



A Literature Review on the combined approach of soft tissue release through IASTM with dry needling is useful in management of quads contusion

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Abstract:**BACKGROUND & INTRODUCTION: -**

A quadriceps contusion, also known as a "charley horse" or a thigh bruise, is an injury that occurs when there is direct trauma or impact to the quadriceps muscle group located in the front of the thigh. This injury is common in sports and activities that involve contact or collisions, such as football, soccer, or basketball.

The combined use of Instrument-Assisted Soft Tissue Mobilization (IASTM) and Dry Needling has gained attention as a comprehensive and effective approach in the management of quadriceps contusions. This integrated technique addresses both the structural and neuromuscular aspects of the injury, offering a synergistic therapeutic solution.

METHODOLOGY:

The originator Several electronic databases were searched for open access articles of general scientific databases including PubMed, science direct, Scopus, Web of Science, shodhganga, Google Scholar etc. Thirty seven considerable scientific studies were found related to the dry needling & IASTM therapeutic effects on managements of quads contusion or knee pain.

RESULTS:

DN can help prepare the muscle for IASTM by reducing muscle tension and promoting relaxation.

The application of these techniques should be tailored to the individual's specific condition, considering the severity of the contusion and the patient's response to treatment.

CONCLUSION:

In conclusion, the combined approach of Dry Needling and Instrument-Assisted Soft Tissue Mobilization (IASTM) presents a promising and multifaceted strategy for managing quadriceps contusions. The review demonstrates moderate-quality evidence on the long-term effect of quads contusion or knee pain.

KEYWORDS: Instrument-Assisted Soft Tissue Mobilization (IASTM), Dry Needling (DN), Quads contusion.

Introduction:

A quadriceps contusion, also known as a "charley horse" or a thigh bruise, is an injury that occurs when there is direct trauma or impact to the quadriceps muscle group located in the front of the thigh. This injury is common in sports and activities that involve contact or collisions, such as football, soccer, or basketball.

Contusion injuries to the quadriceps are common in athletics. Usually the mechanism of injury is a direct blow to the quadriceps causing significant muscle damage. Contusions cause rupture to the muscle fibers at or directly adjacent to the area of impact, usually leading to hematoma formation within the muscle causing pain and loss of motion. A contracted muscle will absorb force better and result in a less severe injury.

- In sports without padding for the thigh and upper leg, e.g. soccer and rugby, quadriceps contusions are a major disabling injury. Better protective equipment may decrease the frequency of this injury, however, research is scant.
- Quadriceps contusions can lead to two serious complications: Compartment Syndrome and myositis ossificans.
- **Epidemiology:** Demographics: 2:1 male: female ratio & athletes: football, soccer, rugby most common sports; more common during competition than practice.
- **Pathophysiology:** Muscle contusions are caused by direct trauma. Direct trauma can affect any part of the quadriceps femoris, with the vastus intermedius muscle most commonly affected. The injury consists of a well-defined sequence of events.
- Myonecrosis and hematoma forms followed by scar formation then muscle regeneration.
- Small muscle fiber tears lead to hemorrhage and swelling into the anterior compartment.

- If there is major untreated and/or unresolved bleeding deep in the muscle tissue, myositis ossificans can occur.
- **Clinical Presentation:** Quadriceps muscle contusions are easily elucidated by a history of blunt trauma and clinical examination usually reveals skin discoloration, tenderness, swelling and varying degrees of pain and tenderness alongside a limited range of motion and difficulties to weight bear.

CLASSIFICATION: - Later to muscle strains is traumatic muscle contusions the most frequent type of quadriceps injury in sports. A direct external forceful blow to the quadriceps causing significant muscle damage is the usual mechanism of this injury. In comparison to strains, contusions will cause rupture to the muscle fibers at or directly adjacent to the area of impact. This typically leads to hematoma formation within the muscle causing pain and loss of motion. The extent of pain and loss of movement will be dependent on the amount of force and the impact of the force at the time of trauma. Quadriceps contusions are graded mild, moderate or severe between 12 and 24 hours. A mild contusion has more than 90 degrees of knee flexion; moderate between 45 and 90 degrees of knee flexion and severe less than 45 grades of knee flexion.

There are three grades in contusions:

PAIN	ACTIVE KNEE FLEXION	GAIT	DESCRIPTION	AVERAGE LOSS OF ACTIVITY
Mild	>90*	Normal	<ul style="list-style-type: none"> • Capillary rupture: Blood into connective tissue • Mild ecchymosis • Feels soreness after cooling down or the following day • The injured area may be tender to touch • Ability to stretch the muscle may be reduced slightly. • The strength of the muscle may also be slightly affected. 	6 Days
Moderate	45-90*	Antalgic	<ul style="list-style-type: none"> • Crushing of the muscle fibres with vasomotor reaction • Minimum stiffness after rest • Swelling • Pain • Tenderness 	56 Days
Severe	<45*	Severely Antalgic	<ul style="list-style-type: none"> • Rapid swelling and bleeding • The patient will be unable to walk properly without the aid of crutches • Pain • Tenderness 	>60 Days

EXAMINATION:-

- Pain: worsening severity over the first 24-48 hours; worse with dynamic movements and with knee flexion
- Observation: Antalgic gait
- Palpation: possible palpable defect indicating partial or complete muscle tear, swelling, ecchymosis, point tenderness.
- Circumference measures: compare thigh firmness and circumference to contralateral side
- Strength testing of the quadriceps: resist knee extension and hip flexion, compared to the uninjured side, helps in assessing severity of injury.
- Measurement of knee flexion is used as a prognostic indicator in quadriceps contusions. Based on this, thigh contusions can be graded into 3 groups that are based on the severity of injury
- Provocative tests: active straight leg raise to test integrity of extensor mechanism
- Neurovascular: distal neurovascular exam to evaluate for thigh compartment syndrome

OUTCOME MEASURES: - The Lower Extremity Functional Scale (LEFS) is used to evaluate the functionality for a wide range of lower limb conditions to know whether the person is having any difficulty with certain activities.

RISK FACTOR:-

- Contact sports and sports that require quick starts, i.e. running races and other track events.
- Warm up and cool down habits.
- Off season/preseason/season training habits.
- Poor muscle conditioning.
- Playing position.
- Level of competition.
- Protective equipment use.
- Playing experience.
- Injury history, especially to the thigh, hip and/or knee.
- Medical history of any bleeding disorder.

MANAGEMENT:-

First line of treatment for acute injuries, begin immediately to minimize hematoma formation: immobilization, cryotherapy, NSAIDs, physical therapy.

- *Definition:-* Skilled intervention performed by a physical therapist that uses a thin filiform needle to penetrate the skin and stimulate underlying myofascial trigger points, muscular and connective tissues for the management of neuromusculoskeletal pain and movement impairments.” – American Physical Therapy Association (APTA).
- Dry needling is a professed or skilled intervention that uses a thin filiform needle to pierce the skin and stimulate underlying myofascial trigger points, muscular, and connective tissues for the management of neuromusculoskeletal pain and movement impairments. Dry needling (DN) is a technique used to treat dysfunctions in skeletal muscle, fascia, and connective tissue, and diminish persistent peripheral nociceptive input, and reduce or restore impairments of body structure and function leading to improved activity and participation.

- *Definition:* - Instrument Assisted Soft Tissue Mobilization technique that enables the therapist to detect and treat myofascial restrictions to improve Range of Motion and decrease pain.
- IASTM refers to a technique that uses instruments to remove scar tissues from injured soft tissues and grease mending process through conformation of new extracellular matrix proteins analogous as collagen.
- The application of the IASTM tool to both acute & chronic conditions may improve healing, some of the effects from this would be on a longer timescale, possibly 24-72 hours, and in clinical practice we observe changes within minutes of starting treatment.
- The skin and fascia are highly innervated with sensory nerve fiber, and in contrast, fascia has been found to contain up to 10 times as many mechanoreceptors as muscle tissue. This evidence has prompted researchers to change the role of skin and fascia in proprioception and motor function.

CONTRAINDICATION

- Patients with needle phobia.
- Patients with Idiotic Phobia.
- Unable to give consent-communication and cognitive.
- Medical emergency conditions.
- Infections like- sle, cellulitis & other infections.
- Abnormal bleeding tendency.
- Vascular disease
- Age related factor

INDICATION

- improve range of motion
- reduce muscle tightness
- Improving circulation
- Reduce spasticity
- Chronic musculoskeletal pain
- Manipulate soft tissue

Key Findings:-

Pain Alleviation: Dry needling, through its mechanism of triggering a localized inflammatory response and releasing muscle tension, contributes to pain alleviation associated with quadriceps contusions. This is complemented by IASTM, which targets scar tissue and adhesions, further reducing pain by optimizing soft tissue function.

Improved Muscle Function: The combined effects of Dry Needling and IASTM may result in improved muscle function by addressing muscle spasms, promoting relaxation, and enhancing blood circulation. This, in turn, supports the restoration of normal muscle mechanics and function.

Comprehensive Rehabilitation: By concurrently targeting trigger points and soft tissue restrictions, the combined approach offers a comprehensive rehabilitation strategy. IASTM aids in breaking down scar tissue and improving range of motion, while Dry Needling facilitates muscle relaxation and stimulates the body's natural healing mechanisms.

Synergistic Benefits: The synergy between Dry Needling and IASTM provides a well-rounded treatment approach. Dry Needling prepares the muscle for subsequent IASTM by reducing tension, allowing for more effective soft tissue mobilization.

Individualized Application: It is crucial to recognize the variability in individual responses to treatment. The application of Dry Needling and IASTM should be tailored to the specific characteristics of the quadriceps contusion, considering factors such as the severity of the injury, patient tolerance, and response to treatment.

Clinical Implications:-

Professional Expertise: The administration of Dry Needling and IASTM should be performed by trained and qualified healthcare professionals, such as physical therapists, who possess expertise in these techniques.

Integrated Rehabilitation: These modalities are often integrated into a broader rehabilitation program, including exercises and stretches, to optimize the overall effectiveness of the treatment plan.

Research Considerations: While promising, further research and clinical studies are needed to establish the specific efficacy and safety of the combined approach for quadriceps contusions, taking into account long-term outcomes and potential variations in patient populations.

Materials and Methodology:

STUDY DESIGN: Narrative Study/Literature Review

SOURCE OF DATA: Google scholar, PubMed, CINAHL, Cochrane literacy, SCOPUS, Shodhganga, PubMed, ResearchGate & Academia and other online libraries.

INCLUSION CRITERIA:

- The language of publication is English.
- The publication is published in the journal of physiotherapy and science directly.
- Studies related only to quads contusion included technique only
- Dry Needling techniques included IASTM.

EXCLUSION CRITERIA:

- The language of publication is not any-other.
- The publication is not an article in a peer-reviewed journal.
- No Other than Quads contusion cases.
- Adjunctive approaches.

Results and Discussion:

The combined use of Instrument-Assisted Soft Tissue Mobilization (IASTM) and dry needling for quadriceps contusion may result in improved muscle recovery, reduced pain, and enhanced mobility. However, individual responses vary, and outcomes depend on the severity of the contusion and the specific characteristics of the patient. Consulting with a physiotherapist for personalized advice is recommended.

Conclusion: In summary, the combined use of Dry Needling and IASTM represents a valuable and integrative therapeutic strategy for managing quadriceps contusions, showing promise in addressing pain, promoting muscle recovery, and facilitating comprehensive rehabilitation. Continued exploration and research in this area will contribute to refining treatment protocols and advancing our understanding of the optimal integration of these modalities in the clinical setting.

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