Journal of the American Society of Hypertension 9(10) (2015) 785–793

Research Article

Massage therapy: understanding the mechanisms of action on blood pressure. A scoping review

Nicole L. Nelson, MSH, LMT*

Clinical and Applied Movement Sciences, Brooks College of Health, University of North Florida, Jacksonville, FL, USA

Manuscript received June 17, 2015 and accepted July 20, 2015

Abstract

Massage therapy (MT) has shown potential in reducing blood pressure (BP); however, the psychophysiological pathways and structures involved in this outcome are unclear. The aims of this scoping review were twofold. (1) To summarize the current knowledge of the mechanisms of action of MT on BP. (2) To highlight the research gaps and challenges that researchers must overcome to further elucidate how MT attenuates BP. A scoping review was conducted to examine the evidence regarding the mechanisms of action of MT on BP. This review included the thematic analysis of 27 publications that considered the influence of MT on BP. Based on this analysis, six potential BP mediating pathways were identified Current theories suggest that MT exerts sympatholytic effects through physiologic and psychological mechanisms, improves hypothalamus–pituitary–adrenocortical axis function, and increases in blood flow, which, in turn, may improve endothelial function. Future study is needed, using more scientifically rigorous methodology, to fully elucidate the mechanism of action of MT. J Am Soc Hypertens 2015;9(10):785–793.

Keywords: Blood pressure; hypertension; massage therapy; prehypertension.

Introduction

According to the American Heart Association, nearly one in three American adults are estimated to have high blood pressure (BP), with nearly two-thirds of those older than the age of 65 being classified as having hypertension.[1] Hypertension is a major antecedent of coronary heart disease, renal disease, and stroke.[44] Worldwide, hypertension is the second largest contributor to the burden of disease.[67] The average age-adjusted death rate attributed to hypertension increased from 1996 to 2006 by 28.7%, with a 17.8% overall death rate in 2006.[1] Those with BP in the prehypertensive range have been found to be three to seven times more likely to become hypertensive and two times as likely to develop cardiovascular disease.[64] Additionally, hypertension carries a large financial burden, with 2009 estimated total costs in the United States reaching $73.4 billion.[44] Unfortunately, only 25%–40% of patients currently taking antihypertensive drug treatments are meeting BP goals.[9] For these reasons, it has become increasingly crucial to explore alternative methods to reduce hypertension.

The Clinical Utility of Massage

Massage therapy (MT), one of the oldest forms of medicine known to man, is a generalized term that encompasses techniques involving the manual manipulation of soft tissue.[58] For the purposes of this review, MT will be broadly defined as a profession in which the practitioner applies manual techniques and may apply adjunctive therapies, with the intention of positively affecting health and well-being of the patient. Although treatment pressure, duration of treatment, and strokes can vary, the coalescing factor is generally considered some type of soft tissue manipulation via a licensed therapist's touch.

MT has become increasingly recognized as a complementary tool in assisting with medical conditions across the scientific community, governmental agencies, and consumers. In 2002, the White House Commission on Complementary and Alternative Medicine Policy[66] called for additional research and public education on MT. According to a 2014 survey commissioned by the American Massage Therapy

Conflict of interest: The author has no financial conflicts of interest.

*Corresponding author: Nicole L. Nelson, MSH, LMT, Clinical and Applied Movement Sciences, Brooks College of Health, University of North Florida, 1 UNF Drive, Jacksonville, FL 32224-2673. Tel: 904-716-2972; Fax: 904-620-2848.

E-mail: nicole.nelson@unf.edu

1933-1711/$ - see front matter
http://dx.doi.org/10.1016/j.jash.2015.07.009

Association, 77% of individuals claim their primary reason for receiving a massage was medical (54%) or stress (23%) related.[2] Additionally, medical providers ranked MT the highest among alternative and complementary practices that are perceived as always or usually effective.

Several randomized controlled trials (RCTs) have demonstrated significant reductions in systolic blood pressure (SBP) and diastolic blood pressure (DBP) of individuals classified as prehypertensive or hypertensive.[29,30,34,48,54,62] Additionally, a recent systematic review and meta-analysis of 24 studies involving 1962 individuals with essential hypertension concluded that, when combined with antihypertensive medication, MT is more effective than antihypertensive drug treatment alone in lowering SBP (mean difference [MD], −6.92 [−10.05, −3.80]; $P < .0001$) and DBP (MD, −3.63 [−6.18, −1.09]; $P = .005$).[68] Although these reductions may appear small, it is well recognized that even modest reductions in BP are associated with significant reduced risk for hypertension complications.[40] It has been estimated that a 2 mm Hg reduction of SBP results in a 6% reduction in stroke mortality and a 4% reduction in coronary heart disease mortality, whereas a 5 mm Hg results in 14% and 9% reductions, respectively.[12]

The BP modulating effects of massage involve a series of complex psychophysiological processes across varying time scales. As such, it is vital to gain a better understanding of these mechanisms when considering the inclusion of MT to any treatment plan. This review aimed to summarize the existing literature regarding how MT influences BP. Based on the findings, a basic schematic representation of the effects of MT on BP modulating pathways was proposed and is presented in the graphical abstract. In addition, this review attempted to describe the gaps in research and identify future research needs. To the author's knowledge, this present review is the first to explicitly explore the possible means by which MT may reduce BP.

Methods

A scoping review method was used based on the framework detailed by.[4] In addition to summarizing and mapping existing literature within a complex study area, a scoping review is designed to identify core methodological issues and research gaps. The process consisted of the following steps: (1) the research question was clearly identified; (2) search strategy was defined; (3) the inclusion and exclusion criteria were described; (4) relevant studies were selected; (5) the key items of information were charted; and (6) the results were summarized in a narrative format. Figure 1 summarizes the various stages of the scoping process.

Research Question

What is the current evidence regarding the mechanisms of action of MT on BP?

Literature Search Outline

A search of MEDLINE, CINHAL, and PubMed was performed up to June 15, 2015, for relevant publications. The search strategy combined two sets of keywords using the Boolean operator "AND," whereas an "OR" strategy was used to combine the keywords within each group. Keywords included the following: massage therapy, high blood pressure, hypertension, prehypertension, nitric oxide, hypothalamus-pituitary-adrenocortical axis, cortisol, blood flow, endothelial function, relaxation response, affect, and sympathetic nervous system activity. Reference lists were hand searched for additional relevant articles. The search initially yielded 625 potentially relevant publications.

Inclusion and Exclusion Criteria

The retrieved abstracts and references were screened to identify documents that reported the effects of MT on any potential BP modulating pathway. All study designs were included (eg, systematic reviews, RCTs, quantitative studies, qualitative studies, or mixed methods). Articles were excluded if it was not subject to peer review and if it was not in English. Of the original 625 abstracts and references, 27 were considered relevant for this review.

Charting the Data

Key items of information from the 27 articles were charted based on outcome measures and proposed mechanisms of BP reduction (Table 1).

Results

A thematic analysis of the 27 eligible articles revealed six primary mechanisms of action: (1) mediation of sympathovagal balance, (2) reduced heart rate, (3) increased O_2 saturation, (4) increased blood flow, (5) decreased blood viscosity, (6) alterations in hypothalamus–pituitary–adrenocortical (HPA) axis activity, and (7) subjective and objective central changes.

Potential Mechanisms of Action

Mediation of Sympathovagal Balance

The balance of sympathetic and parasympathetic nervous system (PNS) activity is one mechanism by which the body regulates BP. Specifically, increased activation of the sympathetic nervous system (SNS) is characterized by rises in heart rate, myocardial contractility, and cardiac output as well as vasoconstriction and elevation of peripheral resistance, which ultimately increases BP. It has been proposed that MT promotes SNS withdraw along with a corresponding increase in PNS activity.[50] This has been evidenced by several investigations reporting improved heart rate