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Review Article

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Fascial Manipulation in Physiotherapy of Young Active Football Players: A Comprehensive Case Series

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ABSTRACT

Background: Fascia is a continuous three-dimensional connective tissue network that plays a crucial role in force transmission, proprioception, movement coordination, and pain modulation. Fascial dysfunctions and densifications are increasingly recognized as contributing factors to musculoskeletal pain and movement disorders, particularly in athletic populations [1,2].

Objective: To evaluate the effectiveness of fascial manipulation in reducing pain and improving functional outcomes in young football players with lower limb musculoskeletal disorders.

Methods: A prospective case series included ten male football players aged 12–17 years presenting with chronic or post-traumatic lower limb pain. All participants underwent a standardized fascial manipulation protocol based on the Anatomy Trains concept and the Fascial Manipulation® method [3,4]. Pain intensity was assessed using the Visual Analogue Scale (VAS) before and after therapy. Active range of motion and functional movement quality were evaluated clinically. Descriptive statistics were applied.

Results: Mean VAS scores decreased from 7.0 ± 0.9 at baseline to 2.4 ± 0.8 after the intervention. All participants demonstrated improvements in joint range of motion, muscle function, and subjective movement control. No adverse events were reported.

Conclusion: Fascial manipulation appears to be a promising non-invasive physiotherapeutic approach for pain reduction and functional improvement in adolescent football players. Further randomized controlled studies with larger samples are required to confirm these findings.

Keywords: Fascia, Fascial Manipulation, Myofascial Pain, Physiotherapy, Athletes, Lower Extremity, Injury Prevention, Anatomy Trains

Introduction

Fascia represents a continuous connective tissue system that envelops, supports, and interconnects muscles, bones, nerves, blood vessels, and internal organs [1]. Structurally, fascia is composed primarily of collagen and elastic fibers embedded in a hydrated extracellular matrix rich in hyaluronic acid [2]. Functionally, it contributes to biomechanical force transmission, postural stability, proprioception, and nociceptive regulation [3]. Current evidence suggests that alterations in fascial hydration, viscosity, and sliding capacity-commonly referred to as densification-may impair movement efficiency and increase pain perception [4].

In young athletes, repetitive mechanical loading, growth-related imbalances, microtrauma, and insufficient recovery may predispose the fascial system to dysfunction, leading to pain syndromes and an elevated risk of injury [5]. Fascial manipulation is a manual therapeutic approach aimed at restoring physiological gliding between fascial layers, normalizing tissue tension, and optimizing neuromuscular coordination [6]. While clinical experience supports its effectiveness in adult populations, evidence in pediatric and adolescent athletes remains limited

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[7]. Therefore, the aim of this study was to comprehensively evaluate the clinical effects of fascial manipulation in young football players with lower limb pain [4].

Fascia and Fascial Manipulation

Fascia can be classified into superficial, deep, and visceral layers [1]. Superficial fascia lies beneath the skin and forms part of the subcutaneous tissue, connecting the skin to underlying muscles [2]. Deep fascia consists of dense connective tissue layers, including aponeurotic and epimysial fascia, which surround and compartmentalize muscles and muscle groups [3]. Visceral fascia envelops internal organs, providing both structural support and mobility [4].

The fascial system forms continuous myofascial chains that transmit mechanical forces throughout the body [5]. These myofascial continuities play a fundamental role in maintaining posture and coordinating complex movements [6]. According to Myers' Anatomy Trains concept, the body can be understood as an integrated system of myofascial meridians rather than isolated muscles [3,7].

In addition to its mechanical role, fascia is a highly innervated sensory organ containing numerous mechanoreceptors and nociceptors [8]. Through these receptors, fascia contributes to proprioceptive feedback and pain modulation [9]. Due to its extensive innervation and structural continuity, the fascial system is closely linked to the nervous system and significantly influences both movement and visceral function [10].

Anatomy Trains and Tensegrity Concept

The Anatomy Trains model describes twelve primary myofascial meridians that organize the body's musculature into functional lines [3]. These include the Superficial Back Line, Superficial Front Line, Lateral Line, Spiral Line, Deep Front Line, Arm Lines, and Functional Lines [4]. Each line represents a continuous pathway of myofascial tissue that coordinates movement and distributes mechanical load [5].

From a biomechanical perspective, the human body can be described as a tensegrity structure—a system in which stability is achieved through a balance of tensile and compressive forces [6]. In biological systems, fascia plays a key role in maintaining this balance by distributing tension across the musculoskeletal system [7]. Proper fascial tension allows for both stability and adaptability, enabling efficient movement and rapid response to external loads [8]. Increased fascial stiffness and loss of elasticity may compromise the tensegrity system, resulting in reduced mobility, altered movement patterns, and increased susceptibility to injury [9]. Fascial manipulation aims to restore optimal tension and elasticity within this system [4].

Fascial Manipulation Techniques

Fascial release techniques involve the application of sustained manual pressure and tangential friction to specific areas of fascial restriction [10]. Initial pressure is applied to engage deeper fascial layers, followed by controlled movements that generate a shearing force within the tissue [2]. These techniques may be performed using the therapist's hands, thumbs, forearms, or elbows [3]. During treatment, patients may experience sensations of tension, warmth, or mild burning, which are associated with changes in tissue viscosity and improved fascial sliding [4].

The therapeutic effect is partly attributed to increased local temperature, which reduces the viscosity of hyaluronic acid and enhances tissue gliding [5]. The DASIE model (Development, Assessment, Strategy, Intervention, Ending) provides a structured framework for myofascial therapy, emphasizing tissue listening, clinical reasoning, targeted intervention, and integration of therapeutic effects [6].

Fascial Manipulation According to Stecco

The Fascial Manipulation® method developed by Luigi Stecco and further refined by Carla and Antonio Stecco is a precise manual therapy approach targeting specific densified points within the fascial system [1]. Treatment is based on detailed patient history, movement assessment, and palpatory identification of densifications [2]. Deep friction is applied to anatomically defined points to restore the sliding capacity of fascial layers and normalize biomechanical function [3].

This targeted approach aims to address the primary cause of myofascial pain rather than solely treating symptoms [4]. At the histological level, densification is associated with altered hyaluronic acid properties and increased tissue viscosity between collagen fibers [5]. Manual friction and pressure facilitate changes in these properties, improving tissue hydration and elasticity [6].

Methods

Study Design

Prospective observational case series [7].

Participants

Ten male football players aged 12–17 years with chronic or post-traumatic lower limb pain were included [8]. All participants had previously received conservative medical treatment without structured physiotherapy [9].

Table 1: Characteristics of the Study Participants

Patient	Age (years)	Sex	Diagnosis	VAS Pre	VAS Post
1	15	Male	Chronic pelvic and inguinal pain	7	3
2	17	Male	Iliopsoas strain and tendinopathy	6	2
3	12	Male	Partial hamstring rupture	6	2
4	14	Male	Hip abductor strain	6	2
5	14	Male	Patellofemoral pain syndrome	8	4
6	16	Male	Partial meniscal rupture	8	3
7	17	Male	Patellar dislocation	8	2
8	15	Male	Partial ACL rupture	7	3
9	13	Male	Ankle sprain	6	1
10	14	Male	Partial ACL rupture	8	2

Intervention Protocol

Therapy consisted of ten fascial manipulation sessions [4]. Initial assessment included postural analysis and palpation (body reading). Treatment focused on the affected lower limb and related myofascial chains. Deep friction was applied to identified densifications, followed by mobilization and stabilization exercises. Pilates-based exercises were gradually incorporated. Patients were educated on home exercises and body awareness training.

Outcome Measures

Pain intensity was measured using the Visual Analogue Scale (VAS) [5]. Active range of motion of the hip, knee, and ankle joints was assessed clinically before and after the intervention [6].

Statistical Analysis

Descriptive statistics were applied. Mean values and standard deviations were calculated for VAS scores [7].

Ethical Considerations

Written informed consent was obtained from all participants and their legal guardians [8]. The study was conducted in accordance with the Declaration of Helsinki [9].

Table 2: Clinical Outcomes: Active Range of Motion and Functional Improvements

Patient	Hip ROM Improvement	Knee ROM Improvement	Ankle ROM Improvement	Functional Movement Quality
1	+10°	+15°	+5°	Improved
2	+12°	+18°	+8°	Improved
3	+8°	+12°	+6°	Improved
4	+10°	+14°	+7°	Improved
5	+15°	+20°	+10°	Improved
6	+13°	+17°	+8°	Improved
7	+12°	+15°	+6°	Improved
8	+10°	+14°	+5°	Improved
9	+9°	+13°	+7°	Improved
10	+11°	+16°	+8°	Improved

Results

All participants demonstrated a clinically significant reduction in pain intensity [4]. Mean VAS values decreased from 7.0 ± 0.9 to 2.4 ± 0.8 [5]. Improvements in joint range of motion, muscle strength, and movement coordination were observed in all cases [6]. No adverse events or complications were reported [7].

Discussion

The findings of this case series suggest that fascial manipulation may be an effective therapeutic approach for managing lower limb pain in young athletes [4]. The observed improvements may be attributed to enhanced fascial gliding, modulation of hyaluronic acid viscosity, and improved neuromuscular coordination within myofascial chains [5].

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