

MODIC CHANGES OF THE LUMBAR SPINE: EPIDEMIOLOGY AND ASSOCIATION WITH MAGNETIC RESONANCE IMAGING PHENOTYPES

Maatta J,¹ Cheung KMC,² Karppinen J,¹ Samartzis D²

¹Department of Physical and Rehabilitation Medicine, University of Oulu, and Medical Research Center Oulu, Finland

²Department of Orthopaedics and Traumatology, The University of Hong Kong, Hong Kong

INTRODUCTION: Modic changes (MC) are associated with low back pain. The morphology, involvement, and association of MC with other spinal phenotypes remain speculative. We evaluated the relationship of MC with spinal magnetic resonance imaging (MRI) phenotypes in a large-scale population-based study.

METHODS: Based on the Hong Kong Degenerative Disc Disease (DDD) Cohort, we assessed lumbar T1- / T2-weighted MRIs of 1604 subjects (62.4% females; mean age, 49 years). The MC assessment included presence, type, vertical height, and axial area. Additional findings were assessed (herniations, Schmorl's nodes). Global DDD score was tabulated.

RESULTS: The prevalence of MC was 24.7% (Type 1: 6.3%, Type 2: 15.5%), mainly at L4-S1. Subjects with MC were older (mean age: 53 vs. 48 years, $p<0.001$) with higher DDD scores ($p<0.001$). Type 1 MC were mainly at lower levels ($p=0.021$), less likely located in anterior region only ($p=0.017$), and associated with disc herniations ($p<0.001$) when compared with Type 2. Lower levels of MC (L4-S1) were not common in the anterior region only, involved left or right endplate, and had a higher prevalence of disc herniation / degeneration compared with upper levels (L1-L4) [$p<0.001$]. Large MC were more prevalent at lower levels, and had higher prevalence of disc herniation / Schmorl's nodes at affected level when compared with smaller MC ($p<0.001$).

CONCLUSION: Based on one of largest studies, MC were clearly associated with disc and endplate changes. Specific MC types and level-specific findings in relation to MRI phenotypes were identified.