



## The clinical significance of the lumbar lordosis: relationship between lumbar spinal curvature and low back pain.

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**Introduction.** There is some evidence to suggest that the degree of lordosis of the lumbar spine influences the likelihood of developing spinal disorders, and that during spinal surgery efforts should be made to reconstruct the 'normal' lordosis to assist in effecting a successful outcome. However, the evidence is by no means unequivocal, and the clinical relevance of the lumbar lordosis still remains uncertain. To date, assessment of the sagittal contour of the spine has only been possible with the use of radiographic analysis, a notoriously resource-intensive technique. The aim of this study was to re-evaluate the clinical significance of the lumbar lordosis in a large group of subjects with and without low back pain, using a recently developed non-invasive technique with an accuracy and reliability comparable to that of radiographic analysis.

**Methods** 108 volunteers over the age of 50 years took part in the study. All completed a questionnaire enquiring about low back pain (LBP) history. Those who declared having a history were required to complete details concerning the duration, frequency and intensity of LBP and the associated disability (Roland and Morris questionnaire). 45 volunteers declared having had no LBP in the last year and 63 declared having had LBP. There was no significant difference between the two groups for age, gender distribution, height or weight; the average age of the whole group was  $62.8 \pm 8.4$  years and 67% were males. In the LBP group, the average duration of LBP was  $17.0 \pm 13$  years, the highest and average pain intensities (0-10 VAS) were  $5.3 \pm 2.2$  and  $3.3 \pm 1.9$  respectively, and the average disability score was  $4.0 \pm 4.0$ . 69% had sought therapy for their LBP and 9.5% had undergone back surgery. For the measurement of lumbar curvature, a computerised electro-mechanical device, 'The Spinal Mouse', was guided paravertebrally along the spine from C7 to S2, with the subject in a standardised upright standing position and in full flexion. Range of motion was calculated from the difference in lumbar curvature in these two positions. The data were analysed using analysis of variance and regression analysis. Significance was accepted at the 5% level.

**Results** There was no significant difference between the LBP group and the LBP-free group in either sagittal lumbar curvature or range of motion. Furthermore, when the LBP group alone was analysed, there was no relationship between spinal profile and any of the pain characteristics (intensity, duration, disability, etc.) ( $p > 0.05$ ). Age, however, did have a significant relationship ( $p < 0.003$ ) with lumbar curvature in standing (increased age, flatter back) and with range of flexion (increased age, reduced mobility).

Parameter	LBP		LBP-free		p value
	Mean	SD	Mean	SD	
Standing lumbar curvature	-15.5	7.8	-14.9	7.4	0.69
Lumbar curvature in flexion	26.0	8.8	23.8	9.6	0.23
Range of flexion	41.5	9.4	38.7	11.5	0.19

**Conclusion** The study presents data concerning the significance of the lumbar lordosis and range of flexion of the lumbar spine in a population over fifty years of age. The 'Spinal Mouse' is a surface based technique that has been validated in previous publications. Both the range of motion and the lumbar lordosis showed, as expected, a significant reduction with increasing age. However, lumbar curvature showed no differences between the LBP-free and LBP groups, and (in the latter group) no relationship with the severity, frequency or duration of pain, suggesting that the degree of lumbar lordosis is of minimal clinical significance. Based upon this data, the value of extensive surgery with restoration of the anterior column and lumbar lordosis in degenerative conditions might be questioned.