IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Cupping Therapy In Rehabilitation: A Narrative Review Of Mechanisms Of Action

[1]Josiane Claudine Pinto, [2]Dr. Anand Heggannavar,

[1]MPT, [2]MPT, PhD, FIAP, Professor & Head,

[1]Department of Orthopedic Manual Therapy,

[1]KAHER Institute f Physiotherapy, Belagavi, India

Abstract: Cupping therapy is a traditional intervention used across cultures and systems of medicine, now increasingly studied through the lens of modern clinical science. This narrative review explores the mechanisms of action underlying cupping therapy, particularly in relation to musculoskeletal rehabilitation. A structured literature search identified studies focusing on the physiological and therapeutic pathways involved in both dry and wet cupping. Mechanisms proposed include stimulation of microcirculation, lymphatic drainage, immune modulation, myofascial decompression, and pain reduction through neurological pathways. Evidence suggests cupping therapy may influence systemic and localized healing responses. However, further studies with robust experimental designs are essential to establish its therapeutic efficacy and safety in modern practice.

Index Terms **- Cupping therapy, Dry cupping, Wet cupping, Pain modulation, Inflammatory response, Traditional medicine, Integrative therapy.**

I. INTRODUCTION

Cupping therapy, an ancient healing technique practiced in Traditional Chinese Medicine, Persian medicine, and various other traditional systems, has found renewed interest in the field of musculoskeletal rehabilitation. Dry cupping (non-invasive suction) and wet cupping (involving superficial incisions) are the primary modalities used. Traditionally regarded as a means of balancing bodily energies or "humors," modern interpretations have shifted towards understanding its mechanical, neurophysiological, and immunomodulatory effects. [1]

Cupping exerts negative pressure on the skin and underlying tissues, which may promote increased blood flow, stimulate lymphatic drainage, and reduce pain perception through neurohumoral pathways.[2] The suction effect may also contribute to mechanical decompression of myofascial structures, facilitating improved mobility and functional outcomes in various musculoskeletal conditions.[3]

Despite its popularity and long history, cupping remains a subject of scientific debate. Clinical application requires an evidence-based understanding of its mechanisms, especially when integrating it into contemporary physical therapy. This narrative review compiles current literature to summarize the proposed mechanisms of cupping therapy relevant to musculoskeletal rehabilitation.

Search Strategy

This review followed a narrative design. An electronic literature search was conducted across PubMed, Google Scholar, and Science Direct for studies published between 2008 and 2024. Keywords included: "cupping therapy," "dry cupping," "wet cupping," "mechanisms of action," "musculoskeletal rehabilitation," and "physiological effects." Inclusion criteria consisted of peer-reviewed clinical trials, reviews, meta-analyses, and book chapters in English focusing on physiological mechanisms and therapeutic outcomes related to cupping therapy in musculoskeletal or pain management contexts.

Mechanisms of Cupping Therapy

1. Pain Modulation

The findings of a randomized controlled trial on pulsatile dry cupping in patients with chronic low back pain, suggest that cupping may exert analgesic effects through stimulation of cutaneous mechanoreceptors, leading to segmental inhibition of pain transmission.[1] Additional explanations include modulation of descending inhibitory pathways and increased beta-endorphin levels.[2]

2. Improved Microcirculation and Tissue Perfusion

The mechanical suction from cupping is thought to increase local blood flow. A study described this vascular effect as central to cupping's benefits in tissue healing and waste removal. Local hyperaemia may enhance oxygenation and nutrient delivery, particularly in injured or hypoxic tissues. [3]

3. Immune System Modulation

Wet cupping (Hijama) may induce systemic immune modulation. A pilot controlled study in patients with Hashimoto's thyroiditis reported reductions in autoimmune activity post-cupping. This points to the ability of cupping to alter cytokine levels and leukocyte responses, thereby offering therapeutic value beyond pain relief. [4]

4. Lymphatic Drainage Support

The lymphatic system plays a pivotal role in maintaining fluid balance and immune function. Cupping may mechanically stimulate lymphatic drainage, thereby reducing edema and aiding detoxification. [5] The resulting decongestion potentially benefits both acute and chronic musculoskeletal injuries.

5. Myofascial Decompression and Muscle Relaxation

A systematic review and meta-analysis explored cupping's role in chronic back pain, emphasizing its utility in reducing muscular tension and releasing fascial adhesions.[6] The decompressive effect may normalize fascial tone and restore tissue mobility.

6. Risk-Benefit Profile and Traditional Rationale

Cupping therapy was evaluated through the lens of traditional Persian medicine, noting that the therapy aims to remove "waste" from interstitial fluid spaces. While this theory lacks modern biomedical equivalence, the authors highlight cupping's perceived detoxifying effect. Importantly, they also caution about adverse effects like infection, emphasizing the need for sterile technique. [7]

7. Neurological Stimulation and Reflex Pathways

In a clinical reference article, it was proposed that cupping may influence the autonomic nervous system via dermatomal stimulation. This could impact not only pain perception but also visceral function. The reflex arc model provides a neurophysiological explanation for improvements in localized and referred pain. [8]

8. Self-Management and Patient Empowerment

A study investigated self-administered cupping therapies for low back pain. While focusing on effectiveness, they also discussed the psychological empowerment cupping offers when patients take active roles in their own recovery. The mechanical and behavioral components of pain relief are thus intertwined. [9]

9. Range of Motion and Tissue Flexibility

A meta-analysis of cupping for musculoskeletal pain revealed improvements in range of motion, likely due to reduced muscle stiffness and fascial restriction. This supports cupping's application in sports therapy and postural correction. [10]

10. Vascular and Neurological Mechanisms in Headache

The results of a study on wet cupping in tension and migraine headaches showed notable symptom relief, attributed to modulation of neurovascular pathways and the release of inflammatory mediators. [11]

11. Consolidated Mechanistic Overview

A modern medical perspective was given in a review, integrating most of the mechanisms discussed—circulatory, neurological, immunological, and fascial. Their review bridges traditional beliefs and scientific evidence, forming a comprehensive foundation for clinical application. [12]

Conclusion

Cupping therapy, while rooted in ancient medical traditions, is increasingly being investigated for its physiological mechanisms in modern clinical practice. Mechanisms such as enhanced microcirculation, lymphatic stimulation, pain modulation, immune response, and myofascial decompression contribute to its therapeutic benefits in musculoskeletal rehabilitation. Despite encouraging findings, many studies remain small-scale or observational. There remains a need for larger randomized trials using standardized protocols to further validate cupping therapy's mechanisms and long-term efficacy.

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