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Dynamic Magnetic Resonance Imaging Parameters For Objective Assessment Of The Magnitude Of Tethered Cord Syndrome In Patients With Spinal Dysraphism

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Purpose:
Dynamic magnetic resonance imaging(MRI)-based criteria for diagnosing magnitude of tethered cord syndrome(TCS) in occult spinal dysraphism are proposed.

Materials and Methods:
In this prospective, case-control design study, MRI lumbosacral spine was performed in 51 subjects [pilot group(n=10) without TCS ; control group(n=10) without TCS (for baseline assessment); and, study group (n= 31) with spinal dysraphism The parameters compared in control and study groups included: Oscillatory frequency(OF), difference in ratio, in supine/prone position, of distance between posterior margin of vertebral body and anterior margin of spinal cord (oscillatory distance,OD), with canal diameter, at the level of conus as well as superior border of contiguous two vertebrae above that level; An outcome assessment at follow-up was also done.

Results:
In the study group (cord tethered), significantly less movement at the level of conus(OF0, p=0.013) and one level above(OF1, p=0.03); and, significant difference in
were observed in supine and prone positions, compared to controls. Median OF(0.04) in the lipomyelomeningocoele group was significantly less than that in control group(0.23). Median
OF was also lesser in patients with thick filum terminale or meningomyelocele. Difference in ratios among study and control were statistically significant.

Conclusion:
New dynamic MRI-based parameters to establish the presence and magnitude of TCS have been defined. OF measured extent of loss of translational cord displacement in supine and prone positions; and, sagittal and axial root angles represented ventral nerve root stretching. The difference in OF was minimum in the group with thick filum terminale and
progressively increased in other groups.