

- PROTOCOL -

A systematic review of diagnostic injections and clinical examination of the shoulder

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Project objectives: To undertake and publish a systematic review of the literature regarding diagnostic shoulder injections and clinical shoulder examination.

Background

More than 180 clinical shoulder tests are described[1]^a. However, confusion still arises which test to use, how to perform them and what conclusion to draw from the clinical examination. Scientific evidence of the usefulness of several tests in clinical practice is lacking or is of poor quality.

Knowledge about the sensitivity, specificity, validity and reliability of clinical shoulder examination tests is insufficient. A Cochrane protocol to examine the test accuracy exists[2]. To our knowledge however no such review has been published. Previous studies have addressed clinical shoulder test for different diagnosis[3-8], some studies emphasis diagnostic imaging while others consider clinical tests for single condition in the shoulder. A recent well designed review[5] has employed a search filter in the search strategy. However using this kind of search filter may not be appropriate for systematic reviews of diagnostic test accuracy[9]. In diagnosing shoulder problems a combination of tests is often used as well as diagnostic injections of local anesthetics. A few studies have assessed the usefulness of test combinations[10, 11] but no systematic review of the literature published on this subject is known to us. At present the knowledge of sensitivity and specificity of test combinations as well as the value of diagnostic injections seems insufficiently addressed.

Standardized ways of communicating, treating and diagnosing problems in the shoulder exists, for example "Axelina"-system^b in Sweden. However such a system is no guarantee for an evidence based clinical practice. There is a need to obtain further evidence on which tests to use, evidence for test combinations and evidence for the use of diagnostic injections in addition to clinical examination.

The main aim of this study is to undertake a systematic review of the literature to find the best available evidence on clinical shoulder tests, evidence for test combinations and evidence for diagnostic shoulder injections.

^a [http://www.herlevhospital.dk/menu/Afdelinger/Ortopaedkirurgisk +Afdeling T/Faglige+vejledninger/](http://www.herlevhospital.dk/menu/Afdelinger/Ortopaedkirurgisk+Afdeling_T/Faglige+vejledninger/)

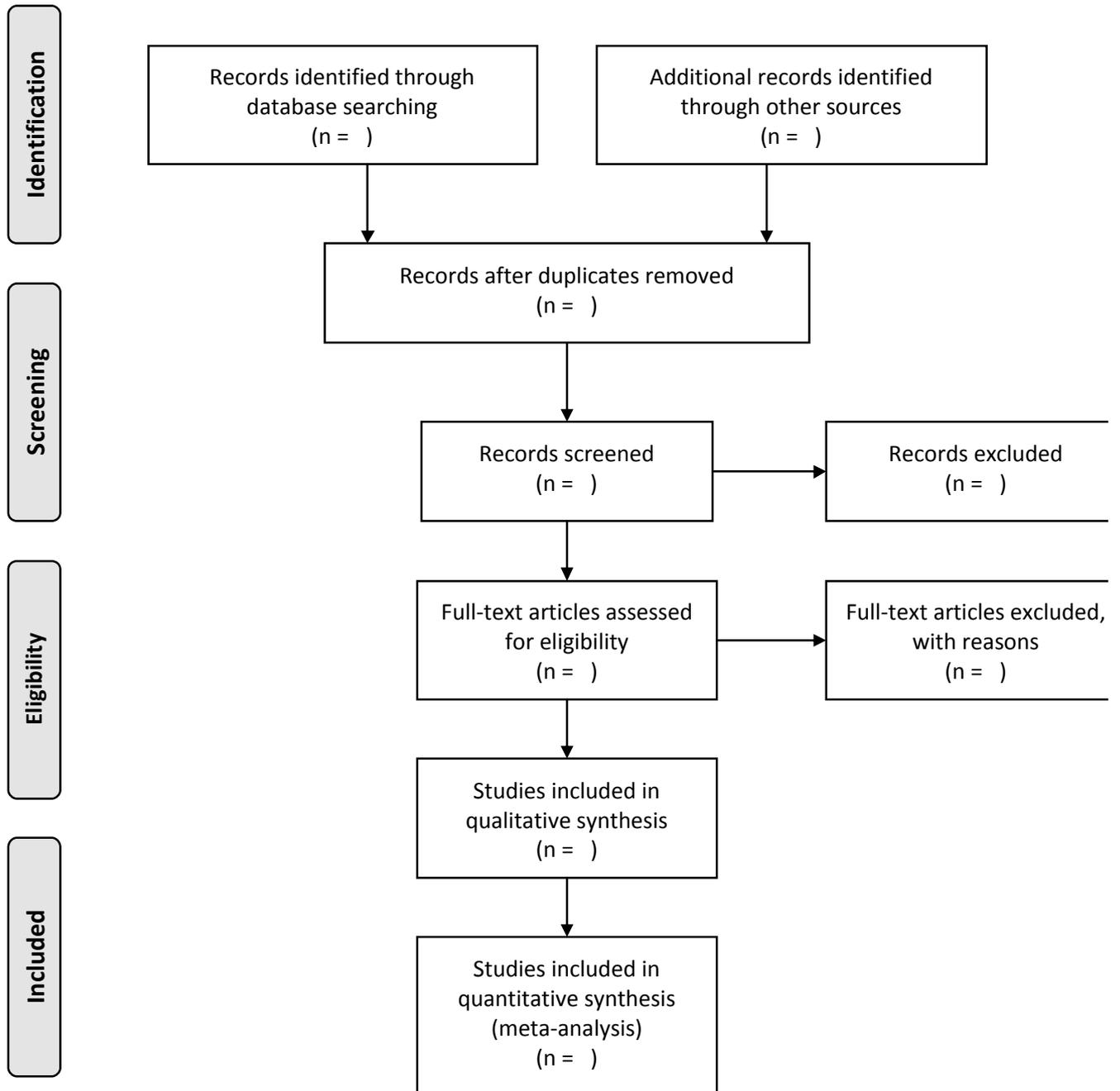
^b <http://www.axelina.com/ENG/top.asp>

Method

* The Systematic review will be conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses - the so called "PRISMA statement" [12]. Se below for schematic flow diagram:



PRISMA 2009 Flow Diagram



* The systematic literature search will be conducted in collaboration with the medical library^c. A systematic data-based literature search will be conducted in the available library databases, including: PubMed; EMBASE; Sportsdiscus; Cochrane library; AMED and PEDRO as well as selective reference search in ISI; SCOPUS and Google Scholar. In addition, the reference lists in Cochrane and other relevant review articles will be cross-checked. Hand search and contact with authors will be done where appropriate to make the retrieval of relevant literature as comprehensive as possible. An automated update search will be set up where possible to ensure up-to-date literature retrieval until concluding article. The full search strategy will be documented with aid from the research librarian. For full search strategy for PubMed see appendix 1.

* Eligibility criteria for inclusion of abstracts and articles are decided on by the review group and set in advance of the literature review. Eligibility criteria are presented in appendix 2.

* Obtained abstracts will be read by two persons and included or excluded in accordance with the eligibility criteria. If an abstract is eligible for inclusion the full article will be obtained and evaluated the same way. In the event of dissent in regard to eligibility, the group will make a consensus decision.

* In the case of unforeseen events that may cause a deviation from the protocol or in the case of any dissent, the group will strive to make a consensus decision.

* Reference handling, removal of duplicates and other processing of the references will be done with aid of the reference application EndNote X3.

Results

The results of this work will be published as a systematic review in adherence with the Vancouver declaration on authorship^d.

In the process, we will prepare a database with available information on the evidence concerning the clinical benefits of the various shoulder tests and test combinations. This may contribute to quality assurance and further development of best evidence-based practice at our shoulder-multidisciplinary outpatient clinic.

This work will also give an overview of the different criterion standards used in the literature evaluating clinical tests for the diversity of clinical shoulder conditions and will help clarify the need for further research.

^c <http://www.ntnu.no/ub/english/subject/medicine>

^d http://www.icmje.org/ethical_1author.html (International Committee of Medical Journal Editors)

References :

1. Blønd, L., *Skulderkompendium*. 2007.
2. Hanchard, N.C. and H.H. Handoll, *Physical tests for shoulder impingements and local lesions of bursa, tendon or labrum that may accompany impingement (Protocol)*. The Cochrane Library, 2008(4).
3. Calvert, E., et al., *Special physical examination tests for superior labrum anterior posterior shoulder tears are clinically limited and invalid: a diagnostic systematic review*. Journal of Clinical Epidemiology, 2009. **62**(5): p. 558-63.
4. Dinnes, J., et al., *The effectiveness of diagnostic tests for the assessment of shoulder pain due to soft tissue disorders: a systematic review*. Health Technology Assessment, 2003. **7**(29): p. iii, 1-166.
5. Hegedus, E.J., et al., *Physical examination tests of the shoulder: a systematic review with meta-analysis of individual tests*. British Journal of Sports Medicine, 2008. **42**(2): p. 80-92; discussion 92.
6. Hughes, P.C., N.F. Taylor, and R.A. Green, *Most clinical tests cannot accurately diagnose rotator cuff pathology: a systematic review*. Aust J Physiother, 2008. **54**(3): p. 159-70.
7. Tennent, T.D., W.R. Beach, and J.F. Meyers, *A review of the special tests associated with shoulder examination. Part I: the rotator cuff tests*. American Journal of Sports Medicine, 2003. **31**(1): p. 154-60.
8. Tennent, T.D., W.R. Beach, and J.F. Meyers, *A review of the special tests associated with shoulder examination. Part II: laxity, instability, and superior labral anterior and posterior (SLAP) lesions*. American Journal of Sports Medicine, 2003. **31**(2): p. 301-7.
9. Leeflang, M.M.G., et al., *Systematic Reviews of Diagnostic Test Accuracy*. Annals of Internal Medicine, 2008. **149**(12): p. 889-897.
10. Park, H.B., et al., *Diagnostic accuracy of clinical tests for the different degrees of subacromial impingement syndrome*. Journal of Bone and Joint Surgery, 2005. **87**(7): p. 1446-55.
11. Murrell, G.A. and J.R. Walton, *Diagnosis of rotator cuff tears*. Lancet, 2001. **357**(9258): p. 769-70.
12. Moher, D., et al., *Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement*. Journal of Clinical Epidemiology, 2009. **62**(10): p. 1006-12.

APPENDIX 1:

Search profile in PubMed: Shoulder diagnosis

- #1 rotator cuff[mesh]
- #2 shoulder impingement syndrome[mesh]
- #3 (arthritis[mesh] OR bursitis[mesh] OR tendinopathy[mesh] OR joint disease[mesh]) AND shoulder
- #4 shoulder pain[mesh]
- #5 shoulder fractures[mesh]
- #6 shoulder dislocation[mesh]
- #7 shoulder [mesh]
- #8 shoulder joint[mesh]
- #9 acromioclavicular joint[mesh]
- #10 scapula[mesh]
- #11 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10
- #12 diagnosis[mesh]
- #13 physical examination[mesh]
- #14 diagnostic techniques and procedures[mesh]
- #15 diagnostic imaging[mesh]
- #16 ultrasonography[subheading]
- #17 diagnosis[subheading]
- #18 #12 OR #13 OR #14 OR #15 OR #16
- #19 diagnostic accuracy
- #20 diagnostic test accuracy
- #21 reference standards[mesh]
- #22 reproducibility of results[mesh]
- #23 meta-analysis
- #24 multicenter study
- #25 predictive value of tests[mesh]
- #26 sensitivity and specificity[mesh]
- #27 #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26
- #28 #11 AND #18 AND #27

Limit to: human, English, Norwegian, Danish, Swedish

APPENDIX 2:

ELIGIBILITY CRITERIA FOR INCLUSION OF ABSTRACTS:

- 1) At least one physical examination test of the shoulder girdle is studied OR diagnostic injection of local anaesthetics in the shoulder, AC-joint, sternoclavicular or thoracoscaphular joint is studied.
- 2) Tests are compared with a criterion standard.
- 3) Studies that only regard tests of fractures and dislocations of joints as well as tests that only regard nerve dysfunction are excluded.
- 4) Living humans are studied (Exclusion of studies where tests are only performed on animals or cadavers as well as tests performed under general anaesthesia)
- 5) Article is in English or Scandinavian languages (Swedish, Danish and Norwegian)

ELIGIBILITY CRITERIA FOR INCLUSION OF ARTICLES:

- 6) Number of individuals included in study is at least 20
- 7) One of the paired statistics of sensitivity and specificity are reported or can be discerned for an individual test.
- 8) One of the following may be used as criterion standard for:
 - a. Impingement
 - i. ARTHROSCOPY / SURGERY
 - ii. MRI OR MRI-ARTHROGRAPHY
 - iii. ULTRASOUND
 - iv. INJECTION OF LOCAL ANAESTHETIC
 - v. ULTRASOUND GUIDED INJECTION
 - b. AC-joint
 - i. ULTRASOUND GUIDED INJECTION OF LOCAL ANAESTHETIC
 - ii. INJECTION OF LOCAL ANAESTHETIC
 - iii. MRI OR MRI-ARTHROGRAPHY
 - iv. ULTRASOUND
 - v. ARTHROSCOPY / SURGERY
 - c. Rupture of the rotator cuff
 - i. ARTHROSCOPY / SURGERY
 - ii. MRI OR MRI-ARTHROGRAPHY
 - iii. ULTRASOUND
 - d. Biceps inflammation / rupture
 - i. MRI OR MRI-ARTHROGRAPHY
 - ii. ARTHROSCOPY / SURGERY
 - iii. ULTRASOUND
 - iv. ULTRASOUND GUIDED INJECTION OF LOCAL ANAESTHETIC
 - v. INJECTION OF LOCAL ANAESTHETIC
 - e. Glenohumeral instability
 - i. ARTHROSCOPY / SURGERY
 - ii. MRI OR MRI-ARTHROGRAPHY
 - f. Adhesive capsulitis
 - i. MRI OR MRI-ARTHROGRAPHY
 - ii. ARTHROSCOPY / SURGERY
 - g. Glenohumeral osteoarthritis
 - i. MRI OR MRI-ARTHROGRAPHY
 - ii. X-ray
 - iii. ARTHROSCOPY / SURGERY
 - h. SLAP-lesjoner
 - i. ARTHROSCOPY / SURGERY
 - ii. MRI OR MRI-ARTHROGRAPHY

Systematic reviews are excluded but the reference list will be browsed for eligible articles.