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The effects of Gua sha on symptoms and inflammatory biomarkers associated with chronic low back pain: A randomized active-controlled crossover pilot study in elderly

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ABSTRACT

Objective: To address the challenges for trialing with elderly and the lacking of valid sham/placebo control, a randomized crossover pilot study is designed and its feasibility on elderly subjects is evaluated.
Design: A pilot randomized crossover study was conducted with hydrocollator-based hot pack therapy as active control. Pain intensity, physical disability, depression, general health status, and salivary biomarkers were assessed as outcome measures.
Results: Despite there was no significant difference observed between any outcome measures attained by the two interventions, several important differences were noted during the one-week follow-up period. The magnitudes of pain reduction (21–25% versus 16–18%) and disability improvement (45–52% versus 39–42%) were greater in the Gua sha-treated group than the hot pack group. Both treatments were shown to improve flexion, extension and bending movements of the lower back, whereas areas of improvement varied between the two interventions. Decreasing trends were observed in both tumor necrosis factor-alpha (TNF-α) and heme-oxygenase-1 (HO-1) levels following Gua sha. However, rebounds of the biomarkers were observed one week following hot pack. Furthermore, in response to Gua sha, the decrease of TNF-α was strongly correlated with the improvement of physical disability, whereas the physical disability was correlated with the VAS pain intensity.
Conclusion: It demonstrated a feasible clinical trial protocol for evaluating the effectiveness of Gua sha and other therapeutic modalities. Gua sha may exhibit a more long-lasting anti-inflammatory effect relative to hot pack for pain relief and improved mobility in elderly patients with chronic low back pain.

1. Introduction

Gua sha, also known as 'coining', is a traditional healing technique widely practiced in Asia for relieving muscle pain, fever and respiratory distress.[1] The procedure involves press-stroking a lubricated area of the body with a smooth-edged instrument to intentionally create transitory therapeutic petechiae called 'sha', which normally fades in a few days.[2] The pain relieving effect of Gua sha was mainly supported by two small-scale randomized controlled trials (RCT) on chronic neck pain[3,4] and chronic low back pain (cLBP).[3]

Epidemiological studies suggested that half of the elderly population worldwide suffers from cLBP condition.[5] Increasing evidence from biochemical[6] and imaging studies[7–9] suggests the presence of tissue inflammation in cLBP. Gua sha has been well accepted as a home-remedial therapeutic technique in many Asian communities and more recently, the popular Gua sha was reported to be highly used amongst the elderly in Hong Kong.[10] However, Gua sha has never been trialed specifically in elderly subjects with cLBP. Based on previous published findings,[11–13] we hypothesized that Gua sha would exert anti-inflammatory effect in cLBP by upregulating the cytoprotective enzyme of heme oxygenase-1 (HO-1),[13] and increase the local microcirculation[14] by pressing and stretching of the superficial skin as well as the deep muscles. Such effects were proposed to be associated with pain reduction and improved physical mobility. To address the challenges

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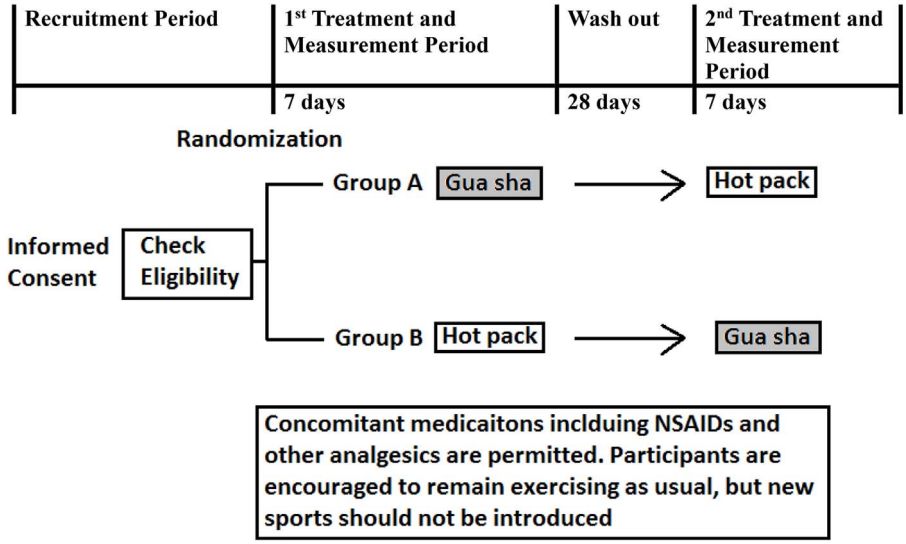

Fig. 1. Flowchart of the study, a randomized, single-blind, active-controlled, crossover trial in elderly with chronic low back pain (N = 12).

for trialing with elderly and the lacking of valid sham/placebo control, a randomized crossover pilot study is designed and its feasibility on elderly subjects is evaluated. Furthermore, this study also allows us to understand the pain relieving actions of Gua sha for cLBP in elderly and to explore the possible biomechanism in relation to inflammation.

2. Methods

2.1. Study design

A pilot study with the randomized, single-blinded, active-controlled crossover design was conducted to test the feasibility for comparing Gua sha with hydrocollator hot pack therapy, on their effects in multiple parameters associated with the nonspecific chronic low back pain (cLBP) in elderly. The study process was summarized with the flowchart (Fig. 1) and detailed below.

The target participants were elderly with non-specific cLBP. After informed consent is given, subject eligibility was checked. Inclusion criteria: (1) ≥60 year-old; (2) VAS pain intensity scores ≥40 mm; and (3) persistent pain restricting the lumbar spine mobility for at least 3 months. Exclusion criteria: prior history of specific LBP including radiculopathy, spinal stenosis and spinal fusion; radiating pain below the knee; received laminectomy, laminotomy or discectomy; serious illness such as malignancy; injury or skin lesions at the lower back region in the past 12 months; and active psychiatric disorders or dementia. Before baseline measurement, blood pressure (BP) and Body Mass Index (BMI) were measured. Any subjects with BP > 140/90 mmHg or BMI < 18.5 kg/m^2 were excluded.

This study involved two active treatment arms: Gua sha therapy (treatment A) and hydrocollator hot pack therapy (treatment B; active control). Hence, the AB/BA design was adopted, whereas each participant would receive both interventions through randomization to one of a set of prespecified sequences of treatments, i.e. treatment A followed by treatment B or treatment B followed by treatment A. An independent biostatistician prepared the randomization schedule for 24 subjects by using the SAS® programming. Under the restriction that the number of subjects for treatment AB and BA was balanced within each block, computer generated random number tables were used to determine the treatment assignment. The randomization schedule was concealed in sequentially numbered, sealed opaque envelopes. The intervention allocation was concealed to two separate investigators who were responsible for conducting the outcome measurements and data analysis.

2.2. The interventions

All participants were required to receive a single session of Gua sha and a single session of hot pack therapy. Both treatment sessions lasted for about 15 min, and were separated by a 28-day washout period.

2.2.1. The procedure of Gua sha

The procedure was based on previous publication[12] with slight modification. The participant was situated in a prone position by placing a body cushion at the abdomen for allowing great access to the scraping area. Treatment site was checked for any wounds or lesions. The lumbar region between T8-L5 was located and balm was adequately applied for lubrication with. Unidirectional press-stroke was applied along the midline (left or right) of the back using a Chinese soup spoon (Fig. 2a). The smooth, round edge of the spoon was press-stroked into the flesh enough to contact the fascial layer, but not so hard that it caused pain or discomfort (Fig. 2b). A stroke line was typically 25–30 cm in length. Press-strokes were repeated until appearance of petechiae (Fig. 2c), typically after 8–12 strokes. The next stroke line was continued directly adjacent to the previous one until the lower one-third of the back was fully covered. The exposed skin region was covered immediately following the procedure. Recommended safety measures were strictly followed.[2] The lubricant was not shared among the participants, and the spoon was disposed after a single use.

2.2.2. Procedure of the hydrocollator-based hot pack therapy

Superficial hot pack therapy is regarded as one of the recognized and effective modalities for patients with low back pain.[15] Hydrocollator-based hot pack therapy uses moist packs to increase tissue temperature sufficiently and steadily without drying the skin.[16] This method is often the choice of physiotherapists in their daily practice. A qualified physiotherapist was assigned to perform the treatment procedure according to previous study.[17] Participant was situated in the same position as Gua sha, the treatment region was checked for wounds or lesions, and tested for skin sensation on heat and cold. A 42–43 °C hydrocollator pack was covered with six layers of towel, and applied to the lower back approximately the same position as Gua sha applied (Fig. 2d & e). The exposed skin region of participant was covered immediately after treatment. The same safety measures recommended for Gua sha was applied. The towels were washed and disinfected after use.