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Review Article

Quality Assessment of Clinical Practice Guidelines for Ankle Sprains Using the Appraisal of Guidelines for Research and Evaluation II Assessment Tool

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ABSTRACT

This study aimed to evaluate clinical practice guidelines (CPGs) for ankle sprains using the Appraisal of Guidelines for Research and Evaluation II tool, using electronic databases (GIN, PubMed, EMBASE, NCKM, CNKI, CiNii, WanFang database, RISS, and SCOPUS), to suggest strategies for improvement in the future. The search was performed on April 23, 2021 and 10 CPGs were selected for evaluation. Three CPGs were recommended without modification (Class A scores), five were recommended with modification (Class B), and two were not recommended (Class C scores). The CPG domain that received the lowest score was "applicability." The traditional medicine CPGs scored higher [Class A (n = 1) and Class B (n = 1)] than the conventional Western medicine CPGs [Class A (n = 2), Class B (n = 4), and Class C (n = 2)] and were considered to be more methodical. In the future, more research into traditional medicine is required.

Introduction

Ankle sprain is defined as "stretching or partial or complete tearing of one or more ligaments in the ankle joint." This is typically caused by a twisting movement that exceeds the normal limits of the joint [1]. Acute ankle sprains are among the most common musculoskeletal injuries, with approximately 2 million cases occurring each year in the United States. Up to 70% of patients who sustain an acute ankle sprain may develop residual physical disability [2]. Individuals with ankle sprains may complain about having pain, functional disability, and often have periods of absence from work. In those people with chronic instability, they may experience continued pain, swelling, recurrent sprains and exacerbate the instability [3]. Ankle sprains are often treated with a combination of rest, ice, compression, and elevation, followed by exercise, ankle support, and cryotherapy. The overall cost of ankle sprain treatment ranged from $1,809 to $5,271 when converted to prices in 2016 [4]. Based on the high healthcare costs, the Korean healthcare system has two major responsibilities: ensuring that individuals are treated according to best practices and reducing unnecessary expenditure [5]. Clinical practice guidelines (CPGs) are "systematically developed statements used to assist practitioner decisions regarding the appropriate healthcare for specific clinical circumstances." Using CPGs, inappropriate variations in practice

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can be reduced to provide high-quality evidence-based healthcare [6]. Therefore, high-quality CPGs are an absolute necessity. The Appraisal of Guidelines for Research and Evaluation (AGREE) is an appraisal tool validated and endorsed by leading producers, raters, or compilers of international CPGs. It was first created by the AGREE collaboration in 2003. The second version, the AGREE II, was updated in 2009. The AGREE II can be used for the development and evaluation of CPGs [7,8]. The AGREE II instrument has the following three goals: (1) To assess the quality of CPGs; (2) To provide a methodologic strategy for the development of guidelines; (3) To recommend how and what information should be reported in the guidelines [9].

This study aimed to assess the quality of CPGs on ankle sprains published before April 23, 2021, to suggest ways to improve them.

Materials and Methods

Search strategy of CPGs

Several databases were used to search for CPGs for ankle sprain. The search date was April 23, 2021. The following databases were used to search for CPGs: Guidelines International Network (www.gin.net), PubMed (https://pubmed.ncbi.nlm.nih.gov/), Embase, National Clearinghouse for Korean Medicine (http://www.nckm.or.kr/main/index.do), Google Scholar, China National Knowledge Infrastructure, Citation Information by NII (https://ci.nii.ac.jp/), WanFang database, Research Information Sharing Service, and Scopus (www.scopus.com). Keywords were combined to search for CPGs in the following databases: (Clinical practice guideline OR Critical practice guideline OR guideline*) AND (ankle). The search strategy was adjusted for each database.

Selection of CPGs

All CPGs retrieved for conventional Western medicine and traditional medicine were supported by an official global medical organization at the time of writing that addressed diagnosis, treatment, prevention, and management. The latest CPG version was selected when various versions were available. Types of excluded CPGs included guidelines without any recommendations, secondary publication from CPGs, systematic reviews, clinical trials, and consensus between panels. Two reviewers independently checked titles and abstracts to exclude ineligible publications. Only CPGs written in English, Korean, Chinese, or Japanese were included in the study. Only full-text articles that met the inclusion criteria were screened (Fig. 1). Inconsistencies at any stage were resolved through discussion between reviewers or by the involvement of a 3rd reviewer.

Data extraction and quality assessment

Two reviewers independently extracted core data from the published CPGs. Inconsistencies were resolved through discussion or by the participation of a 3rd reviewer. The extracted data were listed according to the CPG characteristics namely country, organization, year of publication, number of authors, number of references, target population, subject (i.e., diagnosis, treatment, management, or prevention), treatments and recommendations related to the diagnosis (i.e., conservative, pharmacological, and surgical management. Three researchers independently assessed and scored all the CPGs using the AGREE II instrument. All researchers were Korean medicine doctors majoring in acupuncture and moxibustion. The process of CPG evaluation was based on the Korean version of the AGREE II developed by the Korean Academy of Medical Sciences in 2011 and each researcher was made familiar with this tool. The CPGs were scored using a 7-point rating scale and analyzed according to each category. The AGREE II instrument consists of 23 items sorted into six categories: (1) Scope and purpose: the goal of the guideline, the detailed questions, and the target population; (2) Stakeholder involvement: the emphasis on whether the guidelines have been developed by appropriate stakeholders and whether they reflect the opinions of target practitioners; (3) Rigor of development: the methods used to gather and synthesize evidence, how to make recommendations, and update treatment guidelines; (4) Clarity of presentation: the language, structure, and form of the guidelines; (5) Applicability: the factors that facilitate and impede the implementation of the guidelines, strategies to improve applicability, and the impact of additional resources when the guidelines are applied; and (6) Editorial independence: whether conflicting interests among the members involved in the development of the CPG influenced the derivation of the recommendations.

The overall reviewer assessment included the CPGs quality rating (Class A, B or C) and their feasibility. Each item was rated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree) by the appraisers. If there was a gap of three or more points between appraisers for each item, the criteria of the item were discussed. Through this process, the bias in evaluation alone was reduced, and the reliability increased. Quality scores were calculated for each of the six domains. These scores were independent and were not summed into a single score. Domain scores were calculated by adding all the scores of individual items in a domain and scaling them to the maximum possible score for that domain and multiplying it by 100. When CPGs are rated using the AGREE II instrument, there is no standard for setting the level of recommendation. Therefore, other appraisals of CPGs were referred to and a standard of level was achieved [10,11]. The recommendation of a CPG was divided into three levels. Class A, recommended without modification, was assigned to CPGs with four or more domains rated higher than 60%. Class B, recommended with modifications, was assigned to CPGs with three or more domains rated higher than 30%. Class C, which was not recommended, was assigned to CPGs with four or more domains rated lower than 30%.

Summary of CPGs recommendations

The recommendations of each CPG according to the target population, subject, and treatment are shown in Table 1 [12-21].

Statistical analysis and research ethics

The total score and the score per domain provided by each reviewer were used for statistical analysis. Following the application

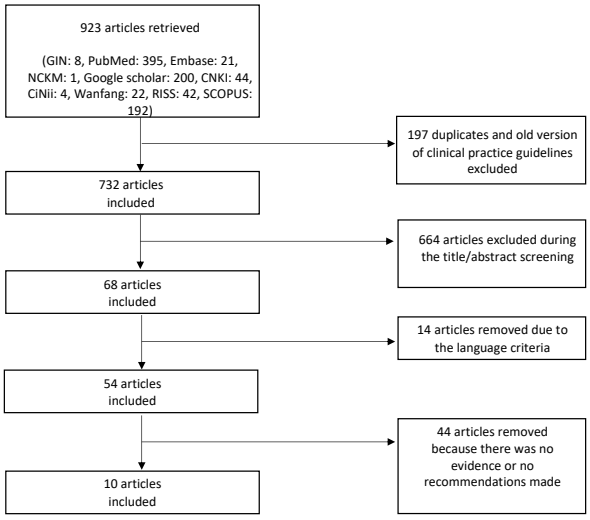

Fig. 1. The flow chart of clinical practice guideline selection.

of the AGREE II instrument and using Excel 2010 (Microsoft Corporation, Redmond, WA, USA), the data were obtained.

No institutional review board approval was required because the study was not patient or body sample-based.

Results

Study selection

Through the database searches, 929 articles were retrieved, of which 197 articles were duplicated. A total of 664 articles were excluded based on the title and the abstract, and 14 articles were excluded based on the language criteria. A flow chart describing the selection process of the 10 articles selected for review is shown in Fig. 1.

CPG components

Ten CPGs published between 2006 and 2021 were included (Table 1 [12-21]). Only one CPG was published before 2010,

Table 1. General Information on the Included Clinical Practice Guidelines.

Study [ref]	Country	Organization	Year	Number (authors)	Number (reference)	Target population	Subject	Treatment
JOSPT 2021 [14]	USA	Journal of Orthopaedic & Sports Physical Therapy	2021	8	485	Adults	1. Diagnosis 2. Treatment 3. Management 4. Prevention	1. Conservative 2. Pharmacological
ACR 2020 [15]	USA	American College of Radiology	2020	19	76	≥ 5 y	1. Diagnosis	Not reported
NCKM 2020 [12]	Republic of Korea	National Institute for Korean Medicine Development	2020	11	332	Adults	1. Diagnosis 2. Treatment 3. Management 4. Prevention	1. Conservative
BJSM 2018 [16]	Netherland	British Journal of Sports Medicine	2018	15	216	≥ 16 y	1. Diagnosis 2. Treatment 3. Management 4. Prevention	1. Conservative 2. Pharmacological 3. Surgery
EUJIM 2017 [17]	Republic of Korea	European Journal of Integrative Medicine	2017	8	41	Adults	1. Treatment	1. Conservative
KCE 2013 [18]	Belgium	Belgian Health Care Knowledge Centre	2013	8	141	≥ 16 y	1. Diagnosis 2. Treatment	1. Pharmacological 2. Conservative
NATA 2013 [19]	USA	National Athletic Trainers' Association	2013	9	189	Athletes	1. Diagnosis 2. Treatment 3. Management 4. Prevention	1. Conservative 2. Pharmacological
AFP 2012 [13]	USA	American Family Physician	2012	1	40	Not reported	1. Diagnosis 2. Treatment 3. Management 4. Prevention	1. Conservative 2. Pharmacological
ORRE 2012 [20]	Germany	Orthopedic Reviews	2012	7	175	Not reported	1. Diagnosis 2. Treatment	1. Conservative 2. Pharmacological 3. Surgery
KNGF 2006 [21]	Netherland	Royal Dutch Society of Physical Therapy	2006	14	26	Athletes	1. Diagnosis 2. Treatment 3. Management 4. Prevention	1. Conservative

ACR, American College of Radiology; AFP, American Family Physician; BJSM, British Journal of Sports Medicine; EUJIM, European Journal of Integrative Medicine; JOSPT, Journal of Orthopaedic & Sports Physical Therapy; KCE, Belgian Health Care Knowledge Centre; KNGF, Royal Dutch Society of Physical Therapy; NATA, National Athletic Trainers' Association; NCKM, National Institute for Korean Medicine Development; ORRE, Orthopedic Reviews.

and three were published within the last 3 years. Forty percent (n = 4) were published in the USA, 20% (n = 2) were published in Korea and 20% were published in the Netherlands, 10% (n = 1) were published in Belgium and 10% were published Germany. The number of authors ranged from 1 to 19, and 40% (n = 4) of CPGs consisted of 10 or more authors. The number of references ranged from 26 to 485, and 60% (n = 6) of CPGs had more than 100 references. No target population was reported in the two cases of CPGs, and most of the remaining CPGs were selected based on the age of the patient. Thirty percent (n = 3) of CPGs were listed for adults, 20% (n = 2) were listed for 16 years of age or older, 10% (n = 1) was listed for those aged 5 years or older. Two CPGs were listed for athletes. Treatment was divided into conservative treatment, pharmacological treatment, and surgery.

The AGREE II appraisal results

Three researchers evaluated 10 CPGs related to ankle sprains using the AGREE II. The scores for each evaluated CPGs are listed in Table 2 [12-21].

When comparing the average scores for each domain, the domain assigned the lowest score was "applicability." The average of this domain was 21.4% and the range was 3-72%. The domain assigned the highest average score was "clarity of presentation." The average of this domain was 59.8%, and the range was 35-91%.

In the overall reviewer assessment, three CPGs were assigned a Class A level of quality, five CPGs were given Class B, and two CPGs were given Class C. The CPG assigned the highest average score was NCKM 2020 [12]. It was given the highest score in all areas, including the domain "scope and purpose" where it scored 100% (the scores of the domains "clarity of presentation" and "editorial independence" are the same as those of other CPGs). The CPG which was assigned the lowest score was AFP 2012 [13]. It was given below-average scores in all domains and was assigned a score of 30% or higher only in the "clarity of presentation" domain.

The "scope and purpose" domain evaluates the overall objectives of the CPG, health-related questions, and the population to which the guideline applies. The average score assigned to this domain was 55.3%, and the range was 2-100%, with a very large deviation. The CPG NCKM 2020 [12] was assigned the highest score which was 100%, two CPGs were given over 80%, and five CPGs were assigned a value of below 60%, and the CPG AFP 2012 [13] received the lowest score which was 2%. The CPG AFP 2012 [13] did not mention the scope or purpose. No health-related questions were asked. Only the name and basic characteristics of the condition/disease were included, and there was no text specifying the subject of application i.e., diagnosis, treatment, management, or prevention. Although the purpose of most CPGs were described well, for CPGs with low scores, (indicating a low level of evidence not sufficient to recommend use of the CPGs or recommended use of CPG with modification) health-related questions and descriptions of the target populations were insufficient.

The "stakeholder involvement" domain evaluates whether the guidelines have been developed by the appropriate stakeholders

Table 2. The AGREE II Domain-Standardized Scores for Clinical Practice Guidelines and Overall Assessment.

Study [ref]	Scope and purpose (%)	Stakeholders involvement (%)	Rigor of development (%)	Clarity of presentation (%)	Applicability (%)	Editorial independence (%)	Overall reviewer assessment (class)
JOSPT 2021 [14]	78	69	73	69	36	78	A
ACR 2020 [15]	52	19	41	91	3	17	B
NCKM 2020 [12]	100	98	81	91	72	78	A
BJSM 2018 [16]	30	65	58	35	7	17	B
EUJIM 2017 [17]	69	52	42	43	7	50	B
KCE 2013 [18]	87	37	79	83	26	64	A
NATA 2013 [19]	33	26	26	57	6	0	C
AFP 2012 [13]	2	6	18	46	17	11	C
ORRE 2012 [20]	35	28	42	39	26	33	B
KNGF 2006 [21]	67	46	27	44	14	0	B

ACR, American College of Radiology; AFP, American Family Physician; BJSM, British Journal of Sports Medicine; EUJIM, European Journal of Integrative Medicine; JOSPT, Journal of Orthopaedic & Sports Physical Therapy; KCE, Belgian Health Care Knowledge Centre; KNGF, Royal Dutch Society of Physical Therapy; NATA, National Athletic Trainers' Association; NCKM, National Institute for Korean Medicine Development; ORRE, Orthopedic Reviews.

and reflects the opinions of practitioners' who will mainly use the guidelines. The average score for this domain was 44.6%, and the range was 6–98%. Only three CPGs scored above 60% and four scored below 30%. None of the CPGs considered the viewpoints and preferences of the groups to which the guidelines were applied, particularly, the CPGs from ACR 2020 [15], KCE 201 [18], NATA 2013 [19], AFP 2012 [13], ORRE 2012 [20], and KNGF 2006 [21]. Although many CPGs included experts associated with the subject (i.e., diagnosis, treatment, management, or prevention), guideline development methodology experts with specified roles were not included. In general, the group of practitioners who would use the CPGs was well specified. The CPGs from JOSPT 2021 [14], NCKM 2020 [12], EUJIM 2017 [17], KCE 2013 [18], and KNGF 2006 [21] describe how practitioners could implement the CPGs in specific fields.

The "rigor of development" domain evaluates the methods used to gather and synthesize the evidence, making recommendations, and updating the guidelines. It consists of the largest number of sub-items. Keeping the purpose of this study in mind, the scores of sub-items in domain 3 (rigor of development) were compared. The average score for this domain was 48.7%, and range was 18–81%. Only three CPGs scored above 60% and three scored below 30%. The scores for each sub-item are presented in Table 3 [12–21]. Here are sub-items of this domain:

Sub-item 7. Systematic methods were used to search for evidence.

Sub-item 8. The criteria for selecting the evidence are clearly described.

Sub-item 9. The strengths and limitations of the body of evidence are clearly described.

Sub-item 10. The methods for formulating the recommendations are clearly described.

Sub-item 11. The health benefits, side effects, and risks have been considered in formulating the recommendations.

Sub-item 12. There is an explicit link between the recommendations and the supporting evidence.

Sub-item 13. The guideline has been externally reviewed by experts prior to its publication.

Sub-item 14. A procedure for updating the guideline is provided.

Among the sub-items, the areas with the lowest average scores were Items 8, 10, 13, and 14. Their scores ranged from 2 to 4. Among the items, the area with the lowest average score was Item 13, and four CPGs were assigned 0% in this item. The CPGs from ACR 2020 [15], AFP 2012 [13], ORRE 2012 [20], and KNGF 2006 [21] had no external reviewers, review purposes, implementation methods, or descriptions of collected information and results. Item 14 received the most 0% across ACR 2020 [15],

Table 3. Rigor of Development: Standardized Average Scores in the AGREE II Domain for Clinical Practice Guidelines.

Study [ref]	Systematic methods used (%)	Selecting criteria presented (%)	The strengths and limitations of the body of evidence (%)	Formulating the recommendations described (%)	Benefits, side effects, and risks considered (%)	Explicit link between the recommendations and evidence (%)	Reviewed by external experts (%)	Updating procedure provided (%)
JOSPT 2021 [14]	100	100	72	33	100	67	39	72
ACR 2020 [15]	100	22	67	0	56	83	0	0
NCKM 2020 [12]	78	94	72	78	100	100	56	72
BJSM 2018 [16]	61	67	56	33	89	33	33	89
EUJIM 2017 [17]	61	27	50	78	56	61	6	0
KCE 2013 [18]	100	78	78	94	50	78	61	94
NATA 2013 [19]	0	0	50	0	78	67	17	0
AFP 2012 [13]	39	0	0	0	39	67	0	0
ORRE 2012 [20]	72	56	50	22	72	61	0	0
KNGF 2006 [21]	0	0	50	22	56	89	0	0

ACR, American College of Radiology; AFP, American Family Physician; BJSM, British Journal of Sports Medicine; EUJIM, European Journal of Integrative Medicine; JOSPT, Journal of Orthopaedic & Sports Physical Therapy; KCE, Belgian Health Care Knowledge Centre; KNGF, Royal Dutch Society of Physical Therapy; NATA, National Athletic Trainers' Association; NCKM, National Institute for Korean Medicine Development; ORRE, orthopedic reviews.

EUJIM 2017 [17], NATA 2013 [19], AFP 2012 [13], ORRE 2012 [20], and KNGF 2006 [21]. No guideline-revision plan was mentioned. KCE 2013 [18] received the highest score for item 14 by presenting the guideline revision schedule, methodology, and criteria for determining revisions. The item with the highest average score in this domain was Item 12, and all CPGs except BJSM 2018 [16] scored over 4 points in here. In most CPGs, recommendations were well-connected to the evidence, and a summary of key evidence or a list of references were presented.

The "clarity of presentation" domain covers the format, language, and structure of the guidelines. A high score can be obtained by describing recommendations specifically, easily finding them, and presenting various alternatives. This domain had an average score of 59.8%, which is the highest average score among the six domains, and with range of 35-91%. Four CPGs scored above 60% and none scored below 30%. ACR 2020 [15] and NCKM 2020 [12] recorded the highest scores of 91%. Both CPGs had some deductions, in that they did not specifically describe the uncertainty of the recommendations. For other items, scores close to perfect were recorded. All CPGs except ORRE 2012 [20] have presented recommendations that are easy to check.

The "applicability" domain evaluates the facilitating factors, obstacles, and strategies to improve the implementation of the guidelines. In addition, the impact of adding resources when a CPG is applied are also evaluated. The average score for this domain was 21.4%, which was the lowest average score among all domains, and the range was 3-72%. Only NCKM 2020 [12] scored above 60% and 8 CPGs scored below 30%. NCKM 2020 [12], which had the highest average score, recorded the lowest score in this domain among all domains. The highest score was obtained because NCKM 2020 [12] met all the criteria of this domain. The other CPGs did not fulfill these criteria well. In particular, ACR 2020 [15] had the lowest score of 3% because it did not consider applicability, except that budget-related issues were briefly described when applying the recommendations. The domain "editorial independence" evaluates whether conflicting interests among members who participated in CPG development influenced the production of recommendations. The average score for this domain was 34.8%, and a range of 0-78%. NATA 2013 [19] and KNGF 2006 [21] did not describe whether or not there was any financial support or whether there was a conflict of interest among members of the guideline development group, which resulted in a score of 0%. JOSPT 2021 [14] and NCKM 2020 [12] scored 78%, and some deductions were made because of the lack of a description of the potential impact of the financial support.

An overall evaluation of the quality and feasibility of the 10 CPGs were evaluated. Three CPGs were rated as Class A, thus, these CPGs could be recommended without modification. Five CPGs were rated as Class B indicating these CPGs can be recommended following revision. Two CPGs were rated Class C, and so these CPGs were not recommended. Among the 6 domains of the AGREE II, the domain with the highest average score was "clarity of presentation" (59.8%), followed by "scope and purpose" (55.3%), "rigor of development" (48.7%), "stakeholder involvement" (44.6%), "editorial independence" (34.8%), and "applicability" (21.4%) had the lowest score. To create a CPG that meets the AGREE II standards, it will be necessary to supplement the Domain 5 "applicability" in the future.

Discussion

CPG allows not only to diagnose, treat, and evaluate ankle sprains easily but also increase patient compliance because of its economic feasibility. Considering that ankle sprain is a common disease, the number of selected CPGs was smaller than expected. This might be because many CPGs were excluded owing to the absence of evidence or recommendations in the CPGs selection process, and ankle sprains are considered a relatively minor health concern. This study is the first to evaluate CPG for ankle sprains using the AGREE II tool. Although a study evaluating CPGs for ankle sprains using the AGREE II was published in 2019, this study was limited to "acute lateral" ankle ligament sprains in the target disease category, and the target population was limited to adults. Moreover, considering that the most recent CPG in this study was published in 2013, our study is significant in that it covers all ankle sprains and includes the latest CPG published in 2021 without any age restrictions [12]. Through our study, we intended to suggest a way to improve CPGs for traditional medicine by evaluating the quality of CPGs using the AGREE II tool.

Among the 10 CPGs, three received Class A in the overall evaluation. Even if they received Class A, they did not score very high in all six domains. JOSPT 2021 [14] and KCE 2013 [18] received 36% and 26% respectively in domain "applicability," but received Class A. This means that both CPGs need to be supplemented according to the criteria of domain "applicability." This also means that stricter standards should be followed for evaluation in the future. NCKM 2020 [12] is the only CPG with a score of over 60% in all domains, and CPG with the highest average score.

Table 1 [12-21] presents the general information on the CPGs. Diagnosis information was described in all CPGs, except EUJIM 2017 [17]. Information on treatment was described for all CPGs, except for ACR 2020 [15]. Prevention and management are described for each of the six CPGs. The recommendations for each CPGs were summarized by dividing them into traditional medicine CPGs and conventional Western medicine CPGs (Tables 4 and 5 [12-21]).

The average scores for each domain of the two traditional medicine CPGs and eight conventional Western medicine CPGs are shown in Table 6. The scores of traditional medicine CPGs were high in all areas. In addition, the scores of traditional medicine CPGs in all domains, except for domain "applicability," was over 60%. There might be an opinion that it is somewhat unreasonable to set these scores as representative evaluation values for traditional medicine CPGs. Because there are only two CPGs for traditional medicine, NCKM 2020 [12] and EUJIM 2017 [17], the average score of NCKM 2020 [12] is the highest among all CPGs. However, EUJIM 2017 [17] was rated as Class B, being rated 4th highest among all CPGs. Therefore, limited to the investigated CPGs, traditional medicine CPGs can be evaluated as CPGs that meet the criteria of the AGREE II.

Both CPGs are relatively recently published papers; in particular,

Table 4. Recommendations for Ankle Sprain in Traditional Medicine Clinical Practice Guidelines.

Study ID	Diagnosis	Herbal pharmacological treatment	Non-herbal pharmacological treatment	Management
NCKM 2020 [12]	Imaging Clinical evaluation	1.Prescribed herbal medicine according to pattern identification 1) Liver Kidney Yin deficiency 2) Qi obstruction due to bloodstream malfunction 2. Manufactured herbal medicine 1) Dangguisoosan 2) Cheongyulsaseuptang 3) Banggihwanggitang 4) Jakyakgamchotang	1. Acupuncture 1) General acupuncture 2) Electroacupuncture 3) Fire needle acupuncture 2. Pharmacopuncture 1) Bee venom pharmacopuncture 3. Moxibustion 4. Cupping 5.Chuna 6. Taping 7. Conservative 1) Rest 2) Ice 3) Compression 4) Elevation 5) Physical therapy	1. Exercise 2. Rehabilitation 3. Footwear
EUJIM 2017 [17]	Not reported	Not reported	1. Acupuncture 1) General acupuncture 2) Electroacupuncture 2. Pharmacopuncture	Not reported

EUJIM, European Journal of Integrative Medicine; NCKM, National Institute for Korean Medicine Development.

Table 5. Recommendations for Ankle Sprain in Conventional Western Medicine Clinical Practice Guidelines.

Study [ref]	Diagnosis	Pharmacological treatment	Non-pharmacological treatment	Management
JOSPT 2021 [14]	1. History taking 2. Physical examination 3. Measurement instruments	1. NSAIDs	1. Conservative 1) Ankle support, 2) Exercise, 3) Manual therapy, 4) Cryotherapy, 5) Diathermy, 6) Low-level laser therapy	1. Physical examination 2. Ankle support 3. Exercise
ACR 2020 [15]	1.Imaging	Not reported	Not reported	Not reported
BJSM 2018 [16]	1. Physical examination 2. Imaging	1. NSAIDs	1. Conservative 1) Ankle support, 2) Exercise, 3) Manual mobilization 2. Surgery	1. Ankle support 2. Exercise
KCE 2013 [18]	1. History taking 2. Physical examination 3. Imaging	1. Paracetamol 2. NSAIDs 3. Opioids 4. Venotonic drugs 5. Ointment	1. Conservative 1) RICE, 2) Ultrasound, 3) Laser therapy, 4) Ankle support, 5) Manual therapy, 6) Exercise therapy	Not reported
NATA 2013 [19]	1. History taking 2. Physical examination 3. Imaging	1. NSAIDs	1. Conservative 1) Cryotherapy, 2) RICE, 3) Ankle support, 4) Exercise, 5) Electrotherapy	1. Measurement instruments 2. Performance test 3. Ankle support 4. Exercise
AFP 2012 [13]	1. History taking 2. Physical examination	1. NSAIDs 2. Acetaminophen 3. Opioids	1. Conservative 1) Cryotherapy, 2) Ankle support, 3) Exercise	1. Follow-up 2. Rehabilitation 3. Ankle support
ORRE 2012 [20]	1. History taking 2. Imaging 3. Physical examination	1. NSAIDs	1. Conservative 1) RICE, 2) Ankle support, 3) Cryotherapy	Not reported
KNGF 2006 [21]	1. History taking 2. Red flags 3. Physical examination 4. Measurement instruments	Not reported	1. Conservative 1) RICE, 2) Functional treatment, 3) Exercise, 4) Strength training, 5) Ultrasound, 6) Laser therapy, 7) Electrotherapy	1. Ankle support 2. Footwear

ACR, American College of Radiology; AFP, American Family Physician; BJSM, British Journal of Sports Medicine; JOSPT, Journal of Orthopaedic & Sports Physical Therapy; KCE, Belgian Health Care Knowledge Centre; KNGF, Royal Dutch Society of Physical Therapy; NATA, National Athletic Trainers' Association; ORRE, orthopedic reviews.

Table 6. A Comparison of the Average Scores of Traditional and Conventional Western Medicine Clinical Practice Guidelines for the AGREE II Domains.

Average scores	Scope and purpose (%)	Stakeholders involvement (%)	Rigor of development (%)	Clarity of presentation (%)	Applicability (%)	Editorial independence (%)
All CPGs (n = 10)	55	45	49	60	21	35
Traditional medicine CPGs (n = 2)	85	75	62	67	40	64
Conventional Western medicine CPGs (n = 8)	48	37	46	58	17	28

NCKM 2020 [12] has been reviewed based on the AGREE II instrument during the CPG production process. In addition, NCKM 2020 [12] was developed as a project by the Ministry of Health and Welfare and was developed strictly with the participation of specialized experts such as disease-related experts, methodological experts, and external review groups. It seems that these factors caused NCKM 2020 [12] to obtain high scores.

Since both traditional medicine CPGs recorded the lowest score in the domain "applicability" in individual scores, this part needs to be supplemented in the future revision process.

The recommendations for the traditional medicine and conventional Western medicine CPGs, respectively, are shown in Tables 4 and 5. In conventional Western medicine CPGs, treatment is divided into pharmacological and non-pharmacological treatments. Of the eight conventional Western medicine CPGs, 6 CPGs suggested pharmacological treatment, and all CPGs that offered pharmacological treatment recommended NSAIDs, suggesting that NSAIDs are the most commonly used drugs for ankle sprains. Non-pharmacological treatment consists mainly of conservative treatment methods, including ankle support, exercise, and cryotherapy. Only one CPG presented surgery.

Specifically, JOSPT 2021 [14] contains the contents of acupuncture, but the level of recommendation was Class D. In JOSPT 2021 [14], the level was Class D and was assigned if the recommendation was based on conflicting evidence. The level of Class B was assigned when there was one high-quality randomized controlled trial (RCT) or multiple lesser quality diagnostic studies, prospective studies, RCTs, and systematic reviews. Level of Class C was assigned when there was one less quality diagnostic study, prospective study, RCT, systematic review, or there were many case-control studies, retrospective studies, or case series. JOSPT 2021 [14] suggested a systematic review as evidence for acupuncture, and they concluded that acupuncture lacks a high-quality study. However, NCKM 2020 [12] presented RCT studies in which no treatment group or cold pack group was set as a control group as the evidence for the acupuncture recommendation, which can receive a minimum level of Class C or higher even in the standard of the recommendation level of JOSPT 2021 [14]. Therefore, it seems that the reason that acupuncture received a level of Class D in JOSPT 2021 [14] was because there was insufficient literature on acupuncture during the CPG development process.

NCKM 2020 [12] and EUJIM 2017 [17], which are traditional medicine CPGs, commonly recommend acupuncture and pharmacopuncture. NCKM 2020 presented a more diverse and wider range of recommendations than EUJIM 2017 [17]. NCKM 2020 [12] presents recommendations for various oriental medicine techniques, such as moxibustion, cupping, and chuna, as non-herbal pharmacological treatments. In addition, conservative treatments, such as rest, ice, compression, and elevation, have been suggested, as suggested in conventional Western medicine CPGs. Although there were mentions of NSAIDs and surgery in the overview of NCKM 2020 [12], they were not included in the recommendations. Recommendations generally tend to have low levels of evidence. For traditional medicine CPGs to have a higher quality, evidence based on a systematic research methodology, such as a large-scale RCT, systematic review and meta-analysis should be prepared. In traditional medicine, a diagnostic method called "pattern identification" is used. Herbal medicine prescriptions according to this diagnostic method were included in the recommendations. Moreover, herbal medicines such as "Dangguisoosan" and "Cheongyulsaseuptang" were suggested as recommendations depending on the symptoms patients complained about, but the level of evidence for recommendation of the CPG was low and was assigned Class C.

If an evaluation tool that supplements the parts not covered by the current AGREE II is developed, it will be helpful in the revision and development of CPGs. For example, among all the investigated CPGs, NCKM 2020 [12] met all the current standards of the AGREE II; however, it had the disadvantage of having low levels of evidence. However, the current AGREE II evaluation criteria do not reflect this.

The Korean evaluation standard was applied for 1, 3, 5, and 7 points; however, depending on the subjective judgment of the evaluator, one point can be added or subtracted to give 2, 4, or 6 points. Although all evaluators are familiar with the AGREE II, but evaluators' subjectivity may create bias.

No overall assessment standards have been established therefore we created our own standards by referring to other appraisal literature [10,11]. In the case of KNGF 2006 [21], it received 0 points in the domain "Editorial Independence," but a Class B in the overall assessment of quality. This indicates that more specific criteria are required for evaluation of the quality of the CPGs.

Conclusion

CPGs were evaluated by three raters using the AGREE II tool. Because the average score of all CPGs recorded the lowest score in "applicability" among the six domains of AGREE II, CPGs revised

and developed in the future require supplementation in the domain "applicability". Two traditional CPGs received higher scores compared to conventional CPGs. Although traditional CPGs can be evaluated as having high methodological quality, they lacked in evidence of recommendations. In the future, it will be necessary to develop high-quality evidence through large-scale RCTs, systematic review and meta-analysis.

Author Contributions

Conceptualization: JYJ. Methodology: JYJ. Formal investigation: JYJ, YCP and MGJ. Data analysis: JYJ, YCP and MGJ. Writing original draft: JYJ. Writing - review and editing: JYJ, MGJ, MJK, SYC, SEL, DML, JHK, BHG, BKS, YHB, SSN and YCP.

Conflicts of Interest

There are no conflicts of interest regarding the publication of this manuscript.

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Ethical Statement

This research did not involve any human or animal experiments.

Data Availability

All relevant data are included in this manuscript.

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