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• Research Article

The anatomical study of the major signal points of the court–type Thai traditional massage on legs and their effects on blood flow and skin temperature

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ABSTRACT

OBJECTIVE: This study aims to investigate the relationship between major signal points (MaSPs) of the lower extremities used in court-type Thai traditional massage (CTTM) and the corresponding underlying anatomical structures, as well as to determine the short-term changes in blood flow and skin temperature of volunteers experiencing CTTM.

METHODS: MaSPs were identified and marked on cadavers before acrylic color was injected. The underlying structures marked with acrylic colors were observed and the anatomical structures were determined. Then, pressure was applied to each MaSP in human volunteers (lateral side of leg and medial side of leg) and blood flow on right dorsalis pedis artery was measured using duplex ultrasound while skin temperature changes were monitored using an infrared themographic camera.

RESULTS: Short-term changes in the blood flow parameters, volume flow and average velocity, compared to baseline ($P < 0.05$), were observed on MaSP of the lower extremity, ML4. Changes in the peak systolic velocity of the area ML5 were also observed relative to baseline. The skin temperature of two different MaSPs on the lateral side of leg (LL4 and LL5) and four on the medial side of leg (ML2, ML3, ML4 and ML5) was significantly increased ($P < 0.05$) at 1 min after pressure application.

CONCLUSION: This study established the clear correlation between the location of MaSP, as defined in CTTM, and the underlying anatomical structures. The effect of massage can stimulate skin blood flow because results showed increased skin temperature and blood flow characteristics. While these results were statistically significant, they may not be clinically relevant, as the present study focused on the immediate physiological effect of manipulation, rather than treatment effects. Thus, this study will serve as baseline data for further clinical studies in CTTM.

Keywords: complementary therapies; massage; cadaver; blood flow; skin temperature

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1 Introduction

Massage is the systemic manipulation of the body's soft tissue with the purpose of to enhancing health and promoting healing.[1] Although effects of different types of massages are reported in various scientific journals, only a few pertain to Thai traditional massage. In Thailand, there are two main types of traditional massages,[2] here referred to as popular type and court-type. Court-type Thai traditional massage (CTTM) gets its name from the traditional discipline reserved for members of the royal court. The main purpose of CTTM is treating ailments, while the popular type is used for relaxation. The CTTM technique specifies that only hands and thumbs are used to massage the body.[3] Despite its origins at court, CTTM is currently used widely in Thailand including hospitals, primary health care units and district hospitals. The application of pressure to the major signal points (MaSPs) to produce healing or alleviate ailments is at the heart of the massage treatment in CTTM.[4] Thai traditional practitioners believe that MaSP massage can decrease muscle tension, increase blood and lymphatic circulations and stimulate the nervous system.[2–4] There are 10 basic massage lines and 50 specific MaSPs distributed throughout the body, including the extremities, abdomen, head and neck.[3,4]

Studies have shown the clinical efficacy of massage in relieving pain and muscle tension.[5–8] Specifically, a randomized controlled trial demonstrated that CTTM was superior to standard physical therapy in relieving muscle tension, muscle spasm and increasing functional ability in stroke patients.[6] Massage has also been shown to affect blood circulation.[9–11] Chenpanich et al.[12] demonstrated that CTTM was able to significantly decrease blood pressure, as well as increase local skin temperature (ST) in the upper extremities of human volunteers. Moreover, the ST in the present study was detected by infrared camera technology, which can reliably localize changes in ST.[13] An additional study also showed that even the isolated application of pressure on MaSPs of the neck, shoulder and arm was able to increase blood circulation significantly.[14] This suggests that MaSPs may have anatomical correlations with muscles and blood vessels that mediate the effect of massage on blood flow (BF), blood volume and ST of the manipulated areas. However, MaSP manipulation of the lower extremities differs substantially from that of the upper extremities in terms of the larger body surface and blood supplies, position of the practitioner as well as the force applied. Thus, in order to bridge the knowledge gap and document the anatomical and physical effects of CTTM, we have undertaken a similar study for the lower extremities. The objective of this study is to characterize the correlation of the underlying anatomical structures with each MaSP. In addition, this study aims to describe and compare the ST and BF changes in the lower extremities when each MaSP is manipulated.

2 Materials and methods

2.1 Study design

This study was approved by the ethical committee of the Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand. There are two parts to the study method (Figure 1). The first part relates to the study of anatomical relationship of the MaSPs in the lower extremities using embalmed cadavers and is similar to the method described by Plakornkul et al.[14] The second part of the study relates to measuring BF and ST changes in healthy volunteers.

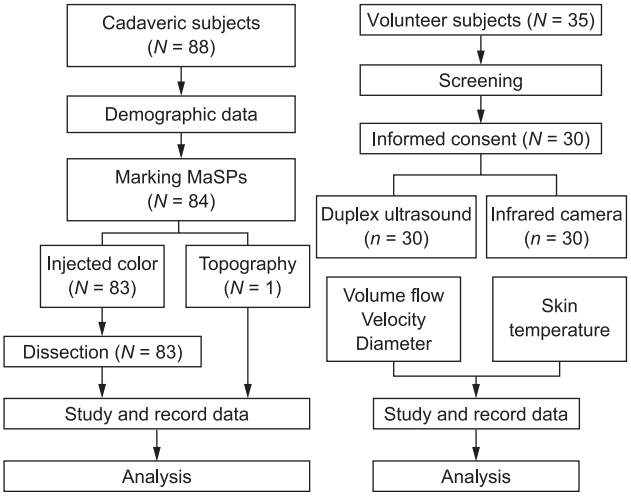

Figure 1 Study flowchart
MaSPs: major signal points.

2.2 Participants

2.2.1 Cadaveric specimens

The sample size needed to demonstrate statistical correlations among MaSPs and anatomical markers was not calculated. Instead, all of the embalmed cadavers intended for the use of medical students during the year 2012–2013, with no evidence of previous injury, deformity or prior surgery on the lower extremities, were included. Cadavers donated to the Department of