A proposed framework for standardizing forces used to produce grades of movement of spinal passive accessory intervertebral movements

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One difficulty in providing consistent manual therapy treatment is that the forces applied to produce a particular grade of movement can vary by greater than a factor of ten. In the present study, forces that would correspond to the definitions of grades of passive accessory intervertebral movements (PAIVMs) were calculated by applying basic mechanical principles to previously reported data on dimensions and stiffness of the cervical spine. Moments of 0.66 to 1.0 Nm have been found to be sufficient to reach what would be considered to be the end of range of movements of the cervical spine. Depending on the individual, a PAIVM force of between 13 N and 26 N would therefore represent the ‘end of range’ and correspond to a grade III or IV movement. The concept of a ‘neutral zone’ of minimal stiffness (defined as the movement occurring with 20% of end of range force) could be seen to correspond to Grades I and II. Less than 2.6 N to 5.2 N of PAIVM force would therefore be used to produce Grade I and II movements. An approximate ‘end or range’ PAIVM force can be calculated for any spinal region and could be considered to correspond to grades III and IV. Less than 20% of this force would then be considered to correspond with grades I and II. Application of a force-referenced definition of grades of movement would enable more effective teaching of manual therapy skills and more consistent treatment by manual therapy techniques.