

Importance of Trigger Point Dry Needling Along with Scapular Strengthening and Thoracic Mobility Exercises for Shoulder Injuries

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Abstract: *Shoulder injuries are some of the most common type injuries experienced in all age groups and all sexes. The common etiologies vastly vary based on age but can range from traumatic causes such as a fall on an out - stretched arm or overuse reasons due to muscle imbalances. Shoulder injuries are not only associated with the glenohumeral (GH) joint but also to the whole shoulder complex leading to not just GH joint dysfunction but also dysfunction for the whole shoulder complex. The purpose of this study is to examine the effects of Trigger point dry needling (TDN) in conjunction with scapular strengthening exercises and thoracic mobility exercises as a holistic approach to treating shoulder pain and injury. The general emphasis is placed on shoulder complex common pathologies, muscle imbalances and combination of different interventions for a holistic approach with reduction in pain, improvement of function and improved mental health.*

Keywords: shoulder injuries, shoulder pain, muscle imbalances, holistic treatment, trigger point dry needling

1. Introduction

Shoulder injuries account for major musculoskeletal injuries affecting all age groups, which can range from history of a simple falls, overuse injuries in pitchers, post - surgical cases etc. Unlike the hip joint, which is also a ball and socket joint but has more stability than the shoulder joint or the knee joint the mobility of the glenohumeral joint due to its unique anatomy makes it more prone to injuries. Another factor as compared to the hip joint that makes it more prone to injuries is the size of muscles where hip is protected by bigger and stronger soft tissue as compared to the shoulder complex. The financial burden of shoulder injuries from 2010 to 2020 was estimated to be between twenty - two to thirty billion dollars (Herring, Nilsson, & Berglund, 2014).

This article explores combination of approaches to shoulder rehabilitation that includes trigger point dry needling (TDN), scapular strengthening exercises, and thoracic mobility exercises. The goal is to provide a comprehensive and holistic treatment strategy that effectively treats both the acute pain, short term and long - term functional deficits associated with shoulder injuries with reduced risk for complications.

Overview of the Shoulder Complex

The shoulder complex comprises several joints that work together to allow a wide range of motions.

- Glenohumeral joint
- Scapulothoracic joint
- Claviculothoracic joint
- Acromioclavicular joint
- Sternoclavicular joint

Key muscles involved include the rotator cuff muscles (supraspinatus, infraspinatus, teres major, teres minor), deltoid group, latissimus dorsi, trapezius, pectoralis major and minor, and serratus anterior. The shoulder also includes other soft tissues like the bursa, labrum, and ligaments, all of which

can be affected by injury (Decker, Tokish, Ellis, & Torry, 2013).

Common Shoulder Pathologies

- 1) Labrum tears
- 2) Rotator cuff tears
- 3) Humeral fractures
- 4) Clavicle fractures
- 5) Shoulder or scapulothoracic impingement
- 6) Shoulder bursitis
- 7) Bicipital tendinitis

Common Muscle Imbalances in Shoulder Injuries

Despite the unique nature of each injury, several commonalities in muscle imbalances can lead to similar pain patterns and rehabilitation needs. Tightness in the trapezius, pectoralis, and biceps muscles often reduces the space between the acromion process and the humeral head which leads to friction between the acromion process and the rotator cuff muscles leading to acute inflammation inside the shoulder commonly presenting itself shoulder impingement and clinically presents as painful arc syndrome. Overuse and weakness are typically observed in the serratus anterior, rhomboids major and minor, and the lower trapezius (Kibler & Sciascia, 2010). This weakness can lead to anterior tipping of the scapula with increased protraction.

Post - operative patients often present with pectoralis tightness, biceps tightness due to use of a sling, and anterior scapular tipping due to latissimus dorsi over - activation. Shoulder hiking is a common compensatory mechanism seen in patients attempting to regain shoulder flexion and abduction, typically aggravated to over - activated trapezius and the levator scapulae (Behrsin & Maguire, 2010).

Introduction to Dry Needling for Shoulder Injuries

Dry needling can be an effective treatment intervention for all types of patient which include both surgical and non - surgical shoulder conditions as long as they have not contraindication

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identified by the therapist performing the intervention. In non-surgical cases, it can be initiated as early as day one. Studies indicate that endorphin release from dry needling can significantly reduce pain and improve mood (Gattie, Cleland, & Snodgrass, 2017). For surgical cases, dry needling is typically introduced after eight weeks to reduce infection risks (Dunning et al., 2014). Areas where there is a risk for the needle to come in contact with metal that is operatively placed in the patient should be avoided as it has the risk for infections which is far greater than the benefits associated with the intervention.

A thorough assessment to identify over-activated, over-simulated and weak muscles is crucial. Targeted dry needling helps optimize the length-tension relationship of these muscles, facilitating healing and functional improvement. Following dry needling, stress loading the treated muscles through exercise is essential to restore strength and attempt to correct any imbalances (Kietrys, Palombaro, & Azzaretto, 2013).

Role of Thoracic Mobility

Thoracic mobility plays a critical role in shoulder function and overall biomechanics. Limited thoracic mobility can lead to compensatory movements in the shoulder, contributing to pain and dysfunction. This usually takes place because of a change in scapular thoracic rhythm from its optimal 1:1 and 1:2 ratio. Early introduction to thoracic mobility exercises into rehabilitation protocol can improve scapular mobility and positioning, leading to improved shoulder mechanics and reduced strain on the shoulder complex (Cools, Johansson, Borms, & Maenhout, 2015).

Key Benefits of Thoracic Mobility Exercises:

- 1) **Enhanced Scapular Movement:** Improved thoracic extension and rotation allow for better scapular kinematics, which is crucial for optimal shoulder function (Ludewig & Reynolds, 2009).
- 2) **Decreased Compensatory Movements:** Scapulothoracic mobility training reduces the need for engagement of muscles which are not normally engaged in certain motions leading to compensatory movements in the shoulder, reducing the risk of overuse injuries (Cools et al., 2015).
- 3) **Improved Posture:** Thoracic mobility exercises promote better posture, which can alleviate strain on the shoulder muscles and joints (Ludewig & Reynolds, 2009). Not only does it improve shoulder function but can also improve cervical loading and mobility affecting over-activation of the trapezius.
- 4) **Increased Range of Motion:** These exercises can help restore a full range of motion in the shoulder, essential for activities of daily living and sport activities (Cools et al., 2015).

Examples of Thoracic Mobility Exercises:

- 1) **Thoracic Extensions:** Using a foam roller, patients can perform thoracic extensions to increase the mobility of the thoracic spine. This can be performed in sitting or supine position. Patients' shoulder focus on only thoracic spine and core engagement should be facilitated and lumbar extension should be avoided along with cervical extension.

- 2) **Thread the Needle:** This exercise involves reaching one arm under the body while on all fours, to improve and facilitate thoracic rotation. Patients should avoid overusing the lumbar spine or reaching out.
- 3) **Cat-Cow Stretch:** This yoga-inspired movement helps in improving thoracic flexion and extension. This muscle does not only facilitate joint mobility but also facilitates thoracic and lumbar muscles responsible for the mobility.
- 4) **Seated Thoracic Rotations:** Sitting with a neutral spine, patients rotate their upper body side to side, enhancing thoracic mobility. Core engagement is important with this exercise to improve thoracic mobility.

Integrating TDN, Scapular Strengthening, and Thoracic Mobility

Combining trigger point dry needling (TDN) with scapular strengthening and thoracic mobility exercises offers a rehabilitation approach which puts the muscles in the optimal length-tension relation and then loading them with the appropriate exercises to achieve the most optimal outcome. Reducing pain and tightness which may be achieved either by loosening the muscle due to the twitch response or endorphin release helps the patients to participate more in scapular strengthening exercises with reduced trunk motion which improves stability and function, and thoracic mobility ensures optimal biomechanics to achieve a long-lasting result. This integrated approach can lead to significant improvements in pain, function, and overall shoulder health (Gattie et al., 2017; Cools et al., 2015).

Rehabilitation Protocol:

- 1) **Initial Assessment:** Thorough evaluation to identify specific muscle imbalances and mobility restrictions (Kibler & Sciascia, 2010).
- 2) **Dry Needling:** Targeted TDN to release trigger points and alleviate muscle tightness (Dunning et al., 2014). Assessing the contraindications and educating the patient on the risks and benefits of TDN is important.
- 3) **Scapular Strengthening:** Exercises focusing on the serratus anterior, rhomboids, and lower trapezius to improve scapular stability (Kibler & Sciascia, 2010). Other muscles can also be targeted based on the assessment of the patient but getting the scapula in retracted and depressed position provides the most results possible.
- 4) **Thoracic Mobility:** Incorporation of thoracic mobility exercises to enhance overall shoulder mechanics and reduce compensatory movements (Cools et al., 2015).
- 5) **Functional Training:** Gradual progression to functional exercises that mimic daily activities and sports-specific movements (Ludewig & Reynolds, 2009). This helps the patients being confident of the combination of motions that can be utilized during the activities of daily living as well as sporting activities. E.g. pitcher needs to practice functional throwing drills and be confident of how his shoulder feels before returning to sport.

2. Conclusion

The combination of trigger point dry needling along with appropriate scapular strengthening and thoracic mobility exercises offers a holistic approach to shoulder complex

rehabilitation. This combined strategy addresses both immediate and long - term needs, promoting optimal recovery and functional outcomes. Future research should continue to explore combination of the most effective exercises along with trigger point dry needling to achieve these results. Studies could also assess the role of endorphin release and short - term effects of dry needling in promoting early return to functional activities.

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