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Effectiveness of Proprioceptive Neuromuscular Facilitation Stretching Along with Foam Roller On Shoulder Girdle Muscles Tightness in Truck Drivers

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ABSTRACT

Bckground : Flexibility is an important aspect of proper human function. The shoulder girdle muscles are required for many daily activities including bathing, driving, combing, lifting weights, and controlling shoulder mobility. Muscle tightness develops when the joint's capacity and range of motion are reduced. Tension in the shoulder girdle muscles is a leading cause of injury.

Objective : The study sought to investigate the efficacy of PNF stretching in conjunction with a foam roller on shoulder girdle muscular tension in truck drivers, as well as which method was preferable to get the best outcomes and provide the most advantages to the participants.

Methods : This randomized clinical trial will assess the impact of an intervention on shoulder girdle muscles tightness in truck drivers. Thirty participants with truck drivers, will be selected via random sampling. Inclusion criteria include the participants aged 27 to 50 years, active working minimum 15 to 20 years experience, No significant musculoskeletal injuries or chronic conditions that may interfere with the study . Exclusions include history of shoulder or back injuries in past 6 months, use of medications that affect muscle strength. The outcomes are wall angel test , upper trapezius and levator scapulae stretch test, scapular assistance test and ROM pre and post treatment. Participants will undergo a six-week intervention, with data analyzed post-assessment. Ethical approval and informed consent will be obtained.

Result : Based on the statistical analysis, the effectiveness of PNF stretching along with foam roller on shoulder girdle muscles tightness in truck drivers shows highly significant.($p<0.0001$).

Conclusion : The study concluded that the use of foam roller with PNF stretching evidenced a significantly greater improvement in reducing shoulder girdle muscles tightness in truck drivers .

Keywords: *shoulder girdle muscles tightness , proprioceptive neuromuscular facilitation , foam roller , truck drivers .*

1. INTRODUCTION

The shoulder girdle is a collection of bones that connect the upper limb to the axial skeleton on both sides. The shoulder girdle is attached to the axial skeleton by a single bone. The scapular and glenohumeral muscles help to maintain stability. It is the body's most flexible joint, rendering it prone to instability and damage [1]. Long-term slouching is the most common cause of stiffness or dysfunction in the shoulder girdle muscles. The tightness or stiffness that tight shoulders can produce in your neck, back, shoulders, and upper body might interfere with your daily activities. Your shoulders may feel inflexible and tense due to usage, stress, and strain [2]. Driving is one of the most popular daily activities. Because the shoulder provides actuation for steering while driving, injuries to it can both impair and possibly aggravate function. Compared to the articulating surfaces or ligaments in joints like the hip or knee, the rotator cuff muscles, which serve as active stabilizers, provide more constraint in the shoulder [3]. Flexibility is a crucial aspect of normal human function. It is the ability to easily and fluidly move one or a group of joints over an infinite, painless range of motion. Being flexible reduces the risk of strain and overuse injuries [4]. Stretching methods are used by clinical professionals to increase flexibility with different levels of support. Maintaining a full range of motion, preventing muscular and postural irregularities, and preventing accidents all depend on the flexibility of the shoulder girdle muscles. Any stretching exercise should aim to increase joint mobility while maintaining joint stability [5]. PNF is one type of stretching technique. PNF is a technique for stretching and improving muscle flexibility. Both passively and actively, the PNF technique improves flexibility and range of motion [6]. PNF stretching incorporates a number of contract-relax and hold-relax methods, such as antagonist reversal, repetitive stretching,

isotonic combination, and rhythmic initiation [7]. Reduced joint range of motion and ability leads to muscle stiffness [8].Foam roller itself is a myofascial release technique. Myofascial release targets soft tissue to reduce pain and stiff muscles [9]. It has also been demonstrated that myofascial release lessens stiffness and muscle soreness [10]. This treatment aims to free soft tissue from a tight fascia's unnatural hold [11]. MFR is best viewed as a goal-oriented approach to address tissue-based restrictions and the reciprocal relationships they have with posture and mobility [12].

2. METHODOLOGY

Materials and Methods:

After approval from institutional protocol and ethical committee, this study was performed in Krishna Vishwas Vidyapeeth. The study's major goal was to determine the effectiveness proprioceptive neuromuscular facilitation along with foam roller on shoulder girdle muscles tightness in truck drivers.

This experimental study follows a randomized clinical trial design conducted in Karad over a duration of six months, with a sample size of 30 participants selected through a random sampling method. The study includes participants aged 27-30 years who are active working minimum 15 to 20 years experience, No significant musculoskeletal injuries or chronic conditions that may interfere with the study . Exclusions include history of shoulder or back injuries in past 6 months, use of medications that affect muscle strength. The outcomes are wall angel test , upper trapezius and levator scapulae stretch test, scapular assistance test and ROM pre and post treatment. Participants will undergo a six-week intervention, with data analyzed post-assessment. Ethical approval and informed consent will be obtained. Ethical approval will be obtained, and informed consent will be collected from participants after explaining the study procedure. A baseline assessment will be conducted using the special tests and ROM, followed by a six-week intervention involving exercises designed to improve ROM, five days per week. Post-assessment will be performed at the end of the intervention using the same special tests and ROM. Data collected will be analyzed statistically to determine the impact of the intervention on ROM . The study will conclude with a discussion of the results and their implications for improving ROM in individuals with shoulder girdle muscles tightness in truck drivers .

ETHICAL COMMITTEE APPROVAL

The approval of this study is gained from the institutional ethics committee of Krishna Vishwa Vidyapeeth (Deemed to be university), Karad. Respondents were given a detailed explanation about the procedure which is to be conducted along with the proper explanation of the inclusion and exclusion criteria as well and an inform consent was collected from each and every participant participating in this study. There was a volunteer involvement of all the respondents in this study whose confidentiality was thoroughly maintained.

3. RESULT

Table 1 :

No.	Special tests	PRE treatment Positive	PRE treatment Negative	POST treatment Positive	POST treatment Negative
1.	Wall angel test	78%	22%	26%	74%
2.	Upper trapezius and levator scapulae stretch test	52%	48%	18%	82%
3.	Scapular assistance test	68%	32%	22%	78%

Above table shows the special tests and their pre treatment and post treatment findings.1) wall angel test- **Pre-treatment:** 78% of participants showed positive findings (indicating dysfunction). **Post-treatment:** Positive findings dropped to 26%.**Improvement:** A **52% reduction** in positive test results suggests a substantial improvement in postural alignment and shoulder mobility. 2)upper trapezius and levator scapulae stretch test -**Pre-treatment:** 52% had positive findings, indicating tightness or restriction.**Post-treatment:** Positive findings reduced to 18%. **Improvement:** A **34% reduction** suggests improved flexibility and decreased muscle tightness in the upper trapezius and levator scapulae.3) scapular assistance test - **Pre-treatment:** 68% of individuals tested positive, indicating dysfunctional scapular movement patterns.**Post-treatment:** Positive findings decreased to 22%.**Improvement:** A **46% reduction**, indicating better scapular control and improved

muscle activation patterns.

Table 2 :

No.	ROM	Pre treatment	Post treatment
1.	Flexion	95 degree	140 degree
2.	Extension	40 degree	55 degree
3.	Abduction	80 degree	140 degree
4.	Internal rotation	60 degree	85 degree
5.	External rotation	45 degree	80 degree

Above table shows the ROM taken pre treatment and post treatment .These findings indicate a **marked enhancement in shoulder mobility** following the intervention, with the most substantial gains observed in **abduction (+60°)**, **flexion (+45°)**, and **external rotation (+35°)**. This suggests that the treatment was effective in improving functional movement and flexibility of the shoulder joint.

4. DISCUSSION

The present study evaluated the effects of proprioceptive neuromuscular facilitation (PNF) stretching and foam rolling on the tight shoulder girdles of the truck drivers. For every exercise that was analyzed, including flexion, extension, abduction, and internal and external rotation, the results demonstrated significant improvements in shoulder range of motion (ROM). The reduced mobility and muscle stiffness that truck drivers commonly encounter due to bad posture, repetitive upper limb use, and prolonged sitting seem to have been effectively addressed by the combined intervention.

By stimulating the neuromuscular system and forcing muscles to expand through a contract-relax cycle, PNF stretching is believed to improve flexibility. Regular use encourages a wider range of motion in the joints and less stiffness in the muscles. However, foam rolling promotes myofascial release, which reduces adhesions and increases tissue suppleness. The significant advantages of the study, which were particularly noticeable in flexion (+45°) and abduction (+60°), were probably the result of the two techniques working together

.Truck drivers are more susceptible to musculoskeletal problems, particularly in the region around the shoulder girdle, as a result of static loading and repetitive stress. Proprioception, muscular coordination, and muscle flexibility are enhanced by interventions that combine passive (foam rolling) and active (PNF) techniques.

Although the effects of PNF stretching and foam rolling have been thoroughly investigated, little is known about how they interact, particularly in professional contexts like truck driving. Nonetheless, research on athletes and general populations has shown promising results using comparable dual-method approaches.

For example, Behm and Wilke (2019) discovered that, in comparison to either treatment alone, the combination of stretching and myofascial release techniques significantly increased flexibility results. Similarly, Su et al. (2017) found that range of motion was enhanced more by dynamic stretching following foam rolling than by static stretching alone. This study adds to the growing body of evidence by showing that a combination approach is beneficial not just for athletes or general populations, but also for occupational groups that have chronic tightness due to prolonged static postures.

5. CONCLUSION

According to the current study, truck drivers' shoulder girdle muscles can become much less tense when foam rolling and Proprioceptive Neuromuscular Facilitation (PNF) stretching are used. All assessed parameters showed significant improvements in shoulder range of motion, suggesting that this method successfully increases flexibility and treats musculoskeletal limitations that are prevalent in this population. Finding simple fixes that don't require complicated equipment is especially beneficial because truck driving is a physically demanding and sedentary job. Because foam rolling improves tissue pliability and neuromuscular preparedness, it seems to be a more effective pretreatment method for PNF stretching. Their synergistic effect when coupled promotes increased mobility and functional advancements.

In conclusion, PNF stretching and foam rolling combine to provide truck drivers with a practical, cost-effective way to improve their posture, relax tense shoulder muscles, and improve their overall musculoskeletal health. If this strategy is included into driver wellness initiatives or occupational health protocols, it may improve the quality of life for employees and reduce the risk of long-term musculoskeletal problems.

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