(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 4, Issue 6, Page No: 230-237
November-December2021

IJMSCR

Effectiveness of Muscle Energy Technique versus Sleeper Stretch on Posterior Shoulder Tightness among Volley Ball Players

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Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Background: Posterior Shoulder Tightness (PST) was common physical impairment in overhead sports. It is more in athletes especially in throwing players places extremely high stress on shoulder specifically on the anatomical stabilization that keeps the shoulder stable. In throwing athletes these stresses are very high and repeated many times and to a wide range of overuse injuries. Some evidence-based studies proved that Muscle energy technique and Sleeper stretch are effective in improving the posterior shoulder tightness among volleyball players. But there is no comparative study of these two protocols. Hence the purpose of this study is to compare the effectiveness of Muscle energy technique and Sleeper stretch are effective in improving the posterior shoulder tightness among Volleyball players.

Methods: 60 subjects who met selection criteria were included in the study and were divided into 2 groups, 30 members in group A (METS), 30 members in group B (SLEEPER STRETCH). Both groups performed intervention as 5 days for week, 40 minutes per session up to 4 weeks. The outcomes were Goniometer and NPRS.

Results: Paired T test was used to access the statistical significance between pre & post test scores. Statistical analysis of the data revealed that there is no difference between both METS and Sleeper stretch.

Conclusion: In this study, 4 weeks of showed that METS and Sleeper Stretch both approaches are significant in improving posterior shoulder tightness among volley ball players.

Keywords: Posterior Shoulder Tightness, METS, Sleeper Stretch, NPRS, Goniometer, Volley Ball players

Introduction

Posterior Shoulder tightness is major problem in general working population. Posterior shoulder tightness (PST) are common physical impairments in overhead sports. It is more in athletes especially in players throwing places extremely high stress on shoulder specifically on the anatomical stabilization that keeps the shoulder stable. In throwing athletes these stresses are very high and repeated many times and to a wide range of overuse injuries. Although throwing injuries in the shoulder most commonly occur in baseball pitchers, they can be seen in any athlete who participants in sports that requires repetitive overhand motions, such as volleyball (1-4).

Volleyball is a complex displace with high technical, tactical, and athletic demands on the players, because of this there is a need for the players to specialize early in certain tasks in the game, such as spiking or setting. Setting is the way in which the ball is hit with the fingertips, the wrist being radially deviated, and

hyperextended. In spiking, the player hits the ball at the maximum height of a vertical jump, directing the hit downwards on the ball so that the ball cannot be returned. Because of the repetitive load due to overhead motions, arrange of pathologies can cause shoulder pain in the volleyball players. Overhead athletes, like volleyball players, can demonstrate altered glenohumeral joint mobility and flexibility in the dominant hand resulting in significantly less internal rotation and greater external rotation of the shoulder, classified as glenohumeral internal rotation deficit [GRID]. 27

It has been suggested that posterior shoulder tightness is a common in overhead throwing athletes. The incidence of shoulder pain in the general population has been reported to be as high as 27% and as many as 74% of the patients who were seen for shoulder Posterior shoulder tightness is identified by measuring horizontal humeral adduction, although another clinical measure that is commonly used is the bilateral measurement of glenohumeral internal rotation (IR) range of motion. It is important to note, however that the measurement of glenohumeral IR range of motion specifically aims to identify glenohumeral IR range of motion deficits (GIRD). Although GIRD is believed to be a leading contributor to posterior shoulder tightness. (25-27)

Anatomical GRID has been described as a loss of less than 18 to 200 deficit of glenohumeral Internal rotation with symmetrical total rotation motion of the uninvolved shoulder within 50. Pathological Grid had been identified as a loss of glenohumeral internal rotation> 18-200. Nonthrowing shoulder has been compared with the throwing shoulder corresponding to loss of the total rotation > 50 has observed. In hand ball players. who are having shoulder problems there is decline in the external rotation strength with grid. (9)

Some authors suggest that repetitive stress to posterior structures in the follow through phase in throwing movements could lead to inflammation, scar formation and subsequent tightness in posterior tissues. There is growing body evidence that PST and can contribute to shoulder impingement symptoms. One cross-sectional study by tyleret found that the presence of positive subacromial impingement, signs positively correlated with PST and GIRD in general population. (10). Moreover, the excessive posterior capsular tightness produced by repetitive functional positions of 90° shoulder abduction and ER ≥ IR makes the humeral head shift antero-superiorly compared with a normal shoulder in throwing movements are applied they are muscle energy technique and sleeper stretch.

Muscle energy technique helps is increasing shoulder range of motion. Muscle energy technique can help to release and relax muscles, and promote the body' s own healing mechanisms. MET is unique in its application as the client provides the initial effort while the practitioner facilities the process. The primary force originates from the contraction of soft tissue, which is then utilized to assist and correct the presenting musculoskeletal dysfunction. MET is generally classified as a direct technique as opposed to indirect because the muscular effort is forming a controlled position in a specific direction against a distant counter force. One of the main uses of this method is to normalize joint range, rather than increase flexibility, and techniques can be used on any joints with restricted range of motion (ROM) Identified during the passive assessment. (5-10)

Sleeper stretch is an exercise that improves the range of motion and internal rotation in the shoulders. It targets the infraspinatus and the teres minor muscles, which are found in the rotator cuff. These muscles provide stability in your shoulders. Sleeper stretch may help to improve movement in your shoulders, allowing you to complete daily or athletic activities with more ease. It can also help you develop the flexibility and stability you need to prevent injury. (12,13,14)

Materials And Methods

The study was proposed to compare the Effectiveness of Muscle Energy Technique and Sleeper Stretch on Posterior Shoulder Tightness among Volleyball Players.

Subjects: Subjects are recruited from KIMS college of physiotherapy and KIMS dental college, study done in KIMS Medical college campus, Amalapuram.

Method Of Data Collection:A total number of 60 patients both men of age between 18 - 25 years suffering with shoulder tightness in volleyball players and who are willing to participate in the study were included as per the study criteria and they were

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divided into two groups respectively after obtaining the consent form the patients. These 60 subjects were allocated into two group by convenience sampling.

GROUPS	NO.OF. SUBJECTS	TREATMENT
GROUP A	30	Muscle Energy Technique [MET]
GROUP B	30	Sleeper Stretch

STUDY DESIGN: Quasi Experimental Study

STUDY SAMPLE: Convenient Sampling

TREATMENT DURATION: 4 weeks, 5days a week, 40min a day.

OUTCOME MEASURES: GONIOMETER and NUMERICAL PAIN RATING SCALE

Goniometer was the most frequently used outcome measure for measuring Range of Motion.

Numerical Pain rating scales used for pain assessment

MATERIALS: Couch, Towel, Stepper, Pillows, Universal goniometer, Consent form, Data collection form

Inclusion Criteria:

10 degrees dominant and non-dominant

Subacute shoulder pain.

Asymmetric in shoulder internal rotation measured with above 900

Age group 18 to 25.

Male Volleyball players are included

Who had not included in any study in last 6 months.

Exclusion Criteria: Recent shoulder injuries on dominant side in previous 6 months, Peripheral nerve injuries, Any trauma cases, Fractures, History of previous surgery, Psychological impaired.

Procedure

Muscle Energy Technique: it is a form of a manual therapy. It is given to improve musculoskeletal function and joint function. The subject is asked to go for a forceful contraction at the end of the available range against resistance where there will be no movement in the joint. Then the subject is asked to relax the muscle (PIR). This shall be given both to abductor group of muscles to improve abduction range. The same technique will be applied for external rotators to improve range of motion in external rotators. (3-5) The below MET techniques are given for 40mins duration, 5 days per week for 4 weeks.

MET for G.H. joint restricted flexion: Therapist stands in front of the patient and places one hand over the top of the patient's shoulder at the superior part of the scapula and cup the G.H. joint to palpate for motion. The other hand and forearm support the patient's flexed elbow and flex the humerus at the G.H. Joint in the sagittal plane up to the initial point of resistance. Direct the patient to extend the elbow against your equal counterforce. Maintain the forces for 3-5 seconds allow the patient to relax for 2seconds, take up the slack and then repeat. (7)

MET for G.H. joint restricted extension: Therapist stands in front of the patient and places one hand over the top of the patient's shoulder at the superior part of the scapula and cups the G.H. joint to palpate for motion. Uses the other hand to support patient's flexed elbow and direct the patient to push the elbow anteriorly. (7-10)

MET for G.H. joint restricted abduction: Therapist stands in front of the patient, places her one hand over the top of patient's shoulder, cups the G.H. joint to palpate for motion. Direct the patient to press the elbow towards the body. (8,9)

MET for G.H. joint restricted internal rotation: Therapist stands facing the patient. Carefully place the dorsum of the patient's hand against the patients back. Therapist places his hand over the top of shoulder and superior part of the scapula and other palm protecting anterior side of the shoulder capsule. Places her other hand posterior to the patient's flexed

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elbow. Direct the patient "Press your elbow against my fingers". (7-10)

MET for G.H. joint restricted external rotation: Therapist stands behind the patient. Places his hand superior to the patient's GH joint. Places her forearm of the other hand medial to the patient's flexed forearm with her hand supporting the patient's hand and the wrist. Direct the patient to internally rotate the arm by pressing the hand. (7-10)

SLEEPER STRETCH

Sleeper stretch was applied in the following way. Participants shoulders and elbows were positioned into 90 degrees of flexion with the lateral border of the scapula positioned firmly against the treatment table. Lie on your head supported by pillows. Raise the down side arm 90 degrees and flex the elbow to 90 degrees. Bend your knees to assume a stable base. Place the hand of the opposite arm just below the wrist of the affected side and slowly push(rotate) the forearm toward the floor until you feel a slide stretch. Be sure to maintain the 90 degrees position at both the shoulder and elbow. (14,15)

Next, the investigator passively internally rotates each participant shoulders by grasping the distal forearm and moving the arm towards the treatment table. Pressure was held constant at the end range of motion for 30 seconds and then repeated twice with 30 seconds rest between stretching. (15) This Technique is given two time per session, 5 days per week for 4 weeks.

Results

Statistical analysis was done using statistical software SPSS 20.0 version for this purpose the data was entered into Microsoft excel-2007 spread sheet, tabulated and subjected into statistical analysis.

Descriptive statistical data was presented in the form of mean (+/-) standard deviation, percentage (%) and also graphical representation. 60 subjects completed the entire study protocol of 4 weeks in the training session of group A and group B

To observe the treatment impact before and after the treatment in the groups, the analysis was carried out using statistical tests, for the outcome measures – Goniometer (shoulder joint) and NPRS Within the group differences were checked with paired student-T test and between the group's differences are checked using unpaired student-T test.

Goniometer and NPRS assessment of the shoulder joint has shown differences in their pre-test and post-test values .But on comparing the means of both groups there was no difference, as both the interventions has improved the posterior shoulder tightness.

Discussion

My study included 60 subjects allotted into 2 groups, 30 in each group respectively. In this study we approached the subjects with two techniques are Muscle Energy Technique and Sleeper Stretch and it carried out for 4weeks which is followed by follow-up. Pre and post intervention data was collected with two scales one is range of motion and second scale is for pain. Goniometer and numerical rating scale the primary and secondary outcomes of my study. There is no significant difference among both groups MET and Sleeper stretch (p-value >0.05). hence my study accepted null hypothesis.

MET is effective in improving the range of motion. Two aspects to MET are their ability to relax an overactive muscle and their ability to enhance stretch of a shortened muscle or its associated fascia when connective tissue or viscoelastic changes have occurred. Two fundamental neurophysiological principles account for the neuromuscular inhibition that occurs during application of these techniques. The first is post contraction inhibition [also known as post isometric relaxation, or PIR], which states that after a muscle is contracted, it is automatically in a relaxed state for a brief, latent, period. The second is reciprocal inhibition (RI) which states that when one muscle is contracted, its antagonist is automatically inhibited.

Chaitow et al stated that normal blood circulation is restored by MET as it is an active muscular relaxation method cleanses the nociceptive stimulants from the area of pain which relieves pain. Active muscle contraction has shown the changes in neuro physiological effects including pain inhibition which promotes the muscle stretching further.

In Post isometric relaxation, a strong muscle contraction against equal counterforce triggers the Golgi tendon organ. The afferent nerve impulse from the GTO enters the dorsal root of the spinal cord and

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meets with an inhibitory motor neuron. This stops the discharge of the efferent motor neurons impulse and therefore prevents further contraction, the muscle tone decreases, which in turn results in the agonist relaxing and lengthening. MET can improve joint mobility, even when the muscle is relaxing initially. A relaxation period follows the muscle contraction, which then helps to achieve the new Range of motion. (25-27) By the following mechanism thus the range of motion increases in posterior shoulder tightness among the volleyball players. (23,24)

The underlying mechanism for the Sleeper stretches and its action on the muscle is increasing the range of motion because of the viscoelasticity behavior of the muscle followed by short term changes in muscle extensibility. Sleeper stretching mechanism has positive implication or range of motion which may involve neurological molecular and biomechanical changes stretching causes gush of viscoelasticity and decline in the stiffness of muscular and connective tissues therefore it leads to improvement in muscle extensibility. while during Sleeper stretching Golgi tendon organ assumes that tension is resulting from the stretch of the muscle tendon unit, may result in muscle elongation by intervening any assisting impulses from primary afferent of muscle spindle and may also contribute muscle relaxation by inhibiting tension in the contractile units of the muscle being stretched.

Due to the inhibitory effects of Golgi tendon organs, there will be reduction in of the pain which followed by static stretching. There by reduction in the motor neuronal discharges they will cause relaxation of the musculotendinous unit by resetting its resting length and Pacinian corpuscles modification. This mechanism of reflexes will allow relaxation in musculotendons unit tension and leads to drop down of the pain perception. By the application on the MET technique and sleeper stretch there is increase in the range of motion and decrease in the pain perception which had been proved significant by the statistical result. (26-30)

Conclusion: After these two interventions which is given to posterior stiffness of shoulder tightness of players. Statistical reports states that there is a significant difference with in the groups for pre and post interventions data and while comparing the both groups it states that there is no significant difference between the group A

Limitations of the study includes very less studies were done and further studies are required to asses in which there is no control group. This study was not blinded and further follow up is needed for this study.

and group B.

Conclusion

In this present study we are accepting the null hypothesis, that both METs and SLEEPER STRETCH are equally effective on Range of Motion and Pain among Volleyball players.

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TABLES

Table – 1: Analysis of Pre and Post Interventions with in the groups

OUTCOMES		MUSCLE ENERGY TECHNIQUE Group A (n=30)			SLEEPER STRETCH Group B (n=30)		
		Pre Mean±SD	Post Mean±SD	p-value	Pre Mean±SD	Post Mean±SD	p-value
ROM	EXT	32.6±3.9	43.9±2.3	0.000*	29.7±1.5	42.06±1.3	0.000*
	FLEX	153.267±3.7	166.8±3.1	0.000*	150.3±2.4	166.9±1.7	0.000*
	ABD	152.033±4.3	167.667±3.03	0.000*	150.3±2.5	167±2.05	0.000*
	ADD	31.03±2.1	42±1.5	0.000*	30.1±1.7	42.2±1.3	0.000*
	INT ROT	47.1±4.6	59.4±4.1	0.000*	49.3±2.27	61.03±2.1	0.000*
	EXT ROT	60.3±7.2	74.9±3.3	0.000*	53.3±2.8	73.5±2.4	0.000*

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NPRS	6.167±0.7	3.1±0.8	0.000*	6.1±0.75	2.7±0.73	0.000*

Result: The above table shows that significant improvement in ROM & Pain mean scores in Group A & B (p value-0.000)

Table – 2: Analysis of Post Interventions between the Groups

OUTCOMES		**MUSCLE ENERGY TECHNIQUE** Group A (n=30)		**SLEEPER STRETCH** Group B (n=30)		p-value
		Post Mean	SD	Post Mean	SD	
ROM	**EXT**	43.9	2.35	42.067	1.20	**0.069**
	FLEX	166.8	3.17	166.933	1.70	**0.84**
	ABD	167.6	3.03	167	2.05	**0.323**
	ADD	42	1.53	42.267	1.36	**0.479**
	INT ROT	59.467	4.16	61.033	2.14	**0.074**
	EXT ROT	74.9	3.31	73.567	2.40	**0.08**
NPRS		3.1	0.84	2.733	0.73	**0.079**

Result: The above table shows that there will be no significant difference in ROM & Pain assessment in between Group A and Group B (p value > 0.05)

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