improving functional status in IT professionals.[1] A study comparing neck stabilization and postural correction exercises with conventional exercises found that the former was more effective in reducing pain and disability, suggesting that targeted exercises may offer superior outcomes.[2]

Endurance exercises, which focus on improving the stamina and strength of postural muscles, have shown promise in treating neck pain by promoting better posture and reducing strain on the neck. These exercises aim to enhance the endurance of the deep cervical muscles, which is crucial for maintaining proper neck alignment and preventing pain associated with prolonged postures. However, the comparative effectiveness of endurance exercises in conjunction with conventional physiotherapy for managing postural neck pain, specifically in an IT professional population, remains underexplored. A study demonstrated that an exercise program focusing on muscle stretching

and endurance training significantly reduced the incidence of neck pain over 12 months, with a hazard rate ratio of 0.45, indicating a protective effect against neck pain.[3] Endurance exercises have been shown to improve neck flexion movement, which is often limited in individuals with neck pain, thereby potentially reducing pain and disability levels.[3] An integrated physiotherapy treatment protocol, which combines various therapeutic exercises, has shown promising results in reducing neck pain and disability among desk job workers, highlighting the potential benefits of a comprehensive approach.[4]

This study aimed to investigate the effect of endurance exercises combined with conventional physiotherapy on postural neck pain among IT professionals. The primary objective was to compare the outcomes of two treatment approaches: conventional physiotherapy alone and a combination of endurance exercises and conventional physiotherapy. This study assessed pain intensity and neck disability using standardized outcome measures, such as the Visual Analogue Scale (VAS) and Neck Disability Index (NDI), to determine a more effective approach for managing postural neck pain in this population.

2 METHODS

A randomized control study recruited subjects diagnosed with postural neck pain from Krupanidhi Clinic and Hospitals located in and around Bangalore. The study was conducted at the Krupanidhi Physiotherapy Center and Krupanidhi Physiotherapy Institute in Bangalore. The inclusion criteria required participants to be male or female IT professionals aged 25-35 years, with a primary complaint of neck pain that had lasted for at least two weeks. Exclusion criteria included a history of whiplash injury, spinal stenosis, spondylolisthesis, cervical spondylolysis, upper extremity symptoms, recent trauma, spinal tumours, fractures, infections, osteoporosis, or any prior neck exercise within the last three months. Patients with systemic disorders, malignancies, acute infections, or a history of migraines were also excluded.

A total of 30 IT professionals aged between 25 and 35 years, with neck pain lasting more than two weeks due to sustained postures, were enrolled. The participants were randomly divided into two groups: Group A received conventional treatment, and Group B, which received a combination of endurance exercises and conventional treatment. This study used convenient random sampling to select participants.

Data collection involved the use of several tools, including the Visual Analogue Scale (VAS) for pain assessment and the Neck Disability Index (NDI) to measure the level of disability due to neck pain. A chair and bed were used for the exercises, and additional equipment such as an ultrasound machine, ultrasound gel, IFT machine, and cotton were used for treatment purposes. All data were carefully recorded, paired t-tests were used to compare the pre-test and post-test scores for each group to determine whether significant improvements occurred after the intervention, and an independent t-test was performed for both the VAS and NDI scores. Statistical significance was set at $P \leq 0.05$. All statistical analyses were performed using the SPSS software (or similar statistical software). The results of the paired 't' tests are reported with the corresponding 't' values, means, standard deviations, and p-values.

3 RESULTS

The results of the within-group analysis for both the Visual Analogue Scale (VAS) and the Neck Disability Index (NDI) are presented in Table 1.

Table 1: Comparison of Pre-test and Post-test VAS and NDI Scores within Group A (Conventional Treatment) and Group B (Endurance Exercise with Conventional Treatment) using Paired 't' Test

Variable	Group	Test	Mean ± SD	't' value	Significance
VAS	Group A	Pre-test	6.87 ± 1.35	11.117	0.0001*
		Post-test	4.73 ± 0.88		
	Group B	Pre-test	6.60 ± 1.05	32.187	0.0001*
		Post-test	1.67 ± 0.72		
NDI	Group A	Pre-test	20.33 ± 4.35	31.805	0.0001*
		Post-test	12.2 ± 4.003		
	Group B	Pre-test	20.20 ± 3.189	67.12	0.0001*
		Post-test	4.33 ± 3.03		

For Group A (Conventional Treatment), the VAS scores showed a significant reduction from a mean of 6.87 ± 1.35 in the pre-test to 4.73 ± 0.88 in the post-test, with a highly significant 't' value of 11.117 (P = 0.0001). Similarly, the NDI scores for Group A also demonstrated a significant improvement, decreasing from a mean of 20.33 ± 4.35 in the pre-test to 12.2 ± 4.00 in the post-test, with a 't' value of 31.805 (P = 0.0001). In Group B (Endurance Exercise with Conventional Treatment), VAS scores showed an even more pronounced improvement. The pre-test score was 6.60 ± 1.05, which dropped significantly to 1.67 ± 0.72 in the post-test, with a 't' value of 32.187 (P = 0.0001). Similarly, the NDI scores in Group B also showed a remarkable reduction from 20.20 ± 3.19 in the pre-test to 4.33 ± 3.03 in the post-test, yielding an extremely significant 't' value of 67.12 (P = 0.0001). Both groups exhibited significant improvements

in their VAS and NDI scores, with Group B showing a greater reduction in pain and disability compared to Group A (Table 1).

The results of the analysis of VAS and NDI scores between Group A (Conventional Treatment) and Group B (Endurance Exercise with Conventional Treatment) by the independent t-test are presented in Table 2. For the VAS scores, Group A had a mean of 2.13 $\pm$ 0.74, while Group B had a higher mean of 4.93 $\pm$ 0.59. The difference between the groups was found to be statistically significant (P = 0.0001). Similarly, for the NDI scores, Group A had a mean of 8.13 $\pm$ 0.99, while Group B had a significantly higher mean of 15.86 $\pm$ 0.91. This difference was also statistically significant (p-value = 0.0001) (Table 2).

Table 2: Analysis of VAS and NDI scale for both groups by independent 't' test

Group	VAS (Mean $\pm$ SD)	NDI (Mean $\pm$ SD)
Group A	2.13 $\pm$ 0.74	8.13 $\pm$ 0.99
Group B	4.93 $\pm$ 0.59	15.86 $\pm$ 0.91
Significance	0.0001*	0.0001*

These findings indicate that Group A (Conventional Treatment) showed significantly better outcomes in terms of pain reduction (VAS) and neck disability (NDI) than Group B (Endurance Exercise with Conventional Treatment). Both groups demonstrated improvement, but Group A achieved a significantly greater reduction in both pain and disability.

4 DISCUSSION

The results demonstrated significant improvements in both pain and neck disability in both treatment groups, with Group B (Endurance Exercise with Conventional Treatment) showing more pronounced improvements in both the Visual Analogue Scale (VAS) and Neck Disability Index (NDI) scores compared to Group A (Conventional Treatment). These findings suggest that the addition of endurance exercises to conventional physiotherapy may enhance the treatment outcomes of postural neck pain in IT professionals.

The current study demonstrated significant improvements in both pain and disability among the participants in both treatment groups. However, Group B (Endurance Exercise with Conventional Treatment) showed superior outcomes compared to Group A (Conventional Treatment alone). Specifically, Group A exhibited a reduction in VAS scores from 6.87 to 4.73 (P = 0.0001) and a decrease in NDI scores from 20.33 to 12.2 (P = 0.0001), which are consistent with recent findings by Kozel et al.[5] On the other hand, Group B showed a more pronounced improvement, with VAS scores dropping from 6.60 to 1.67 (P = 0.0001) and NDI scores reducing from 20.20 to 4.33 (P = 0.0001), indicating a greater effectiveness of combining endurance exercises with conventional physiotherapy, as also highlighted by Aghav et al.[6] These results align with the existing literature, which shows the positive impact of incorporating exercise modalities into physiotherapy treatment for neck pain. Studies have demonstrated that combining core stability exercises or other targeted exercise regimens with conventional physiotherapy can lead to better pain reduction and functional improvements.[7] Additionally, comparisons of isometric exercises versus general exercise routines shows the effectiveness of specific, targeted exercises in alleviating chronic neck pain, particularly in individuals with postural issues.[8]

In the current study, Group A, which received endurance exercises, reported a mean VAS score of 2.13 $\pm$ 0.74, while Group B, which underwent conventional physiotherapy, had a mean of 4.93 $\pm$ 0.59. The difference between the two groups was statistically significant (P = 0.0001), indicating that endurance exercises led to greater pain reduction than conventional treatment alone. Similarly, the NDI scores showed a significant improvement for Group A, with a post-treatment mean of 8.13 $\pm$ 0.99, compared to Group B's mean of 15.86 $\pm$ 0.91 (P = 0.0001). These findings suggest that endurance exercises, when incorporated into a physiotherapy regimen, provide superior outcomes in terms of pain relief and functional improvement. These results align with recent literature that highlights the effectiveness of endurance training in reducing chronic neck pain. In the study of Tabassum et al. demonstrated that endurance training significantly decreased pain levels in patients with chronic neck pain, achieving a post-treatment mean of 0.40 $\pm$ 0.507, which supports the benefits of endurance exercises for pain management.[9] Additionally, Rajalaxmi et al. found that combining core stability exercises with conventional neck exercises resulted in more significant improvements in both VAS and NDI scores than conventional treatments alone, reinforcing the idea that targeted exercise interventions can enhance recovery.[7] Furthermore, Yaminisudha, reported that postural exercises combined with interferential therapy were more effective than isometric exercises in treating postural neck pain, suggesting that specific, tailored interventions can be particularly beneficial for IT professionals dealing with neck pain due to prolonged sitting and poor posture.[10] Thus, the findings from this study further validate the role of endurance exercises in improving pain and disability in individuals with postural neck pain, particularly in at-risk populations, such as IT professionals. Although endurance exercises show promise in reducing neck pain, it is important to consider individual differences and preferences when designing treatment protocols. Conventional physiotherapy methods, which have been effective in improving the quality of life and reducing pain, may still be preferred by some individuals due to familiarity and accessibility. Further research is needed to establish the most effective combination of exercises for different populations.

5 CONCLUSION

This study demonstrated that both conventional physiotherapy and endurance exercises significantly improved pain and disability in IT professionals with postural neck pain. However, the combination of endurance exercises with conventional physiotherapy (Group B) led to superior outcomes in both pain reduction and functional improvement compared to conventional treatment alone (Group A). These findings suggest that incorporating endurance exercises into physiotherapy protocols can be an effective strategy for managing postural neck pain in IT professionals. Further research is needed to explore the most optimal treatment combinations.

REFERENCES

1. Tsvetomira Ivanova, Petrov Y, Bogomilova S. Physiotherapy for IT Specialists with Pain in the Cervical and Thoracic Spine. *Varna Medical Forum*. 2023;12(0):125–128. Available from: https://dx.doi.org/10.14748/vmf.v12i0.9209.
2. Rajalaxmi V, Ranjani VKM, Paul J, Subramanian SS, Cyrus BE, Pavithralochani V. Efficacy of Neck Stabilization and Postural Correction Exercise on Pain, Posture, Disability, Respiratory Dysfuntions and Mental Status in Desk Job Workers-A Randomised Controlled Double Blinded Study. *Research Journal of Pharmacy and Technology*. 2019;12(5):2333–2338. Available from: https://dx.doi.org/10.5958/0974-360x.2019.00388.3.
3. Sihawong R, Janwantanakul P, Jiamjarasrangsi W. Effects of an exercise programme on preventing neck pain among office workers: a 12-month cluster-randomised controlled trial. *Occupational and Environmental Medicine*. 2014;71(1):63–70. Available from: https://dx.doi.org/10.1136/oemed-2013-101561.
4. Garg A, Singh S, Anandabai J, Kumar A. Development of an Integrated Physiotherapy Treatment Protocol for Desk Job Personals: A Pilot Research. *Indian Journal Of Science And Technology*. 2024;17(37):3824–3833. Available from: https://dx.doi.org/10.17485/ijst/v17i37.2095.
5. Kozel M, Škrečková G, Lukáčová E, Klímová E. Comparison of the researched analyses evaluating the physiotherapy of the pain with a cause in the region of the cervical spine. *Fizjoterapia Polska*. 2024;24(3):400–404. Available from: https://dx.doi.org/10.56984/8zg020ad5k.
6. Aghav V, Gurudut P, Kage V, Welling A. Global postural re-education versus Egoscue exercises in upper cross syndrome on neck pain, forward head and rounded shoulder posture: a randomised clinical trial. *Comparative Exercise Physiology*. 2024;20(4):341–352. Available from: https://dx.doi.org/10.1163/17552559-00001068.
7. Rajalaxmi V, Manickam M, Srilakshmi M, Arunselvi J, Jayabarathi R, Anupreethi P, et al. The role of multistep core stability exercise with and without conventional neck exercises in the treatment of chronic non-specific neck pain: a randomized controlled trial. *Journal of Clinical and Diagnostic Research*. 2020;40(2):232–235. Available from: https://doi.org/10.51248/.V40I2.79.
8. Hayat M, Siddique R, Basharat A, Waheed I, Rubab SU, Naqvi H, et al. Comparison of Treatment Outcome of the Effectiveness of Isometric Exercises as Compared to General Exercises with Cervical Spine Mobilization in The Management of Chronic Non Specific Neck Pain. *British Journal of Multidisciplinary and Advanced Studies*. 2023;4(6):63–72. Available from: https://dx.doi.org/10.37745/bjmas.2022.0380.
9. Tabassum H, Ayub H, Latif SBM, Latif MJM, Shah K, Hassan MS, et al. A Randomized Control Trial to Compare the Effects of Endurance Training Versus Strength Training Among Students with Neck Pain. *Pakistan BioMedical Journal*. 2022;5(8):07–11. Available from: https://doi.org/10.54393/pbmj.v5i8.761.
10. Yaminisudha M, kumar SS. Comparison of the effectiveness of postural exercises with interferential therapy and isometric exercises with interferential therapy for mechanical neck pain in IT professionals. *Indian Scientific Journal of Research in Engineering and Management*. 2023;07(09):1–9. Available from: https://dx.doi.org/10.55041/ijsrem25729.