Clinical tests for screening and diagnosis of cervical spine myelopathy: A systematic review.

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CRD summary
This review found that nearly all the clinical tests for cervical spine myelopathy seemed to be poor screening tools and more high-quality studies were needed. The low to moderate quality of the studies and the lack of a statistical synthesis make the validity of the results and conclusions uncertain, but the recommendation for further high-quality studies is justified.

Authors' objectives
To review the diagnostic accuracy of clinical tests for cervical spine myelopathy.

Searching
PubMed and CINAHL were searched for publications in English. Search terms were presented, but search dates were not. Reference lists of identified studies and a relevant textbook were also searched.

Study selection
Eligible studies had to report on a clinical test for the diagnosis of cervical spine myelopathy, specifically myelopathy associated with degeneration. An acceptable reference standard had to be used and studies had to report diagnostic accuracy data for the tests (such as sensitivity and specificity). Reference standards including a clinical diagnosis with imaging confirmation, or using imaging confirmation only were included. Studies of spinal cord trauma from injury were excluded.

Clinical tests were classified as being gait or balance analyses (including abnormal gait and static or dynamic Rhomberg sign); pathological signs (including Hoffman sign, Babinski sign and clonus); or deep tendon reflex changes.

Two reviewers selected the studies for inclusion, with disagreements resolved by consensus.

Assessment of study quality
Three reviewers assessed study quality using the QUADAS tool. Studies were graded out of 14, with 10 or more being high quality, 8 or 9 moderate quality and 7 or less low quality. Disagreements were resolved by consensus.

Data extraction
Sensitivity, specificity, positive and negative likelihood ratios, with their 95% confidence intervals (if reported) were extracted from studies either directly or by calculation from published 2x2 tables of diagnostic accuracy. It was not stated how many reviewers extracted data.

Methods of synthesis
Statistical synthesis was considered but not performed because studies were judged to be not of sufficiently high quality. Instead, diagnostic accuracy results were tabulated for each study and discussed narratively.

Results of the review
Twelve studies were included. The number of participants was not reported. Quality scores ranged from 2 to 12. Only one study was considered to be of high quality.

Among the pathological signs, for the Hoffmann sign (10 studies) sensitivity ranged from zero to 94% (where reported), and specificity from zero to 90% (where reported). For the Babinski sign (seven studies), sensitivity ranged from 7% to 53%, and specificity from 92% to 100%. For Clonus (four studies), sensitivity ranged from 7% to 35%, and specificity from 96% to 100%. For the inverted supinator sign (five studies), sensitivity ranged from 18% to 61%, and specificity from 72.4% to 99%.

Other tests were reported in only one or two studies (results presented in paper). The authors broadly concluded that the tests had good specificity but lacked sensitivity.
Authors' conclusions
Nearly all the clinical tests for cervical spine myelopathy seemed to be poor screening tools and more high-quality studies were needed.

CRD commentary
This review addressed a relevant research question with appropriate inclusion criteria. A search was conducted but it was limited to studies in English and its timing was not stated, so it was unclear whether all relevant studies were identified. Action was taken to reduce reviewer error and bias in the study selection and quality assessment. Study quality was assessed and found to be generally low to moderate, with only one high-quality study. Many of the studies had case-control or other retrospective designs, which may be prone to bias. The number of participants was not stated, and details on the types of participant who were included were limited, so the generalizability of the results was unclear.

Due to the low to moderate quality of the studies no statistical synthesis was performed, making it difficult to assess the validity of the study results. Some studies reported one of sensitivity or specificity, but not both, making it difficult to assess diagnostic accuracy. For all these reasons the validity of the results and the authors’ conclusions is uncertain, although the recommendation for further high-quality studies is justified.

Implications of the review for practice and research
Practice: The authors recommended that manual therapists should be aware that current clinical tests for cervical spine myelopathy lack diagnostic accuracy.

Research: The authors suggested that high-quality studies of diagnostic accuracy are needed, including studies that investigate clusters of tests.

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**Record Status**
This is a systematic review that meets the criteria for inclusion on DARE.