
1:00 pm – 1:05 pm

Measuring the Treatment Effect in End-Stage Ankle Arthritis: Introducing the Revised Ankle Osteoarthritis Score

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Summary

The goals of this study were to investigate which of the 18 questions (9 pain and 9 disability) contribute most significantly to the Ankle Osteoarthritis Scale (AOS) before and after surgery, using a large heterogeneous cohort of 380 patients undergoing surgery for end-stage ankle arthritis. Further understanding of patient reported outcomes in the setting of end-stage ankle arthritis is required.

Introduction

The Ankle Osteoarthritis Scale (AOS) is a validated, disease-specific patient reported outcome score with subscales measuring pain and disability. The goals of this study were to investigate which of the 18 questions (9 pain and 9 disability) contribute most significantly to the AOS before and after surgery, using a large heterogeneous cohort of 380 patients undergoing surgery for end-stage ankle arthritis.

Methods

A secondary analysis of prospectively collected longitudinal data from patients with ankle arthritis who had surgical treatment at one of four centers was used in this study. AOS surveys were considered complete if all the questions had been scored, with the exception of two pain subscale questions which were discarded since greater than 30% of the patients answered "not applicable" to the questions. The dataset was randomly divided into exploratory and confirmatory datasets (in keeping with established methodology for evaluating a new instrument). For each of the pre and post-surgery exploratory datasets, pairwise correlations between questions were calculated to identify pairs or clusters of questions correlated at ≥ 0.70 (pre-surgery data) or ≥ 0.80 (post-surgery data). Highly correlated questions were candidates for reduction since they duplicate information. Among clusters of correlated questions, the question with the largest clinical relevance was retained. The remaining questions in the exploratory dataset were subject to principal components analysis (PCA) in order to identify questions that contribute to variability in the AOS scores. The factor loadings were used to calculate weights for the retained questions. The retained items were multiplied by their corresponding weights to construct the Revised AOS (RAOS) score.

Results

This analysis found that, from the original 18 questions in the AOS, eight questions could be used to form the RAOS. The RAOS retains three questions from the AOS Pain subscale and five from the AOS Disability subscale. The PCA analysis identified two components in the data, better clustered into a Basic Activity subscale (2 Pain and 2 Disability questions) and an Advanced Activity subscale (1 Pain and 3 Disability questions). The questions with the largest weight in both the pre- and post-surgery PCA were

1) difficulty walking fast/running and 2) pain before getting up in the morning. The questions within each new subscale share conceptual meaning. Analysis of the confirmatory data confirmed the findings from the exploratory dataset. The correlation between patients' AOS score and their ROAS score is approximately 95%. This finding is fairly remarkable given that ten questions were removed from the instrument.

Conclusion

This analysis found that eight questions from the 18-item AOS could be used to form the ROAS. The ten questions removed from the AOS contribute little variability to patients' score. The PCA analysis suggests that the questions are better clustered into a Basic Activity subscale (2 Pain and 2 Disability questions) and an Advanced Activity subscale (1 Pain and 3 Disability questions). The new subscales are helpful in interpreting a patient's level of function. The ROAS reduces responder burden and may increase the number of patients that complete every item on the instrument as compared to the AOS. Further investigations will be carried out to better understand the clinical performance of the ROAS in measuring the patient response to surgery.

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