

Supplementary Materials

Table 1. Results of a pilot study comparing between MSAT and control groups.

| | Outcome change ¹ | | Mean difference ² | Pooled SD | Effect size |
|-------------------------|-----------------------------|---------------|------------------------------|-----------|-------------|
| | MSAT (N=10) | Control (N=9) | | | |
| NRS score for neck pain | -2.00±1.41 | -0.56±1.24 | 1.44 (0.15, 2.74) | 1.32 | 1.09 |
| NRS score for arm pain | -1.30±1.89 | -0.67±1.41 | 0.63 (-1.00, 2.26) | 1.89 | 0.34 |
| ROM for flexion | 15.00±6.24 | 4.44±7.68 | -10.56 (-17.30, -3.81) | 7.03 | 1.50 |
| ROM for extension | 23.00±5.87 | 6.11±9.28 | -16.89 (-24.32, -9.46) | 7.85 | 2.15 |
| ROM for right flexion | 13.00±13.17 | 3.89±8.58 | -9.11 (-20.01, 1.79) | 10.97 | 0.83 |
| ROM for left flexion | 18.00±8.56 | 5.00±9.68 | -13.00 (-21.83, -4.17) | 9.17 | 1.42 |
| ROM for right rotation | 26.50±11.56 | 10.00±13.46 | -16.50 (-28.61, -4.39) | 12.60 | 1.31 |
| ROM for left rotation | 24.50±12.57 | 8.33±17.32 | -16.17 (-30.70, -1.63) | 15.27 | 1.09 |

Notes: In the pilot study, outcomes were measured at baseline and after each MSAT session, with no follow-up period. Twenty participants were included (MSAT: 10, control: 10). One patient in the control group withdrew. Complete case analysis was performed. ¹Difference between the baseline value and the value after three sessions of MSAT; values are reported as mean ± standard deviation. ²Mean difference in the outcome change between the two groups; values are reported with 95% confidence intervals. **Abbreviations:** MSAT, motion style acupuncture treatment; NRS, numeric rating scale; ROM, range of motion.

Table 2. Chuna manual therapy techniques used in this study.

| Chuna techniques for the cervical spine | |
|---|---|
| Distraction | Supine position cervical distraction method Prone position cervical distraction method |
| Correction | Supine position cervical correction method Supine position cervical JS distraction and correction method Supine atlas correction method Supine occipital correction method |

Table 3. Details of motion style acupuncture treatment (MSAT) and traditional acupuncture treatment based on the STRICTA 2010 checklist.

| Item | Details |
|--------------------------|--|
| 1. Acupuncture rationale | 1a) Style of acupuncture: MSAT: 3 days of motion style acupuncture + Korean traditional acupuncture Control: Korean traditional acupuncture |
| | 1b) Reasoning for treatment provided, based on historical context, literature sources, and/or consensus methods, with references where appropriate: MSAT: Used by Korean medicine doctors [1,2] and based on the consensus of a group of clinical experts Korean traditional: Based on the textbook of acupuncture and commonly used by Korean medicine doctors |
| | 1c) Extent to which the treatment was varied: |

| | |
|---|---|
| | <p>MSAT: Each treatment is performed for about 10 minutes, but the degree and frequency of movement can be adjusted at the discretion of the doctor.</p> <p>Korean traditional: 6-12 needles among essential and optional acupoints</p> |
| 2. Details of needling | <p>2a) Number of needle insertions per subject per session:</p> <p>MSAT: 6 acupoints/Korean traditional: 6-12 acupoints</p> |
| | <p>2b) Names (or location if no standard name) of points used (unilateral/bilateral):</p> <p>MSAT: both sides of the upper trapezius.</p> <p>Korean traditional: essential - SI15, TE15, LI16 bilateral optional - GB20, BL10, SI14 bilateral, GV14 unilateral</p> |
| | <p>2c) Depth of insertion, based on a specified unit of measurement or a particular tissue level:</p> <p>MSAT: 5-10 mm based on the depth of upper trapezius Korean traditional: based on the physician's judgment</p> |
| | <p>2d) Response sought (e.g., <i>de qi</i> or muscle twitch response):</p> <p>MSAT: None/Korean traditional: <i>de qi</i></p> |
| | <p>2e) Needle stimulation (e.g., manual, electrical):</p> <p>MSAT: manual stimulation during movement Korean traditional: electrical stimulation</p> |
| | <p>2f) Needle retention time:</p> <p>MSAT: about 10 minutes/Korean traditional: 15 minutes</p> |
| | <p>2g) Needle type (diameter, length, and manufacturer or material):</p> <p>0.25 * 30 mm, stainless steel, Dong-bang medical, Korea</p> |
| 3. Treatment regimen | <p>3a) Number of treatment sessions:</p> <p>MSAT: 3 sessions/Korean traditional: 8-26 sessions</p> |
| | <p>3b) Frequency and duration of treatment sessions:</p> <p>MSAT: once a day for 3 days/Korean traditional: twice a day for 5-13 days</p> |
| 4. Other components of treatment | <p>4a) Details of other interventions administered to the acupuncture group (eg, moxibustion, cupping, herbs, exercises, and lifestyle advice):</p> <p>Integrative Korean medicine treatment such as acupuncture, phamacopuncture, chuna manual therapy, herbal medicine, etc.</p> |
| | <p>4b) Setting and context of treatment, including instructions to practitioners and information and explanations to patients:</p> <p>None in particular</p> |
| 5. Practitioner background | <p>5) Description of participating acupuncturists (qualification or professional affiliation, years in acupuncture practice, other relevant experience):</p> <p>Korean medicine doctor with at least 3 years of clinical experience and affiliated to Bucheon Jaseng hospital.</p> |
| 6. Control or comparator interventions | <p>6a) Rationale for the control or comparator in the context of the research question, with sources that justify this choice:</p> <p>For the purpose of the study evaluating the effectiveness of additional treatment with MSAT in traditional Korean medicine treatment, the control was defined as a group that received integrative Korean medicine treatment only.</p> |

6b) Precise description of the control or comparator. If sham acupuncture or any other type of acupuncture-like control is used, provide details as for items 1 to 3 above:

Integrative Korean medicine treatment such as acupuncture, phamacupuncture, chuna manual therapy, herbal medicine, etc. Details related to acupuncture are mentioned for items 1-3.

MSAT, motion style acupuncture treatment

Table 4. Study schedule and measurements at each visit.

| | Study period | | | | | | | | | | |
|--------------------------------------|--------------|------------|------------------|----------------|---|---|---|---|-----|-----------|----|
| | Enrolment | Allocation | Active treatment | | | | | | | Follow-up | |
| Days ¹ | 1 | 1 | 2 ² | 2 ³ | 3 | 4 | 5 | 8 | d/c | 14 | 90 |
| Enrolment | | | | | | | | | | | |
| Eligibility screen | ○ | | | | | | | | | | |
| Informed consent | ○ | | | | | | | | | | |
| Credibility and expectancy | ○ | | | | | | | | | | |
| Medical history | ○ | | | | | | | | | | |
| Allocation | | ○ | | | | | | | | | |
| Interventions | | | | | | | | | | | |
| MSAT+IKM | | | ○ | | ○ | ○ | | | | | |
| IKM | | | ○ | | ○ | ○ | ○ | ○ | | | |
| Assessment | | | | | | | | | | | |
| Check symptoms and Medicine change | | ○ | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| NRS score for neck pain ⁴ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| VAS score for neck pain ⁴ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Cervical ROM ⁴ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |
| NRS score for arm pain ⁴ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| VAS score for arm pain ⁴ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |
| NDI | | ○ | | | | | ○ | ○ | ○ | ○ | ○ |
| EQ-5D | | ○ | | | | | ○ | ○ | ○ | ○ | ○ |
| PGIC | | | | | | | ○ | ○ | ○ | ○ | ○ |
| Adverse events | | ○ | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Notes: ¹Days from admission ²Outcomes before treatment on day 2 ³Outcomes after treatment on day 2 ⁴NRS scores for neck and arm pain, VAS scores for neck and arm pain, and ROM of the neck were additionally measured after treatment on the second day. **Abbreviations:** d/c, discharge; MSAT, motion style acupuncture treatment; IKM, integrative Korean medicine treatment; NRS, numeric rating scale; VAS, visual analog scale; ROM, range of motion; NDI, neck disability index; EQ-5D, EuroQol-5 dimension; PGIC, patient global impression of change.

Table 5. Cases of adverse events during study period by treatment group.

| | | MSAT (N=48) | Control (N=49) |
|---|--------------------------|-------------|----------------|
| Total cases | | 13 | 7 |
| Severity¹ | Mild | 12 | 6 |
| | Moderate | 1 | 0 |
| | Severe | 0 | 0 |
| Gastro Intestinal symptoms | | | |
| - | Diarrhea | 8 | 4 |
| - | Nausea, Heartburn | 2 | 1 |
| Skin related symptoms (rash, itchy, vesicle) | | 2 | 2 |
| | Dizziness | 1 | 0 |

¹ Severity was classified according to Spilker, et al. [3]. Mild, did not impair the participant's normal activities of daily living [ADLs], caused minimal discomfort, and required no additional treatment; moderate, significantly impaired the participant's normal ADLs and may have required treatment, but they resolved after treatment; severe, severely impaired the participant's normal ADLs, required intense treatment, and left sequelae.

1. Shin, J.; Boone, W.; Kim, P.; So, C. Acute and long term benefits of motion style treatment (MST): two case reports. *International Journal of Clinical Acupuncture* **2007**, *16*, 85.
2. Shin, J.-S.; Ha, I.-H.; Lee, J.; Choi, Y.; Kim, M.-r.; Park, B.-Y.; Shin, B.-C.; Lee, M.S. Effects of motion style acupuncture treatment in acute low back pain patients with severe disability: a multicenter, randomized, controlled, comparative effectiveness trial. *PAIN®* **2013**, *154*, 1030-1037.
3. Song, K.-J.; Choi, B.-W.; Kim, S.-J.; Yoon, S.-J. Cross-cultural adaptation and validation of the Korean version of the neck disability index. *Journal of the Korean Orthopaedic Association* **2009**, *44*, 350-359.

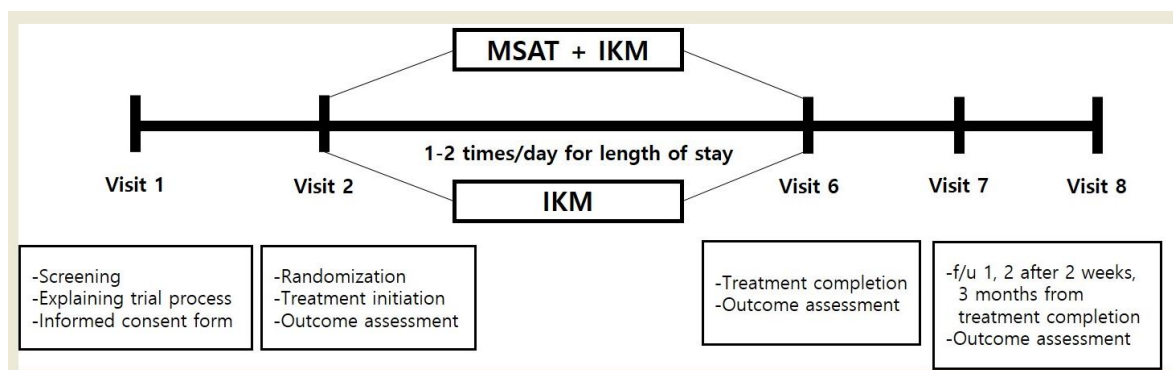


Figure 1. Research process of the study.



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