

Poster Presentation

The Effect of Ageing and Degeneration on Glycosaminoglycan Concentration in the Intervertebral Disc

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Introduction

The correct spatial distribution and high negative charge of glycosaminoglycans (GAGs) within the intervertebral disc (IVD) are responsible for discs water imbibition, proper osmotic pressure, and as such IVD's physiological swelling behaviors and compressive properties. The aim of this study was to investigate the association of the concentration and distribution of GAG with IVD degeneration as measured by Pfirmann *et al.* and Thompson *et al.* grading systems.

Methodology

Full spinal columns (vertebrae L1-S1 and IVD between them) were harvested from fresh cadavers through an anterior dissection. MRI scans were taken of all spinal columns and were assessed using Pfirmann grading system. All vertebral columns were cut in the midsagittal plane. The level of degeneration was assessed morphologically using Thompson *et al.* grading system. Samples from five regions of the L5/S1 IVDs were taken for GAG concentration analyses. Standard curve spectrophotometry was utilized for this purpose.

Result

One hundred lumbar spine columns (L1-S1) were harvested from cadavers. Radiologic assessment using the Pfirmann grading system and morphological Thompson grading system classified majority of discs as grade 3 and 4. A total of 478 samples from five regions of L5/S1 IVDs were included in the analysis of GAG content. The samples from the nucleus pulposus showed on average the highest concentration of GAG, although the differences were not statistically significant. The one-way analysis of variance (ANOVA) showed no statistically significant differences in the mean GAG mass between different Pfirmann grades ($F = 1.85, p = 0.13$) and between different Thompson grades ($F = 1.17, p = 0.33$).

Conclusion

Our study showed no association between GAG concentration levels and degeneration grade of the IVD as measured by radiological Pfirmann and morphological Thompson grading systems.

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