

Effect of Massage Therapy on the Circulatory System: A Literature Review

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Massage therapy has been employed for centuries as a method to promote health and well-being, with notable physiological effects on various body systems. Among these, the circulatory system plays a central role in mediating the therapeutic outcomes of massage. This literature review explores contemporary research investigating the influence of massage therapy on cardiovascular parameters such as blood pressure, heart rate, peripheral circulation, and vascular function. By synthesizing findings from clinical studies, systematic reviews, and mechanistic investigations, this paper evaluates the efficacy and underlying mechanisms of massage therapy in enhancing circulatory health. The review concludes that while evidence supports beneficial effects, variations in massage modalities, duration, and participant characteristics contribute to inconsistent outcomes, necessitating further rigorous investigation. Practically, the evidence suggests that massage therapy, particularly for populations with hypertension or poor peripheral circulation, could be considered as a complementary treatment. However, further clinical trials with standardized protocols are necessary to refine therapeutic practices.

KEYWORDS: Massage therapy; circulatory health; blood pressure; heart rate; peripheral circulation; vascular function; cardiovascular parameters; therapeutic outcomes

INTRODUCTION

Massage therapy, defined as the manual manipulation of soft tissues with the aim of improving health outcomes, has gained

increasing recognition within integrative and complementary medicine. Historically rooted in traditional practices, massage has evolved into a clinical tool used to alleviate stress, improve musculoskeletal conditions, and enhance systemic physiological functions. One of the systems most impacted by massage therapy is the circulatory system, which includes the heart, blood vessels, and blood. Given its centrality to homeostasis, any modulation of circulatory function has far-reaching health implications.

The objective of this literature review is to examine empirical evidence surrounding the effects of massage therapy on the circulatory system. Specifically, it explores studies assessing parameters such as blood pressure, heart rate, blood flow, and vascular responsiveness. Additionally, it discusses proposed physiological mechanisms and identifies methodological gaps that future research should address. With an increased focus on practical application, this review aims to contribute to evidence-based recommendations for the clinical use of massage therapy in circulatory health. For the purpose of this review, massage therapy is defined in line with the terminology recommended by Kennedy et al., who emphasized the need for standardization in how techniques such as “Swedish”, “deep tissue”, or “myofascial” massage are described.⁽¹⁾ Clear definitions are essential to improving research reproducibility and professional consensus in the field.

PHYSIOLOGICAL BASIS OF MASSAGE AND CIRCULATION

The circulatory system responds dynamically to external stimuli, including mechan-

ical manipulation of tissues. Massage therapy is hypothesized to exert its effects on the cardiovascular system through several mechanisms: mechanical stimulation of blood vessels, activation of the parasympathetic nervous system, release of vasodilatory substances, and reduction in circulating stress hormones such as cortisol and adrenaline. These processes potentially lead to vasodilation, improved venous return, and reduced arterial stiffness, all of which contribute to enhanced hemodynamic regulation. Recent studies (Monteiro et al., 2025) support the role of shear stress and neurovascular feedback in controlling blood flow and arterial compliance.⁽²⁾ Massage is thus placed not only as a biomechanical intervention but also as a neurophysiological one, engaging both local and systemic pathways.

EFFECTS ON BLOOD PRESSURE

Blood pressure is a critical cardiovascular parameter influenced by massage. Multiple studies have investigated the acute and chronic effects of massage therapy on systolic and diastolic blood pressure. Alves da Silva et al. assessed the immediate and short-term effects of a single 30-min session of Swedish massage on anxiety levels, measured using the State-Trait Anxiety Inventory (S-STAI), and vital signs (arterial pressure, heart rate, respiratory rate) among 48 hemodynamically and respiratory-stable intensive care unit patients aged 18–50 years, showing significant reductions in anxiety and vital parameters immediately post-intervention. So this goes to show how massage can help even in cases under emergency care very effectively as an adjunct to the ongoing medications.⁽³⁾ Liao et al., in a meta-analysis of randomized trials, stated a medium effect on systolic and a small effect on diastolic pressure.⁽⁴⁾ Massage therapy may be effective in lowering blood pressure in patients with essential hypertension, especially when combined with antihypertensive medication. Systematic reviews support these findings. A meta-analysis by Xiong et al. concluded that massage therapy significantly lowers blood pressure, particularly among hypertensive populations.⁽⁵⁾ However, the review also noted substantial heterogeneity in effect sizes, which may be attributed to differences in massage technique, duration, and participant health

status. Due to low methodological quality and unclear safety, the current evidence remains insufficient to support routine clinical use. Further high-quality, rigorously designed randomized controlled trials are warranted to confirm these findings. Contrastingly, some studies found minimal or no long-term impact of massage on blood pressure. The systematic review by Liao et al. found that massage therapy contributes to a significant reduction in both systolic and diastolic blood pressure in patients with hypertension and prehypertension, with a medium effect on systolic and a small effect on diastolic blood pressure.⁽⁴⁾

EFFECTS ON HEART RATE AND AUTONOMIC REGULATION

Massage therapy has been associated with modulation of heart rate (HR) and autonomic nervous system activity. Reduction in HR following massage is considered indicative of increased parasympathetic tone and decreased sympathetic activation. Siva Kumar et al. extended these findings, recording significant shifts toward parasympathetic dominance using HR variability metrics.⁽⁶⁾ Recent systematic reviews (Monteiro et al., 2025) further emphasize massage's autonomic effects, supporting its potential to control cardiovascular tone. However, stronger documentation of techniques and participant states (e.g., resting vs. post-exercise) remains critical for interpreting autonomic outcomes.⁽²⁾ The role of massage in autonomic modulation is further supported by neurophysiological studies. Activation of mechanoreceptors during massage stimulates afferent neural pathways that influence brainstem centers regulating cardiovascular output. This can lead to a shift from sympathetic to parasympathetic dominance, contributing to lower HR and blood pressure.

PERIPHERAL CIRCULATION AND BLOOD FLOW

Enhancement of peripheral blood flow is one of the utmost frequently cited physiological benefits associated with massage therapy. The mechanical pressure applied during massage—particularly when applied to skeletal muscles and sur-

rounding connective tissues—is believed to stimulate both superficial and deep vascular networks. This pressure facilitates the mobilization of venous blood toward the heart, alleviates capillary stasis, and increases arterial perfusion by decreasing vascular resistance. These hemodynamic changes are vital for improving tissue oxygenation, nutrient delivery, and metabolic waste removal in both healthy and clinical populations. Quantitative research operating techniques such as Doppler ultrasound and laser Doppler flowmetry has provided measurable evidence supporting these claims. A recent clinical study by Kapusta et al. investigated the combined effects of hydro-massage and exercise in patients diagnosed with peripheral arterial disease, a condition characterized by impaired blood flow and reduced mobility. Their findings revealed statistically significant progresses in lower-extremity blood flow and functional performance metrics, including walking distance and gait efficiency.⁽⁷⁾ These outcomes suggest that massage therapy, especially when integrated with exercise, can enhance vascular responsiveness and microcirculatory function in populations with compromised peripheral circulation. The study underlines the role of massage not only as a palliative intervention but also as a potentially rehabilitative tool in the management of vascular disorders. Furthermore, these results highlight the need for standardized protocols in clinical massage practice to maximize circulatory benefits across diverse patient groups.

VASCULAR FUNCTION AND ENDOTHELIAL HEALTH

Emerging research has examined the effects of massage on vascular function, including arterial stiffness and endothelial responsiveness. A pilot study by Okamoto et al. reported reduced arterial stiffness and improved flow-mediated dilation (FMD) following massage therapy, suggesting enhanced endothelial function. The authors hypothesized that massage-induced shear stress on vessel walls promotes nitric oxide (NO) production, thus improving vascular compliance.⁽⁸⁾ Monteiro et al. confirmed these outcomes in a review of both passive and active massage modalities.⁽²⁾ Miyaji et al. demonstrated that regular use of a facial massage roller

led to significant improvements in skin blood flow and vascular reactivity, with both short- and long-term benefits.⁽⁹⁾ These findings support the hypothesis that mechanical stimulation enhances endothelial responsiveness via localized shear stress, contributing to improved microvascular function. These findings align with broader research on passive interventions and endothelial health. For example, studies on passive limb movement and compression therapy also demonstrate improved FMD and NO bioavailability, indicating a shared mechano-transduction pathway. Nonetheless, more robust longitudinal studies are needed to establish durable vascular adaptations.

PSYCHOLOGICAL MODULATION AND INDIRECT EFFECTS

The circulatory benefits of massage may also be mediated ultimately through psychological mechanisms. Stress, anxiety, and depression are known to adversely affect cardiovascular function via autonomic dysregulation and improved inflammatory burden. Massage therapy has been consistently shown to reduce psychological distress, and in doing so, contribute to improved cardiovascular regulation. Recent research supports this relationship. A study by Anwar et al. observed the effects of foot massage on older adults with hypertension in Indonesia and found significant reductions in both blood pressure and anxiety levels following the intervention.⁽¹⁰⁾ These findings suggest that massage-induced psychological relaxation can lead to measurable improvements in cardiovascular outcomes. Similarly, Pinar and Afsar conducted a randomized controlled trial among family caregivers of cancer patients, validating that back massage significantly reduced state anxiety, systolic and diastolic blood pressure, heart rate, and salivary cortisol levels, while concurrently improving sleep quality.⁽¹¹⁾ These findings provide compelling evidence for massage therapy's role in modulating psychophysiological stress responses that influence cardiovascular health. Mechanistically, Field highlighted that moderate-pressure massage stimulates pressure receptors in the skin, enhancing vagal activity and reducing hypothalamic-pituitary-adrenal axis activation. This neurophysiological response supports parasympathetic dominance and

facilitates reductions in stress hormones such as cortisol and adrenaline, further supporting circulatory health.⁽¹²⁾ These findings underscore that the psychological relief provided by massage is not only a subjective benefit but also a physiological mechanism with direct implications for vascular and autonomic regulation.

LIMITATIONS OF EXISTING RESEARCH

Despite promising findings, several limitations constrain the interpretation of existing literature on massage and circulatory health. Lack of standardized terminology impedes replication. First, heterogeneity in massage techniques (e.g., Swedish, deep tissue, Shiatsu), session duration, and frequency complicates comparisons across studies. A persistent challenge in the field is the inconsistent description of massage interventions. Many studies use broad terms such as “Swedish” or “deep tissue” without detailing the specific maneuvers, pressure levels, session duration, or therapist expertise. This lack of clarity limits replicability and weakens cross-study comparisons. Second, many studies rely on small, non-representative samples, limiting statistical power and generalizability. Third, blinding and placebo control are inherently difficult in massage research, raising concerns about expectancy effects.

FUTURE DIRECTIONS

To advance understanding in this field, future studies should adopt standardized protocols, larger sample sizes, and rigorous control conditions. Use of objective measures such as FMD, arterial stiffness indices, and biomarkers of endothelial function can enhance mechanistic insight. Additionally, stratified analyses based on age, health status, and baseline autonomic tone may help identify subgroups most responsive to massage. It is also advisable to involve well-trained, research-literate massage therapy practitioners in study design and protocol development. Their expertise ensures that interventions are both authentic to real-world practice and described with the rigor required for scientific reproducibility. Integration of neuroimaging and autonomic assessments could further elucidate central mechanisms mediating

cardiovascular effects. An important but underexplored area is the cost-effectiveness of massage therapy interventions. Given that massage is often not reimbursed in many health-care systems, its economic feasibility plays a critical role in broader adoption. Future research should assess not only clinical efficacy but also health-economic outcomes to guide policy and payer decisions.

CONCLUSION

As the field moves forward, addressing cost, standardization, and professional input will be critical for translating massage therapy into broader clinical use and policy frameworks. The body of literature reviewed suggests that massage therapy exerts measurable effects on the circulatory system, including reductions in blood pressure and heart rate, enhancements in peripheral blood flow, and potential improvements in vascular function. These outcomes appear to result from both direct mechanical stimulation and indirect modulation of autonomic and psychological pathways. Nonetheless, inconsistencies across studies highlight the need for more rigorous research. As an adjunct to conventional cardiovascular care, massage therapy holds promise, particularly for populations with hypertension or poor peripheral circulation. Establishing its role within evidence-based practice will depend on overcoming current methodological limitations and elucidating its physiological mechanisms.

CONFLICT OF INTEREST NOTIFICATION

The authors declare there are no conflicts of interest.

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