



Exercise for ankylosing spondylitis: An evidence-based consensus statement



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ABSTRACT

Objective: Despite Level 1b evidence and international consensus that exercise is beneficial in ankylosing spondylitis (AS), there is a paucity of detailed information to guide exercise prescription, including the type and dosage of exercise required for the most benefit. This collaborative project, combining evidence with clinical expertise, was established to develop practical recommendations to guide sustainable exercise prescription for individuals with AS.

Methods: Using a modified Delphi technique, 10 clinical questions were generated and a systematic literature review was conducted for each. Draft recommendations were developed at a 2-day meeting, based on the integration of evidence summaries and expert opinion. Feedback was obtained from patient and health professional groups prior to finalisation.

Results: Recommendations and practice points were developed for the following areas: assessment; monitoring; safety; disease management; AS-specific exercise; physical activity; dosage, adherence and setting. A framework was developed that could also be adapted for exercise in other chronic musculoskeletal conditions. Feedback suggests that the final consensus statement provides useful information for those seeking to provide best practice exercise prescription for people with AS.

Conclusion: The recommendations provide an up-to-date, evidence-based approach to the full range of issues related to the use of exercise in AS, as well as identifying evidence gaps for further research. Most importantly, this includes investigation of aspects of exercise programme design required to produce the largest effect, long-term adherence with exercise programs and the specific exercise requirements of sub-groups of people with AS. Widespread dissemination and implementation of the guidelines will be required to optimise exercise outcomes.

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Introduction

Individuals with ankylosing spondylitis (AS) experience pain and stiffness, which mainly affects the axial skeleton (spine, hips

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and shoulders). Since the condition is an inflammatory arthritis, fatigue can also be a prominent symptom [1]. The primary pathology includes enthesitis, or inflammation of the anatomical region of the bony attachment of tendons, ligaments or joint capsules [2]. Typically this occurs in the spine; if unchecked, new bone formation may result in ankylosis, or spinal fusion. The most common age of onset is in early adulthood, therefore the lifetime individual impact of AS can be high [3]. Traditionally, the condition has been managed with a combination of anti-inflammatory medication and exercise, with the latter appearing anecdotally to be more effective than for other types of arthritis.

Although exercise recommendations feature prominently in relevant clinical guidelines for the management of ankylosing spondylitis [4–7], and are supported by a body of mixed-quality evidence [8], in clinical practice there is a lack of specific information to guide exercise planning [9,10]. The majority of published evidence focuses on mobility exercise [9], and relatively little attention has been given to other aspects of exercise programme design such as strengthening, balance or cardio-respiratory exercise, despite recognition that AS can affect muscle strength [11], balance [12] and cardio-respiratory function [13]. Similarly, there is little information about dosage (frequency, intensity and duration) or adherence to recommended programs [9]. Several trials are based on intensive, time-limited (often residential) exercise modalities, which are not readily available in many regions—such as in-patient rehabilitation or spa therapy/exercise combinations [14]. Lastly, recent rapid advances in medical management, such as tighter control of disease activity by the use of anti-tumour necrosis factor- α (anti-TNF α) agents, have raised questions about the ongoing relevance of exercise in the management of AS [15].

The task of developing an optimally effective, evidence based and sustainable exercise programme for a person or a group with AS therefore remains challenging. The overall objective of this project was to develop more specific recommendations covering a range of topics which need to be considered for exercise prescription—primarily for use by health professionals, but also for people with AS who may wish to acquire more detailed information about the use of exercise as a self-management strategy.

Methods

Systematic review

The Writing Group (WG) comprised 11 physiotherapist members of an ankylosing spondylitis special interest group in Australia, and a rheumatologist (J.Z.) with experience in Delphi methodology and guideline development. WG members independently submitted up to 10 questions of clinical importance to their practice, which were grouped into nine topics by the project co-ordinators (J.M. and J.Z.). These were assessment, monitoring, safety, disease management, AS-specific exercise, physical activity, dosage, adherence and setting. A systematic review was carried out for each topic; details of the methods are shown in [Appendix A \(Section A1\)](#). All WG members then participated in the assessment of included studies, using a pro forma “article summary” tool to record quality, relevance to a non-residential setting and reproducibility of the exercises in a “real-life” context. Meta-analysis was performed using random effects models where data was available to allow pooling, that is, for pain, disease activity, spinal mobility measures (cervical mobility, fingertip to floor distance, chest expansion and lumbar flexion) and physical function. An “evidence matrix” was compiled by the co-ordinators to show the number, type and quality of studies; overall level of evidence; consistency of results and (where applicable) effect sizes. Any discrepancies

were resolved by discussion. Details of the flow of studies are shown in [Figure A1](#), included and excluded full-text papers (with reasons for exclusion) at A2 and A3 and evidence for the recommendations at [Appendix B](#).

Consensus meeting

A 2-day face-to-face meeting was held to review the evidence and develop recommendations, during which WG members presented topic summaries, as described above. These findings were discussed in the context of the collective clinical experience of the group, before recommendations were derived for each topic. After gaining appropriate ethics approval, consumer and health professional feedback on the draft recommendations was obtained by anonymously surveying people with AS (via patient support groups) and health professionals (via professional organisations). Further information regarding the surveys is provided in [Appendix C, Section 1 \(C1\)](#). The consensus statement wording was adjusted and further independent voting by the WG was used to finalise each recommendation.

Grade of recommendations

The Australian National Health and Medical Research Council (NHMRC) hierarchy [16] was used to grade the recommendations as follows: *Evidence-Based Recommendation (EBR)* based on a body of evidence, graded A–D depending on types of studies and consistency of results; *Consensus Based Recommendation (CBR)* developed by the WG in the absence of direct evidence, or poor quality evidence, to answer the question and *Practice Points (PP)* developed by the WG where there was a need to provide practical guidance to support the implementation of EBRs and CBRs. The derivation of PPs is shown in [Appendix C, Section 2 \(C2\)](#).

Results

The final 10 recommendations with practice points are listed at [Box 1](#). The process of developing the recommendations highlighted the complexities of therapeutic exercise prescription and the potential for multiple interactions between the different topics examined. [Figure 1](#) summarises the recommendations and relationships of these factors, and may be useful in informing joint (patient and health professional) decision making regarding exercise choice. A plain language summary of the recommendations and framework is also provided in [Appendix C, Section 3 \(C3\)](#). Survey results ([Table C1](#)) demonstrated a high level of patient importance (mean for all recommendations 8.46/10; range: 8.0–8.9) and health professional (HP) support (mean = 8.66 and range: 7.3–9.58). The mean proportion of HPs who stated that the recommendation was already their practice was 60.2%, whilst 21% stated that the recommendation would modify their practice. 0.8% of HPs reported that they did not wish to change their practice, and the remainder (17.8%) stated that the recommendation did not apply to their practice. The background, clinical question(s), results and rationale for each recommendation are outlined as follows.

Assessment and monitoring

Background

Pre-exercise objective physical measures are an established component of individual exercise prescription, serving to inform individual training goals; appropriate exercise type(s); starting dose precautions (which may indicate exercise modification), and personal information regarding the need for specific exercise [17].

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