



Analysis of Outcome of Iastm and Motor Control Training Exercises in Chronic Nonspecific Neck Pain- A Literature Review

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ABSTRACT:

Mechanical Neck pain seems to be the most frequent issue described by many people in their daily life. Neck discomfort has been demonstrated to be a risk factor for decreased general job productivity in young people and is connected with impairment and a much worse quality of life. It is recognized as a medical and socioeconomic burden and one of the frequent reasons behind job absenteeism. IASTM (Instrument Assisted Soft Tissue Mobilization) is a soft tissue manipulation method using a metal instrument over the fascia. Instruments are utilized mechanically to stimulate soft tissue structures during the Instrument Assisted Soft Tissue Mobilization (IASTM) treatment, which reduces musculoskeletal pain and suffering while also enhancing mobility and function. Utilizing an Accel instrument, which was ergonomically created to help doctors identify and treat soft tissue pain, damage, and dysfunction, is a component of this specific method. However, the therapy methods that primarily focus on motor control, activation of deep cervical muscles, and trying to retrain the cervical muscles' ideal control and coordination are the motor control exercises. Primary objective was to assess the outcome of the IASTM and Motor Control Training Exercise program in subjects suffering from nonspecific neck pain which was chronic. Five electronic databases were searched to find the literature (MEDLINE, PubMed, Cochrane, Google Scholar, and CINAHL). The systematic review comprised articles with complete texts that were published between 2013 and 2023, nine of which were studies.

INTRODUCTION

A persistent discomfort in the neck area for at least three months that is caused by mechanical stresses, which are also chronic in nature, such as an altered posture in the neck and degenerative changes in the spine, is referred to as chronic nonspecific neck pain. At a certain point in their life, up to 67 per cent of people worldwide might have persistent non-specific neck discomfort. Mechanical issues, head and neck abnormalities, and myofascial dysfunction all contribute to non-specific neck discomfort ⁽¹⁾. MPS (Myofascial Pain Syndrome) is considered a common non-articular musculoskeletal pain syndrome and one of the most important causes of chronic neck pain.

Proprioceptive afferent input from the cervical spine is different in the population with persistent nonspecific neck pain ⁽²⁾. Because of the discomfort, it can be hindered. IASTM is a recently popularized technique which is utilised to lower myofascial pain and improve ROM (Range of Motion) of the affected joints and functional status ⁽³⁾. The central processing and integration of all afferent information is part of the sensorimotor control of the cervical muscles. This is followed by the motor programme being carried out by the cervical muscles, which aids in maintaining a person's balance and head position. Due to the existence of pain in these individuals, the proprioceptive afferent



information from the cervical spine may be impaired. It has been shown effective to lessen pain and improve proprioception by using metal tools like IASTM. IASTM enhances the cervical spine's ROM, soft-tissue mobility, and total function while reducing discomfort. To restore the soft tissue's normal flexibility and performance around the cervical spine, these tools cause microtrauma. A study conducted by Kivlan et al. demonstrated rapid and profound changes in muscle functioning after the application of a single session of IASTM. After using the tool, there was a significant increase in fascial motility, as well as a proliferation of extracellular matrix fibroblasts and an improvement in blood flow to the region around the wounded tissue. Also, there was a decrease in adhesion within the cellular matrix and localized ischemia ⁽⁴⁾.

A disturbance in motor control that affects the neuromuscular behaviour of muscles initially appears during the first episode of severe neck discomfort. The two primary modifications are a loss in muscle power and a limitation in the range of motion in the affected joints. These changes in the neuromuscular properties of the muscles will have an impact on physically demanding actions like lifting heavy objects while having no impact on less strenuous ones. The whole phenomenon, according to the research done by Gizzi et al. in 2015, maybe possible because additional muscle groups with comparable lines of action in the cervical spine may do the same function ⁽⁵⁾.

When a person suffers from chronic pain, neck muscle endurance has been found to be reduced. It happens when deep flexor and extensor muscle activity decreases, which also results in an increase in superficial muscle tone.

As a result, the major goal of this review article was to critically evaluate the results of the IASTM and Motor Control Training Program as a therapy method for persistent nonspecific neck pain and to collect supporting documentation for these exercises.

MATERIALS AND METHODS

Literature Search Methodology: Google Scholar, MEDLINE, CINHALL, and PEDro were some of the online search engines utilised to gather journals.

Based on the keywords, the writers located the articles. The whole text of the articles was gathered. There were 219 papers found in total and 9 of them were chosen for review [Table/Fig-1].

Study Selection

Data Extraction: The information that was gathered was tabulated based on the sample size, the duration of treatment, the outcome measures utilized, the outcomes attained, and the degree of evidence. The information was then organised chronologically. The quality of the research review was evaluated using the CEBM levels of evidence.

Inclusion criteria: (1) published only in English; (2) Neck pain treated with IASTM and non-specific neck discomfort treated with motor control training exercises; (3) exclusively cited in peer-reviewed journals; (4) Adult human participants were examined; (5) The current study includes both RCTs and systematic reviews.

Exclusion criteria: (1) Expert opinion from editors; (2) Case studies and case reports; (3) The research did not include case-control studies.

Literature Evaluation

The research's findings were very diverse. Nine of the 219 original articles met the criterion for inclusion, out of which 219 were eligible. Excluding case studies, the papers varied from systematic reviews through RCTs. Four systematic reviews and five RCTs were used to classify the research into two groups. There was no evidence of study overlap in systematic reviews. Centre for Evidence-Based Medicine (CEBM) was used to check the articles which were selected for the level of evidence. Using the tool two studies were rated as 1a, and four studies as 1b, as per CEBM levels of evidence.

Data Synthesis

A study conducted by Mylonas K et al. ranked 1b on the CEBM scale that it showed individual RCT with low confidence interval. In a group of persons with non-specific neck discomfort, the research looked at the combined effects of targeted IASTM and neuromuscular exercises in adjusting forward head position and functioning. The study concluded that the use of IASTM and motor control exercise training have better results in a reduction of pain, improving ROM and reducing disability.⁶



A study by Gercek H et al. was ranked 1b where they conducted a study to evaluate the immediate effects of IASTM in patients with chronic nonspecific neck pain. The research concluded that a single session of IASTM has a profound reduction in pain and correction of joint position error.⁴

Ahmadpour Emshi Z et al. study was ranked 1b suggestive of not very high-quality RCT with a low confidence interval. The research was conducted to evaluate the effects of dry needling and IASTM over the upper trapezius and it concluded that both techniques are effective for the reduction of pain, improving ROM, increasing pain pressure threshold and reducing disability. The above study had few limitations for conducting an invasive technique for a long duration and no proper blinding of the examiner was done.⁷

Haythem EL Hafej et al. was ranked 1b on the CEBM scale. This study checked the effectiveness of IASTM along with stripping massage in another group, on myofascial trigger points over upper trapezius in subjects with neck pain. The study remarked that both methods were equally effective in releasing myofascial trigger points over the upper trapezius. The duration of this study was 4 weeks which was mentioned as short and also no proper follow-up assessments were done hence there were described as limitations of the study by the authors. A study by Carmen Martin-Gomez et al. was ranked 1a on CEBM. A systematic review and meta-analysis regarding the impact of Motor control exercises in patients with nonspecific neck pain and

it was concluded that the motor control exercises were more effective compared to other exercise methods in treating chronic nonspecific neck pain.⁹ Rutger MJ de Zoete et al. was ranked 1a which is a high-quality systematic review. The study compared the effect of motor control training exercises with other physical exercises like pilates, tai-chi etc. in nonspecific neck pain. It has demonstrated that all the exercises more or less have equal results on pain and disability⁽¹⁰⁾.

Somayeh Amiri Arimi et al. conducted a systematic review to examine the effects of Cranio-cervical flexion exercises as a part of motor control training in nonspecific chronic neck pain patients compared to general exercises and it was concluded that the Motor control exercises were more efficient than general exercises. The study was ranked 1a on CEBM score levels.¹¹

A study by Johannes Blomgren et al. was ranked 1a showing high-quality evidence which was a systematic review along with metaanalysis regarding the effectiveness of deep cervical flexor muscle training in improving neuromotor coordination for patients having chronic nonspecific neck pain. The research concluded that deep cervical flexor training exercises improve neuromuscular coordination in patients having chronic neck pain.¹²

Pegah Kashfi et al. conducted an RCT to assess the uses of specific exercises vs general exercises in chronic neck pain and it was concluded that it could be effective but not explained clearly. Hence the study was ranked 1b on CEBM levels.¹³

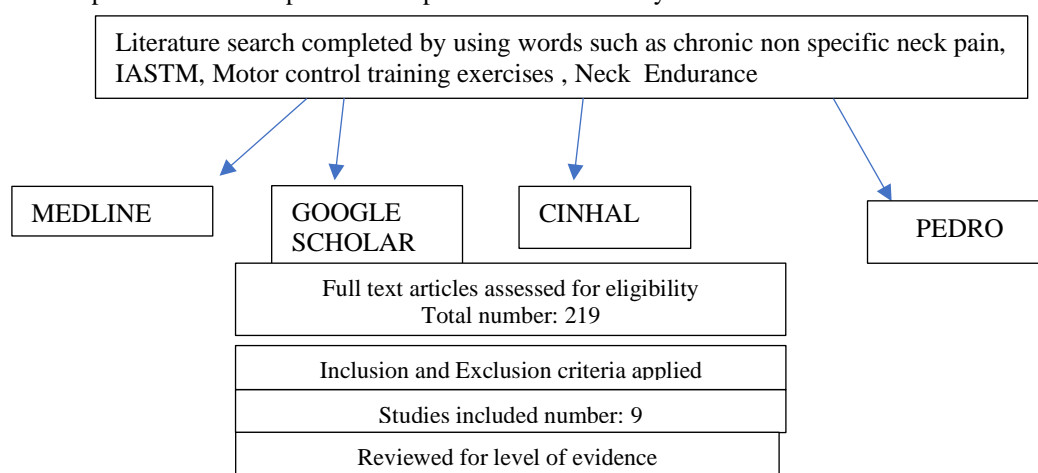


Table 1: Study Flow Diagram (CENTRE FOR EVIDENCE-BASED MEDICINE)



S L N o.	Authors	Study Design	Participants number	Condition	Treatment	Control Group	Outcome Measure	Results	Level of Evidence
1	Mylonas K et al.	RCT	20	Mechanical neck pain	IASTM+ Neuromuscular exercise	Classical massage	Craniovertebral angle/VAS/ROM/NDI	IASTM and neuromuscular exercises showed better results	1b
2	Gerçek H et al.	RCT	39	Chronic neck pain	IASTM	NI	VAS/ Joint position error(JPE)	IASTM showed better results	1b
3	Ahmadpour Emshiz et al.	RCT	81	Myofascial trigger points over upper trapezius	IASTM+ Dry needling	NI	NPS/PPT/ACLF/NDI/Muscle thickness	Similar effects of both the techniques	1b
4	Haythem EL Hafej et al.	RCT	40	Myofascial trigger points over right upper trapezius	IASTM (M2 blade)+ Stretching	Stripping massage+ stretching	VAS/NDI/Pressure Algometer	Equally effective	1b

Table 2: CEBM score for IASTM

S L N o.	Authors	Study Design	Participants number	Condition	Treatment	Control Group	Outcome Measure	Results	Level of Evidence
1	Carmen Martin-Gomez et al.	Systematic review/meta analysis	NA	CNS NP	Motor Control training exercises	Other therapeutic exercises	Pain/Disability	MC found to be effective compared to other treatment methods	1a



2	Rutger MJ de Zoete	Systematic review /Metanalysis	NA	Chronic non specific neck pain	Motor control training exercises	Physical exercises/Pilates/Tai chi	Pain/Disability	Low quality evidence showed that motor control exercises are equally effective	1a
3	Somayeh Amiri et al.	Systematic review	NA	Chronic neck pain	Cranio cervical flexion exercises	General exercises	Pain/disability	Motor control exercises Found to be more useful	1a
4	Johannes Blomgren et al.	Systematic review/Met analysis	NA		Deep cervical flexor training	NA	Neuromuscular coordination	DCF training improves coordination than strength and endurance.	1a
5	Pegah Kashfi et al.	RCT	64	Chronic non specific neck pain	Specific exercises	General exercises	Pain /disability	Not specified	1b

Table 3: CEBM score for Motor control exercises

DISCUSSION

The present review was carried out to analyse the efficiency of IASTM and Motor control training exercises in chronic nonspecific neck pain patients. The study reviewed a total number of 4 RCTs related to IASTM. All of them were conducted to check the effectiveness of IASTM in patients having chronic nonspecific neck pain. The number of participants ranged from a minimum of 20 to a maximum of 81. Outcome measures were used on pain like VAS and NPS, disability using NDI, Joint position error (JPE), Range of Motion, Active Contralateral

Lateral Flexion of Cervical spine etc. out of four studies two of them demonstrated IASTM as superior to other methods however two studies have concluded that the effect of IASTM was almost similar to other conventional techniques in patients with nonspecific neck pain. The current study also analysed the effectiveness of Motor control training exercises. Total number of relevant studies was five, out of which one RCT and the rest were systematic reviews with metanalysis. Most of the studies performed using outcome measures for pain and disability and one included neuromotor



coordination. The maximum number of participants in RCT was 64. Majority of the systematic reviews concluded that the role of motor control training was significant in reducing symptoms associated with this condition. However, few of them also did not clearly mention the benefits of specific exercises for deep cervical flexors for the same.

CONCLUSION

The present literature review analysed RCTs and systematic reviews regarding the effectiveness of IASTM and Motor Control Exercises in chronic nonspecific neck pain. The broad range of systematic reviews and RCTs mentioned in the present study concluded that IASTM can be an option for treating such cases and also can be used as an adjunct to other conventional treatment techniques and It is essential to have a proof for these. Similarly Motor Control Training exercises were also found to be useful and effective in reducing symptoms associated with this condition compared to the general exercise protocol. The motor control training exercises were mainly focusing on the uses of the deep neck flexor group of muscles in improving neuromuscular coordination and hence in reducing pain and disability.

CONFLICT OF INTEREST

No conflict of interest.

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