Disc nucleus fortification

Spinal stability is attributed in part to osteoligamentous structures, including the vertebral body, facets, intervertebral discs, and posterior elements. The materials in this study provide an opportunity to augment the degenerated nucleus without removing native disc material, a procedure introduced here as “fortification.” The objective of this study was to determine the effect of nucleus fortification on lumbar disc biomechanics.

Dupré et al performed in vitro analysis of human cadaveric functional spinal units (FSUs), along with characterization and quantification of movement of the units using biomechanical data in intact, disc-only, and fortified specimens. The units underwent removal of all posterior elements and annulus and were fortified by injecting a biogel into the nucleus pulposus. Each specimen was subjected to load testing, range of motion (ROM) quantification, and disc bulge measurements. Optoelectric tracking was used to quantify disc bulge. These criteria were assessed in the intact, disc-only, and fortified treatments.

Disc-only FSUs resulted in increased ROM when compared with intact and fortified conditions. Fortification of the FSU resulted in partial restoration of normal ROM in the treatment groups. Analysis of hysteresis loops showed more linear response in the fortified groups when compared with the intact and disc-only groups.

Disc nucleus fortification increases linearity and decreases ROM [1].

1)
Dupré DA, Cook DJ, Brad Bellotte J, Oh MY, Whiting D, Cheng BC. Disc nucleus fortification for lumbar degenerative disc disease: a biomechanical study. J Neurosurg Spine. 2016 Jan 15:1-7. [Epub ahead of print] PubMed PMID: 26771371.