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REVIEW ARTICLE (META-ANALYSIS)

Prevalence of Myofascial Trigger Points in Spinal Disorders: A Systematic Review and Meta-Analysis

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Abstract

Objective: To retrieve, appraise, and synthesize the results of studies on the prevalence of active and latent myofascial trigger points (MTrPs) in subjects with spinal pain disorders.

Data Sources: The databases PubMed, Embase, and CINAHL were searched, with no date or language restrictions. Search terms included controlled and free-text terms for spinal disorders and MTrPs. Further searches were conducted in Google Scholar and by contacting 3 experts in the field. Citation tracking of eligible studies was performed.

Study Selection: Two reviewers independently selected observational studies assessing the prevalence of active and/or latent MTrPs in at least 1 group of adults with a spinal disorder. Twelve studies met the eligibility criteria.

Data Extraction: Methodologic quality was assessed by 2 reviewers independently using a modified version of the Downs and Black checklist. Two reviewers also used a customized form to extract studies and subjects' characteristics and the proportions of subjects with active and/or latent MTrPs in each muscle assessed.

Data Synthesis: A meta-analysis was performed when there was sufficient clinical homogeneity in at least 2 studies for the same spinal disorder. The Grading of Recommendations Assessment, Development and Evaluation approach was used to rate the body of evidence in each meta-analysis. A qualitative description of the results of single studies was provided. Low-quality evidence underpinned pooled estimates of MTrPs in the upper-body muscles of subjects with chronic neck pain. The point prevalence of MTrPs in different muscles of other disorders (eg, whiplash-associated disorders, nonspecific low back pain) was extracted from single studies with low methodologic quality and small samples. Active MTrPs were found to be present in all assessed muscles of subjects diagnosed with different spinal pain disorders. Latent MTrPs were not consistently more prevalent in subjects with a spinal disorder than in healthy controls.

Conclusions: The MTrPs point prevalence estimates in this review should be viewed with caution because future studies with large samples and high methodologic quality are likely to change them substantially.

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Spinal disorders are among the leading causes of years lived with disability, with low back pain (LBP) ranking first and neck pain (NP) ranking fourth worldwide.[1] The same disorders are also majorly responsible for disability-adjusted life years.[2] The mean lifetime activity-limiting prevalence of LBP is estimated to be approximately 39% and that of NP is 23%, and the point prevalence is approximately 18% and 14%, respectively.[3,4] Cost-of-illness studies have highlighted that costs associated with these disorders

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represent a significant burden to society.[5,6] Considering all these factors together, it is apparent that research to increase our understanding of the etiology of these disorders is critical.

A clinical sign in subjects with spinal disorders is the presence of myofascial trigger points (MTrPs).[7-9] Expert-based definitions of MTrPs identify these as hypersensitive spots within a taut band of skeletal muscle that are painful on compression and which can evoke referred pain.[10] From a clinical perspective, MTrPs can be differentiated by manual assessment into active and latent.[10] Active MTrPs elicit local and referred pain that reproduce the symptoms that the patient suffered from and are recognized as a familiar complaint, whereas latent MTrPs reproduce local and referred pain that does not reproduce any spontaneous symptoms perceived by the patient.[10]

The clinical distinction between active and latent MTrPs is supported by histochemical findings showing that active MTrPs contain higher levels of algogenic substances and chemical mediators (eg, bradykinin, substance P, serotonin) than latent MTrPs and body areas without MTrPs.[11,12] Both active and latent MTrPs can be involved in pain sensitization processes involving the central nervous system,[13,14] and these processes have been shown to be altered in subjects diagnosed with different spinal disorders.[15-18] Further, latent MTrPs can be contributors to musculoskeletal signs and symptoms (eg, muscle imbalance, muscle weakness, fatigability), as reported by recent studies.[19-21]

The presence of active MTrPs in a subject can lead to the diagnosis of myofascial pain syndrome, which is considered to be a major cause of musculoskeletal pain, and its prevalence in adult subjects is reported to be high.[22] Several studies have reported the prevalence of manually assessed active and latent MTrPs in different muscles of subjects diagnosed with spinal disorders. To our knowledge, however, no systematic reviews to date have attempted to retrieve all of these studies to assess their methodologic quality and summarize their findings.

The objective of our study was therefore to conduct a systematic review of the literature with a meta-analysis to synthesize the evidence on the prevalence of active and latent MTrPs in subjects with spinal disorders. The body of evidence on the prevalence of MTrPs was considered and analyzed separately for each spinal pain disorder following diagnoses and definitions used by the authors of the original studies (eg, LBP, NP, whiplash-associated disorder [WAD]). Three specific aims were defined for each disorder: (1) to estimate the prevalence of active MTrPs in all evaluated muscles; (2) to compare the prevalence of latent MTrPs in subjects diagnosed with different spinal disorders (eg, NP vs WAD); and (3) to compare the prevalence of latent MTrPs in both subjects diagnosed with a spinal disorder and healthy controls. We did not aim to compare the prevalence of active MTrPs between subjects diagnosed with different spinal disorders or between subjects with a spinal disorder and healthy controls because, by definition, active MTrPs cannot be present in healthy subjects.[7-10]

List of abbreviations:

CI	**confidence interval**
CR	**cervical radiculopathy**
LBP	**low back pain**
MTrP	**myofascial trigger point**
NP	**neck pain**
NSLBP	**nonspecific low back pain**
OR	**odds ratio**
WAD	**whiplash-associated disorder**

Methods

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement guidelines.[23] A protocol was written a priori and is available in appendices 1 through 3.

Study retrieval and screening

On October 15, 2014, we conducted a comprehensive systematic search of the following bibliographic databases: MEDLINE (via PubMed), Embase (via Embase.com), and CINAHL (via EBSCOhost). Search terms included controlled terms (ie, Medical Subject Headings in PubMed, Emtree in Embase, subject headings in CINAHL) and free-text terms. Each database was searched separately, and the search strategy had the same structure in all databases. The complete search strategies for all databases can be found in appendices 1 through 3. No restrictions were applied on the language of the articles. An additional search with the keyword *trigger point* was conducted in the search engine Google Scholar. The first 200 hits were screened because it is not feasible to screen all results obtained with a simple search in Google Scholar (ie, >2 million for *trigger point*) and because this engine automatically lists references with regard to their relevance and the number of citations on the topic searched. All hits obtained with the search strategies were exported in EndNote[a] where duplicates were removed.

The titles and abstracts of the resulting studies were screened by 2 reviewers independently (A.C., M.B.) to assess their eligibility. The full texts of potentially eligible studies were retrieved and assessed against the inclusion criteria by the same 2 reviewers independently. Controversies between reviewers regarding the eligibility of titles/abstracts or full texts were solved in a consensus meeting. When consensus could not be reached, a third reviewer (R.C.) was asked to make the final decision.

Forward citation tracking of the eligible studies was conducted in Web of Science (via Web of Knowledge) by 1 reviewer (A.C.). Backward citation tracking of the reference lists of included studies was also conducted by 1 reviewer (A.C.). When other potentially eligible studies were detected, 2 reviewers (A.C., M.B.) checked independently against the inclusion criteria. At the end of this process, 3 authors with a large number of publications in the field of MTrPs were contacted by e-mail and asked to identify whether to their knowledge any study was missing and whether any other unpublished studies were ongoing.

Eligibility criteria

The following types of study were included in this review: (1) full-text articles published in a peer-reviewed scientific journal; (2) observational designs aimed at assessing the prevalence of active and/or latent MTrPs in at least 1 group of adult subjects (ie, >18y old) with a spinal disorder; (3) inclusion of manual assessment of MTrPs in at least 1 specific muscle; and (4) articles written in English, Italian, French, or Spanish. All medical diagnoses indicating the presence of a spinal pain disorder (eg, nonspecific low back pain [NSLBP], idiopathic NP, WAD, spinal stenosis, herniated disk)[24] were accepted and included in this review. Studies conducted in subjects with underlying medical conditions (eg, rheumatoid arthritis, tumor, infection) were not included, and studies conducted in subjects with fibromyalgia were also excluded. Articles published in languages other than the aforementioned ones were included only if an English version was available.