

## Validity of L5 Pedicle Lateral Tilt (L5 PLT) Classification: a retrospective analysis on 23 misplaced screw

Giorgio Cacciola<sup>1</sup>, Fabio Trimarchi<sup>1</sup>, Ludovico Magaudda<sup>1</sup>, Daniele Bruschetta<sup>1</sup>, Giuseppe Santoro<sup>1</sup>, Alessandro Pisani<sup>2</sup>, Pietro Cavaliere<sup>2</sup>, Federico De Meo<sup>2</sup>, Andrea Barbanera<sup>3</sup>, Angelo Favalaro<sup>1</sup>

<sup>1</sup> University of Messina, Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Messina, Italia

<sup>2</sup> Istituto Ortopedico del Mezzogiorno d'Italia, "Franco Scalabrino", Messina, Italia

<sup>3</sup> A.O.N. SS Antonio e Biagio e Cesare Arrigo, Neurochirurgia, Alessandria, Italia

Posterior fixation of the lumbar spine using screw and bar is a commonly used surgical approach for the treatment of a wide series of spine pathologies. Despite the improvement in surgical technique and in the development of the material, the incidence of misplaced screw at the lumbar spine is about 4.8% (range, 3% to 6%) [1]. The L5 pedicle lateral tilt classification was introduced recently [1]. This classification is based on the morphological changes that occur at the L5 and L4 bone anatomy and on the distance between pedicles and nervous structures. It subdivides the population in three groups based on the lateral tilt of L5 pedicle. The purpose of this study is to evaluate the validity of the L5 PLT Classification. After obtaining internal institutional approval we retrospectively analyzed data from 218 patients that underwent posterior spine stabilization of one or more level. In total 436 screws were positioned at the pedicles of L5. Screw positioning was evaluated using Zdcchivasky classification on a CT scan of the lumbar spine. The incidence of screw misplacement was 5.3% (23 screws), a statistically significant difference was found between people that belong in group U (narrowed lateral tilt) and people that belongs to the other two groups W and V (p-value < 0.05). The results obtained in this study was conducted to confirm the theorized hypothesis that the lateral tilt of L5 pedicles must be considered as risk factor for screw misplacement during lumbar spine posterior stabilization. In conclusion the L5 PLT classification is valid.

### References

- [1] Cacciola G, Anastasi G, Bertino S, Rizzo G, Cutroneo G, Trimarchi F, Pisani A, Cavaliere P, Barbanera A, Bruschetta D. Anatomical differences in the bony structure of L5 and L4: A possible classification according to the lateral tilt of the pedicles. *J Orthop.* 2018 Jan 30;15(1):205-209.
- [2] Filardi V, Portaro S, Cacciola G, Bertino S, Soliera L, Barbanera A, Pisani A, Milardi D, Bramanti A. Finite element analysis of sagittal balance in different morphotype: Forces and resulting strain in pelvis and spine. *J Orthop.* 2017 Mar 25;14(2):268-275.

### Key words

Pedicles, lumbar spine, hip.