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THREE-DIMENSIONAL MRI ASSESSMENT OF LEVATOR ANI MORPHOLOGY IN DIFFERENT GRADES OF PROLAPSE

Aims of Study
To identify the morphological changes in the levator ani in different grades of prolapse by using reconstructed 3-dimensional models of magnetic resonance images and to subclassify prolapse into different categories based on their levator ani morphology.

Methods
Sixty one women with prolapse were studied, 8 women in Stage I, 15 women in Stage II, 22 women in Stage III, 8 women in Stage IV prolapse and 9 asymptomatic volunteers without prolapse. Axial, sagittal and coronal T2 weighted pelvic magnetic resonance scans were obtained with the patient in the supine position. The 3-dimensional models were reconstructed from the source images using manual segmentation and surface modelling. The morphology of the puborectalis was assessed on these reconstructed models by measuring 1) the levator symphysis gap (LSG), ii) the width of the levator hiatus, iii) the length of the levator hiatus. In order to assess the ileococcygeus we measured i) the maximum width of the ileococcygeus, ii) the direction of its fibres, which was assessed by measuring the ileo-coccygeal angle and iii) the levator plate, angle. Nine nulliparous asymptomatic females were studied as controls.

Results
Alterations in levator ani morphology are not dependent upon the grade of the prolapse and not all women with pelvic floor prolapse have abnormal morphology. In normal controls the ileococcygeal width (ICW) measured less than 40mm and the ileococcygeal angle measured less than 20degrees. Based on the MRI findings four patterns of changes in the levator ani have been identified. Group 1(normal) had an ICA <200 and ICW>40mm, Group2 had an ICA >200 and an ICW>40mm, Group3 had an ICA >200 and an ICW<40mm, Group4 had an ICW <20 0 and an ICW <40mm. Both the levator sling gap (LSG) and the levator hiatus which is dependent on the puborectalis function widen with increasing grade of prolapse.

Conclusions
It is possible to subclassifying prolapse based on the morphological changes in the levator ani using MRI. This may be a very useful predictor as to which patients develop recurrent prolapse after surgery.