May S, Aina A. Centralization and directional preference: A systematic review. Manual Therapy 2012;17:497-506.

Design: Systematic review of observational studies

Partial summary of results:

- This review is confined to the section dealing with the prognostic implications of centralization
- Centralization is considered to mean the abolition of distal and spinal pain in response to repeated movements or sustained postures
    - An associated concept, directional preference, is defined as the repeated movement which either induces centralization or which abolishes symptoms, but also decreases symptom severity and induces a positive mechanical response, such as increased range of movement; movements in the opposite direction may exacerbate symptoms and signs
- Databases were MEDLINE, CINAHL, and AMed from 1990 (the date of the first publication of a study of centralization) through June 2011
- The two authors independently extracted data and evaluated the prognostic studies using a set of criteria derived from Hudak et al 1996, which scored individual criteria on a scale from 0 (unsatisfactory) up to 3 (completely satisfactory); the Hudak criteria were:
    - Case definition
        - 2= operational definition of cases including exclusion criteria
        - 1=operational definition of cases but no exclusion criteria
        - 0= no explicit definition of cases or can't tell
    - Patient selection
        - 2=inception cohort (defined in relation to onset of symptoms)
        - 1=Survival cohort (patients are first studied after symptom onset), including a subset of patients with duration <= 4 months, which is separately analyzed
        - 0=Survival cohort in which the reader cannot tell the differences between patients with recent onset and patients with longer time since onset
    - Follow-up
        - 3=Followup of >= 80% of patients at the 1 year mark
        - 2=Follow-up of >=80% of patients for duration of treatment only or less than 1 year from symptom onset

        - 1=Cross-sectional study or <80% of total sample
        - 0=Unclear or can't tell
    - Outcome
        - 2=Blinded outcome criteria appropriate to the research question with potential for replicability of at least one outcome
        - 1=Outcome criteria appropriate to the research question
        - 0=No explicit outcome criteria (for example, "patient significantly improved") or can't tell
    - Prognostic factors:
        - 2=Measurement and reporting of potential prognostic factors in sufficient detail (raw data given; proportions of patients, etc)
        - 1=Measurement of potential prognostic factors but not reported or reported in insufficient detail (means, ranges)
        - 0=No measurement of prognostic factors or can't tell
    - Analysis:
        - 3=Adjusted proportions provided by appropriate analytical technique which adjusts for other prognostic factors
        - 2=Crude proportions reported, but data stratified or presented in a manner which would allow for analysis of subsets
        - 1= Crude proportions for at least one response, remission, or recurrence
        - 0= Description of sample only, with unclear statistical methods or can't tell
    - The maximum possible score is 16 points if all the Hudak criteria are fully satisfied
        - The authors made small modifications to Hudak which make the maximum score unclear
- The authors rated a study as *strong* evidence if it partially or fully met all criteria; *moderate* evidence if it partially fulfilled most criteria, and *weaker* if it failed to fulfill multiple criteria
    - In Table 3, it appears that the authors rated a study as strong if it scored 5 or more points on their modified scale, and moderate if it scored 3.5 to 4.5 points
- 23 studies considered the prognostic value of centralization, but were of uneven quality
    - 3 studies provided strong evidence of the prognostic value of centralization
    - 2 studies provided moderate evidence of the prognostic value of centralization
    - 1 study provide moderate that non-centralization was a negative prognostic factor
    - 2 studies provided moderate evidence unsupportive of the prognostic value of centralization

    - The remaining studies, representing weaker evidence supported the prognostic value of centralization

Authors' conclusions:

- Centralization appears to be a favorable prognostic indicator for nonspecific low back pain and for sciatica
- There is substantial variation in study size, outcome measurement, and design, precluding any attempt to pool the results statistically
- The strong studies supported of the prognostic value of centralization; the moderate quality studies were conflicting
- Centralization is generally, but not universally, a good prognostic indicator
- The data on directional preference is more limited than the data for centralization
- Centralization was more common in acute spine problems and in patients under 44 years old

Comments:

- Reporting and analysis standards for prognostic studies are less well developed and agreed upon than for randomized clinical trials, cohort studies of risk factors, and case-control studies of risk factors for disease
- The Hudak article which was used as the basis for grading study quality was done in patients with elbow disorders, but uses criteria compatible with those suggested in a proposal for quality of prognosis suggested in 2006 by Hayden et al in the *Annals of Internal Medicine*
- The scoring of the studies in Table 3 is clouded by the apparent departure from the system in Hudak 1996, and the scoring may have been on the low side
    - For example, Skytte et al 2005 was awarded 6 points on a scale with unclear maximum scores
        - The authors awarded Skytte 1 point for their first criterion, having a representative sample, and 1 point for being at a well-defined point in the natural history
        - If Hudak's first criterion of case definition corresponds to the authors' first criterion of a representative sample, the Hudak criterion ought to receive 2 points, since the inclusion and exclusion criteria were specified
        - The authors awarded Skytte 1 point for their second criterion, patients at a well-defined point in the natural history
        - If Hudak's second criterion of an inception cohort is applied (less than 4 months since onset of symptoms), Skytte also should have 2 points, since they excluded patients with symptom duration more than 14

weeks; the second criterion of the authors could have been awarded 2 points if they were following the Hudak scoring criteria
        - Similarly, the authors awarded Skytte 1 point for length of follow-up and 1 point for having more than 85% follow-up and 1 year, for a total of 2 points; Hudak would have awarded Skytte 3 points on the same criteria
- The authors' scoring system therefore seems to be based on a lower number of maximum points than the scheme on which they based their approach
- Therefore the level of evidence in favor of centralization as a predictor of prognosis may be greater than would be apparent from looking at the scores
- Parenthetically, the authors also reported that there was insufficient evidence to rate centralization as a predictor of discogenic pain

Assessment: Adequate to provide good evidence that centralization is a favorable predictor of outcomes at 1 year with respect to pain and function for low back pain with and without sciatica

References:

Hudak PL, Cole DC, Haines T. Understanding Prognosis to Improve Rehabilitation: The Example of Lateral Elbow Pain. Arch Phys Med Rehabil 1996;77:568-593

Hayden JA, Cote P, Bombardier C. Evaluation of the Quality of Prognosis Studies in Systematic Reviews. Ann Intern Med 2006;144:427-437

Skytte L, May D, Petersen P. Centralization: Its Prognostic Value in Patients With Referred Symptoms and Sciatica. Spine 2005;30:E293-E299.