



Research Article

Translating Clinical Practice Guidelines into Stepped Care Treatment Recommendations for Osteoarthritis in the Assessment of Burden of Chronic Conditions (ABCC-) tool: A Mixed Qualitative Method Study

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Abstract

Background: Many evidence-based clinical practices guidelines are available for osteoarthritis (OA). However, to be effectively implemented in clinical practice, these guidelines should be translated into concrete personalized, stepped care treatment recommendations. This study aims to develop treatment recommendations for OA using the Assessment of Burden of Chronic Conditions (ABCC-) tool, which quantifies and visualizes the burden of OA across physical, emotional, and social domains. The ABCC-tool includes personalized treatment recommendations to aid self-management, shared decision-making, and personalized care plans. The OA module, developed with input from healthcare professionals and patients, addresses pain, activity avoidance, and joint stiffness. **Methods:** A mixed qualitative methods study was conducted. First, a literature review was performed to identify current evidence-based treatment recommendations of the hip, knee, hand and wrist, and foot and ankle OA across the settings of general practice, physical therapy, orthopedic surgery, and rheumatology. Next, a consensus meeting was held with general practitioners specialized in musculoskeletal disorders to formulate stepped care evidence-based treatment recommendations for integration in the ABCC-tool. **Results:** Treatment recommendations for pain and joint stiffness were similar, focusing on lifestyle modifications and patient education, pain medication, corticosteroid injections and referrals to specialists. For activity avoidance, treatment recommendations emphasized patient education and specialist referrals. **Conclusion:** These treatment recommendations, integrated into the ABCC-tool, provide a stepped care, patient-centered framework for OA management, ensuring that guidelines can be applied to the individual needs of the patient. Future research should focus on pilot testing and implementing the ABCC-tool in clinical practice.

Keywords: ABCC-tool, Osteoarthritis, Clinical practice guidelines, Treatment recommendations, Stepped care, Personalized-care

List of Abbreviations: ABCC-tool: Assessment of Burden of Chronic Conditions Tool; COPD: Chronic Obstructive Pulmonary Disease; EULAR: European Alliance of Associations for Rheumatology; GP: General Practitioner; IA: Intra-Articular; MSK: Musculoskeletal; NICE: National Institute for Health and Care Excellence; NSAID: Non-Steroidal Anti-Inflammatory Drugs; OA: Osteoarthritis; OARSI: Osteoarthritis Research Society International; PROM: Patient Reported Outcome Measures; PRP: Platelet Rich Plasma; RCT: Randomized Controlled Trial; SNRI's: Serotonin and Norepinephrine Reuptake Inhibitors

Introduction

A wide range of evidence-based clinical practice guidelines exist for osteoarthritis (OA), developed independently by various OA-related disciplines. These guidelines may be joint-specific or address OA more generally and most are developed separately across different countries [1-3]. Evidence-based guidelines are valuable tools for providing effective and efficient care, however they are often difficult to translate into treatment recommendations for routine clinical practice [4]. Typically, these guidelines are based on a standard patient profile, but many patients present with comorbidities. These patients often require more complex care than is provided in the original evidence used for the guidelines [4]. A more individualized approach is preferred, and guidelines should not be applied as 'cookbook medicine' [5]. Other challenges arise during the implementation phase, as patient preferences are often insufficiently considered in the guideline development process [4]. Furthermore, guidelines are mostly focused on biomedical symptoms, leaving out psychosocial burden [6]. Effective OA care should be tailored to the individual, ideally following a stepped care approach that adjusts treatment intensity based on the patient's needs and response to earlier steps.

To facilitate this personalized stepped care approach, the Assessment of Burden of Chronic Conditions (ABCC-) tool is expanded and validated for OA [7,8]. The ABCC-tool quantifies

and visualizes the full scope of experienced burden of one or more chronic conditions, which can initiate the conversation between the patient and healthcare professional and includes practical treatment recommendations. Furthermore, this tool facilitates self-management, shared decision making, and personalized care plans, that include the chosen treatment [9]. Other chronic conditions in the ABCC-tool are asthma, chronic obstructive pulmonary disease (COPD), diabetes mellitus type 2, chronic heart failure, and post-COVID, and can be used together in any combination [9-14]. The ABCC-tool is explained in detail in Box 1.

The ABCC-tool consists of a five-step cycle. First, patients complete a self-administered questionnaire on physical, emotional and social burden. This questionnaire features a modular structure, consisting of a core set of generic questions applicable to all chronic conditions, with condition-specific modules added as needed. This enables a personalized patient reported outcome measure (PROM) tailored to individual patients. Second, results are visualized in a balloon diagram, where red (low) to green (high) balloons indicate the level of disease burden. Third, this balloon diagram can be used to select relevant topics for the patient to discuss the preferences of the patient, based on the colors and height of the balloon. Fourth, healthcare professionals can click on balloons and tailored treatment recommendations pop up, forming the basis to create personalized goals and a personalized care plan (see Figure 1). Finally, during follow-up, previous results (grey) and current results (colored) allow progress monitoring [10].

Box 1: ABCC-tool.

The OA module in the ABCC-tool consists of three domains: pain, activity avoidance and joint stiffness, and is aimed at hip, knee, hand, wrist, foot and ankle OA. The next step before implementation is to develop corresponding treatment recommendations for each domain, to be discussed during step 4 in the abovementioned cycle. Therefore, this study aims to translate evidence-based clinical practice guidelines into stepped care practical treatment recommendations to be integrated in the ABCC-tool.

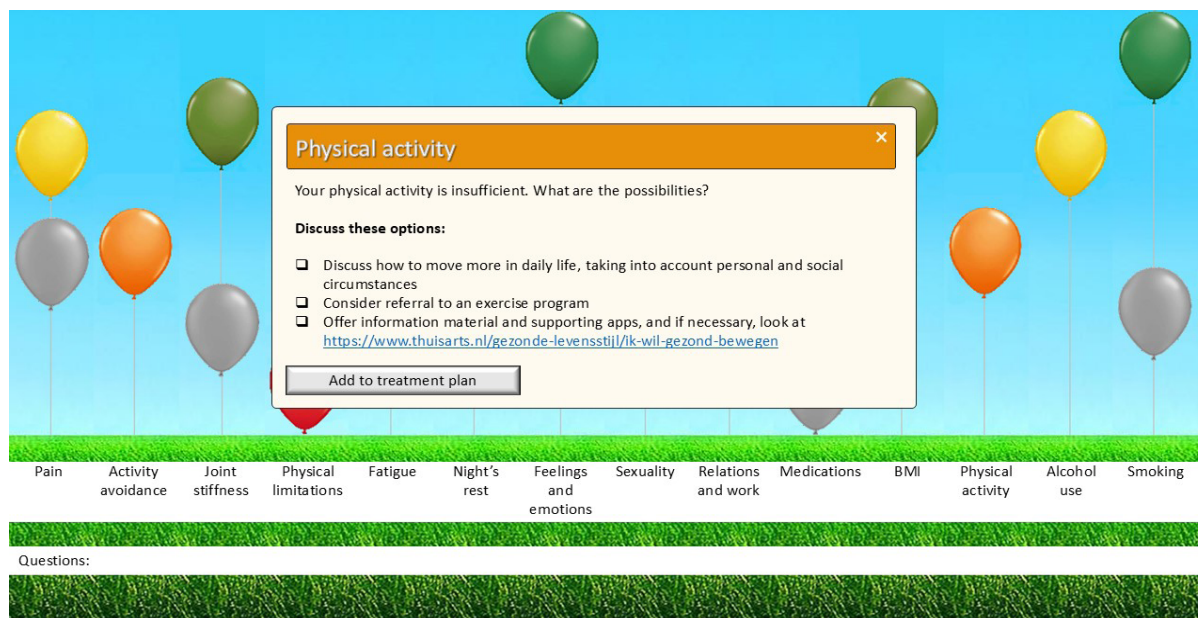


Figure 1: The balloon diagram in the ABCC tool for OA, showing the treatment recommendation for the “Physical Activity” domain, based on the height of the balloon. This domain is part of the lifestyle module, for which treatment recommendations were developed in a previous study (7). The recommendation appears when the healthcare professional clicks on the corresponding balloon.

Methods

A mixed qualitative study design was carried out, combining a literature review and a consensus meeting to identify evidence-based conservative treatment recommendations for hip, knee, hand, wrist, foot and ankle OA across the three domains of ABCC-tool’s OA module: pain, activity avoidance and joint stiffness. These recommendations were derived from clinical guidelines across the settings of general practice, physical therapy, orthopedic surgery and rheumatology, chosen because they represent the core settings involved in managing OA.

Literature Review

We followed a stepwise process to extract OA treatment recommendations for the ABCC-tool. First, we reviewed joint specific, evidence-based guidelines from Australia, Canada, the Netherlands, the United Kingdom, the United States, and other internationally recognized leading guidelines, across general practice, physical therapy, orthopedic surgery, and rheumatology. These were all developed from international literature and endorsed by scientific associations.

When no guidelines could be included, we searched PubMed and Embase for systematic reviews published after the year 2000 that offered joint specific treatment recommendations for at least one

domain in the ABCC-tool. Only English and Dutch reviews were included. The full search strings are presented in **Appendix 1**. Additionally, an expert in musculoskeletal (MSK) disorders (RO) was consulted to ensure comprehensive coverage of the literature and to identify any additional treatment recommendations that may not have emerged from the systematic review.

Consensus Meeting

Based the literature review, the research team formulated a stepped care treatment concept for all included joints, aligned with the color-code balloons of the ABCC-tool. The cut-off points for the balloon colors in the ABCC-tool are determined based on the severity of the burden. Each question within the tool is scored on a scale from 0 (no burden) to 6 (severe burden). For all OA domains, scores of 0 correspond to a green balloon, 1–2 to orange, 3 to yellow, and 4–6 to red.

Through the Dutch College of General Practitioners expert group of general practitioners (GPs) specialized in MSK disorders, all their specialized GPs (n=70) were invited to participate in a questionnaire study and consensus meeting to establish consensus on the treatment recommendations for OA. The aim was to include at least six to twelve specialized GPs in the consensus meeting [15].

Ahead of the meeting, a draft set of recommendations was sent via an online questionnaire. GPs rated each on a 10-point Likert scale (0 = complete disagreement, 10 = complete agreement) and could provide feedback. Mean scores were calculated, and feedback was incorporated.

Before the consensus meeting, all mean scores were calculated, and additional feedback was processed. During the online meeting, only recommendations with a mean score below 7.5 were discussed [16]. The chair proposed revisions, which were re-rated by the GPs. This process was repeated until consensus was reached on all recommendations.

Results

Literature Review

The literature review and consensus meeting addressing the domains pain and activity avoidance were conducted between September and November 2022, while those focusing on the domain joint stiffness were held between October 2024 and January 2025, due to the addition of this OA domain following the validation process [8]. Because of this extended time between the two reviews, an additional literature review was conducted in May 2025 on pain and avoiding activities to ensure the latest versions of all guidelines were reviewed. A total of 26 guidelines were included in this study, see Table 1.

	General practice	Physical therapy	Orthopedic surgery	Rheumatology
Australia	Royal Australian college of General Practitioners [2]	Australian Physiotherapy Association [17]	Australian orthopedic association [18]	Australian Rheumatology Association [19]
Canada	The College of Family Physicians of Canada [20]		Arthroscopy Association of Canada [21]	
The Netherlands	Dutch College of General Practitioners [22-24]	Royal Dutch Society for Physical Therapy [23,25]	Dutch Orthopedic Association [23,26-28]	Dutch Association for Rheumatology [29]
United Kingdom			British Orthopedic Association [30]	
United States		American Physical Therapy Association [31,32]	American Academy of Orthopedic Surgeons [3,33-36]	American College of Rheumatology [37,38]
International guidelines			Osteoarthritis research society international [39]	European Alliance of Associations for Rheumatology [40]

Table 1: Included guidelines per country and discipline.

Domain Pain

For the domain pain, a total of 12 guidelines on hip OA were included [2,17,19,20,26,28,31,33,34,37,39,41], 16 for knee OA [2,17-23,25,26,30,32,35,37,39,41], eight for hand and wrist OA [20,24,29,36-40], and one for foot and ankle OA [3]. Treatment recommendations were mainly based on activation of self-

management skills. Furthermore, it was advised to focus on education and lifestyle; physical-, occupational- and hand therapy; using braces, orthosis, and splints; prescribing non-steroidal anti-inflammatory drugs (NSAIDs) and weak opioids (e.g. tramadol); providing intra-articular corticosteroid injections; and refer to a specialist. See Table 2 for the recommendations per guideline used, with the specific joints specified.

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	General practice						Orthopedic surgery						Rheumatology			
	Royal Australian college of General Practitioners [2]	The College of Family Physicians of Canada [20]	Dutch College of General Practitioners [22-24]	Australian Physical therapy Association [17]	American Physical Therapy Association [31,32]	Royal Dutch Society for Physical Therapy [23,25]	Australian orthopedic association [18]	Arthroscopy Association of Canada [21]	Dutch Orthopedic Association [23,26,28]	British Orthopedic Association [30]	American Academy of Orthopedic Surgeons [3,33-36]	Osteoarthritis research society international [39]	Australian Rheumatology Association [19]	American College of Rheumatology [37,38]	Dutch Association for Rheumatology [29]	European Alliance of Associations for Rheumatology [40,41]
Self-management and education	2	1,2,3	2,3	1,2		1,2			1,2	2		2	1,2	1,2,3		3
Lifestyle	1	1,2	2	1,2		1	2		1	2	1,2,4		1,2	1,2		
Brace, orthosis, splint		1,2,3	2,3		2		2		2	2	3,4		1,2	1,2	3	3
Walking aid	1,2	1,2		1,2							1			1,2		
Thermal therapy		1,2,3		1,2	1,2		2			2	3		2			
Exercise program	1,2	3	2		1,2	1,2	2		1,2	2	2	2	1,2	1,2,3	3	1,2,3
Physical therapy	1,2	1,2	2	1,2	1,2	1,2	2		1,2	2	1,2,4					
Occupational therapy									1,2							
Hand therapy			3												3	
Paracetamol	2		2,3	1,2		1,2	2		1,2							
NSAID (oral)	2	1,2,3	2	1,2		2	2		1,2	2	1,2,3,4	2		1,2,3	3	3
NSAID (topical)	2	2,3	2,3	1,2		1,2			1,2	2		2	2	2, 3	3	3
Weak opioid	2	1,2,3	2			1,2			1,2				1,2	3		
IA corticosteroid injections	1,2	1,2	2,3	1,2		2		2	1,2	2	1,2,3,4	2		1,2,3	3	3

Referral to (another) specialist	2		2,3		1,2	1,2	2		1,2	2	1,2,3,4		1,2		3	3
1= hip OA; 2= knee OA; 3= hand and wrist OA; 4= foot and ankle OA																
NSAID= non-steroidal anti-inflammatory drugs; IA= intra-articular																

Table 2: Treatment recommendations from national and international guidelines for pain in hip, knee, hand, wrist, foot and ankle OA. For all joints, at least one guideline emerged, and therefore, no literature review was done. In addition, the expert recommended two randomized controlled trials (RCT’s) on intramuscular corticosteroid injections for hip and knee OA [42,43].

Domain Activity avoidance

Two guidelines were found for activity avoidance for patients with hip and knee OA [25,26], which is presented in Table 3.

	Physical therapy	Orthopedic surgery
	Royal Dutch Society for Physical Therapy [25]	Dutch Orthopedic Association [26]
Self-management and education	1,2	
Training of pain coping skills	1,2	
Exercise program	1,2	1,2
Physical therapy		1,2
Referral to therapist	1,2	
1= hip OA; 2= knee OA		

Table 3: Treatment recommendations from a Dutch guideline for activity avoidance in hip and knee OA.

A search in PubMed and Embase was conducted because no guidelines were available for hand, wrist, foot and ankle OA on activity avoidance. This resulted in 18 unique articles. However, no articles were eligible for this study after reading the full text (see Figure 1 in Appendix 2). The consulted expert suggested as treatment recommendations that patients can be referred to a physical therapist and mental health practice nurse. Additionally, the expert also recommended a Dutch article that described the avoidance model on patients with OA in general, which focused on education and a referral to a physical therapist and psychologist [44].

Domain Joint stiffness

For the domain addressing joint stiffness of the hip, three guidelines were included [25,26,31], four for knee stiffness [22,25,26,35], two for hand and wrist stiffness [24,30], and none for stiffness in the foot or ankle. These guidelines recommend the support of self-management, education and lifestyle. Furthermore, braces and splints; an exercise program and physical therapy; NSAIDs; intra-articular corticosteroid-, and PRP-injections; and referring the patient to a specialist as well. Recommendations per guideline with the specific joints specified are presented in table 4.

	General practice	Physical therapy		Orthopedic surgery		
	Dutch College of General Practitioners [22,24]	Royal Dutch Society for Physical Therapy [25]	American Physical Therapy Association [31]	Dutch Orthopedic Association [26]	British Orthopedic Association [30]	American Academy of Orthopedic Surgeons [35]
Self-management and education	3			2		
Lifestyle				1		2
Brace, orthosis					3	
Exercise program	2	1,2	1	1,2	3	2
Physical therapy	2		1			2
NSAID (unspecified)				1,2		2
IA corticosteroid injections				2		
Referral to (another) specialist						2
1= hip OA; 2= knee OA; 3= hand and wrist OA						
NSAID= non-steroidal anti-inflammatory drugs; IA= intra-articular						

Table 4: Treatment recommendations from national and international guidelines for stiffness in hip, knee, hand and wrist OA

No specific guidelines addressing foot and ankle stiffness emerged during the search, so a literature review was conducted (see Figure 2 in Appendix 2). One systematic review was retrieved focusing on intra-articular injections to reduce joint stiffness [45].

Consensus Meeting

For the domains pain and activity avoidance, 17 treatment recommendations were formulated and sent to 70 specialized GPs in an online questionnaire. A total of 15 GPs completed the questionnaire. For 12 recommendations, consensus was reached (range mean consensus 7.5 to 9.0), while for the other five recommendations no consensus was reached (range mean consensus 5.1 to 7.2). Twelve out of 15 GPs participated in the consensus meeting. The five recommendations that initially lacked consensus were discussed after which the recommendations were revised to reach consensus on all recommendations.

For the domain joint stiffness, five GPs participated in the consensus meeting. Considering the significant overlap between the treatment recommendations for pain and joint stiffness, it was deemed unnecessary to conduct a separate scoring process

for these recommendations. Instead, the beforementioned GPs were consulted to assess whether they agreed to adopt the same treatment recommendations established for pain in the context of joint stiffness, which they did.

See Appendix 3 for all treatment recommendations and adjustments with scores before and after the consensus meeting, and Appendix 4 for the final treatment recommendations included in the ABCC-tool for the domains pain, activity avoidance and joint stiffness.

Discussion

After a literature review, a questionnaire study and a consensus meeting, evidence-based stepped care conservative treatment recommendations for hip, knee, hand, wrist, foot and ankle OA were formulated, and linked to the severity of the experienced disease burden as measured with the ABCC-tool. Treatment recommendations for pain and joint stiffness consisted of four different steps (i.e. education and lifestyle recommendations, pain medication, corticosteroid injections, and referring to other specialists), while recommendations for activity avoidance were based on education and referrals. These formulated

recommendations require clinical judgement of the healthcare professional, in collaboration with the patient, to tailor them into an individualized care plan.

During the review process it was noticed that all OA guidelines predominantly focus on pain management, while less attention was paid to joint stiffness or activity avoidance. This might be because from a healthcare professional's perspective, joint stiffness is mainly considered a symptom in the diagnostic process and usually resolves on its own within 30 minutes. It appears that this is being overlooked in the treatment process and has therefore not been included in guidelines, despite patients indicating during the development process of the OA module of the ABCC-tool that joint stiffness was a significant burden [7].

For activity avoidance, only two guidelines were retrieved, for hip and knee OA [25,26]. OA guidelines mostly focus on the physical burden of OA, while avoiding activities due to OA is more of a mental burden. Mental burden guidelines or studies are mostly limited to depression and anxiety in general [46]. To gain further insight into recommendations for activity avoidance, we conducted an additional literature review. Unfortunately, no relevant reviews were found. However, the purpose of the ABCC-tool is to focus on the physical, emotional and social burden of OA. Therefore, to create recommendations we consulted an expert in MSK disorders and discussed this topic extensively during the consensus meeting.

Although we intended to only include systematic reviews in this study, we included two RCTs as well [42,43]. These studies included a new insight into intra-muscular injections as a treatment for pain, which is a relatively new recommendation not yet included in guidelines.

As far as we know, this is the first study that attempts to translate clinical guidelines into practical recommendations for patients with OA. As mentioned earlier, the goal is not to facilitate 'cookbook medicine' but rather facilitating the process of making a personalized care plan, where the interaction between healthcare professional and patient is still essential. By providing a more step by step approach, patients can be involved and can become active partners in their own care process.

Strengths and limitations

This study has several strengths. First, we reviewed guidelines from five countries and two international organizations (OsteoArthritis Research Society International (OARSI) and European Alliance of Associations for Rheumatology (EULAR)) [39,40]. When no guidelines were available, international databases were searched to ensure all relevant evidence was included. Second, guidelines for various joints were considered, allowing us to create general OA treatment recommendations with joint-specific options where

relevant, important since many patients have OA in multiple joints. Third, the literature review was conducted by two researchers, to ensure all relevant literature was included and to reduce selection bias and improving reliability [47-49]. Fourth, all treatment recommendations are based on consensus by a group of specialized GPs.

In addition, there are some limitations in this study. First, only English and Dutch guidelines were included due to language constraints. Still, as these are based on international evidence, we believe no key information was missed [50,51]. Within these guidelines, most physical therapy and orthopedic surgery guidelines focused on hip and knee OA, with hand, wrist, foot, and ankle guidelines only available from the American Academy of Orthopedic Surgeons [3,36]. General practice and rheumatology guidelines mainly covered hip, knee, hand, and wrist OA. Furthermore, guidelines focusing on OA in general, so not joint specific, for example the National Institute for Health and Care Excellence (NICE) guidelines, were not included [52]. However, a subsequent review of these NICE guidelines revealed no additional relevant information that would have impacted on our treatment recommendations. Second, the consensus process involved only specialized GPs, lacking input from other disciplines like physical therapy or orthopaedics. However, we included multidisciplinary guidelines to capture diverse perspectives.

Third, the domain of joint stiffness was added to the ABCC-tool later due to co-creations processes used in the development and validation phase [7]. Therefore, recommendations for this domain were developed subsequently, using the same methodology. Additionally, a search of the guidelines was performed to check for new or updated guidelines for the domains pain and activity avoidance. Fourth, we did not conduct an independent risk of bias assessment for the included reviews, as our analysis focused on existing clinical guidelines. However, these guidelines are generally developed through rigorous processes, with guideline committees typically assessing the quality of the underlying evidence using standardized methods such as the GRADE approach.

Implications for future research

The aim of the ABCC-tool is to help patients address their experienced physical, emotional and social burden of disease and create personalized goals with their healthcare professional. By incorporating evidence-based treatment recommendations for OA into this tool, these personalized goals can be translated into a personalized care plan, characterized by a stepped care approach. Previous research showed an increase in perceived quality of care and patient activation after using the ABCC-tool for patients with COPD, asthma, diabetes mellitus type 2 and heart failure [53]. As with this final element of the OA module the development for OA

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is now completed and could be implemented and pilot tested in clinical practice.

Conclusion

By translating evidence-based clinical practice guidelines and additional evidence from current studies into practical treatment recommendations following a stepped care approach, care for people with OA can now be delivered in a more structured, evidence-based and personalized way. With this step completed, the development process of the ABCC-tool for OA is finished. The next step of the ABCC-tool for OA is the implementation phase.

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Conflict of interest statement

There are no conflicts of interest.

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