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Research Paper Review

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Centralization & directional preference: A systematic review

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ABSTRACT

Centralization is a symptom response to repeated movements that can be used to classify patients into sub-groups, determine appropriate management strategies, and prognosis. The aim of this study was to systematically review the literature relating to centralization and directional preference, and specifically report on prevalence, prognostic validity, reliability, loading strategies, and diagnostic implications. Search was conducted to June 2011; multiple study designs were considered. 62 studies were included in the review; 54 related to centralization and 8 to directional preference. The prevalence of centralization was 44.4% (range 11%-89%) in 4745 patients with back and neck pain in 29 studies; it was more prevalent in acute (74%) than sub-acute or chronic (42%) symptoms. The prevalence of directional preference was 70% (range 60%-78%) in 2368 patients with back or neck pain in 5 studies. Twenty-one of 23 studies supported the prognostic validity of centralization, including 3 high quality studies and 4 of moderate quality; whereas 2 moderate quality studies showed evidence that did not support the prognostic validity of centralization. Data on the prognostic validity of directional preference was limited to one study. Centralization and directional preference appear to be useful treatment effect modifiers in 7 out of 8 studies. Levels of reliability were very variable (kappa 0.15-0.9) in 5 studies. Findings of centralization or directional preference at baseline would appear to be useful indicators of management strategies and prognosis, and therefore warrant further investigation.

ANALYSIS

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Background Information

The treatment of lumbar and cervical spine pain remains controversial, largely due to the spectrum of causes and responses to treatment found in both low back and neck pain patients. Recent research has highlighted the value of predictive information, in relation to examination findings, that may be able to predict a response to a specific treatment. The most comprehensively researched of these clinically-induced symptom response relationships is *centralization*, the phenomenon where repeated movements or sustained postures result in an abolition of distal and spinal pain (it is also often used to describe proximal migration of radicular pain back toward the spine – from the calf to the glutes, for example). Two systematic reviews have been published on this topic within the last decade (1, 2), although the former is generally considered to be no longer contemporary.

An associated but separate phenomenon is low back and neck pain that demonstrates a *directional preference*, where repeated movements induce centralization or abolition of symptoms but also a decrease in symptom severity and/or a positive mechanical response (ex. increased range of motion). In cases of directional preference, contralateral movement often increases symptomatology.

A finding of directional preference at baseline has been shown to predict a significantly better response to directional preference exercises than non-specific exercises. Given the potential value in identifying these characteristics and their possible value in predicting patient outcomes, the current study aimed to systematically review the literature relating to all aspects of centralization and directional preference.

SUMMARY

From an initial pool of 1416 titles and abstracts, 62 articles were finally included, the majority of which related to centralization (only 8 related to directional preference). The majority of studies related to low back complaints, with only 5 involving patients with either neck pain or combined complaints.

The occurrence of centralization as a proportion of the total study population could be calculated in 29 studies: among 4745 patients, centralization occurred in 2109 (44.4%). Centralization occurred in 74%, 50%, and 40% of 317 acute, 123 sub-acute, and 567 chronic spine problems, respectively. It was found to be more common in acute pain versus chronic pain and in a younger patient population as compared to an older population.

Centralization was associated with a good prognosis in 21 of 23 studies. Conversely, non-centralization was associated with a poor prognosis and with greater psychosocial issues. Centralization, therefore,

appeared to be a positive prognostic indicator for non-specific low back pain and for sciatica; however, there was less evidence for centralization as a treatment effect modifier.

Directional preference or derangement was reported in 1661 of 2368 patients in 5 studies (70%). Directional preference had limited evidence as a prognostic indicator, but there was some evidence for it as a treatment effect modifier.

EDITOR'S NOTE: *Remember, a prognostic factor helps us identify patients who are likely to achieve an outcome overall (be it positive or negative, depending on the factor). A treatment effect modifier, on the other hand, offers information about how a patient may respond to a particular intervention. In the case if directional preference, it makes sense that if a patient seems to respond well to flexion in an assessment, treatment including flexion-based movements should provide the highest degree of benefit.*

CLINICAL APPLICATION & CONCLUSIONS

Centralization and directional preference appear to be well accepted concepts commonly encountered by clinicians managing patients with back and neck pain. There appears to be some relationship between centralization and discogenic pathology, but the authors were unable to determine that exact nature of that relationship. Unfortunately, data was very limited on the differential prognostic validity of centralization and directional preference. From the evidence, it appears that the prognostic validity of centralization is much more clearly established. The evidence for directional preference and prognosis is more limited, though it is better for directional preference as a treatment effect modifier. Overall, both constructs represent rational and reasonable goals of patient assessment, and should continue to be utilized on appropriate patients.

STUDY METHODS

Study Selection: Any full-text study that reported some aspect of centralization or directional preference, in adults reporting spinal pain (low back or neck pain) with or without radiating symptoms.

Data Sources: Medline, Cinahl and AMed from 1990 to June 2011; as well as the database on: www.mckenziemdt.org.

Search Terms: Centralization, directional preference, spine pain, back pain, neck pain; used individually and then in combinations.

Data Extraction: Data was independently extracted. Prognostic studies were scored against existing quality criteria (3): strong evidence partially or fully meeting all criteria; moderate evidence partially fulfilling most criteria; weaker evidence when studies failed to fulfil multiple criteria.

STUDY STRENGTHS / WEAKNESSES

Limitations

- There was a large degree of heterogeneity across studies.
- The authors depended substantially on searches of the reference lists of included articles and the mckenziemdt.org website.
- Sample sizes ranged from very small to substantial.

Strengths

- The search strategy employed allowed the authors to access substantially more data than any previous review.
- The authors did not need to restrict their search to English language only.

Additional References

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