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ORIGINAL ARTICLE

Are degenerative rotator cuff disorders a cause of shoulder pain? Comparison of prevalence of degenerative rotator cuff disease to prevalence of nontraumatic shoulder pain through three systematic and critical reviews

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Hypothesis and Background: The role of degeneration is not well understood for rotator cuff pain. If age-related degenerative changes would be the cause of symptoms, degeneration would precede or concur with self-reported pain. We performed 3 systematic literature reviews. Our objectives were to determine the prevalence estimates for rotator cuff partial or complete tears (1) in cadavers and (2) in the general population and (3) to estimate the incidence/prevalence of self-reported nontraumatic shoulder pain in the general population in order to compare their respective age-related profiles.

Methods: We searched PubMed and ScienceDirect, including 2015, for cadaveric studies and transverse and longitudinal studies of the general population reporting the incidence/prevalence of rotator cuff disorders or nontraumatic shoulder pain, or both, according to age. The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines. Results were interpreted visually.

Results: We found 6 cadaveric studies, 2 studies from the general population reporting complete tears, and 10 articles on nontraumatic shoulder pain in the general population that met our criteria. The profiles of degeneration vs. pain were very similar in early years. Although degenerative rotators cuff lesions increased gradually after 50 years, the incidence/prevalence of nontraumatic shoulder pain decreased after 65 years.

Conclusion: The profile of age-related degenerative rotator cuff disorders fails to correlate systematically with self-reported nontraumatic shoulder pain, particularly in older age; thus, it appears that degeneration should not be considered the primary source of the pain. Physical activity may play an important role in the production of the pain, a theory that warrants further study.

Institutional Review Board approval was not required for this review study of published articles.

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The prevalence of shoulder pain in the general adult population is relatively common, with lifetime prevalence estimates reported to be as high as 67%.¹⁴ Shoulder pain can cause considerable discomfort and may therefore have some consequences such as a need for treatment, reduced work capacity, and sickness absence.^{16,26,32}

The most frequent cause is known to be problems with the rotator cuff.¹⁶ However, the origin of pain has not been clearly elucidated. The management of painful shoulders includes conservative and surgical treatments, but their effects and comparative outcomes remain unclear.^{3-5,27} A better understanding of the definite role of the degenerated rotator cuff in the painful shoulder would represent a step forward toward a logical treatment approach to this large diagnostic subgroup of the painful shoulder.

Teunis et al²⁸ studied this very issue in a review, in which they concluded that “the prevalence of rotator cuff abnormalities in asymptomatic people is high enough for degeneration of the rotator cuff to be considered a common aspect of normal aging and to make it difficult to determine when an abnormality is new (eg, after a dislocation) or is the cause of symptoms.”

Their review, however, failed to clearly demonstrate how they reached this conclusion. For this reason, we decided to perform a new systematic review, to do so in a critical context, and to visualize clearly the results in order to clarify the findings of the previous review, while updating it with any new information that was available.

Our objectives were:

1. to determine the prevalence of rotator cuff partial or complete tears in the cadaveric and the general populations, when demonstrated with validated diagnostic tools, according to age;
2. to determine the prevalence/incidence of self-reported nontraumatic shoulder pain (NTSP) in the general population, according to age;
3. to compare the age-related profiles of degeneration and pain, to see if they concur; and
4. to compare the prevalence estimates of pain for men and women.

We hypothesized that if age-related degenerative changes were the cause of most shoulder pain, then objective signs of degeneration would be as common as or somewhat more common than self-reported pain in each age group but that the 2 age-related curves would not concur if degenerative changes were not the cause.

Materials and methods

Design and registration

We performed 3 systematic and critical reviews of the literature to satisfy each of the 3 objectives: (1) the first on the prevalence of rotator cuff degenerative disorder (RCDD) in cadavers, (2) the second on the prevalence of RCDD in the general population, and (3) the third on the prevalence of self-reported NTSP in the general population. The review was registered in the International prospective register of systematic reviews PROSPERO (PROSPERO CRD42014015240).

Information sources and search

Searches were made in the PubMed and ScienceDirect databases to identify articles until December 2015. The search terms used were Medical Subject Headings and free text. Details of the searches are given in [Appendix S1](#) for each of the 3 reviews.

Eligibility criteria

Inclusion criteria:

1. The design of the studies concerned cadaveric studies for objective 1 and population-based, cross-sectional, or longitudinal studies for objectives 2 and 3.
2. Only articles published in English or French were considered, with no limitation for year of publication.
3. Estimates had to be provided in relation to age group, because our goal was to assess findings in relation to age.
4. The type of RCDD had to be demonstrated at autopsy or by complementary examinations. Arthroscopy was retained because it is a reference standard test in assessing the articular and bursal side of the rotator cuff. We also accepted magnetic resonance imaging and ultrasound imaging because a systematic review showed their diagnostic performance has had good accuracy in the diagnosis of rotator cuff tears.¹²

Exclusion criteria in the population-based studies were:

1. case-control studies;
2. studies that used physical examination as the diagnostic method for RCDD because of its lack of objectivity;
3. studies that did not clearly distinguish between neck and shoulder pain;
4. studies concerning the upper limb if shoulder pain was not clearly distinguished from other painful upper limb areas or pathologies; and
5. sample size <100 (no limit was set for the cadaveric studies).

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