Complementary Therapies in Clinical Practice 36 (2019) 142–152

Contents lists available at ScienceDirect

Complementary Therapies in Clinical Practice

journal homepage: www.elsevier.com/locate/ctcp

Clinical effectiveness and safety of acupotomy: An overview of systematic reviews

Chan-Young Kwon[a,*,1], Sang-Hoon Yoon[b,1], Boram Lee[a]

[a] Department of Clinical Korean Medicine, Graduate School, Kyung Hee University, 26, Kyungheedae-ro, Dongdaemun-gu, Seoul, Republic of Korea
[b] Chung-Yeon Central Medical Institute, 64 Sangmujungang-ro, Seo-gu, Gwangju, Republic of Korea

ARTICLE INFO

Keywords:
Acupotomy
Acupuncture
Review
Systematic review

ABSTRACT

Background and Purpose: Acupotomy is a modern type of acupuncture that uses a blade-needle combined with a flat surgical scalpel at its tip. This study was conducted to summarize and critically evaluate the current evidence on acupotomy.

Materials and methods: All relevant studies up to February 19, 2019, were included, through comprehensive searches in 11 electronic databases without language restrictions.

Results: Eleven systematic reviews (SRs) comprising of 69 randomized controlled trials were included, and the methodological quality was medium-to-high in AMSTAR. All the included studies reviewed musculoskeletal disorders and reported a significantly higher total effective and cure rates in the acupotomy group for frozen shoulder, cervical spondylosis, third lumbar vertebrae transverse process syndrome, trigger finger, knee osteoarthritis, and lumbar spinal stenosis, compared to the other active control groups.

Conclusion: Acupotomy showed promising results for some musculoskeletal disorders; however, additional high-quality evidence is required to make clinical recommendations regarding this procedure.

1. Introduction

In recent years, complementary and alternative medicine (CAM) has been widely used in a variety of diseases, particularly for musculoskeletal pain [1,2]. According to a recent US survey in 2016, 41.2% of patients with lower back pain, which is one of the most common painful conditions, received CAM therapies [3]. It was reported that patients used CAM due to the lack of efficacy of conventional medicine, and unwanted side effects [2]. Although most CAM therapies still require additional evidence to validate their effectiveness, some therapies, such as electro-acupuncture, have been proposed as promising alternatives to the opioid crisis [4].

Acupuncture is one of the most recognized CAM therapies, and its effectiveness and safety for various conditions, including pediatric disorders [5], stroke [6], gynecologic conditions [7], cancer care [8], and pain [9] has been extensively studied. Acupotomy, a type of acupuncture, uses a blade-needle combined with a flat surgical scalpel at the tip of the needle (Fig. 1) [10]. Though it has been called Feng Zhen in ancient literature, acupotomy was re-invented and refined by Professor Zhu Hanzhang in China in 1976 [10]. Since then, this type of acupuncture has been widely used for the treatment of musculoskeletal pain such as chronic neck pain [11], knee osteoarthritis [12], herniated intervertebral disc [13], myofascial pain syndrome [14], and plantar fasciitis [15]; it has been described with similar terminologies such as acupotomology, acupotome, needle knife, needle scalpel, miniscalpel, stiletto needle, sword like needle, mini needle knife, and xiaozhendao.

Acupotomy involves stripping adhesions and releasing contractures of deep soft tissues through the flat knife at the tip of the needle [16]. Both animal and clinical studies have shown the inflammation reduction, pain threshold elevation, pain-relieving, and apoptosis-reducing actions of acupotomy treatment; they have also reported the down-regulation of inflammatory factors such as interleukin-1β, interleukin-6, and tumor necrosis factor-α [17]. Additionally, the pressure-pain threshold was elevated [18], nitric oxide synthase was lowered [19], and mRNA expressions of Bax and Caspase-3 were down-regulated [20]. According to a recent network meta-analysis which analyzed the effects of various acupuncture treatments on myofascial pain syndrome, acupotomy was more effective in improving the pressure pain threshold compared with manual acupuncture (or dry needling), and electro-acupuncture [21]. Thus, acupotomy has become a new alternative to existing nonpharmacological interventions, including conventional acupuncture. However, since the safety of acupotomy has rarely been

* Corresponding author.
E-mail addresses: beanalogue@naver.com, beanalogue@khu.ac.kr (C.-Y. Kwon), chin9yaaaa@gmail.com (S.-H. Yoon), qhfka9357@naver.com (B. Lee).
[1] These authors contributed equally to this work (co-first authors).

https://doi.org/10.1016/j.ctcp.2019.07.002
Received 20 March 2019; Received in revised form 3 July 2019; Accepted 3 July 2019

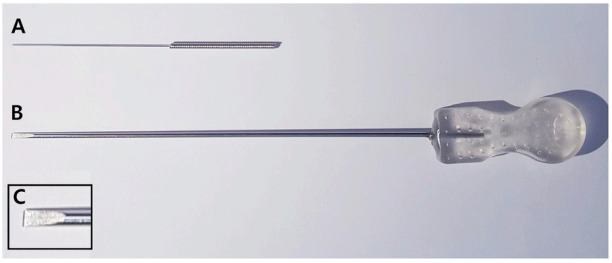

Fig. 1. Image of Filiform Needle and Acupotomy Needle.
A, filiform acupuncture needle (Dongbang Medical Co., Korea); 0.25 mm × 30 mm. B, acupotomy needle (Dongbang Medical Co., Korea); 1.0 mm × 80 mm. C, tip of an acupotomy needle.

systematically reviewed [22], safety studies are of interest.

Consequently, acupotomy has been actively studied and many systematic reviews (SRs) and/or meta-analyses of acupotomy have recently been published. Therefore, it is necessary to summarize the status of the evidence on this topic for evidence-based decision making in clinical practice. The objective of this article is to provide an overview and critical evaluation of evidence from SRs on the effectiveness and safety of acupotomy as a monotherapy.

2. Methods

2.1. Search strategy

Two researchers (CYK and SHY) independently performed comprehensive searches in Medline (via PubMed), EMBASE (via Elsevier), the Cochrane Library, the Allied and Complementary Medicine Database (AMED), the Cumulative Index to Nursing & Allied Health Literature (CINAHL), three Chinese databases (the China National Knowledge Infrastructure [CNKI], Wanfang data, and VIP), and three Korean databases (the Korean studies Information Service System [KISS], the Oriental Medicine Advanced Searching Integrated System [OASIS], and the Research Information Sharing Service [RISS]). All relevant studies published through February 19, 2019, without language restrictions, were included. To identify missing articles, the reference lists of included studies were reviewed, and Google scholar was searched. The search strategy consisted of two parts: systematic review OR meta-analysis OR meta-analysis, which corresponds to the study design; and acupotomy OR acupotomology OR acupotome OR needle knife OR needle scalpel OR miniscalpel OR stiletto needle OR sword like needle OR mini needle knife OR xiaozhendao, which corresponds to the intervention. Search strategies for each database are presented in Appendix 1.

2.2. Study selection

We included SRs and/or meta-analyses of randomized controlled clinical trials (RCTs) or quasi-randomized controlled clinical trials (quasi-RCTs) evaluating the effectiveness of acupotomy as a monotherapy compared with no treatment, usual care, or active controls such as Western medication, massage, and conventional acupuncture. There were no restrictions on target disease or disorder, or on outcome measures. In this overview, acupotomy was defined as acupuncture to strip adhesions and release contractures of deep soft tissues through a flat knife at the tip of the needle. Cases were excluded if they: (i) were not SRs, (ii) compared different manual methods of acupotomy, (iii) assessed the effectiveness of acupotomy combined with other interventions, or (iv) did not analyze the effectiveness or safety of acupotomy on humans, e.g. SR of animal studies. Two researchers (CYK and SHY) independently assessed the eligibility of the searched articles, and any disagreements were resolved through discussion under the arbitration of the third reviewer (BL).

2.3. Data extraction

Using a predefined standardized data collection form, two researchers (CYK and SHY) independently extracted data from the included reviews. The data extracted were: country, target disease, the number of trials and participants, experimental and control interventions, outcome measures, results, conclusion, adverse events (AEs), details on the assessment of methodological quality, and precautions in interpretation of the data. Any disagreements were resolved through discussion under the arbitration of the third reviewer (BL).

2.4. Quality assessment

Using the assessment of multiple systematic reviews (AMSTAR) instrument [23], two researchers (CYK and SHY) independently assessed the quality of included reviews. This validated assessment tool evaluated the methodological quality of the SR. Evaluators assessed 11 items with “Yes”, “No”, “Can't answer”, or “Not applicable”, resulting in scores ranging from 0 to 11 points. A score of less than 4 points was defined as low-quality, between 5 and 7 points was medium-quality, and a score of 8 points or more was high-quality [24]. Any disagreements were resolved through discussion under the arbitration of the third reviewer (BL).

2.5. Quality of evidence

Using the grading of recommendations, assessment, development, and evaluation (GRADE) approach [25], two researchers (CYK and SHY) independently assessed the quality of evidence for each main finding. This assessment tool evaluates the quality of evidence in five main domains: risk of bias, inconsistency, indirectness, imprecision of results, and probability of publication bias. Evaluators graded the quality of evidence as “Very low,” “Low,” “Moderate,” or “High.” Any disagreements were resolved through a discussion under the arbitration of the third reviewer (BL).

2.6. Data analysis

Due to the statistical and clinical heterogeneity of the included studies, qualitative, but not quantitative analysis was performed. However, the data obtained from each SR were presented as the odds ratio (OR) or risk ratio (RR) for dichotomous data, and mean difference (MD) or standardized mean difference (SMD) for continuous data, with 95% confidence intervals (CIs).

3. Results

3.1. Description of included studies

We identified 1613 studies through eleven database searches. After removing 124 duplications, the titles and abstracts of the remaining 1489 studies were screened for first exclusion. Then, the full texts of 70 potentially relevant articles were reviewed for eligibility. Finally, a total of 11 SRs [26–36] were included(Fig. 2).

3.2. Study characteristics

This overview included 11 SRs [26–36], comprising 69 RCTs with 7323 participants, excluding duplicated RCTs from each review. Meta-analysis was conducted in all included studies. All studies were non-Cochrane reviews and investigated musculoskeletal conditions. All the first authors of the included SRs were from China. Three reviews (27.27%) [26,28,30] analyzed the effectiveness of acupotomy for frozen shoulder, and two each analyzed for cervical spondylosis [27,34], trigger finger [32,33], or third lumbar vertebrae transverse process syndrome (18.18% each) [31,36]. One each evaluated the

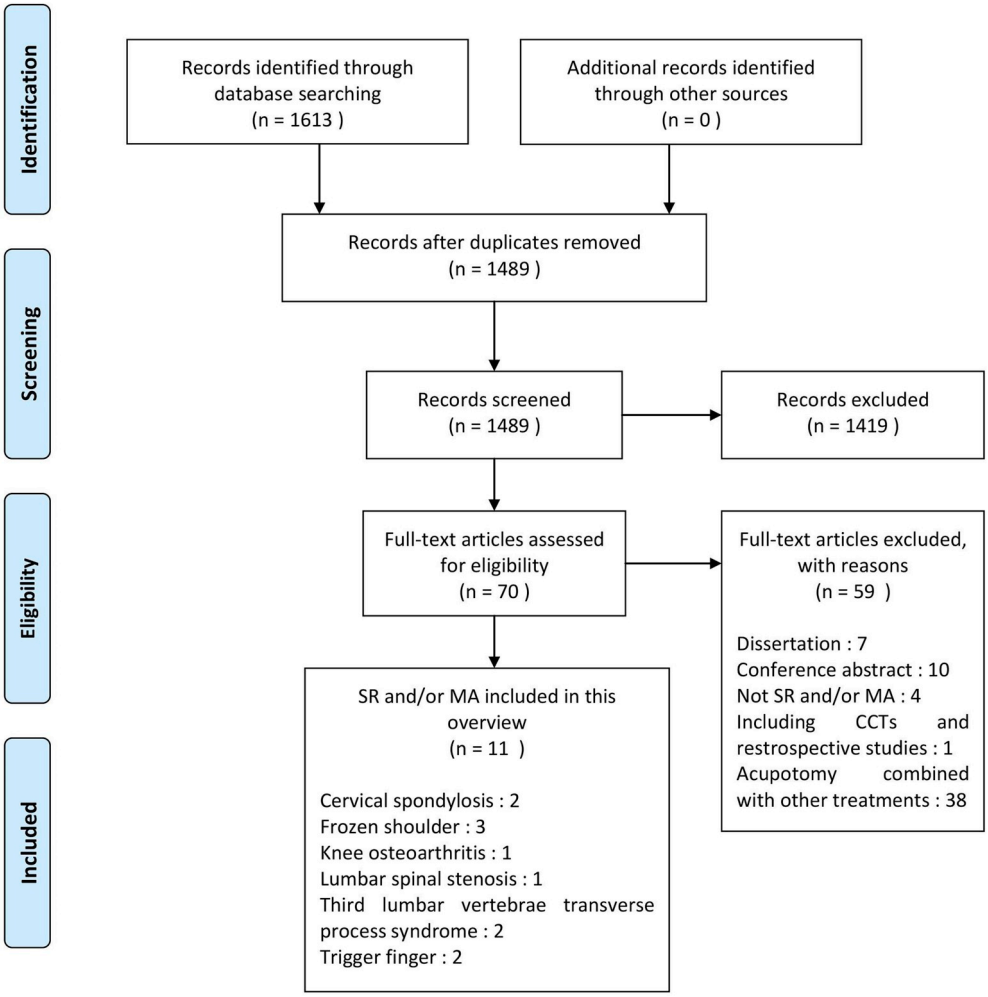

Fig. 2. PRISMA Flow Chart.
Abbreviations. CCT, nonrandomized controlled trial; MA, meta-analysis; SR, systematic review.

effectiveness of acupotomy for knee osteoarthritis and lumbar spinal stenosis (9.09% each) [29,35]. In most cases, clinical effective rates, including the cure rate (CR) [26,28,30–34,36], total effective rate (TER) [26–36], and rarely not cured but improvement rate (NCIR) [33], were used as outcome measures. In Chinese clinical trials, participants are generally classified as “cured,” “improved,” or “non-responder” according to symptom improvement after intervention. These outcomes, CR, TER, and NCIR, are defined as the percentage of “cured,” both “cured” and “improved,” and “improved,” for the total sample size, respectively. Some studies used the visual analog scale (VAS) [31] and the Japanese orthopedic association (JOA) scores [35] as outcome measures. The characteristics of the included SRs are summarized in Table 1.

3.3. Methodological quality

According to the AMSTAR checklist, four reviews (36.36%) [29,31,33,34] were considered high-quality, with a mean score of 8.25. The remaining seven (63.64%) [26–28,30,32,35,36] were rated medium-quality, with a mean score of 6.71. There was no review that pre-registered the study protocol. Study selection and the data extraction process were conducted by two independent researchers in most reviews (81.82%) [27–31,33–36]. Four (36.36%) [27,28,30,36] were evaluated as not performing a comprehensive literature search, as they did not refer to the supplemental data sources. In nine (81.82%) [26–33,36], the status of publication as inclusion criteria in their search strategies was mentioned. All presented the list of included studies, but not the list of excluded studies. Nine (81.82%) [26,28–34,36] presented the characteristics of the included studies. All assessed the methodological quality of the included studies, six [26–29,32,33] of which used the Jadad scale or modified Jadad scale, three [30,31,35] used Cochrane Collaboration's “Risk of Bias (ROB)” tool, and two [34,36] used both the Jadad scale and ROB tool. Ten (90.90%) [26–34,36] were deemed to have used the scientific quality of the included studies in formulating conclusions appropriately. All were assessed to use appropriate methods for combining the findings. Seven (63.64%) [27,29,31–35] assessed the likelihood of publication bias, and seven (63.64%) [26–28,33–36] stated conflicts of interest (Table 2).

3.4. Clinical effectiveness of acupotomy

3.4.1. Frozen shoulder

Three SRs [26,28,30], comprising 9 RCTs with 765 participants, assessed the effectiveness of acupotomy on frozen shoulder. All these studies performed meta-analysis and compared the effectiveness of acupotomy with acupuncture [26], with other treatments including nerve block, acupuncture, and tuina [28], and with nerve block [30]. All used CR and TER as outcome measures.

Liu et al. [26] found that acupotomy was associated with a significantly higher CR (OR 5.39, 95% CI 3.48 to 8.32) and TER (OR 7.70, 95% CI 2.58 to 22.99) compared to acupuncture, but concluded that further rigorously designed RCTs are still needed to confirm the

Table 1
Characteristics of included systematic reviews.

First author (year)	First author's country	Disease	Studies (total sample)	Search duration	Control intervention	Main results (meta-analysis)	Key conclusion	Precautions in interpretation
Liu et al., 2012 [26]	China	Frozen shoulder	6 RCTs (570)	Inception-2010.12.	Acupuncture	Acupotomy vs. Acupuncture; 1) CR at post-treatment (6 RCTs) : OR 5.39, 95% CI 3.48 to 8.32 2) TER at post-treatment (6 RCTs) : OR 7.70, 95% CI 2.58 to 22.99	Acupotomy is superior to acupuncture in the treatment of frozen shoulder.	However, due to low quality of included studies, rigorously designed RCTs are needed to confirm the conclusions.
Kan et al., 2013 [27]	China	Cervical spondylosis	13 RCTs (1419)	2000.-2012.	Not limited	Acupotomy vs. Acupuncture; 1) TER at post-treatment (9 RCTs) : RR 1.27, 95% CI 1.19 to 1.35 Acupotomy vs. Traction therapy; 1) TER at post-treatment (4 RCTs) : RR 1.30, 95% CI 1.18 to 1.42	Compared with acupuncture or traction therapy, the overall efficacy of acupotomy is higher.	However, due to small sample size, the outcome cannot be entirely sure. Large sample, multi-center, high quality RCTs are needed to confirm the efficacy.
Wu et al., 2013 [28]	China	Frozen shoulder	6 RCTs (487)	Inception-2013.06.	Not limited	Acupotomy vs. Other treatments (e.g. nerve block, acupuncture, tuina); 1) CR at post-treatment (6 RCTs) : OR 4.96, 95% CI 3.12 to 7.87 2) TER at post-treatment (6 RCTs) : OR 6.31, 95% CI 2.83 to 14.06	Acupotomy is superior to other treatments in the treatment of frozen shoulder.	However, due to small number and low quality of included studies, more large-sample and high-quality RCTs are needed.
Lu et al., 2014 [29]	China	Knee osteoarthritis	6 RCTs (494)	2003.01.-2013.12.	Not limited	Acupotomy vs. Other treatments (e.g. electro-acupuncture, massage, sodium hyaluronate injection, acupuncture, NSAIDs); 1) TER at post-treatment (6 RCTs) : OR 6.31, 95% CI 2.83 to 14.06 2) Pain score at post-treatment (6 RCTs) : SMD -0.01, 95% CI -0.19 to 0.16	The use of acupotomy can improve the clinical symptoms of knee osteoarthritis.	However, due to some methodological limitations such as blinding and small sample size of included studies, more large-sample and high-quality RCTs are needed.
Ma et al., 2014 [30]	China	Frozen shoulder	2 RCTs (115)	Inception-2013.05.	Nerve block	Acupotomy vs. Nerve block[a]; 1) CR at post-treatment (2 RCTs) : OR 1.89, 95% CI 0.88 to 4.05 2) CR at 3–6 mo f/u (2 RCTs) : OR 13.39, 95% CI 3.82 to 46.92 3) TER at post-treatment (1 RCT) : OR 3.51, 95% CI 0.82 to 15.03 4) TER at 3–6 mo f/u (2 RCTs) : OR 10.67, 95% CI 3.83 to 29.74	Acupotomy may be superior to nerve block in the treatment for frozen shoulder.	However, due to low quality of the included studies, rigorously designed RCTs are needed to confirm the conclusion.
Gao et al., 2016 [31]	China	Third lumbar vertebrae transverse process syndrome	11 RCTs (1238)	NR	Not limited	Acupotomy vs. Other treatments (e.g. nerve block, acupuncture, tuina); 1) CR at post-treatment (11 RCTs) : OR 5.28, 95% CI 3.30 to 8.44 2) TER at post-treatment (11 RCTs) : OR 5.80, 95% CI 3.93 to 8.55 3) VAS at post-treatment (5 RCTs) : MD -1.66, 95% CI -2.34 to −0.98	Acupotomy is more effective than other treatments on improving CR, TER and reducing pain.	However, more high quality studies with large-scales are needed to verify the findings because of the limited qualities and sample sizes of the included studies.
Xie et al., 2016 [32]	China	Trigger finger	7 RCTs (1174)	Inception-2015.03.	Nerve block	Acupotomy vs. Nerve block; 1) CR at post-treatment (7 RCTs) : OR 7.86, 95% CI 5.75 to 10.74 2) TER at post-treatment (7 RCTs) : OR 9.07, 95% CI 4.64 to 17.76	The curative effect of acupotomy was better than that of nerve block.	Since the study included limited number of trials, the quality of the literature was not high, and the funnel plot showed publication bias, so the conclusion need to be validated by more rigorous RCTs.

(*continued on next page*)

Table 1 (*continued*)

First author (year)	First author's country	Disease	Studies (total sample)	Search duration	Control intervention	Main results (meta-analysis)	Key conclusion	Precautions in interpretation
Zhang et al., 2016 [33]	China	Trigger finger	10 RCTs (1426)	Inception-2015.08.	Nerve block	Acupotomy vs. Nerve block; 1) CR at post-treatment (10 RCTs) : OR 13.11, 95% CI 8.23 to 20.89 2) NCIR at post-treatment (10 RCTs) : OR 0.14, 95% CI 0.10 to 0.19 3) TER at post-treatment (10 RCTs) : OR 18.26, 95% CI 9.95 to 33.50	Acupotomy for stenosing tenovaginitis of flexor digitorum is superior to local blocking injection.	Because the quality of the included RCTs is low, more large-sample, multi-center, and high-quality clinical RCTs are required for further verification.
Zhao et al., 2016 [34]	China	Cervical spondylosis	7 RCTs (825)	Inception-2016.10.	Other TCM treatments	Acupotomy vs. Other TCM treatments (e.g. acupuncture, manipulation, etc.); 1) CR at post-treatment (7 RCTs) : OR 2.12, 95% CI 1.59 to 2.83 2) TER at post-treatment (7 RCTs) : OR 5.96, 95% CI 3.61 to 9.84	Acupotomy is effective in the treatment of cervical spondylosis, and the procedure of acupotomy should be further improved for its safety.	However, due to small number and low quality of included studies, more rigorous RCTs are needed.
Lyu et al., 2017 [35]	China	Lumbar spinal stenosis	8 RCTs (651)	NR	Other TCM treatments	Acupotomy vs. Other TCM treatments (e.g. acupuncture, manipulation, etc.); 1) TER at post-treatment (6 RCTs) : OR 6.52, 95% CI 3.64 to 11.69 2) JOA score at post-treatment (4 RCTs) : MD 3.29, 95% CI 1.25 to 5.33	As one of minimally invasive surgery, acupotomy has wonderful clinical effect on lumbar spinal stenosis.	NR
Chen et al., 2017 [36]	China	Third lumbar vertebrae transverse process syndrome	6 RCTs (781)	NR	Acupuncture	Acupotomy vs. Acupuncture; 1) CR at post-treatment (6 RCTs) : OR 4.25, 95% CI 3.12 to 5.78 2) TER at post-treatment (6 RCTs) : OR 5.65, 95% CI 3.32 to 9.60	Acupotomy is more effective than acupuncture in treating third lumber vertebrae transverse process syndrome.	However, because the number of trials included in this study was small and the quality was not high, and no included studies reported the adverse event, more rigorous RCTs were needed to further verify the conclusions.

Abbreviations: CI, confidence interval; CR, cure rate; JOA, Japanese orthopaedic association; MD, mean difference; NCIR, not cured but improve rate; NR, not recorded; OR, odds ratio; RCT, randomized controlled trial; RR, risk ratio; SMD, standard mean difference; TCM, traditional Chinese medicine; TER, total effective rate; VAS, visual analogue scale.

[a] In the original meta-analysis, the experimental group and the control group were set to nerve block and acupotomy, respectively. So we crossed and recalculated them.

Table 2
AMSTAR checklist assessment of included studies.

First author (year)	(1) A priori design	(2) Duplicate study selection and data extraction	(3) A comprehensive literature search	(4) Status of publication used as an inclusion criterion	(5) A list of included and excluded studies	(6) Characteristics of the included studies	(7) Quality assessed and documented	(8) Quality used appropriately in formulating conclusions	(9) Methods for combining the findings appropriate	(10) Likelihood of publication bias assessed	(11) Conflicts of interest stated	Overall quality assessment
Liu et al., 2012 [26]	N	N	Y	Y	N	Y	Y	Y	Y	N	Y	Medium (7 scores)
Kan et al., 2013 [27]	N	Y	N	Y	N	N	Y	Y	Y	Y	Y	Medium (7 scores)
Wu et al., 2013 [28]	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	Medium (7 scores)
Lu et al., 2014 [29]	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	High (8 scores)
Ma et al., 2014 [30]	N	Y	N	Y	N	Y	Y	Y	Y	N	N	Medium (6 scores)
Gao et al., 2016 [31]	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	High (8 scores)
Xie et al., 2016 [32]	N	N	Y	Y	N	Y	Y	Y	Y	Y	N	Medium (7 scores)
Zhang et al., 2016 [33]	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	High (9 scores)
Zhao et al., 2016 [34]	N	Y	Y	N	N	Y	Y	Y	Y	Y	Y	High (8 scores)
Lyu et al., 2017 [35]	N	Y	Y	N	N	N	Y	N	Y	Y	Y	Medium (6 scores)
Chen et al., 2017 [36]	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	Medium (7 scores)

Abbreviations: AMSTAR, assessment of multiple systematic reviews; N, no; Y, yes.

beneficial effects of acupotomy. Wu et al. [28] found that acupotomy was associated with a significantly higher CR (OR 4.96, 95% CI 3.12 to 7.87) and TER (OR 6.31, 95% CI 2.83 to 14.06) compared to other treatments. However, they noted that larger high-quality RCTs are needed to confirm their findings. In the study by Ma et al. [30], the experimental intervention and control intervention were nerve block and acupotomy, respectively, so we crossed and recalculated them. According to the recalculation, acupotomy was associated with a significantly higher CR and TER at the 3–6 months follow-up (CR: OR 13.39, 95% CI 3.82 to 46.92; TER: OR 10.67, 95% CI 3.83 to 29.74), but not at post-treatment (CR: OR 1.89, 95% CI 0.88 to 4.05; TER: OR 3.51, 95% CI 0.82 to 15.03). However, they noted that rigorously designed RCTs are needed to confirm the benefits of acupotomy due to the low quality of the included studies.

3.4.2. Cervical spondylosis

Two SRs [27,34], comprising 20 RCTs with 2244 participants, described the effectiveness of acupotomy on cervical spondylosis. All of them performed meta-analysis and compared the effectiveness of acupotomy with other treatments including acupuncture and traction therapy. Both evaluated TER, and Zhao et al. [34] also evaluated CR as an outcome measure.

In the two reviews, acupotomy was associated with a significantly higher TER compared with acupuncture (RR 1.27, 95% CI 1.19 to 1.35) [27], traction therapy (RR 1.30, 95% CI 1.18 to 1.42) [27], and other traditional Chinese medicine treatments (OR 5.96, 95% CI 3.61 to 9.84) [34]. Moreover, Zhao et al. [34] found that acupotomy was associated with a significantly higher CR (OR 2.12, 95% CI 1.59 to 2.83) compared to other traditional Chinese medicine treatments. However, all studies noted that more rigorous high-quality RCTs are required due to small sample size and the low quality of the included RCTs.

3.4.3. Third lumbar vertebrae transverse process syndrome

Two SRs [31,36], comprising 14 RCTs with 1499 participants, described the effectiveness of acupotomy on third lumbar vertebrae transverse process syndrome, which is a common cause of backache and sciatica [37]. All reviews performed meta-analysis and compared the effectiveness of acupotomy with other treatments including nerve block, acupuncture, and tuina [31], and with acupuncture [36]. Both evaluated CR and TER, and Gao et al. [31] also evaluated VAS as outcome measures.

Gao et al. [31] found that acupotomy was associated with a significantly higher CR (OR 5.28, 95% CI 3.30 to 8.44) and TER (OR 5.80, 95% CI 3.93 to 8.55), and a significantly lower VAS score (MD -1.66, 95% CI -2.34 to −0.98) compared to other treatments. Moreover, Chen et al. [36] found that acupotomy was associated with a significantly higher CR (OR 4.25, 95% CI 3.12 to 5.78) and TER (OR 5.65, 95% CI 3.32 to 9.60) compared to acupuncture. However, both studies stated that larger, high-quality RCTs are needed to confirm their findings.

3.4.4. Trigger finger

Two SRs [32,33], comprising 12 RCTs with 1670 participants, described the effectiveness of acupotomy on trigger finger. All performed meta-analysis and compared the effectiveness of acupotomy with nerve block. Both evaluated CR and TER, and Zhang et al. [33] also evaluated NCIR as an outcome measure.

Xie et al. [32] and Zhang et al. [33] found that acupotomy was associated with a significantly higher CR (OR 7.86, 95% CI 5.75 to 10.74; OR 13.11, 95% CI 8.23 to 20.89, respectively) and TER (OR 9.07, 95% CI 4.64 to 17.76; OR 18.26, 95% CI 9.95 to 33.50, respectively) compared to nerve block. Moreover, Zhang et al. [33] found that acupotomy was associated with a significantly lower NCIR (OR 0.14, 95% CI 0.10 to 0.19) compared to nerve block. However, both studies highlighted the need of larger, rigorous high-quality RCTs due to the limited number and low quality of trials included, and potential publication bias.

3.4.5. Knee osteoarthritis

One SR [29], comprising 6 RCTs with 494 participants, described the effectiveness of acupotomy on knee osteoarthritis. Lu et al. [29] performed meta-analysis and compared the effectiveness of acupotomy with other treatments including electro-acupuncture, massage, sodium hyaluronate injection, acupuncture, and oral non-steroidal anti-inflammatory drugs. They used the TER and pain score as outcome measures. In the meta-analyses, acupotomy was associated with a significantly higher TER (OR 6.31, 95% CI 2.83 to 14.06); however, there was no significant difference between the two groups for pain scores including the Knee Society Score, Numeral Rating Scale, the Western Ontario and McMaster Universities Osteoarthritis Index, and VAS (SMD -0.01, 95% CI -0.19 to 0.16). They highlighted that acupotomy can improve the clinical symptoms of knee osteoarthritis; however, larger sample sizes and higher-quality RCTs are needed.

3.4.6. Lumbar spinal stenosis

One SR [35], comprising 8 RCTs with 651 participants, described the effectiveness of acupotomy on lumbar spinal stenosis. Lyu et al. [35] performed meta-analysis and compared the effectiveness of acupotomy with other traditional Chinese medicine interventions, including acupuncture and manipulation. They used the TER and JOA score as outcome measures. In the meta-analyses, acupotomy was associated with a significantly higher TER (OR 6.52, 95% CI 3.64 to 11.69) and JOA score (MD 3.29, 95% CI 1.25 to 5.33). They highlighted that this treatment, which is a minimally invasive surgery, has clinical benefit for lumbar spinal stenosis.

3.5. Safety of acupotomy

Only three reviews (27.27%) [28,29,34] described the safety of acupotomy by reporting adverse reactions reported in each included RCT. In the first review [28], one RCT reported that there were no AEs in the acupotomy group, which consisted of 30 participants. Therefore, the incidence of AEs in the acupotomy group was evaluated as 0% (0/30). In the second review [29], three RCTs reported that there were no AEs in the acupotomy group, which consisted of 157 participants. Therefore, the incidence of AEs in the acupotomy group was evaluated as 0% (0/157). In the third review [34], one RCT reported two AEs in the acupotomy group, which consisted of 25 participants. The AEs were numbness and pain near treatment site. The relevance between the described AEs and acupotomy was assessed to be clear, and the incidence of AEs in acupotomy group was evaluated as 8% (2/25) (Table 3).

3.6. Quality of evidence

Based on the GRADE approach, the quality of evidence for quantitative synthetic results in the included SRs was evaluated (Table 4). The quality of most evidence was graded “Very low” or “Low,” with three and one findings being graded as “Moderate” and “High”, respectively. The main reason for downgrading was the high risk of bias in the RCTs included in each SR, most notably, high performance bias and detection bias. Given that most studies evaluated TER or CR as the outcome measures, which includes the evaluator's clinical judgment, these high risks of bias may result in overestimation of the effect size of the intervention. In addition, we downgraded the quality of evidence in the indirectness category if the criteria of the control group were broad and unspecified, for example, comparing acupotomy with other treatments or other traditional Chinese medicine treatments. Moreover, the quality of some findings was downgraded because potential publication bias could not be ruled out.

4. Discussion

This overview aimed to summarize and critically evaluate the

Table 3
The reported adverse events in included studies.

First author (year)	AEs	Relevance between AEs and acupotomy
Liu et al., 2012 [26]	NR	Not applicable
Kan et al., 2013 [27]	NR	Not applicable
Wu et al., 2013 [28]	One RCT (1/6, 16.67%) reported AEs: there were no AEs in acupotomy group. Incidence of AEs in acupotomy group: 0/30, 0%	Not applicable
Lu et al., 2014 [29]	Three RCTs (3/6, 50.00%) reported AEs: there were no AEs in acupotomy group. Incidence of AEs in acupotomy group: 0/157, 0%	Not applicable
Ma et al., 2014 [30]	NR	Not applicable
Gao et al., 2016 [31]	NR	Not applicable
Xie et al., 2016 [32]	NR	Not applicable
Zhang et al., 2016 [33]	NR	Not applicable
Zhao et al., 2016 [34]	One RCT (1/7, 14.29%) reported AEs: 2 cases of numbness and pain near treatment site in acupotomy group. Incidence of AEs in acupotomy group: 2/25, 8%	Clear
Lyu et al., 2017 [35]	NR	Not applicable
Chen et al., 2017 [36]	NR	Not applicable

Abbreviations: AE, adverse event; NR, not recorded; RCT, randomized controlled trial.

effectiveness and safety of acupotomy, based on currently available SRs. Through a comprehensive search, we included 11 relevant SRs [26–36] in the overview. The most frequent target disease was frozen shoulder [26,28,30], with the remaining also related to musculoskeletal conditions, including cervical spondylosis [27,34], third lumbar vertebrae transverse process syndrome [31,36], trigger finger [32,33], knee osteoarthritis [29], and lumbar spinal stenosis [35]. All studies performed meta-analyses. Most studies included the TER [26–36] and CR [26,28,30–34,36] as outcome measures, and some studies used the VAS [31], NCIR [33], and JOA score [35]. In most cases, the methodological quality was rated as medium, based on the AMSTAR checklist.

For frozen shoulder, acupotomy showed superior results in CR and TER compared to acupuncture [26] and other treatments (e.g. nerve block, tuina, and acupuncture) [28]. Interestingly, when acupotomy was compared with nerve block [29], there was no significant difference in post-treatment CR and TER, but acupotomy was significantly better in CR and TER at the 3–6 months follow-up. For cervical spondylosis, acupotomy showed consistently superior results in CR and TER compared to acupuncture, traction therapy [27], and other traditional Chinese medicine treatments (e.g. manipulation and acupuncture) [34]. In addition, for third lumbar vertebrae transverse process syndrome, acupotomy showed consistently superior results in CR and TER compared to existing treatments (e.g. nerve block, acupuncture, and tuina) [31] and acupuncture [36]. Furthermore, using the VAS score as an outcome measure, Gao et al. [31] found that the score of the acupotomy group post-treatment was significantly lower than that of the other treatments group. For trigger finger, acupotomy showed superior results in CR and TER compared to nerve block [32,33]. In Zhang et al. [33], NCIR at post-treatment was significantly higher in control group, while both CR and TER at post-treatment were significantly higher in the acupotomy group. These findings suggest that both the treatment response (higher TER) and the degree of improvement (higher CR and lower NCIR) were superior in the acupotomy group. For knee osteoarthritis, acupotomy showed superior results in TER compared to existing treatments (e.g. electro-acupuncture, massage, sodium hyaluronate injection, acupuncture, and oral non-steroidal anti-inflammatory drugs) [29]. For lumbar spinal stenosis, acupotomy showed superior results in the TER and JOA score compared to other traditional Chinese medicine treatments (e.g. acupuncture and manipulation) [35], suggesting that acupotomy is effective in improving function in patients with lumbar spinal stenosis. Although, the included studies have reported that acupotomy may improve or cure clinical symptoms or movement limitations, they do not suggest that acupotomy can correct or cure the pathological structures of lumbar spinal stenosis.

There were only three reviews (27.27%) [28,29,34] that reported AEs, and no serious AEs were reported. Most reported AEs were mild and were associated with acupotomy procedures; they included numbness and pain near the treatment site. According to the studies, the incidence of AEs related with acupotomy ranged from 0% to 8%.

Despite overall promising findings, most included SRs highlighted limitations of pool methodological quality of the included RCTs and small sample size; it also emphasized the need for precautions in the interpretation of results. In addition, there is the limitation that the verified quantitative evaluation tool was rarely used. The quality of the evidence, which was graded according to the GRADE approach, was predominantly “Very low” or “Low.” Therefore, the findings in this overview are less convincing, and consequently it has not been possible to draw a firm conclusion on the effectiveness and safety of acupotomy.

Acupotomy is a relatively modernized acupuncture treatment, and it is regarded as a minimally invasive surgery that uses the tip of a needle to exert a surgical effect [10]. This treatment is more invasive than conventional acupuncture; however, it is also expected to have unique surgical-like effects that distinguish it from conventional acupuncture such as filiform needle therapy. According to the results of this review, acupotomy was mainly used for chronic musculoskeletal conditions. In chronic pain conditions, nonpharmacological interventions play an important role because of the limitations of medications such as abuse risk of opioids and side effects caused by long-term used of nonsteroidal anti-inflammatory drugs [4,38]. The accumulation of clinical evidence recommends the use of acupotomy in clinical practice guidelines. For example, in the 2016 clinical practice guideline of low back pain [39], published by the China Association of Acupuncture-Moxibustion, acupotomy was recommended to be used for treating low back pain caused by third lumbar vertebrae transverse process syndrome. Moreover, in the 2014 clinical practice guideline of shoulder pain [40], published by Korea Institute of Oriental Medicine and the Society of Korean Medical Rehabilitation, acupotomy was recommended to be used for treating chronic shoulder pain that frequently reoccurs with stubborn pain. In a recent narrative review of the non-operative treatment for lumbar intervertebral disc herniation [41], acupotomy was described as a promising alternative. Overall, acupotomy has emerged as a new alternative to complement the limitations of existing therapies, especially in the field of pain.

The results in this overview have the following limitations: (1) All included SRs were conducted in China, and most RCTs included in each SR were also conducted in China. Moreover, there was no review that pre-registered the study protocol. This may suggest a potential publication bias. However, given that acupotomy is a relatively recent treatment developed in China, it can be considered an inevitable result. (2) As a result of evaluating the included studies using the AMSTAR checklist, SRs evaluated as having high methodological quality were rare. (3) It was also observed that RCTs included in each SR had a poor methodological quality and a high risk of bias. Particularly, the poor implementations of allocation concealment and the blinding procedure

Table 4
Quality of evidence in included systematic reviews.

Disease	Control intervention	Main findings	Main results (favours)	Quality of evidence[a]	Importance	Study ID
Frozen shoulder	Acupuncture	CR at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Liu et al., 2012 [26]
		TER at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Liu et al., 2012 [26]
	Other treatments	CR at post-treatment	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Wu et al., 2013 [28]
		TER at post-treatment	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Wu et al., 2013 [28]
	Nerve block	CR at post-treatment	No significant difference	⊕◯◯◯ (Very low)	Important	Ma et al., 2014 [30]
		CR at 3–6 mo f/u	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Ma et al., 2014 [30]
		TER at post-treatment	No significant difference	⊕◯◯◯ (Very low)	Important	Ma et al., 2014 [30]
		TER at 3–6 m f/u	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Ma et al., 2014 [30]
Cervical spondylosis	Acupuncture	TER at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Kan et al., 2013 [27]
	Traction therapy	TER at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Kan et al., 2013 [27]
	Other TCM treatments	CR at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Zhao et al., 2016 [34]
		TER at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Zhao et al., 2016 [34]
Third lumbar vertebrae transverse process syndrome	Other treatments	CR at post-treatment	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Gao et al., 2016 [31]
		TER at post-treatment	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Gao et al., 2016 [31]
		VAS at post-treatment	Acupotomy > Control	⊕◯◯◯ (Very low)	Critical	Gao et al., 2016 [31]
	Acupuncture	CR at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Chen et al., 2017 [36]
		TER at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Chen et al., 2017 [36]
Trigger finger	Nerve block	CR at post-treatment	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Xie et al., 2016 [32]
		TER at post-treatment	Acupotomy > Control	⊕◯◯◯ (Very low)	Important	Xie et al., 2016 [32]
		CR at post-treatment	Acupotomy > Control	⊕⊕⊕◯ (Moderate)	Important	Zhang et al., 2016 [33]
		NCIR at post-treatment	Acupotomy < Control	⊕⊕◯◯ (Low)	Not important	Zhang et al., 2016 [33]
		TER at post-treatment	Acupotomy > Control	⊕⊕⊕◯ (Moderate)	Important	Zhang et al., 2016 [33]
Knee osteoarthritis	Other treatments	TER at post-treatment	Acupotomy > Control	⊕⊕⊕⊕ (High)	Important	Lu et al., 2014 [29]
		Pain score at post-treatment	No significant difference	⊕⊕⊕◯ (Moderate)	Critical	Lu et al., 2014 [29]
Lumbar spinal stenosis	Other TCM treatments	TER at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Important	Lyu et al., 2017 [35]
		JOA score at post-treatment	Acupotomy > Control	⊕⊕◯◯ (Low)	Critical	Lyu et al., 2017 [35]

Abbreviations: CR, cure rate; JOA, Japanese orthopaedic association; NCIR, not cured but improve rate; TCM, traditional Chinese medicine; TER, total effective rate; VAS, visual analogue scale.
[a] Based on principles from grading of recommendations assessment, development, and evaluation (GRADE).

may be related to the overestimation of results. Therefore, these methodological problems pose a major limitation on the reliability of the results. (4) Of the included SRs, no studies have examined the details of acupotomy procedures. Therefore, we could not summarize the data needed to establish an optimized method of acupotomy. (5) Data on safety were reported in a small number of SRs, which prevents the reliability of the safety information. (6) The protocol of this review was not registered in the international prospective register of systematic reviews, such as PROSPERO.

Despite these limitations, this study has the advantage of being the first comprehensive overview of the evidence for acupotomy, one of the promising nonpharmacological CAM therapies. Systematically and critically summarizing the evidence to date may facilitate its use in evidence-based clinical practice. Although the quality of the studies included in the analysis was generally poor, the results provide us with insight into the promising areas of acupotomy and the methodological issues to be addressed in the future.

5. Conclusion

In summary, according to the results of current acupotomy-related SRs, acupotomy showed promising results compared to existing treatments (including acupuncture and nerve block) for some musculoskeletal conditions including frozen shoulder, cervical spondylosis, third lumbar vertebrae transverse process syndrome, trigger finger, knee osteoarthritis, and lumbar spinal stenosis. Moreover, no serious AEs were reported among the included reviews. However, the quality of evidence of the main findings was generally low. In addition, given the lack of high-quality SRs and that the quality of the RCTs included in each SR was poor, these results should be interpreted with caution. Therefore, to propose clinical recommendations for acupotomy in these clinical areas, more rigorous, well designed, and high-quality RCTs are needed.

Future research should consider the following points. (1) Higher quality, more rigorous, and larger RCTs on acupotomy, and the implementation of quantified and validated assessment tools, are needed. (2) Given the higher invasiveness of acupotomy compared with acupuncture in general, strict AE reporting systems need to be established in relation to acupotomy procedures. (3) Using standardized reporting methods such as the Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICTA) guideline [42], data related to the procedure of acupotomy need to be reported. (4) Given its invasiveness, acupotomy has the potential to compensate for the limitations of conventional acupuncture treatment through its unique surgical-like effects, which distinguishes it from conventional acupuncture treatment. Therefore, clinical trials comparing acupotomy with acupuncture as active control are required. (5) Most of the studies included in our review involved adult patients with chronic musculoskeletal pain. Therefore, future studies may further address the role of acupotomy in this population.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

Declarations of interest

None.

Author's contribution

CYK and SHY participated in the literature search, study selection and data extraction, and graded the quality of evidence using GRADE approach. CYK and SHY assessed the methodological quality of included studies using the AMSTAR checklist. CYK described the manuscript. BL supervised the study design and critically reviewed the manuscript. All authors participated in the analysis and interpretation of data and approved the final paper.

Acknowledgments

This work was supported by Chung-Yeon Central Institute (Research Program 2019).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ctcp.2019.07.002.

References

[1] K. Krug, K.I. Kraus, K. Herrmann, S. Joos, Complementary and alternative medicine (CAM) as part of primary health care in Germany-comparison of patients consulting general practitioners and CAM practitioners: a cross-sectional study, BMC Complement Altern. Med. 16 (1) (2016) 409.
[2] T. Cizmesija, B. Bergman-Marković, Use of complementary and alternative medicine among the patients in primary health care, Acta Med. Croat. 62 (1) (2008) 15–22.
[3] N. Ghildayal, P.J. Johnson, R.L. Evans, M.J. Kreitzer, Complementary and alternative medicine use in the US adult low back pain population, Glob. Adv. Health Med. 5 (1) (2016) 69–78.
[4] P.F. White, O.L. Elvir Lazo, L. Galeas, X. Cao, Use of electroanalgesia and laser therapies as alternatives to opioids for acute and chronic pain management, F1000Res 6 (2017) 2161.
[5] C. Yang, Z. Hao, L.L. Zhang, Q. Guo, Efficacy and safety of acupuncture in children: an overview of systematic reviews, Pediatr. Res. 78 (2) (2015) 112–119.
[6] J.H. Zhang, D. Wang, M. Liu, Overview of systematic reviews and meta-analyses of acupuncture for stroke, Neuroepidemiology 42 (1) (2014) 50–58.
[7] H.S. Kang, D. Jeong, D.I. Kim, M.S. Lee, The use of acupuncture for managing gynaecologic conditions: an overview of systematic reviews, Maturitas 68 (4) (2011) 346–354.
[8] P. Towler, A. Molassiotis, S.G. Brearley, What is the evidence for the use of acupuncture as an intervention for symptom management in cancer supportive and palliative care: an integrative overview of reviews, Support. Care Canc. 21 (10) (2013) 2913–2923.
[9] M.S. Lee, E. Ernst, Acupuncture for pain: an overview of Cochrane reviews, Chin. J. Integr. Med. 17 (3) (2011) 187–189.
[10] H.Z. Zhu, Summarization of acupotomology, Syst. Eng. Sci. (Chin) 8 (2006) 1–15.
[11] Y. Zheng, D. Shi, X. Wu, M. Gu, Z. Ai, K. Tang, L. Ye, X. Wang, Ultrasound-guided miniscalpel-needle release versus dry needling for chronic neck pain: a randomized controlled trial, Evid. Based Complement Altern. Med. 2014 (2014) 235817.
[12] Y. Ding, Y. Wang, X. Shi, et al., Effect of ultrasound-guided acupotomy vs electroacupuncture on knee osteoarthritis: a randomized controlled study, J. Tradit. Chin. Med. 36 (4) (2016) 450–455.
[13] H.J. Kim, J.H. Jeon, Y.I. Kim, Clinical effect of acupotomy combined with Korean medicine: a case series of a herniated intervertebral disc, J. Acupunct. Meridian Stud. 9 (1) (2016) 31–41.
[14] C. Ma, S. Wu, G. Li, et al., Comparison of miniscalpel-needle release, acupuncture needling, and stretching exercise to trigger point in myofascial pain syndrome, Clin. J. Pain 26 (3) (2010) 251–257.
[15] S. Li, T. Shen, Y. Liang, et al., Miniscalpel-needle versus steroid injection for plantar fasciitis: a randomized controlled trial with a 12-month follow-up, Evid. Based Complement Altern. Med. 2014 (2014) 164714.
[16] D.I. Yuk, K.M. Kim, J.H. Jeon, et al., A review of trends for acupotomy, Acupuncture 31 (2014) 35–43.
[17] M. Lin, X. Li, W. Liang, et al., Needle-knife therapy improves the clinical symptoms of knee osteoarthritis by inhibiting the expression of inflammatory cytokines, Exp. Ther. Med. 7 (4) (2014) 835–842.
[18] J.N. Yu, C.Q. Guo, B. Hu, et al., Effects of acupuncture knife on inflammatory factors and pain in third lumbar vertebrae transverse process syndrome model rats, Evid. Based Complement Altern. Med. 2014 (2014) 892406.
[19] C. Guo, N. Liu, X. Li, et al., Effect of acupotomy on nitric oxide synthase and beta-endorphin in third lumbar vertebrae transverse process syndrome model rats, J. Tradit. Chin. Med. 34 (2) (2014) 194–198.
[20] F.S. Liu, F.Y. Zhou, Y. Zhang, C.Q. Guo, Effects of acupotomy therapy on mRNA expressions of bcl-2, Bax, caspase-3 in posterior cervical extensor muscles in cervical spondylosis rabbits, Zhen Ci Yan Jiu 42 (6) (2017) 514–517.
[21] X. Li, R. Wang, X. Xing, et al., Acupuncture for myofascial pain syndrome: a network meta-analysis of 33 randomized controlled trials, Pain Physician 20 (6) (2017) E883–E902.
[22] S.H. Yoon, C.Y. Kwon, J. Leem, Adverse events of miniscalpel-needle treatment in Korea: a systematic review, Eur. J. Integr. Med. (2019) Article in press https://doi.org/10.1016/j.eujim.2019.02.002.
[23] B.J. Shea, J.M. Grimshaw, G.A. Wells, et al., Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews, BMC Med. Res. Methodol. 7 (2007) 10.

[24] N. Graham, A.R. Gross, L.C. Carlesso, et al., An ICON overview on physical modalities for neck pain and associated disorders, Open Orthop. J. 7 (2013) 440–460.
[25] H. Balshem, M. Helfand, H.J. Schünemann, et al., GRADE guidelines: 3. Rating the quality of evidence, J. Clin. Epidemiol. 64 (4) (2011) 401–406.
[26] F.S. Liu, X.F. Jin, C.Q. Guo, Systematic review of acupuncture versus acupotomology for frozen shoulder, CJTCMP 27 (3) (2012) 582–585.
[27] L.L. Kan, H.D. Wang, A.G. Liu, Meta-analysis of needle-knife treatment on cervical spondylosis, China J. Orthop. Traumatol. 26 (11) (2013) 935–939.
[28] X. Wu, D.Z. Jin, F.S. Liu, H. Xu, Meta-analysis of acupotomy on frozen shoulder, Tradit. Chin. Med. J 12 (6) (2013) 55–58.
[29] B. Lu, H. Wang, Meta-analysis of clinical efficacy of acupotomy in the treatment of knee osteoarthritis, J. Front. Med. (24) (2014) 582–585.
[30] S. Ma, Q. Shang, D. Fu, Z. Luo, Systematic review on comparing blockage and acupotomology in treating frozen shoulder, World Chin. Med. 9 (3) (2014) 361–364.
[31] G.P. Gao, M.J. Mai, J.X. Huang, et al., Meta-analysis of needle-knife therapy on the third lumber vertebrae transverse process syndrome, Heilongjiang Med. J. 40 (8) (2016) 693–697.
[32] L. Xie, X. Zhou, Z. Wang, D. Liang, Meta-analysis of curative effect of small needle knife therapy on stenosing tenovaginitis of flexor digitorum, Shandong J. Tradit. Chin. Med. 35 (6) (2016) 522–525.
[33] J.W. Zhang, S.M. Jiang, H.B. Wu, et al., System review of acupotomy treatment for stenosing tenovaginitis of flexor digitorum, Chin. J. Inf. TCM 23 (7) (2016) 46–50.
[34] M.M. Zhao, F.S. Liu, T. Hong, et al., Systematic review of acupotomy in the treatment of cervical spondylotic radiculopathy, Tradit. Chin. Med. J 15 (4) (2016) 40–45.
[35] H.Y. Lyu, Y.J. Zhang, Q.B. Xiao, et al., Data mining of acupotomy in treating lumbar spinal stenosis, Chin. Med. Herit. 14 (27) (2017) 165–169.
[36] M. Chen, F.S. Liu, F.Y. Zhou, et al., Meta-analysis of acupotomy and acupuncture on the third lumber vertebrae transverse process syndrome, Tradit. Chin. Med. J 16 (2) (2017) 41–45.
[37] H. Li, X.J. Shang, Q.R. Dong, Effects of transcutaneous electrical nerve stimulation on rats with the third lumbar vertebrae transverse process syndrome, Acupunct. Med. 33 (5) (2015) 400–405.
[38] L. Manchikanti, A.M. Kaye, N.N. Knezevic, et al., Responsible, safe, and effective prescription of opioids for chronic non-cancer pain: American society of interventional pain physicians (ASIPP) guidelines, Pain Physician 20 (2S) (2017) S3–S92.
[39] H. Zhao, B.Y. Liu, Z.S. Liu, et al., Clinical practice guidelines of using acupuncture for low back pain, World J. Acupuncture-Moxibustion 26 (4) (2016) 1–13.
[40] Evidence Based Korean Medicine Clinical Practice Guideline Development Committee for Shoulder Pain in Adults (Korea Institute of Oriental Medicine and the Society of Korean Medical Rehabilitation). Korean Medicine Clinical Practice Guideline for Shoulder Pain in Adults, Daejeon: Korea, 2014.
[41] B. Zhang, H. Xu, J. Wang, et al., A narrative review of non-operative treatment, especially traditional Chinese medicine therapy, for lumbar intervertebral disc herniation, Biosci. Trends 11 (4) (2017) 406–417.
[42] H. MacPherson, D.G. Altman, R. Hammerschlag, et al., Revised standards for reporting interventions in clinical trials of acupuncture (STRICTA): extending the CONSORT statement, PLoS Med. 7 (6) (2010) e1000261.