EPH-International Journal of Medical and Health Science
ISSN (Online): 2456-6063
Volume 11 Issue 02 June 2025
DOI: https://doi.org/10.53555/c40c3873

SUSTAINED FUNCTIONAL IMPROVEMENT FOLLOWING TRANSITION FROM LOCAL CUPPING TO REGIONAL MYOFASCIAL RELEASE (TARGETING FASCIAL LINES) IN A CHRONIC LATERAL EPICONDYLITIS PATIENT: A CASE STUDY

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Abstract

*Tennis Elbow or Lateral Epicondylitis is a debilitating upper limb disorder, often maintained by regional biomechanical issues. This case study investigates the clinical efficacy of a **phased manual therapy approach**, sequentially moving from local pain modulation to regional fascial mobilization, in a patient with chronic, functional limitations.*

***Case Description:** A 45-year-old female housewife presented with a 9-month history of dominant arm Chronic Lateral Epicondylitis, poorly responsive to initial conservative treatments. Assessment revealed severe pain, low functional capacity, and palpable restrictions along the **Superficial Back Arm Line (SBAL)**, particularly in the triceps and posterior shoulder fascia.*

***Intervention:** The 12-week rehabilitation was sequenced into two phases: **Phase 1 (Weeks 1-4): Local Dynamic Cupping** over the forearm extensors to modulate pain. **Phase 2 (Weeks 5-12):** Progression to **Regional Myofascial Release (MFR)**, targeting the **SBAL** to address regional mechanical restrictions. Both phases incorporated a progressive eccentric home exercise program.*

***Outcomes:** The patient demonstrated significant and sustained functional improvement. The **Patient-Rated Tennis Elbow Evaluation (PRTEE)** score improved from **85/100** at baseline to **12/100** (Week 12) and remained **7/100** at the 6-month follow-up. **Pain-Free Grip Strength (PFGS)** increased from **3 kg** to **21 kg**.*

***Conclusion:** A phased manual therapy strategy, using local pain modulation (Cupping) to enable exercise and subsequent regional mobilization (MFR) to address the underlying fascial driver, proved highly effective for achieving sustained functional recovery in this case of chronic, activity-limited Chronic Lateral Epicondylitis.*

Keywords: *Lateral Epicondylitis, Dynamic Cupping, Myofascial Release, Superficial Back Arm Line, Sustained Functional Improvement .*

INTRODUCTION:

Chronic Lateral Epicondylitis (CLE), frequently and often referred to as "tennis elbow," represents a highly prevalent and often protracted musculoskeletal disorder.[2] It is clinically characterized by pain and tenderness at the common extensor origin on the lateral epicondyle of the humerus, leading to significant functional impairment in gripping, lifting, and repetitive tasks [1]. While historical treatment models focused on inflammation, current understanding recognizes CLE as primarily a non-inflammatory, **degenerative process (tendinosis)** involving failed healing responses, disorganization of collagen fibers, and sometimes, neurovascular ingrowth [2, 3].[3] Despite varied treatment options, including pharmacological agents and local injections, a substantial subset of patients experience persistent symptoms, necessitating a more comprehensive rehabilitation strategy [4].

The limitations of isolated local treatments necessitate shifting focus to the global factors influencing tissue health. The **Regional Interdependence Model** is a core framework in modern physiotherapy, postulating that seemingly unrelated impairments in one body region (e.g., the shoulder or thoracic spine) can contribute to, or even drive, the symptoms presenting in a distant area (the elbow) [5].[4]

This model is anatomically supported by the concept of **myofascial continuity** [6]. The **fascial line model**, popularized by Myers' *Anatomy Trains*, maps the human body into continuous fascial and muscular chains that distribute and transfer mechanical tension [6].[5] Specifically, the **Superficial Back Arm Line (SBAL)** links the forearm extensor fascia via the lateral intermuscular septum to the triceps and upper torso fascia. Chronic tightness or restriction along the SBAL can alter the resting tension, biomechanics, and load absorption capacity of the entire arm, contributing to pathological tensile strain at the vulnerable common extensor origin [7].

To address this complexity, this case study implements a novel **phased and sequential manual therapy strategy** built on the principles of pain science and biomechanics:

> **Phase 1: Local Pain Modulation. Dynamic Cupping** is chosen here for its dual mechanism: a strong **neurophysiological effect** (activating descending pain inhibitory pathways to break the pain cycle) [8, 9] and a local mechanical effect (creating fascial lift and decompression) [8]. The goal is to rapidly achieve a reduction in pain, thereby establishing a **"window of opportunity"** for active exercise [10].
>
> **Phase 2: Regional Structural Mobilization.** Following pain control, the treatment transitions to **Regional Myofascial Release (MFR)**. MFR is applied specifically to the major components of the SBAL (triceps, posterior shoulder) to restore the length, viscoelasticity, and mobility of the proximal fascial chain [11]. This correction aims to normalize resting tissue tension, optimize load transfer across the arm, and ultimately ensure the tissue adapts sustainably to functional demands.

This case study documents a phased and transitional treatment strategy—moving from Local Dynamic Cupping for initial pain relief to Regional Myofascial Release (MFR) targeting the SBAL—which led to sustained functional recovery in a 45-year-old housewife with severe, chronic LE [1].

Case Description:

Patient History and Subjective Complaints-

A **45-year-old right-hand dominant female** presented with a chief complaint of chronic, severe pain localized to her **right lateral epicondyle**. The patient reported the onset of symptoms approximately **9 months prior**, which occurred gradually without a specific traumatic event, correlating with an increase in her domestic workload.

Her primary occupational identity as a **housewife** significantly contributed to the chronicity and severity of her symptoms. Pain was consistently provoked and exacerbated by common, high-frequency household activities, including:

- **Repetitive Gripping and Wringing:** Squeezing sponges, wringing out clothes, and scrubbing surfaces.
- **Sustained Lifting:** Lifting her grandchild and carrying grocery bags.
- **Fine Motor Tasks:** Using kitchen utensils (chopping, stirring) and opening jars.

The patient reported that the pain was constant, disrupting sleep and making simple tasks (like holding a coffee cup or turning a door handle) excruciating. She described the pain as a deep, aching sensation that sometimes radiated into her forearm.

Previous Management- The patient reported having pursued conventional conservative management, including a period of rest, consistent use of over-the-counter medication (NSAIDs), and two separate sessions of electrotherapy (conventional ultrasound). All previous attempts resulted in **minimal or no sustained relief**, reinforcing the chronicity and recalcitrance of her condition.

Baseline Assessment (Week 0)

A comprehensive physical and functional assessment was conducted to quantify the impairment and identify potential regional contributing factors.

Pain and Functional Disability

Measure	Instrument	Baseline	Clinical Significance
Numeric Pain Rating Scale (NPRS)	Self-Report	Average 7/10; Worst 9/10	High pain intensity, suggestive of potential **central sensitization** [3].
Patient-Rated Tennis Elbow Evaluation (PRTEE)	Questionnaire	**85/100**	**Severe disability**, validating the chronic functional limitation [14].

Objective Measures

Measure	Instrument	Baseline	Clinical Finding
Pain-Free Grip Strength (PFGS)	Hand Dynamometer	**3 kg** (Unaffected side: 25 kg)	Critically low, indicating a severe lack of local load tolerance necessary for basic gripping tasks [1].
Myofascial/Regional Assessment	Palpation & Observation	Significant palpable restrictions along the **SBAL** (Triceps Brachii, Posterior Shoulder Fascia).	Confirmed myofascial restriction consistent with the **Regional Interdependence Model** [5, 6].

Myofascial and Regional Assessment

Crucially, the assessment extended beyond the elbow to investigate the anatomical chain:

- **Palpation:** Significant **palpable taut bands**, **decreased skin and fascial glide**, and point tenderness were noted along the **ipsilateral Triceps Brachii** (particularly near the lateral intermuscular septum), the **Posterior Deltoid**, and the **Latissimus Dorsi/Thoracic Fascia**.
- **Fascial Restriction:** These findings were highly consistent with a **restriction along the Superficial Back Arm Line (SBAL)**, indicating potential chronic, increased tension imposed proximally on the distal elbow insertion.
- **Neurodynamics:** Radial nerve neurodynamic testing (ULTT2b) was non-provocative, suggesting that the primary driver was **mechanical and myofascial tension** rather than acute neural compromise.

Intervention:

The clinical picture—severe pain, critically low function, and demonstrable regional tightness—dictated a sequential, following strategy:

Phase 1 (Addressing the Pain Barrier): The PRTEE of 85/100 meant active loading was not yet tolerated. Local Dynamic Cupping was selected for its immediate, non-aggressive **neurophysiological effect** [8, 9] to rapidly reduce local pain and guarding, thereby creating the **"window of opportunity"** required for the patient to engage in initial pain-free isometric exercise [10].

Phase 2 (Addressing the Structural Driver): The significant restrictions along the SBAL were deemed the chronic driver maintaining tension at the elbow [7]. Regional Myofascial Release (MFR) was chosen for its sustained, specific mechanical force, aiming to **restore the viscoelasticity and length** of the proximal fascial chain [11] and normalize the tensile load on the elbow insertion.

Intervention Protocol :

The patient received physical therapy once per week for a total of **12 weeks**[1].The treatment was strictly divided into two sequential phases, designed to address the primary clinical barriers—pain sensitization and regional mechanical restriction—in a strategic order. Both manual therapy phases were integrated with a consistent, progressive home exercise program focused on load tolerance.

Phase 1: Local Pain Modulation using Dynamic Cupping (Weeks 1–4)

The primary goal of this initial phase was to **break the chronic pain cycle** and achieve rapid pain reduction sufficient to enable the patient to begin active loading exercises.

- **Rationale:** Dynamic Cupping was selected for its strong neurophysiological effects [9], acting via descending pain inhibition, and local mechanoreceptor stimulation [8]. Its local mechanical effect of lifting and separating the underlying fascia and skin was also aimed at improving blood flow and reducing local tissue tension [8].
- **Primary Technique: Local Dynamic Cupping.**
  - **Application:** Three small-to-medium-sized silicone cups were applied over the belly of the forearm extensors, distal and proximal to the lateral epicondyle, avoiding direct contact with the most tender origin site initially.
  - **Suction:** Moderate suction was applied (enough to create palpable tissue lift and visible erythema, but entirely comfortable for the patient).
  - **Movement:** For **8 minutes**, the therapist passively guided the patient's wrist and elbow through gentle, slow ranges of flexion and extension while the cups remained applied, maximizing the shearing and decompression effect on the underlying fascia and muscles.
- **Exercise Component: Pain-Free Isometric Loading.** The patient was instructed to perform **sub-maximal, pain-free isometric wrist extension holds** (3 sets of 45 seconds) three times daily[10] , alongside gentle passive stretching of the wrist flexors and sustained elbow extension holds.
- **Transition Criteria:** The transition to Phase 2 was planned only upon achieving a **sustained reduction in NPRS to ≤ 5/10** and demonstrated ability to perform the isometric loading without pain increase.

Phase 2: Regional Mobilization using Myofascial Release (Weeks 5–12)

The primary goal of this phase was to address the structural driver of the chronic symptoms by releasing the tension along the **Superficial Back Arm Line (SBAL)**.

- **Rationale:** To address the structural tension along the **SBAL**, normalizing the tensile load [7, 6]. Regional MFR was chosen to apply sustained, deep force for **structural, viscoelastic change** [11].

- **Primary Technique: Regional Myofascial Release (Targeting SBAL).**
  - Targets & Technique: Sustained broad-hand compression and shear applied to the Triceps Brachii (along the lateral intermuscular septum), Posterior Shoulder Fascia (Infraspinatus/Posterior Deltoid), and Latissimus Dorsi/Thoracic Fascia [6, 11]. Sustained pressure was held for **60–90 seconds** to maximize tissue change [11].
- **Exercise Component: Progressive Eccentric Loading.** The cornerstone of tendon healing [1, 10].
  - Weeks 5-8: Started with light-weight **eccentric wrist extension exercises** (e.g., 0.5 kg dumbbell) [1].
  - Weeks 9-12: Advanced to full-range concentric/eccentric exercises with increasing weight, integrated with functional task simulation [13].

Discussion

This case study successfully demonstrates the effectiveness of a **phased and regionally-informed manual therapy approach** in achieving significant and sustained functional recovery in a 45-year-old housewife with chronic, treatment-resistant Lateral Epicondylalgia (CLE). The sequential strategy—moving from local pain modulation via Dynamic Cupping to regional structural release via Myofascial Release (MFR)—proved critical for overcoming chronic barriers and establishing long-term load tolerance.

Interpretation of Phased Outcome Results

The Role of Local Cupping (Phase 1)

The **rapid and substantial reduction in pain and disability** during the initial four weeks (PRTEE drop from 85 to 56; NPRS 9 → 6) strongly supports the use of **Dynamic Cupping** as a primary intervention for **pain modulation**. This effect is primarily attributed to **neurophysiological mechanisms**, where the strong mechanical and sensory input overrides the chronic nociceptive signal (Gate Control Theory) and activates the descending pain inhibitory pathways. This rapid desensitization was essential, as it immediately addressed the patient's dominant barrier (**pain hypersensitivity**), creating the necessary "window of opportunity" to begin the crucial pain-free isometric loading required for tendon recovery. The doubling of **Pain-Free Grip Strength (PFGS)** (from 3 kg to 11 kg) during this phase confirms the successful transition from pain-dominated guarding to minimal, active tissue engagement.

The Significance of Regional MFR (Phase 2)

The **sustained and accelerated functional improvement** observed after the transition to **Regional MFR** (PRTEE 56 →12) provides the most compelling evidence of the study's central hypothesis. This success suggests that the **myofascial restrictions along the Superficial Back Arm Line (SBAL)** were the chronic, underlying **mechanical driver** of the patient's symptoms. By applying sustained, specific MFR to the triceps and shoulder fascia, the therapy likely achieved two things:

1. **Restored Viscoelasticity:** Normalized the length and mobility of the proximal fascial chain.
2. Optimized Load Transfer: Reduced the pathological chronic tensile load transmitted to the common extensor origin, allowing the tendon to adapt to the progressive eccentric exercise.

This structural correction was key to achieving sustained outcomes (PRTEE 7 at 6 months), far exceeding the temporary relief offered by the patient's prior local treatments.

Comparison with Current Literature

1. Contrasting Local vs. Regional Focus

Current literature for CLE largely focuses on local eccentric exercise and injection therapies [1]. While eccentric loading is the gold standard, its effectiveness is often hampered by high initial pain. This case study aligns with findings that manual therapy can "prime the pump" for exercise [6]. However, it extends this idea by linking the *sustainability* of the outcome not just to the exercise, but to the correction of the **regional myofascial driver** identified by the fascial line model [2]. This moves beyond the localized view often seen in RCTs.

2. Support for Fascial and Pain Science Models

The clinical rationale is strongly supported by two theoretical frameworks:

- **Pain Neuroscience:** The immediate, strong effect of Cupping aligns with neurophysiological studies confirming manual therapy's power to inhibit pain signaling [5].[1]
- **Biomechanics/Fascial Anatomy:** The successful use of MFR on the SBAL reinforces the anatomical validity of the **Regional Interdependence Model**. The result suggests that in cases of repetitive strain (like this housewife), the global myofascial tension must be addressed to offload the local insertion site.

Clinical Implications:

This case provides two clear, actionable takeaways for physiotherapy practice regarding complex chronic pain:

- **Prioritize the Barrier: Open the treatment window.** For patients presenting with high, chronic pain, the first step is always to use a technique that immediately **calms the nervous system** (e.g., Dynamic Cupping) and reduces guarding. This creates a critical "window" to successfully initiate the necessary, but often painful, active loading phase.
- **Treat the Driver: Fix the structural cause.** Once the pain is managed, the therapist must pivot to address the **underlying mechanical or regional driver** (e.g., stiffness in the shoulder/back fascia with MFR, guided by fascial models). This ensures that the tissue adapts permanently and prevents the chronic tensile strain from returning when the patient resumes demanding functional loads.

Limitations and Future Research:

As a **single case study**, the findings cannot establish general causality, and the observed improvements are the cumulative result of the combined manual techniques, exercise, and patient education. Furthermore, the inherent lack of blinding means the strong expectation bias (placebo effect) in both the therapist and the patient cannot be entirely excluded.

Future research should focus on validating this sequential approach through a **multi-session randomized controlled trial (RCT)**. Such an RCT should include objective measures like **Shear Wave Elastography (SWE)** to quantify and compare the changes in tissue stiffness along the SBAL between a sequential group (Cupping→ MFR) and a standard local treatment group. This would provide the necessary objective data to confirm the hypothesized mechanical changes.

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