

FLEX CEUs



Shoulder Physical Examination Clinical Performance



and shoulder diagnoses. The GRADE initiative [47] suggests that validity of different diagnostic subgrouping strategies should be evaluated in a randomized design providing direct comparison of effects on patient-important outcomes (e.g. pain and shoulder function) for different diagnostic strategies, rather than the indirect evidence provided by the accuracy design. We therefore suggest that future research on the validity of PETS consider using such a randomized design.

Limitations and strengths

This study adhered to the state of the art methodology for systematic reviews and diagnostic meta-analysis. A broad scope without limitations to any specific shoulder diagnoses was chosen to strengthen the potential clinical applicability of results. In the meta-analysis, a clear description of inclusion criteria was made mandatory for primary studies to ensure that applicability in other clinical settings can be assessed for all studies included. The chosen QUADAS cutoff in this study was in line with that used in several previous reviews [14, 48] and particularly strong selection criteria were used for the meta-analysis to ensure inclusion of only high quality primary studies with a low risk of bias. However, with strong selection criteria, there is a risk that relevant primary studies were excluded from the meta-analysis and that this may have biased our conclusions. In addition the application of a QUADAS cutoff score has been advised against by its developers [49] and our choice may have introduced a selection bias of primary studies. Also, due to the small number of primary studies available for pooling, hierarchical or bivariate random effects modeling were not feasible. However, since heterogeneity was low, a fixed effects approach could be used. A revised edition of the original QUADAS tool has been published [50]. Implementation was not possible in this review as QUADAS scoring had already started with the original tool. This was a meta-analysis of single PETS but in clinical practice a combination of tests is commonly used. Several of the included primary studies reported diagnostic performance when different tests were combined [3, 26, 34, 35, 37]. However, as test combinations differ, meaningful statistical pooling was not feasible and assessment of test combinations was beyond the specific scope of this meta-analysis. Another important limitation regarding conclusions and recommendations of this meta-analysis is the designated context of specialist care with high prevalence of shoulder pathology and co-morbidity. Care should be taken to assess applicability of results to any specific clinical context. To enable clinicians to assess transferability of primary research findings to their own specific spectrum of patients, we only included studies where inclusion criteria had been clearly described. The extraction of raw data from the included

primary studies have been provided for clinicians own scrutiny (Additional file 5).

Conclusions

The clinical performance of single PETS is limited. However, our evidence indicates statistical validity when the different PETS for SLAP lesions were pooled. We suggest that clinicians choose their PETS among those with the highest rank of pooled DOR (Compression rotation, Yergason, Anterior apprehension or Crank tests for SLAP lesions; Hawkins-Kennedy for subacromial impingement and the supraspinatus/empty can/Jobe's test for full thickness rotator cuff tears). Furthermore, we recommend that the clinician assess the inclusion criteria in relevant primary studies to assess the validity for their own clinical setting. There is still a need for a new research approach to the evidence based shoulder examination. A new approach to the diagnostic labels in the shoulder has also been called for by Schellingerhout et al. [7]. We therefore propose that future studies on the validity of PETS use a randomized research design [47] in order to compare the validity of different diagnostic strategies related to their effect on patient-outcomes.

Additional files

Additional file 1: Table S1. Detailed description of the literature search strategy. (XLS 31 kb)

Additional file 2: Contains: a) Overview of PETS in the 20 articles with low risk of bias. b) Adapted QUADAS assessment tool and scoring guide. c) Full initial eligibility criteria for abstracts and full text articles. (DOC 104 kb)

Additional file 3: Table S2. Quality scores for the 20 full text articles with acceptable risk of bias. (XLSX 17 kb)

Additional file 4: QUADAS score table (containing scores for all articles assessed). (XLS 2873 kb)

Additional file 5: Data-extraction from 20 articles with low risk of bias (raw-data). (XLS 109 kb)

Additional file 6: Data-extraction prepared for Meta-analysis (raw-data). (XLS 83 kb)

Abbreviations

DOR: Diagnostic Odds Ratio; LR +/-: Likelihood ratio positive/negative; PETS: Physical Examination Test(s) of the Shoulder; PRISMA: Preferred Reporting Items in Systematic Reviews and Meta-Analysis; QUADAS: Quality Assessment of Diagnostic Accuracy Studies; SLAP: Superior Labral Anterior Posterior



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