A comparative study to evaluate effictiveness of kiastm versus mfr with shoulder strenghthening exercises in upper cross syndrome in swimmers.

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**INTRODUCTION**

Many swimmers experience tightness in the pecs (major and minor) as well as the upper traps and latissimus dorsi. This is because of the demands put on these muscles when creating propulsion in freestyle, butterfly and backstroke.²

When these muscles become tight the neck flexors as well as muscles in the upper back (rhomboids and serratus anterior) are often inhibited and typically weak²

Upper-crossed syndrome (UCS) is also referred to as proximal or shoulder girdle crossed syndrome. In UCS, tightness of the upper trapezius and levator scapula on the dorsal side crosses with tightness of the pectoralis major and minor. Weakness of the deep cervical flexors, ventrally, crosses with weakness of the middle and lower trapezius. This pattern of imbalance creates joint dysfunction, particularly at the atlanto-occipital joint, C4-C5 segment, cervicothoracic joint, glenohumeral joint, and T4-T5 segment. Janda noted that these focal areas of stress within the spine correspond to transitional zones in which neighboring vertebrae change in morphology¹

Specific postural changes are seen in UCS, including forward head posture, increased cervical lordosis and thoracic kyphosis, elevated and protracted shoulders, and rotation or abduction and winging of the scapulae. These postural changes decrease glenohumeral stability as the glenoid fossa becomes more vertical due to serratus anterior weakness leading to abduction, rotation, and winging of the scapulae. This loss of stability requires the levator scapulae and upper trapezius to increase activation to maintain glenohumeral centration¹

Exposure of the human body to gravity forces, e.g., when standing or walking, is necessary to ensure proper activity of the skeletal muscles responsible for maintaining good body [posture](https://www.physio-pedia.com/Posture). When these muscles are not stimulated to resist gravity for an extended period, e.g., during prolonged sitting or lying, their stabilizing function is disturbed by the hypoactivity reaction resulting in muscular weakness and atrophy. The deficit of the locomotor system stability triggers a compensatory mechanism—the stabilizing function is overtaken by the mobilizing muscles. However, as a side effect, such compensation leads to mobilizers’ increased activity (hyperactivity) and, subsequently, their decreased flexibility, which may finally lead to a pathological chain of reactions within the musculoskeletal system.²

According to Karel Lewit (1994), muscle imbalance usually occurs before functional dysfunction 9. V Janda (2013), also describes this muscle imbalance as a condition in which some muscles become inhibit and weak and others become short and stiff. Such imbalance can bring changes in tissues, which may cause inappropriate movement patterns in the individual. Such conditions can eventually cause side effects such as pain and inflammation. Janda attributes these predicted patterns to a large extent, due to the immobile conditions and repetitive task². Muscle balance can be defined as a relative equality of muscle length or strength between an agonist and an antagonist; this balance is necessary for normal movement and function¹.

In this syndrome, mainly the posterior superior muscles in the neck and the anterior neck, which are tonic, are short and the anterior deep muscles of the neck and posterior shoulder girdle, which are mainly phasic, are inhibited and weakened. This condition is caused by the changes in the elevation, protraction and abduction of the shoulder by increasing the angle of forward head and hyperextension of the upper part of the cervical spine, which are often associated with forward head, round shoulder, protracted scapulae, and thoracic kyphosis³. These muscle imbalances and movement dysfunctions may have a direct effect on joint surfaces, thus potentially leading to joint degeneration. In some cases, joint degeneration may be a direct source of pain, but the actual cause of pain has been often secondary to muscle imbalance4.

Kinesio instrument assisted soft tissue mobilization (KIASTM) is a skilled myofascial intervention used for soft-tissue treatment. It is based on the principles of James Cyrix's cross-friction massage6.

It is applied using instruments that are usually made of stainless steel with beveled edges and contours that can conform to different body anatomical locations and allows for deeper penetration. It is used for the detection and treatment of soft tissue disorders6

A proposed description for KIASTM is “a skilled intervention that includes the use of specialized tools to manipulate the skin, myofascia, muscles, and tendons by various direct compressive stroke techniques”7.

The technique itself is said to have evolved from Guasha which is a method used in Chinese medicine.10 Guasha uses instruments with smoothed edges to scrape the skin till red blemishes occur. However, Gusha has different rationale, goals and application method from KIASTM.7

Myofascial Release (MFR) is a holistic, therapeutic approach to manual therapy, popularized by John Barnes(PT). MFR offers a comprehensive approach for the evaluation and treatment of the myofascial system, the system of tissues and muscles in the body. This technique is designed to release restrictions such a trigger points, muscle tightness, and dysfunctions in soft tissue that may cause pain and limit motion in all parts of the body. It has shown success in decreasing pain and increasing mobility5

The main tissue that MFR focuses on for release in the myofascial system is the fascia. Fascia is a fine tissue that surrounds all structures in the body Including muscles, nerves, vessels, and bones. MFR allows the therapist to evaluate, identify, and treat fascial restrictions. These restrictions can be caused by numerous factors, such as trauma, musculoskeletal conditions, repetitive stress syndrome, and poor posture.5

By applying gentle, hands-on techniques to the whole body, positive structural changes may occur, such as increased range of motion, decreased pain, and, most importantly, increased fascial mobility. In combination with traditional physical therapy, MFR can help patients return to their daily and recreational activities6.

According to research done by Vladimir Janda in 1979, In this research study, exercise and stretching proved to be effective for correcting this syndrome. ¹²

Exercises used to correct Upper cross syndrome are -

* **Thoracic Twist**
* **One Arm Chest Stretch**
* **Levator scapula stretch**
* **Chin Tucks**
* **Supine Chin Tucks**
* **Prone YS¹¹ ¹²**
* **Massage sternocleidomastoid**

**METHODOLOGY**

It is acomparative Study in which 50 SwimmersDiagnosed with upper cross syndrome . It is divided into two groups, 25 each group.**Group A :** KIASTM and Shoulder Strengthening Exercises. **Group B :** MFR and Shoulder Strengthening Exercise. Inclusion criteria is Swimmers with upper cross syndrome, Age between 15 to 30 years, Swimmers with constantly and frequently occurring neck and shoulder pain more than one month. Exclusion criteria is Recent Shoulder Surgery, Shoulder dislocation, Fracture, In-cooperative patients, Unstable heart condition on rapid fluctuations in hyper tension ,Diabetes Mellitus.

OUTCOME MEASUREMENT

* **Vas Scale :** Visual analog scale .
* **Goniometer:** To measure Joint ROM.

**PROCEDURE**

Group A with KIASTM, Pectoralis major will mobilize in supine lying.

In sitting upper trapezius, levator scapulae and sub-occipitals will mobilise sweeping the tool over muscle belly in parallel direction .

The latissimus dorsi turn followed by sweeping was applied with the instrument held at 45° degree with bevel up in side lying .Each treatment session will be of 15-20 minutes for all muscles, with the help of KIASTM device assisted by friction-free oil or gel, while the evidence available on the shoulder for application of KIASTM with applied protocol being 40 seconds. The general principle is a six-step technique comprising examination, warm-up, KIASTM, stretching, strengthening and icing.

It is applied using instruments that are usually made of stainless steel with beveled edges and contours that can conform to different body anatomical locations and allows for deeper penetration. It is used for the detection and treatment of soft tissue hudisorders.²¹

Following procedure is done for KIASTM

1. Examination
2. KIASTM, done at 45° degrees angle for 40-120 seconds
3. Stretching, 3 reps for 30 seconds
4. Strengthening, high repetitions with low load exercise

Myofascial therapy can also enhance or assist other treatments to increase their effectiveness such as acupuncture, manipulation, physical therapy. Myofascial release therapy can also improve skeletal and muscular alignment prior to a surgery, or help athletes achieve better alignment prior to sports competitions.

By targeting specific areas of the fascial system, myofascial therapy can help prepare patients for more aggressive forms of strengthening, or provide pain relief for patients with restricted flexibility and movement, thus allowing patients to return to normal movement and greater function.

The specific releases to Tight, Facilitated

Pectorals

Upper Trapezius

Levator Scapula

Sternocleidomastoid

Suboccipitals

Subscapularis

Latissimus Dorsi

Arm Flexors

**Weak and inhibited**

Longus Capitis

Longus Colli

Hyoids

Serratus Anterior

Rhomboids

Lower Trapezius

Posterior Rotator Cuff

Arm Extensors but generally include gentle application of pressure or sustained low load stretch to the affected area. Progress is gauged by the level of increased motion or function experienced, and/or decrease in pain felt by the patient²4.

**DATA ANALYSIS**

All the pre and post data of outcome measures would be kept safely for analysis.

"t" test and unpaired 't" test will be performed for analysis of pre and post data evaluation within and between groups.

**RESULTS**

Result of the study will be revealed after getting the analyzed data.

**DISCUSSION AND CONCLUSION**

Discussion and conclusion will be included after revealing of analyzed data.

**REFERENCES**

[1] Frank CC, Lardner R. Assessment and treatment of muscle imbalance: The Janda Approach 2010, Champaign, IL: Human Frank CC, Lardner R. Assessment and treatment of muscle imbalance: The Janda Approach 2010, Champaign, IL: Human Kinetics.

[2] Moore MK. Upper crossed syndrome and its relationship to cervicogenic headache. J Manipulative Physiol.

[3] Janda V. Muscle function testing. Elsevier; 2013; 230-58

[4] Phadke A,Bedekar N et al. Effect of muscle energy technique and static stretching on pain and functional disability in patients with mechanical neck pain: A randomized controlled trial. Hong Kong Physiotherapy Journal 2016; Vol 35, p. 5-11

[5] Dutton, Mark. Orthopaedic examination, evaluation, & intervention. New York : McGraw-Hill, c2004 pages 331-332, 1218

[6] John Barnes’ Courses completed MFR I, MFR 2, Myofascial Unwinding, Myofascial Soft Tissue Mobilization workshop.

[7] Cheatham SW, Baker R, Kreiswirth E. Instrument assisted soft-tissue mobilization: A commentary on clinical practice guidelines for rehabilitation professionals. International journal of sports physical therapy. 2019 JulCheatham SW, Baker R, Kreiswirth E. Instrument assisted soft-tissue mobilization: A commentary on clinical practice guidelines for rehabilitation professionals. International journal of sports physical therapy. 2019 July

[8] Lambert M, Hitchcock R, Lavallee K, Hayford E, Morazzini R, Wallace A, Conroy D, Cleland J. The effects of instrument-assisted soft tissue mobilization compared to other interventions on pain and function: a systematic review. Physical Therapy Reviews. 2017 Mar 4;22(1-2):76-85.

[9] Ge W, Roth E, Sansone A. A quasi-experimental study on the effects of instrument assisted soft tissue mobilization on mechanosensitive neurons. Journal of physical therapy science. 2017;29(4):654-7.

[10] Nazari G, Bobos P, MacDermid JC, Birmingham T. The effectiveness of Instrument-Assisted soft tissue mobilization in athletes, participants without extremity or spinal conditions, and individuals with upper extremity, lower extremity, and spinal conditions: a systematic review. Archives of Physical Medicine and Rehabilitation.

[11] Bae WS, Lee OH, Shin JW, et al. The effect of middle and lower trapezius strength exercises and levator scapulae and upper trapezius stretching exercises in upper crossed syndrome. J Phys Ther Sci. 2016; 28 (5): 1636-1639.

[12] Gillani SN, Quarat-ul-ain, Shakil ur Rehman, et al. Effects of eccentric muscle energy technique versus static stretching exercises in the management of cervical dysfunction in upper cross syndrome: a randomized control trial. J Pak Med Assoc. 2020; 70 (3).

[13] Muscolino, J. Upper crossed syndrome. Journal of the Australian Traditional-Medicine Society.2015;

[14]Yoo WG, Yi CH, Kim MH. Effects of a ball-backrest Chair on the muscles associated with upper crossed syndrome when working at a VDT. Work. 2007;29(3):239

[15]Phillip Page, Clare Frank, Robert Lardner, Treatment of Muscle Imbalance eBook.2010.

[16]Johnson G, Bogduk N, Nowitzke A, House D. Anatomy and actions of the trapezius muscle. Clin Biomech (Bristol, Avon). 1994 Jan;9(1):44-50.

[17] Janda, V., Muscle strength in relation to muscle length,Pain, and muscle imbalance, in Muscle Strength(Internationally Perspectives in Physical Therapy)

[18]Harms-Ringdahl, Editor 1993, Churchill Livingstone: Edinburgh. P. 83–91

[19] Kang JH, Park RY, Lee SJ, Kim JY, Yoon SR, Jung KI.The effect of the forward head posture on postural balance in long time computer based worker. Ann Rehabil Med. 2012 Feb;36(1):98-104

[20] Phil Page. Shoulder muscle imbalance and subacromial impingement syndrome in overhead athletes. Int Sports Phys Ther. 2011 Mar; 6(1): 51–58.

[21] Weon JH, Oh JS, Cynn HS, Kim YW, Kwon OY, Yi CH.Influence of forward head posture on scapular upwardRotators during isometric shoulder flexion 2010 Oct;14(4):367-74.

[22] Eirik Garnas. Upper Crossed Syndrome: The Personal Trainer’s Guide. <http://www.theptdc.com/2014/07/>

[23] Weon JH, Oh JS, Cynn HS, Kim YW, Kwon OY, Yi CH.Influence of forward head posture on scapular upward Rotators during isometric shoulder flexion. J BodywMov Ther. 2010 Oct;14(4):367-74.

[24] Eirik Garnas. Upper Crossed Syndrome: The Personal Trainer’s Guide. <http://www.theptdc.com/2014/07/>

[25]Upper-crossed-syndrome/Christensen K. Manual muscle testing and postural

[26]Imbalance. Dynamic Chiropractic 2000; 15: 2.Morris CE, Bonnefin D, Darville C. The Torsional Upper Crossed Syndrome: A multi-planar update to Janadas model, with a case series introduction of the Mid-pectoral fascial lesion as an associated etiological factor. J Bodyw Mov Ther. 2015 Oct;19(4):681-9.

[27] Klussmann et al. Musculoskeletal symptoms ofThe upper extremities and the neck: A cross-sectional study on prevalence and symptom-predicting factors at visual display terminal (VDT) Workstations. BMC Musculoskelet Disord. 2008 Jun 27;9:96.

[28] Derek R. Smith, Peter A. Leggat. Musculoskeletal disorders among rural Australian nursing students. Australian Journal of Rural Health. 2004;12(6):241-245.

[29] Valli J. Chiropractic management of a 46-year-old Type 1 diabetic patient with upper crossed syndrome And adhesive capsulitis. J Chiropr Med. 2004 Autumn;3(4):138-44.

[30] Moore MK. Upper crossed syndrome and its relationship to cervicogenic headache. J Manipulative Physiol Ther. 2004 Jul-Aug;27(6):414-20.