

## MORPHOMETRIC VARIATIONS OF THE LUMBOSACRAL CANAL IN THE ADULT ASIAN(MALAYSIAN) POPULATION

Paul Tan<sup>1</sup>, Chee Chiu<sup>1</sup>, Weng Chung<sup>1</sup>, Chris Chan<sup>1</sup>, Mun Kwan<sup>1</sup>

<sup>1</sup>Department of Orthopaedic, University of Malaya, Kuala Lumpur Malaysia.

### INTRODUCTION:

Prevalence of trefoil shaped canal in the lower lumbosacral region have been reported to be up to 28%. The objective of this study is to determine the incidence of different morphometries of the lumbosacral canal to aid in the safe application of pedicle screws.

### METHODS:

This was a retrospective study on normal lumbosacral spine of patients aged 18–80 years old who had lumbosacral computed tomography (CT) scans performed from January 2015 to December 2019. The exclusion criteria were patients who had spinal deformities (scoliosis, kyphosis, or spondylolisthesis) or pathologies (congenital vertebrae abnormalities, fractures, tumor or metastasis) of the lumbosacral canal which could prevent accurate analyses.

The lumbosacral canal was classified into *oval/round*, *triangle* and *trefoil* shapes based on the following parameters, (a) transverse distance, (b) midsagittal distance, (c) presence of a protuberance: defined as the presence of the perpendicular distance from a line drawn connecting the most concave part of the inner lamina to the most lateral part of the canal and the apex of protuberance of more than 1mm.

### RESULTS:

A total of 648 vertebral canals from 108 patients were obtained and measured. The prevalence of *trefoil-shaped* canals was 11.7%. The prevalence of *trefoil canals* by vertebral level at L3 was 2.8%, L4 was 14.8%, L5 was 36.1% and S1 was 16.7%. L5 vertebra had the highest prevalence of *trefoil canals* followed by S1 and L4. There were no *trefoil canals* at L1 and L2 vertebra. The prevalence of *triangular-shaped* canals

was 35.6%. *Oval/round* shape canals were found at L1 to L4 vertebrae with a total prevalence of 52.6%.

---

### CONCLUSION:

*Trefoil-shaped* canals can be found from L3 to S1 vertebrae with the highest prevalence at L5.

### REFERENCES:

1. Eisenstein, S. (1980). The trefoil configuration of the lumbar vertebral canal. A study of South African skeletal material
2. Chiu, C. K., Kwan, M. K., Chan, C. Y., Schaefer, C., & Hansen-Algenstaedt, N. (2015). The accuracy and safety of fluoroscopically guided percutaneous pedicle screws in the lumbosacral junction and the lumbar spine: a review of 880 screws.