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Systematic Review Protocol: Range of Motion of the Cervical Spine in Adults V.1

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We use this protocol and it's working

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Abstract

To systematically review and synthesize evidence on the normative range of motion (ROM) of the cervical spine in healthy adults. The study will evaluate variations in ROM values across different age groups, genders, and measurement techniques. Findings will provide a comprehensive reference for clinicians and researchers, aiding in cervical spine mobility assessment and standardization of measurement methods.

Guidelines

The cervical spine plays a critical role in maintaining head mobility and positioning. Understanding its normal range of motion is fundamental for diagnosing and treating musculoskeletal disorders. However, reported normative values for cervical spine ROM vary significantly across studies, largely due to differences in methodologies, populations, and measurement tools. This systematic review will collate and analyze existing data to establish comprehensive normative values.

Design & Methods

1 This protocol outlines a systematic review on the range of motion of the cervical spine in healthy adults. A comprehensive search will be conducted across multiple electronic databases, focusing on peer-reviewed studies. Grey literature (e.g., conference abstracts, unpublished theses) will not be included due to potential methodological inconsistencies and lack of peer review. Relevant studies will undergo full-text review to extract data on methodologies, measurement techniques, and outcomes. Two independent reviewers will screen and extract data, resolving discrepancies through discussion or adjudication by a third reviewer if necessary. Study quality will be assessed using the CASP checklist for methodological appraisal, and reporting will adhere to PRISMA guidelines. Findings will be synthesized narratively, with descriptive tables summarizing study characteristics and results. If sufficient homogeneous data are available, a meta-analysis will be performed; otherwise, a qualitative synthesis will be conducted. Multiple study designs will be considered to enhance the comprehensiveness of the review, and existing systematic reviews will be examined to identify additional relevant studies.

Discussion

2 The findings from this systematic review will provide a comprehensive understanding of the current literature on the range of motion of the cervical spine in healthy adults. This synthesis will establish normative data and identify gaps in existing research, offering a foundation for future studies. Such data will be instrumental in refining clinical assessments, enhancing diagnostic accuracy, and guiding therapeutic interventions. Ultimately, this review aims to support evidence-based practice and inform further research to improve clinical outcomes related to cervical spine mobility.

Information Sources

3 The search strategy will involve systematic searches of the electronic databases PubMed, Embase, Cochrane Library, CINAHL, Web of Science, SCOPUS, Physiotherapy Evidence Database (PEDro), ClinicalTrials.gov, and NICE Evidence Search, from the date of first entry to the date of search.

Eligibility Criteria

4 Population: Healthy adults with no history of cervical spine pathology, trauma, or surgery and patients with Degenerative cervical myelopathy (DCM). No restriction on gender or ethnicity.

5 Intervention: Assessment of cervical spine range of motion using validated techniques (e.g., goniometry, inclinometry, imaging).

6 Outcomes: The primary outcome is cervical spine ROM (flexion, extension, lateral flexion, and rotation). Secondary outcomes include factors influencing ROM, such as age and sex.

7 Study Designs: Observational studies (most relevant), cross-sectional studies, and cohort studies reporting primary data on cervical spine ROM. Randomized Controlled Trials (RCTs) are unlikely to be useful for this topic.

8 Exclusion Criteria: Case reports, animal studies, secondary studies, studies on pathological populations, and articles not available in English.

Search Strategy

9 Search Terms: ("cervical spine" OR "neck" OR "cervical vertebrae" OR "cervical region") AND ("range of motion" OR "ROM" OR "flexibility" OR "mobility" OR "movement" OR "kinematics" OR "joint motion" OR "spinal motion").

10 Filtering Strategy: We will avoid using "NOT" in search terms but will include broader terminology to yield more results.

11 Database Considerations: Will be mindful of the different symbols, truncations, and wildcards across various databases, therefore ensuring that the search terms will be adapted based on database-specific syntax.

12 Search Documentation: Will use a spreadsheet to record our searches across different databases and quantify the number of available papers after duplicate removal.

Data Extraction

13 A standardized data extraction form will be used to collect:

13.1 Study characteristics (authors, year, country, sample size)

13.2 Population demographics (age, sex)

13.3 Measurement methods and tools

13.4 Reported cervical spine ROM values

Risk of Bias Assessment

14 The quality of included studies will be assessed using the PRISMA guidelines for standardized reporting and the CASP checklist for methodology. This paper can also be critically appraised using the ARRIVE guidelines. For risk of bias, multiple resources such as SYRCLE's risk of bias tool, QUADAS-2 (diagnostic/measurement accuracy), AMSTAR 2 (systematic reviews), and Cochrane RoB 2 (RCT bias) will be used. Each study will be rated as low, moderate, or high risk of bias.

Ethics and Dissemination

15 This systematic review does not require ethics approval as it involves secondary analysis of published data. Hence, patient and public involvement is not applicable. Results will be disseminated through peer-reviewed journals and conference presentations.

Funding and Conflicts of Interest

16 This review is unfunded. The authors declare no conflicts of interest.

References

17 References will be added upon completion of the review and include all studies meeting the eligibility criteria.