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Original research article

Role of isometric training with theraband in chronic neck pain

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Abstract

Neck pain is very common these days as lifestyle changes from active to sedentary. Occupational changes such as increase in IT sector jobs have been skyrocketed as technology enters into every sector. People mostly are into desk jobs working on pc, laptops etc. and bowed down for long hours which caused short and tight neck muscles. The incidence of neck pain is drastically increased to about 71%. Despite following ergonomic measures and various to cope up with disability no criteria has been decided for neck pain. Many conservative measures has been developed in recent advancement out of which isometric training is commonly compiled with mostly every method and past studies demonstrated the efficacy of isometric exercise in reducing pain and disability. Through this study we will focus on increasing efficacy and accuracy of isometric exercises with compiling it with theraband.

Keywords: Neck pain, neck disability, theraband, isometric training, lifestyle, occupational

Introduction

Recent studies study the cause behind increasing incidence of neck and disability and lifestyle changes and occupational changes is one of the leading cause especially sectors such and banking, IT and other desk jobs also student studying for long hours mostly from laptop and tabs create eye strain as eye is focused only in one direction which makes eye muscle strain and neck muscles has to work for restricted eye as well as posterior muscles go eccentric locked and anterior remain concentrically locked which creates short anterior muscles and overall a forward neck posture.

Other than mechanical cause's postural unawareness, depression and anxiety disorder can also create forward neck or stoop posture. Chronic neck pain is associated with depression, anxiety disorders, mood swings, cognitive dysfunctions, eye disorder, balance disorders etc.

Chronic neck pain is seen generally with upper thoracic pain or trapezitis and is one of the major health care burdens in present date with a vivid etiology and treatment methods. In United States, the annual incidence seen is 41.5% out of which chronic neck pain is seen mostly among middle aged with mean average age of 48.9 years and mostly women are more affected than men. In Australia, the incidence seen was 27.1% and in Canada the incidence seen was 14.6 out of which 0.6% developed disabling neck pain. In India, the prevalence of neck pain was found among computer operators, around 47% people complains of severe neck pain mostly between 30 to 50 years of age and in another population study it has been found that persistent complain of pain was seen only in 22.22% office workers whereas 52.22% has a complain of occasional neck pain.

Many treatment methods were incorporated and many advances can be seen in treating neck pain conservatively without medical and surgical methods but isometric exercises are most commonly used. Isometric exercises are form of static exercise in which the targeted muscle is contracted voluntarily with holding it for a desired amount of time which strengthens the muscle as well as increases the endurance. It works on the principle sustained contraction to increase load on muscle which in turn cause better output in terms of endurance and strength. This study uses a theraband, which is a elastic band made of rubber configured with different resistance mild, medium and heavy in terms of tension when stretched available with color coding as per the resistance and every brand has different criteria of color coding.

Background

Isometric exercise has been a golden standard in treating pain and correcting any disability or impairment since the 500BC and has been into practice till today many alternatives are there in today's world but

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there is no better tool which can treat pain as well as increase strength and endurance.
There are many studies in support of isometric exercises but very few elaborate the technique of performing the exercise effectively and efficiently. As traditional method involves use of hand or wall over which the patient resist the movement and hold it but due to inaccuracy there can be difference in efficacy of each repetition also the muscles which should not be engaged while targeting a specific set of muscles does over work if hand is used to resist neck which can create more compensatory movements along with more energy will be needed overall performance will decline after each repetitions along with intensity.
To get same repetitions a tool is needed and this study focus on the use of theraband or resistance band of different resistance from low to heavy depending upon the outcome and the results are studied by using VAS to measure pain and Neck Disability Index to evaluate functional change with comparing pre and post data along with duration of treatment. A total of 60 subjects are selected from age between 30 – 50 years based on inclusion criteria with proper consent and prior information. No subjects were selected with condition mentioned in exclusion criteria.
The study has been conducted after getting clearance from Institutional Ethics Committee, Pacific Medical College and hospital, Udaipur, Rajasthan, India. Ethical Clearance Number.

Aim of the Study
To assess the Role of Isometric Exercises with Theraband in Patients with Chronic Neck Pain (at least above 7 weeks).

Inclusion Criteria
1. Male and female between age group 30-50 years.
2. Patient with NDI score of at least 15/50.
3. Chronic neck pain at least from 7 weeks or more.

Exclusion Criteria
1. Acute pain and inflammation
2. Acute inflmmatopry period
3. Rheumatoid arthritis
4. Torticollis
5. Unstable/acute osteoarthritis
6. Recent fractures
7. PIVD
8. Spondylolistheis
9. Vertigo
10. Vertebrobasilar Insufficiency
11. Chronic Heart Disease, Myocardial Infraction
12. Pregnancy

Methodology
Study design: observational study.

Sample design: Randomized.

Place of the Study: Pacific Medical College and Hospital, Udaipur, Rajasthan, India.

Duration: 12 weeks.

Procedure
Total 60 subjects were taken based on the inclusion criteria with prior consent and information. 30 subjects were treated with isometric exercises using theraband of low to medium resistance for 12 weeks with 3 sessions per week.

Protocol
1. **Cervical neck flexion (sitting position)**
- By placing the centre of band over the frontalis therapist will hold the ends of the band standing behind the patient facing the occiput of the patient while keeping the neck in neutral position the therapist pull the band towards himself/ herself with holding it for 10 seconds.

2. **Cervical neck extension (sitting position)**
- By placing the centre of the band on the occiput. Therapist holds the ends of the theraband standing behind the patient facing the frontalis of patient, by keeping the head in neutral position therapist

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 08, 2024

pulls the band towards him/her with holding it for 10 seconds.

3. **Cervical side flexion (sitting position)**

- By fixating the centre part of band on temporalis. Therapist grasps the ends of the band standing on the opposite side, facing the contralateral temporalis. Therapist fixates the neck of patient in neutral position with chin tucked and pulls the band through the ends towards her/him. Holding the desired movement for 10 seconds.

4. **Cervical rotation isometric (sitting position)**

- First the band is wrapped over the frontalis of the patient one end of the band is grasped by the patient and another end is in therapist hand on the opposite side, therapist is facing the temporalis of the patient. Slowly the therapist will pull the band towards him/her holds it for 10 seconds.

Results and Tables

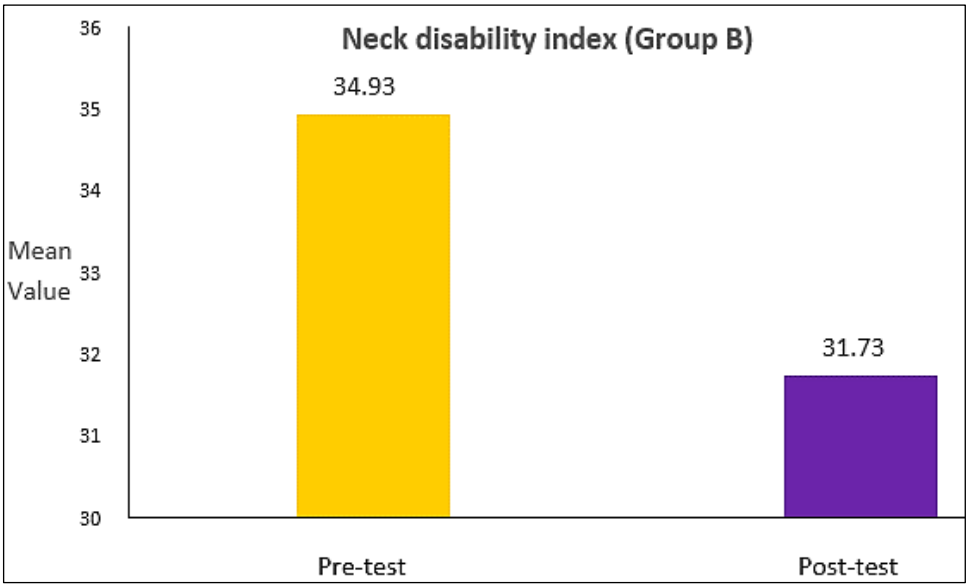
Data analysis

Pre and post intervention evaluation of outcome measure had collected through Neck Disability Index and Visual Analogue Scale and analyzed with statistical package SPSS 16. Student t-test, paired t-test and mean improvement has been analyzed. The demographic variables and pre-intervention outcome measures between the groups were evaluated by Student's t-test. The parametric test results within the group and between the groups were obtained and statistically analysed using Student's paired and unpaired t-tests, respectively.

Table 1

Neck disability index	Mean	N	SD	Std. Error	Mean Diff	T	P	Sig.
Pre-test	34.93	15	5.60	1.45	3.20	23.14	<0.001**	HS
Post-test	31.73	15	5.31	1.37				

** Highly Significant



Graph 1

Interpretation: The above table and graph shows the comparison of score for the Neck disability index within group B.

Table 2

VAS	Mean	N	SD	Std. Error	Mean Diff	T	P	Sig.
Pre-test	5.07	15	1.10	0.28	2.93	12.91	<0.001	HS
Post-test	2.13	15	0.64	0.17				

** Highly Significant

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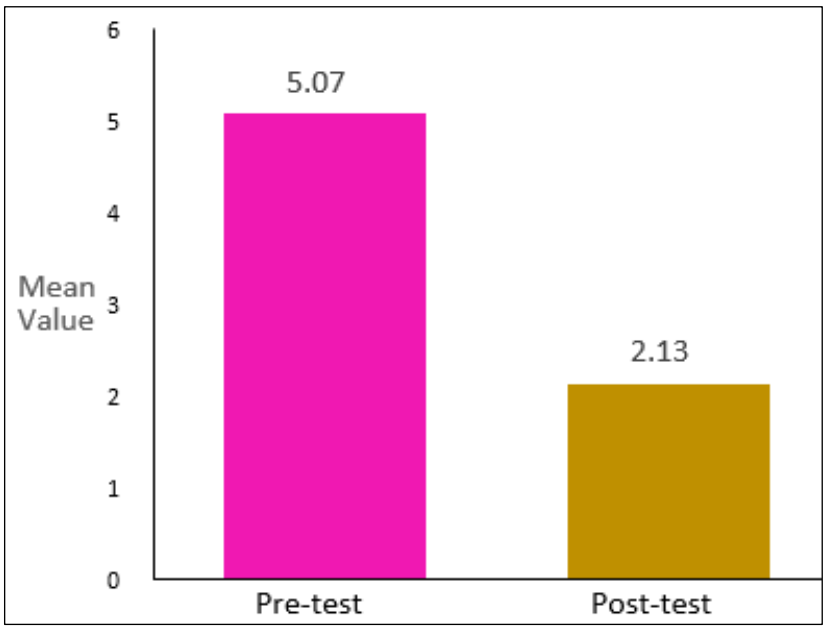

Graph 2

Interpretation
The above table and graph shows the comparison of pre and post score VAS.

Result
Table 1 clearly shows a clear reduction in NDI scores, from pre mean value 34.5±1.45 to post mean value of 31.73±1.37.
Table 2 shows a significant reduction in VAS scores, from pre mean value of 5.67±0.29 to post mean value of 3.40±0.24.
Both the table clearly indicates a positive change after using theraband as a tool for performing isometrics of neck muscles.

Discussion
In year 2022 Jiaqi Yang and Min Yang did a study to assess the effects of isometric training interventions on the treatment of neck pain and concluded that isometric training relive the pain and disability of neck by improving the contractile ability of neck muscles and tonicity of soft tissue which improves overall posture and hence the abnormal force loading is decreased due to which it has long term effects and prolong relief as compared to acupuncture, massage or other passive therapies.
Another study done by Randlov A *et al*. performed a study on 'Isometric exercise program with theraband for females with chronic neck pain observed both subjective and objective improvements but it is limited only to female population. Similar studies conducted by Berg HE et. al compared whether the isometric neck exercise could increase strength simultaneously reducing pain and for twelve weeks administered theraband to strengthen neck flexors, extensors and rotators of the neck and concluded that there is significant reduction after isometric training in pain and disability.
Studies suggest that theraband is a light, inexpensive elastic material which can provide varied resistance throughout the range of motion and provides consistent results with every repetition with preventing compensatory movements.
This study incorporate the benefits of theraband with the concept of isometrics which is proven to be best while treating neck pain and asses the pre and post scores of both VAS for pain and NDI for functional status of neck.

Conclusion
Through detailed analysis and statistical markers it is clear that theraband adds a positive strength to isometric exercise as it prevents the accessory or compensatory movements which occurs as patient is unaware of the force and movement. Also, theraband adds accuracy to every repetition as it prevents sustained exercise fatigue and every repetition is similar when comes to resistance and strength.
VAS showed a significant reduction whereas NDI scores have a positive change but not significant because there are many factors when which are needed to be balanced with proper training to observe an significant change such as ergonomic measures when it comes occupation induced neck pain. Some may have due to vision issues, lifestyle etc.

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Limitations and Recommendations

Limitations

1. Sample size is small that is only 60 subjects.
2. This study only evaluates the therapeutic efficacy of theraband compiled with isometrics.
3. Only neck pain is taken into criteria.

Recommendations

1. Bigger population study should be carried out.
2. More intervention should be compared with proper follow up and studies with longer duration should be incorporated.
3. Criteria should be expanded with taking more conditions into consideration.

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