A survey of the clinical practice followed by Korean medicine doctors for scoliosis
Preliminary data for clinical practice guidelines

Won-Suk Sung, KMD, PhD[a], Seong-Kyeong Choi, KMD, BSc[b], Hyo-Rim Jo, KMD, BSc[a], Seo-Hyun Park, KMD, MS[c], Sun-Haeng Lee, KMD, PhD[d], Yoon-Jae Lee, KMD, PhD[e], In-Hyuk Ha, KMD, PhD[e], Byung-Kwan Seo, KMD, PhD[f], Hoe-Cheon Yang, KMD, PhD[g], Seung-Ug Hong, KMD, PhD[h], Dong-Ho Keum, KMD, PhD[c], Eun-Jung Kim, KMD, PhD[a],* iD

Abstract

Scoliosis is a spinal disease in which the Cobb angle is >10°. Scoliosis treatment can be surgical or conservative, and clinical practice guidelines (CPGs) for conservative treatments have been updated since 2006. There have been several articles regarding the efficacy and safety of Korean medicine (KM) in treating scoliosis, but there are no CPGs. Our study investigated the current clinical practice using a survey for the future establishment of KM-CPGs. The survey mainly comprised clinical practice status, diagnosis, treatment, progress and prognosis, and perception of KM on scoliosis, with reference to existing surveys of other musculoskeletal disorders and scoliosis-related articles. A web-based survey was conducted from February 16, 2021 to February 28, 2021. We found that 60% of KM doctors (KMDs) respondents treated patients with scoliosis, and they valued radiographical measurements and scoliosis-related factors in the diagnosis. KMDs used multiple KM treatments, including acupuncture, Chuna, cupping, pharmacopuncture, and herbal medicine, and they emphasized the importance of KM more in nonstructural scoliosis than in structural scoliosis. Although the perception of the prognosis of scoliosis was in agreement with that suggested by previous guidelines, KMDs showed outstanding focus on reduction of symptoms of scoliosis and improvement of quality of life. Despite some limitations, including low participation and the need for consulting other medical practitioners, our study may be helpful for the development of KM-CPGs because it is the first to analyze the perceptions of KMDs on scoliosis and to collect preliminary data that are of significance for preparing clinical guidelines.

Abbreviations: CPGs = clinical practice guidelines, KM = Korean medicine, KMD = Korean medicine doctor, QOL = quality of life, SOSORT = International Scientific Society on Scoliosis Orthopedic and Rehabilitation Treatment, SRS-22 = Scoliosis Research Society-22, TCM = traditional Chinese medicine.

Keywords: clinical practice guidelines, Korean medicine, scoliosis, survey

1. Introduction

Scoliosis is a spinal deformity with an abnormal curvature along the 3-dimensional spinal axis; this disease is diagnosed when the Cobb angle is >10° along any part of the spine.[1] The prevalence of scoliosis in Korea is reported to range from 1.1% to 6.0%, according to a previous report,[2] and the worldwide prevalence is up to 10.4%.[3]

Scoliosis can be classified according to the etiology (congenital, neuromuscular, syndrome-related, and idiopathic) or onset of presentation.[4] However, the symptoms are similar regardless of the classification and include pain, leg length discrepancy, impaired posture, gait imperfections, and psychological problems, resulting in lower health-related quality of life (QOL).[5] The treatment includes surgical and conservative methods to prevent disease progression and manage the symptoms.

Manual Medicine, Seoul, Republic of Korea, [h] Department of Ophthalmology & Otolaryngology & Dermatology, Dongguk University Ilsan Oriental Hospital, Goyang-si, Gyeonggi-do, Republic of Korea.

*Correspondence: Eun-Jung Kim, Department of Acupuncture & Moxibustion, Dongguk University Bundang Oriental Hospital, 268, Buljeong-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea (e-mail: hanijjung@naver.com).

Despite persistent efforts, the existing treatments still have limitations including surgical risks, poor compliance, and negative effects.[5] Therefore, several clinical practice guidelines (CPGs) have been published to reasonably align the treatment with new scientific evidence, provide the latest knowledge, and reflect clinical practices. Among these, the International Scientific Society on Scoliosis Orthopedic and Rehabilitation Treatment (SOSORT) published the first guidelines in 2006[6] and the third guidelines in 2018;[7] these are the most representative in terms of their use and credibility. The latest version focused on conservative treatments and suggested the use of braces, exercise, and assessment as the preferred treatment options. These recommendations were made based on the findings of multiple literature reviews and the consensus achieved through several meetings.

However, these guidelines did not include Korean medicine (KM) treatment or traditional Chinese medicine (TCM) for scoliosis, which have shown efficacy and safety for scoliosis treatment in several randomized controlled trials,[8] case reports,[9] and reviews.[10] In addition, although there have been several KM-CPGs for musculoskeletal disorders, including low back pain, neck pain, whiplash injuries, and knee osteoarthritis, in Korea,[11] there are still no KM-CPGs for scoliosis.

The purpose of our study was to investigate the current clinical practice patterns of KM doctors (KMDs) for treating scoliosis through a web-based survey and to reflect the current state in the establishment of KM-CPGs for scoliosis.

2. Methods

2.1. Study design

Our study was designed for KMDs to investigate the perception and clinical practice of scoliosis through a web-based survey. We searched the literature published within the last 10 years for surveys about KM treatment for other musculoskeletal disorders.[12–14] WSS and SHP, who are KMDs specialized in scoliosis (KM specialists in Korean acupuncture and moxibustion medicine, and Korean rehabilitation medicine), referenced the related articles and prepared a 35-question survey with the following sections: (1) consent to voluntary participation, (2) clinical practice status, (3) diagnosis, (4–5) treatment (overall and individual KM treatment), (6) progress and prognosis, (7) perception of KM on scoliosis, and (8) demographic characteristics. For some questions, we allowed multiple responses or asked participants to rank the factors in the order of highest importance.

SKC and HRJ searched for literature regarding the treatment of scoliosis through databases including MEDLINE, EMBASE, Cochrane library, China National Knowledge Infrastructure (Chinese database), CiNii, KoreaMed, Korean Medical Database, Korean Studies Information Service System, ScienceOn, Korea Institute of Science and Technology Information, and Oriental Medicine Advanced Searching Integrated System. Based on 3 conferences, a draft questionnaire was prepared, and the other KMDs (EJK and DHK), who are also specialized in scoliosis treatment and have more than 10 years of experience, participated in the revision of the questionnaire. Then, we sent the revised questionnaire to a panel of 5 experts for an external review and finalized the questionnaire.

2.2. Participants and procedures

A web-based version of the questionnaire was prepared to obtain more complete answers, prevent omissions, and facilitate statistical analyses. An e-mail with a link for the survey was distributed to 25,373 KMDs through the Association of Korean Medicine and KM specialists through the Korean Medicine Specialist Association. The survey was conducted from February 16, 2021 to February 28, 2021, and the e-mail was sent twice: once on February 16, 2021 and once on February 23, 2021. We used the "Moaform" online survey platform, which had no conflicts of interests, to prevent any bias in the collection of responses.

2.3. Ethics

This study was approved by the Institutional Review Board of Dongguk University Bundang Oriental Hospital in Korea (DUBOH IRB 2021-0002). All KMDs who received the e-mail with the survey link were informed about the objectives of this survey, survey completion method, estimated time needed to respond to the questionnaire, e-mail address for research inquiries, and which data would be collected. They were also notified that their personal information would be kept confidential and that the survey results would be used for academic purposes only. Notification that participants could stop the survey at any time was provided twice, once in the e-mail text and once before the linked survey. We also reconfirmed voluntary participation by confirming consent to participate in the research in the first questionnaire.

2.4. Statistical analysis

All response results were provided from the online survey platform as raw data using Microsoft Excel 2010. We reviewed the number of each question count and arranged the raw data as follows: categorical variables were reported as frequencies and percentages, and Likert scale-type questions were converted into continuous variables. Continuous variables were presented as the mean ± standard deviation and were analyzed using STATA version 15.0 (STATA Corp, LP. College Station, USA), and 1 independent researcher repeatedly reviewed these data.

3. Results

Precise statistics are shown in the supplementary file, and the main results are described here. In total, 676 (475 male and 201 female respondents) among 25,373 KMDs voluntarily participated in the survey, showing the response rate as 2.66% (Supplement 1, http://links.lww.com/MD/H29). Among the participants, the majority were in their 30s, and the period of clinical experience was 5 to 10 years (Table 1).

3.1. Clinical practice status

Among the 676 participants, 396 KMDs (58.6%) answered that they had treated patients with scoliosis, and they completed the questionnaire until the "progress and prognosis" section. Approximately 90% of respondents responded that they treated within 10 first-visit patients with scoliosis per month [within 5 persons, n = 286 (72.2%) and within 6 to 10 persons, n = 73 (18.4%)]. We asked about the ratio of structural and nonstructural scoliosis cases that respondents treated using a scale ranging from 0 to 10, and the ratio was almost 1:1 (10 indicated that all patients with scoliosis had structural scoliosis, and the average was 4.89 out of 10). The patient age range chosen by more than 50% of the respondents was 10 to 30 years. The duration of treatment varied, but the most selected answer was 3–6 months [n = 104 (26.3%)], and patient satisfaction was predominantly distributed on a scale of 5 to 8 out of 10 [10 indicating maximum satisfaction; 5, n = 116 (29.3%); 6, n = 59 (14.9%); 7, n = 114 (28.8%); and 8, n = 45 (11.4%)] (Section 2 in Supplement 1, http://links.lww.com/MD/H29).

Table 1

Demographic characteristics of Korean medicine doctors who responded the survey.

Factors		N (%)
Age (yr)	~29	090 (13.3)
	30–39	279 (41.3)
	40–49	204 (30.2)
	50–59	088 (13.0)
	60~	015 (02.2)
Sex	Male	475 (70.3)
	Female	201 (29.7)
Clinical experience (yr)	~ 5	143 (21.2)
	5–10	172 (25.4)
	11–15	127 (18.8)
	16–20	106 (15.7)
	21–30	103 (15.2)
	30~	025 (03.7)
Institutional working	KM clinic	429 (63.5)
	KM university hospital	078 (11.5)
	nonuniversity KM hospital	068 (10.1)
	Hospital (working with western medicine)	014 (02.1)
	Nursing hospital	029 (04.3)
	National medical institutions	003 (00.4)
	Public health center	028 (04.1)
	Military as a medical officer	012 (01.8)
	Research institution	008 (01.2)
	Others	007 (01.0)

KM = Korean medicine.

3.2. Diagnosis

We evaluated the frequency of use (consideration) in the diagnosis of scoliosis. The numbers were measured on a 5-point scale (never/sometimes/usually/often/always), and we identified the factors the respondents depended on by counting the number of "often" and "always" responses. The factors that respondents selected as having a high frequency of use in descending order were physical examinations [n = 314 (79.3%)], medical history [n = 310 (78.3%)], symptoms [area and description of the pain, n = 301 (76.0%)], age [n = 264 (66.7%)], X-ray analysis [n = 245 (61.9%)], and inspection diagnosis [n = 230 (58.1%)]. Factors including nonradiographic measurements (scoliometer, topography, Moiré topography, grid panel, and posture application), questionnaire scores, and pattern identification were infrequently used (<50%). We also evaluated the importance of the same factors in the diagnosis of scoliosis, and the results obtained were similar to those for the frequency of use. The factors that the respondents selected as important in descending order were symptoms [n = 336 (84.9%)], physical examinations [n = 332 (83.8%)], age [n = 320 (80.8%)], X-ray analysis [n = 318 (80.3%)], medical history [n = 314 (79.3%)], and inspection diagnosis [n = 230 (56.1%)] (Section 3 in Supplement 1, Table 2, http://links.lww.com/MD/H29).

3.3. Treatment

3.3.1. Overall. We evaluated the main goal of treatment by presenting several factors referring to the Scoliosis Research Society-22 (SRS-22) questionnaire[15] and asked participants to rank the 1st, 2nd, and 3rd place factors. The factors that the majority of the 396 respondents considered important were improvement of function (n = 335) and pain reduction (n = 333), and more than 50% of KMDs also considered improvement of

Table 2

Consideration and importance of factors in the diagnosis of scoliosis.

Factors	Consideration (%, ranked)	Importance (%, ranked)
Description of symptoms by scoliosis	301 (76.0,03)	336 (84.8, 01)
Age	264 (66.7,04)	320 (80.8, 03)
X-ray	245 (61.9, 05)	318 (80.3, 05)
Scoliometer	072 (18.2,08)	120 (30.3, 08)
Topography	031 (07.8, 13)	042 (10.6, 13)
Moiré topography	044 (11.1, 11)	076 (19.2, 10)
Grid panel	048 (12.1, 10)	068 (17.2, 11)
Posture application	041 (10.4, 12)	055 (13.9, 12)
Questionnaire about scoliosis	053 (13.4, 09)	094 (23.7, 09)
Medical history of patients	310 (78.3, 02)	314 (79.3, 04)
Physical examinations	314 (79.3, 01)	332 (83.8, 02)
Inspection diagnosis	230 (58.1, 06)	222 (56.1, 06)
Pattern identification according to KM	142 (35.9, 07)	159 (40.2, 07)

KM = Korean medicine.
We measured on a 5-point scale (never/sometimes/usually/often/always) and counted the number of "often" and "always". We considered the number of factors as having high consideration or importance in the diagnosis of scoliosis.

QOL important (n = 197). Regarding the number of treatments, most KMDs treated patients with scoliosis 1 to 3 times a week [1 time, n = 83 (21.0%); 2 times, n = 213 (53.8%); and 3 times, n = 95 (24.0%)]. Regarding the use of treatments, KMDs selected an average of 4.52 variables (total 1792 answers among 396 respondents), indicating that they conducted multiple KM treatments, and the most commonly used KM treatments were acupuncture [n = 379 (95.7%)], Chuna [n = 298, (75.3%)], cupping [n = 237 (59.8%)], pharmacopuncture [n = 234 (59.1%)], and KM physiotherapy [n = 203 (51.3%)]; these treatments accounted for more than 50% of treatments in multiple responses.

We also investigated the perception (importance) of each KM treatment in the treatment of scoliosis using a 7-point scale (not at all/not important/not very important/usually/somewhat important/important/very important) by counting the number of "somewhat important," "important," and "very important" responses. The results for the perception of each KM treatment were similar to those for the frequency of use. Acupuncture, Chuna, herbal medicine, pharmacopuncture, cupping, KM physiotherapy, and Daoyin exercises were considered important for > 50% of respondents for the treatment of structural and nonstructural scoliosis.

Between structural and nonstructural scoliosis, KM treatments were considered more important for nonstructural scoliosis. We converted the 7-point scale to 1 to 7 points and calculated the average of each item. All KM treatments received higher scores for the treatment of nonstructural scoliosis and showed significant differences, except Chuna and Daoyin exercise (Section 4 in Supplement 1, Table 3, http://links.lww.com/MD/H29).

3.3.2. Individual KM treatment. In this section, we evaluated the specific clinical practices of individual KM treatment using questions about the site, stimulation method, and technique of treatment.

3.3.2.1. Acupuncture and pharmacopuncture. Over 50% of KMDs conducted acupuncture for the thoracic [n = 298 (75.3%)], lumbar [n = 358 (90.4%)], and pelvic [n = 235 (59.3%)] sites. They mainly stimulated acupuncture by retention [n = 322 (81.7%)] and electrostimulation [n = 294 (74.6%)]. Regarding pharmacopuncture, there were no primarily used

Importance of Korean medicine treatments in the treatment of scoliosis.

Items	Structural scoliosis	Nonstructural scoliosis	P-value
Acupuncture	6.010 ± 1.160	6.326 ± 0.995	0.0000*
Pharmacopuncture	5.098 ± 1.537	5.631 ± 1.479	0.0000*
Thread embedding acupuncture	3.960 ± 1.589	4.265 ± 1.664	0.0039*
Acupotomy	3.770 ± 1.598	4.159 ± 1.656	0.0004*
Moxibustion	4.023 ± 1.497	4.417 ± 1.543	0.0003*
Chuna	6.020 ± 1.230	6.109 ± 1.161	0.4169
Herbal medicine	5.093 ± 1.468	5.510 ± 1.311	0.0000*
Cupping	4.970 ± 1.383	5.273 ± 1.404	0.0004*
Korean medical physiotherapy	4.997 ± 1.280	5.217 ± 1.332	0.0057*
Daoyin exercise	4.960 ± 1.459	5.035 ± 1.417	0.4403

*Wilcox rank-sum test.

We explained the definitions and the types of the structural scoliosis (scoliosis by structural abnormality of spine) and nonstructural scoliosis (scoliosis by an underlying condition including leg length difference, muscle spasm, musculoskeletal pain) in the survey and asked for answers. We converted 7-point scale into continuous variables (not at all to 1; not important to 2; not very important to 3; usually to 4; somewhat important to 5; important to 6; very important to 7) and presented them as means ± standard deviation.

items; however, Jungsongouhyul [n = 166 (41.9%)] and bee venom [n = 124 (31.3%)] were used by > 30% of the respondents (Section 5-1 in Supplement 1, http://links.lww.com/MD/H29).

3.3.2.2. Herbal medicine. We presented several herbal medicine items referring from previous studies that resulted in the improvement in the symptoms of scoliosis. There were no primarily used items; however, the > 30% of KMDs selected Jakyakgamcho-tang [n = 158 (39.9%)], Ojeok-san [n = 145 (36.6%)], and Yukmijihwang-tang [n = 138 (34.8%)] as herbal medicines by KMDs (Section 5-2 in Supplement 1, http://links.lww.com/MD/H29).

3.3.2.3. Chuna. There are various types of Chuna, and we present several items according to the Korean health insurance criteria and textbook.[16,17] The items that more than 50% of KMDs selected were simple Chuna [fascia therapy, n = 259 (65.4%); joint therapy, n = 172 (43.4%); distraction, n = 186 (47.0%)] and complex Chuna [joint mobilization, n = 208 (52.5%)]. With respect to the region of scoliosis, from the head to the thoracic spine, most KMDs performed simple Chuna, whereas for the lumbar spine and pelvis, most KMDs performed both complex and simple Chuna almost equally (Section 5-3 in Supplement 1, http://links.lww.com/MD/H29).

3.4. Progress and prognosis

Most KMDs answered that they regularly evaluated patient progress [n = 358 (90.4%)], and the common interval was within 6 months [within 3 months, n = 234 (65.4%); 3–6 months, n = 97 (27.1%)]. We questioned the KMDs regarding the factors they considered important by presenting factors from the diagnosis section. The importance was measured on a 5-point scale (not at all/not important/usually/important/very important), and we counted the number of "important" and "very important" responses. The factors that respondents considered important in descending order were pain [n = 348 (87.9%)], deterioration in QOL [n = 344 (86.9%)], physical examinations [n = 335 (84.6%)], age [n = 321 (81.0%)], compliance [n = 316 (79.8%)], radiographic results [n = 308 (77.7%)], morbidity period [n = 284 (71.7%)], psychological factors [n = 276 (69.7%)], and history [n = 270 (68.2%)] (Section 6 in Supplement 1, Table 4, http://links.lww.com/MD/H29).

Importance of factors in the prognosis of scoliosis.

Factors	The degree of importance (points, ranked)
The degree of the pain	4.255 ± 0.801 (01)
The degree of deterioration in quality of life	4.247 ± 0.746 (02)
Age	4.101 ± 0.770 (04)
Radiologic results	4.086 ± 0.835 (05)
Medical history of patients	3.816 ± 0.779 (09)
Compliance (patient's attitude to the disease)	4.063 ± 0.785 (06)
Psychological factors including patient's personality	3.861 ± 0.859 (08)
The morbidity period	3.927 ± 0.806 (07)
Physical examinations	4.121 ± 0.773 (03)
Pattern identification according to KM	3.260 ± 1.070 (10)

KM = Korean medicine.

We converted 5-point scale into continuous variables (not at all to 1; not important to 2; usually to 3; important to 4; very important to 5) and presented them as means ± standard deviation.

3.5. Perception of KM for scoliosis

Regardless of their experience with treating scoliosis, we asked all 676 respondents to answer this section of the questionnaire. We provided a 5-point scale (not at all/no/usually/yes/it really is) and counted the number of "yes" and "it really is" responses. KMDs considered all factors as having more than 50% importance, and >80% considered "relieving pain" [n = 635 (93.9%)], "improving QOL" [n = 631 (93.3%)], "improving function" [n = 617 (91.3%)], and "improving work efficiency" [n = 607 (89.8%)] as important. KMDs showed relatively low agreement for the other factors, including "delaying progress" [n = 530 (78.4%)], "reducing the need for surgery" [n = 520 (76.9%)], "reducing the need for orthosis" [n = 497 (73.5%)], and "improving appearance" [n = 425 (62.9%)] (Section 7 in Supplement 1, Table 5, http://links.lww.com/MD/H29).

4. Discussion

The SOSORT committee held a consensus meeting in Milan in 2005 and published the first version of scoliosis guidelines in 2006.[6] Regarding treatment, the guidelines provided the systematic application of conservative treatment according to the Cobb angle and maturity. The latest version,[7] published in 2018, incorporated evidence-based clinical practice approaches and provided detailed information on each treatment. KM and TCM treatments were mentioned as possible alternative treatment approaches for scoliosis, and improvements in the condition have been reported in several articles. One report described patient with degenerative scoliosis who was treated using acupuncture. Through a randomized clinical trial, Wei et al showed that a combination treatment using acupotomy, Chuna, and Daoyin exercise could be beneficial for the treatment of scoliosis.[8,18] However, no efforts have been made to establish CPGs for ideal application. Therefore, we conducted this survey to elucidate the clinical status and collect preliminary data that would help establish a KM-CPGs for the future. For systematic data collection, a questionnaire was prepared through (1) preliminary research from various references, (2) drafting and revision by KMDs with sufficient clinical experience, and (3) extramural expert review for external validity and credibility.

Our results showed that 60% of KMDs treated patients with scoliosis, and most of them encountered fewer than 10 first-visit patients with scoliosis in a month; these low figures may be associated with the low prevalence of scoliosis in Korea. In 2014, An et al performed Moiré screening and secondary radiographic tests for 413,351 10 to 11-year-old adolescents

Table 5

Perception of Korean medicine on scoliosis

Factors	The degree of perception (Points, ranked)
KM can delay the progression of scoliosis	3.994 ± 0.750 (5)
KM can relieve the pain	4.405 ± 0.612 (1)
KM can improve the appearance and body shape	3.714 ± 0.845 (8)
KM can improve the quality of life	4.334 ± 0.612 (2)
KM can improve the function (movement, activity)	4.253 ± 0.627 (3)
KM can improve work efficiency	4.225 ± 0.639 (4)
KM can reduce the need for surgery	3.947 ± 0.838 (6)
KM can reduce the need for orthosis (brace)	3.889 ± 0.831 (7)

KM = Korean medicine.
We converted 5-point scale into continuous variables (not at all to 1; no to 2; usually to 3; yes to 4; it really is to 5) and presented them as means ± standard deviation.

and diagnosed 1584 subjects with scoliosis.[19] According to the 2019 health insurance statistics,[20] medical institutions treated 94,000 patients, and KM institutions treated 8000 patients with scoliosis; therefore, it can be inferred that KM institutions are not the primary choice for patients with scoliosis. However, many teenage patients with scoliosis and patients in their 20s visited KM institutions, and the satisfaction scale for KM treatment was 6 to 7 out of 10 with a treatment period <6 months, confirming KM treatment as a possible solution for patients with scoliosis who cannot receive immediate surgical treatment due to problems associated with vertebral growth.

With respect to diagnosis, most KMDs relied on radiographic measurements and scoliosis-related factors. For the diagnosis and evaluation of scoliosis, radiography is the most commonly used method to assess the degree of scoliosis, to monitor progression, and to help determine the treatment course.[21] nonradiographic assessment tools, such as scoliometer, topography, Moiré topography, grid panel, and posture application, have been used to reduce the number of radiographs, but our results indicated their low usefulness due to limitations in reliability and validity.[22] We considered the factors used to classify scoliosis (age and underlying disease) and evaluation for a musculoskeletal disorder (pain information and range of motion) as scoliosis-related factors, and these factors were considered important in the diagnosis. In contrast, questionnaire scores and pattern identification were relatively less necessary for diagnosing scoliosis, and their use was found to be infrequent.

There were 2 interesting results in the treatment section. First, KMDs usually used multiple KM treatments. There were differences in the frequency of use; however, we confirmed statistically that KMDs used 4 KM techniques. Second, the perception of treatment importance section showed that all KM treatments scored higher for nonstructural scoliosis than for structural scoliosis. This result is consistent with clinical practice and with the findings of a previous study that used multiple KM treatments.[8] In addition, it would be helpful to elucidate the characteristics of KM treatment and its role in scoliosis.

The KM treatment that most KMDs used for scoliosis was acupuncture. This may be due to the analgesic effects of acupuncture. Acupuncture has been shown to reduce pain in previous studies, and the American College of Physicians suggested that acupuncture had a moderate analgesic effect in their guidelines for chronic low back pain.[23,24] With respect to scoliosis, acupuncture is considered to increase blood flow and induce environmental changes in the related muscles.[25,26] Acupotomy and thread embedding acupuncture showed low response rates in this survey; however, these techniques are known to help relieve muscle tone, improve the balance of related muscles, and promote tissue regeneration.[27,28]

Chuna, another commonly used KM treatment, corrects the displacement of structures with thrust and mobilization. Chuna also includes other manual techniques, such as manipulation (spine, joint, and visceral), soft tissue release, craniosacral therapy, and diaplasis techniques.[29] According to the systematic review by Lee et al, Chuna was considered to safely and effectively reduce pain and improve function in musculoskeletal diseases.[30] Our survey showed that there was no difference in the importance of Chuna or Daoyin exercise between nonstructural and structural scoliosis. Thus, these manual therapies may be beneficial regardless of the type of scoliosis.

Among other KM treatments, cupping has also been suggested as a method to decrease the symptoms of spinal disorders. Mardani-Kivi et al reported that the therapeutic effect of cupping could be more long lasting than that of conventional therapy for persistent low back pain.[31] Another previous study also suggested the efficacy of other KM treatments (pharmacopuncture and herbal medicine) for spinal disorders, thereby emphasizing their usefulness.[32]

The results of the "progress and prognosis" and "perception of KM" sections were also in accordance with the findings of previous guidelines or studies. With respect to the "progress and prognosis" section, the 2012 SOSORT guidelines[33] suggested 3 to 6 months as the appropriate interval for evaluation, which was in agreement with the opinions of the surveyed KMDs. However, previous guidelines considered radiographic indicators as important, whereas KMDs prioritized current patient symptoms. Regarding the perception of KM, KMDs recognized that KM was helpful in relieving symptoms caused by scoliosis (pain, functional issues, and worsened QOL) rather than being helpful in preventing the progression of scoliosis (prevention of the need for surgery and braces). We inferred that KMDs considered KM as a conservative treatment for scoliosis. This result is consistent with the findings previous studies that showed that KM aided in the improvement of QOL for other diseases.[34–36] Meanwhile, there was difference between the median score of perception of KM and patients' satisfaction score based on 10-point scale (perception of KM score 8 vs patients' satisfaction score 6). We interpreted this difference was originated by the favorable view by KMD and few cases that scoliosis can be cured by conservative treatment alone. It would be helpful to understand the KM treatment's role as conservative treatment in scoliosis.

To our knowledge, this study is the first to investigate the current clinical practices surrounding scoliosis treatment and analyze the perception of KMDs. With the opinion of KMDs, it would be helpful to establish the KM-CPGs for scoliosis using the opinions of KMDs. However, there are some limitations of this study. Despite sending the e-mail 2 times to increase the response rate, the participation rate was as low as 393 responses in previous study.[37] In addition, some KMDs could not participate in this survey because of unfamiliarity with electronic surveys; respondents > 60 years of age accounted for only 2.5% of the total participants. Therefore, the findings may not be representative of the opinions of all KMDs. Furthermore, the survey was limited to KMDs, and the results may have overestimated the treatment effect and been subject to recall bias. It would be necessary to include the opinions of other practitioners, such as doctors, physical therapists, and patients, regardless of the satisfaction with treatment. Other minor limitation includes the interpretation scale rating as continuous variables.[38] Nevertheless, this preliminary data could be the basis for developing KM-CPGs.

Author contributions

Investigation: Seong-Kyeong Choi, Hyo-Rim Jo
Methodology: Sun-Haeng Lee, Yoon-Jae Lee, In-Hyuk Ha
Project administration: Byung-Kwan Seo, Hoe-Cheon Yang, Seung-Ug Hong, Dong-Ho Keum
Supervision: Eun-Jung Kim
Writing—original draft: Won-Suk Sung
Writing—review & editing: Seo-Hyun Park, Eun-Jung Kim

References

[1] The Society of Korean Medicine Rehabilitation. Korean Rehabilitation Medicine. 5th ed. Seoul: Kunja; 2020.
[2] Park SH, Sung WS, Lee SH, et al. The effectiveness and safety of Chuna manual therapy on scoliosis: a protocol for systematic review and meta-analysis. Medicine (Baltim). 2021;100:e24778.
[3] Eksi MS, Özcan-Eksi EE, Huet SE, et al. Prevalence of thoracic scoliosis in adolescents in Turkey: analysis of 1065 chest radiographs. World Neurosug. 2020;135:e527–540.
[4] Janicki JA, Alman B. Scoliosis: review of diagnosis and treatment. Paediatr Child Health. 2007;12:771–6.
[5] Choi SK, Jo HR, Park SH, et al. The effectiveness and safety of acupuncture for scoliosis: a protocol for systematic review and/or meta-analysis. Medicine (Baltim). 2020;99:e23238.
[6] SOSORT Guideline Committee. Indications for conservative management of scoliosis (guidelines). Scoliosis. 2006;1:5.
[7] Negrini S, Donzelli S, Aulisa AG, et al. 2016 SOSORT guidelines: orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. Scoliosis Spinal Disord. 2018;13:3.
[8] Wei H, Xu J, Jiang Z, et al. Effect of a traditional Chinese medicine combined therapy on adolescent idiopathic scoliosis: a randomized controlled trial. J Tradit Chin Med. 2015;35:514–9.
[9] Liu CT, Chen KC, Chiu EHH. Adult degenerative scoliosis treated by acupuncture. J Altern Complement Med. 2009;15:935–7.
[10] Lee SW, Chu HY, Kim H, et al. A review of the domestic trends of Korean traditional medicine for idiopathic scoliosis. J Korean Med Rehabil. 2020;30:55–64.
[11] https://nikom.or.kr/nckm/module/practiceGuide/index.do?menu_idx=14.
[12] Shin YS, Shin JS, Lee J, et al. A survey among Korea Medicine doctors (KMDs) in Korea on patterns of integrative Korean Medicine practice for lumbar intervertebral disc displacement: preliminary research for clinical practice guidelines. BMC Complement Altern Med. 2015;15:432.
[13] Choi J, Jun JH, Kim JU, et al. Korean medicine clinical practice guideline on acupuncture for acute ankle sprains in adults: evidence-based approach. EUJIM. 2018;12:182–8.
[14] Choi HS, Lee YJ, Kim MR, et al. Survey of integrative treatment practices of Korean medicine doctors for cervical disc herniation: preliminary data for clinical practice guidelines. Evid Based Complement Alternat Med. 2019;2019:2345640.
[15] Lee JS, Lee DH, Suh KT, et al. Validation of the Korean version of the Scoliosis Research Society-22 questionnaire. Eur Spine J. 2011;20:1751–6.
[16] Heo I. Chuna manual therapy for spinal scoliosis: a review of clinical study. J Korean CHUNA Manual Med Spine Nerves. 2019;14:39–47.
[17] Korean Society of Chuna Manual Medicine for Spine & Nerves. Chuna Manual Medicine. 2nd ed. Seoul: Korean Society of Chuna Manual Medicine for Spine & Nerves; 2014.
[18] Liu CT, Chen KC, Chiu EHH. Adult degenerative scoliosis treated by acupuncture. J Altern Complement Med. 2009;15:935–7.
[19] An KC, Park DH, Kong GM, et al. Prevalence study of adolescent idiopathic scoliosis in ten-, eleven-year olds for 10 years. J Korean Orthop Assoc. 2015;50:25–30.
[20] https://www.hira.or.kr/main.do.
[21] Komeili A, Westover LM, Parent EC, et al. Surface topography asymmetry maps categorizing external deformity in scoliosis. Spine J. 2014;14:973–83.
[22] Kim DJ, Choi SK, Jo HR, et al. Review study on the measurement tools of scoliosis: mainly on non-radiological methods. J Korean Med. 2021;42:75–99.
[23] Zhang Y, Wang C. Acupuncture and chronic musculoskeletal pain. Curr Rheumatol Rep. 2020;22:80.
[24] Qaseem A, Wilt TJ, McLean RM, et al. Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. Ann Intern Med. 2017;166:514–30.
[25] Takayama S, Watanabe M, Kusuyama H, et al. Evaluation of the effects of acupuncture on blood flow in humans with ultrasound color Doppler imaging. Evid Based Complement Alternat Med. 2012;2012:513638.
[26] Kim SY, Min S, Lee H, et al. Changes of local blood flow in response to acupuncture stimulation: a systematic review. Evid Based Complement Alternat Med. 2016;2016:9874207.
[27] Yang XY, Chen ZR, Zhao DC, et al. Clinical efficacy evaluation of needle-knife for lumber disc herniation based on surface electromyography signals. Zhongguo Zhen Jiu. 2014;34:798–800.
[28] Lee KH, Lee DH, Kwon KR, et al. A literary study on embedding therapy. J Pharmacopuncture. 2003;6:15–21.
[29] Park TY, Moon TW, Cho DC, et al. An introduction to Chuna manual medicine in Korea: history, insurance coverage, education, and clinical research in Korean literature. Integr Med Res. 2014;3:49–59.
[30] Lee NW, Kim GH, Kim KW, et al. Chuna (or Tuina) manual therapy for musculoskeletal disorders: a systematic review and meta-analysis of randomized controlled trials. Evid Based Complement Alternat Med. 2017;2017:8218139.
[31] Mardani-Kivi M, Montazar R, Azizkhani M, et al. Wet-cupping is effective on persistent nonspecific low back pain: a randomized clinical trial. Chin J Integr Med. 2019;25:502–6.
[32] Lee YJ, Shin JS, Lee J, et al. Survey of integrative lumbar spinal stenosis treatment in Korean medicine doctors: preliminary data for clinical practice guidelines. BMC Complement Altern Med. 2017;17:425.
[33] Knott P, Pappo E, Cameron M, et al. SOSORT 2012 consensus paper: reducing x-ray exposure in pediatric patients with scoliosis. Scoliosis. 2014;9:4.
[34] Han Y, Wang H, Xu W, et al. Chinese herbal medicine as maintenance therapy for improving the quality of life for advanced non-small cell lung cancer patients. Complement Ther Med. 2016;24:81–9.
[35] Reinhold T, Witt CM, Jena S, et al. Quality of life and cost-effectiveness of acupuncture treatment in patients with osteoarthritis pain. Eur J Health Econ. 2008;9:209–19.
[36] Li H, He T, Xu Q, et al. Acupuncture and regulation of gastrointestinal function. World J Gastroenterol. 2015;21:8304–13.
[37] Park JE, Kim KH, Kang SH, et al. Usage status and satisfaction with pharmacopuncture in Korea: a survey among Korean medicine doctors. Eur J Integr Med. 2019;27:121–30.
[38] Jamieson S. Likert scales: how to (ab)use them. Med Educ. 2004;38:1217–8.