Passive accessory movements of the cervical spine: does what we think and teach match what we feel?

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Passive accessory movements of the cervical spine: does what we think and teach match what we feel?

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Background: Spinal assessments by passive accessory intervertebral movements (PAIVMs) are intended to assess segmental intervertebral mobility and were originally considered to produce localized accessory glides between two vertebrae. Subjective terms or movement diagrams were then used to describe the resulting movement as if the entire movement occurred at the target structure. Features typically considered include range of movement (ROM) and end-of-range stiffness (endfeel). It is now known that the movements produced by PAIVMs are neither predominantly accessory movements nor localized, but rather include complex contributions from local and regional structures. The descriptors of PAIVMs (ROM and endfeel) used clinically and in research, however have not altered in response to this knowledge. Instrumented assessments of PAIVMs using these descriptors do not agree with therapist's assessments of intervertebral movement. We therefore undertook two studies to assess what aspects of PAIVMs might be related to intervertebral dysfunction.

Study 1: We developed a simplified 2D computer-based model of the cervical spine and applied a virtual PAIVM to C4/5 to assess how the PAIVM would alter with changes in regional or intersegmental mobility. The modelling demonstrated that the overall range of movement decreased and stiffness at the end of range of the PAIVMs increased regardless of whether the less mobile structures occurred regionally or at any intersegmental level. There were, however differences between PAIVMs on models with different structures rendered less mobile in the behaviour of the stiffness in the middle portion of the PAIVM.

Study 2: We used a newly developed device for assessment of PAIVMs to compare the force-displacement (FD) characteristics of unilateral PA PAIVMs of a painful location on the cervical spine with the opposite non-painful side. There were no detectable differences in the raw FD curves, but when the behaviour of the stiffness was considered, and in particular the rates of change of the stiffness, there were significant differences occurring in the middle third of the movement.

Conclusions: From both studies it appears that the descriptors typically used to evaluate PAIVMs may not be the parameters of interest in assessing segmental mobility. This may explain not only the lack of agreement

between clinical and instrumented assessment of PAIVMs, but also the difficulty that students experience in developing palpation skills. It is suggested that experienced clinicians effectively filter their findings on PAIVMs to extract the information relevant to the target motion segment and perhaps describe the filtered rather than the raw data.