

NEW GLOBAL CLASSIFICATION OF RADIOLOGICAL IMAGING FOR LESIONS OF THE LUMBAR SPINE. DEVELOPMENT AND FEASIBILITY

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Introduction :

Phenotypisation of the lumbar discs degeneration was the topic of the last 4 meetings of the ISSLS focus group. In 2014 the focus was enlarged to the whole lumbar spine degeneration. No consensus exists for the definition of different degenerative diseases nor for classification of these diseases. The existing scoring systems are usually limited to a single structure e.g. discs, facets, spinal canal etc.

Method :

Our tool is derived from the TNM-classification system used for tumours. It includes 5 main categories : Dural Sac Impression, Disc Degeneration, Endplate Lesion, Neuroforaminal Stenosis, Spine Deformity and up to 4 modifiers. The findings were encoded in a standardized manner as shown in Fig 1. and Fig. 2.

An extrusion in the 5th segment right lateral and protrusion in 3rd segment centrally would be encoded as 1st category : dural sac impression, the 1st modifier : herniation, the 2nd modifier : Extrusion and protrusion, the 3rd modifier : segment V and III, the 4th modifier : right and central. The antelithesis of 5th lumbar vertebral as shown in Fig. 2 would be encoded as 1st category: spine deformity, the 1th modifier antelithesis, 3th modifier: vertebral body V.

Purpose :

The aim of this study is to present a simple method to describe the normal image and the radiological changes of lumbar spine pathology and by that to get a tool for classification. This tool can be used for CT, MRI, X-ray, discography and myelography.

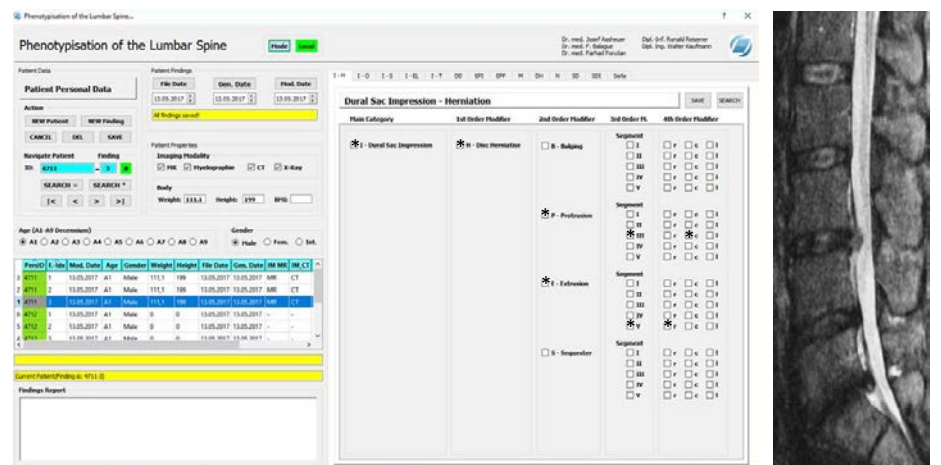


Fig. 1: Herniation

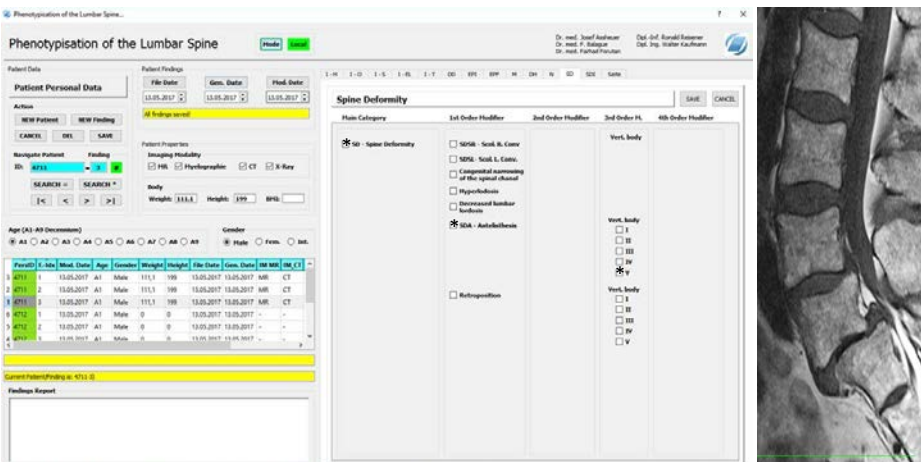


Fig. 2: Spinal deformity

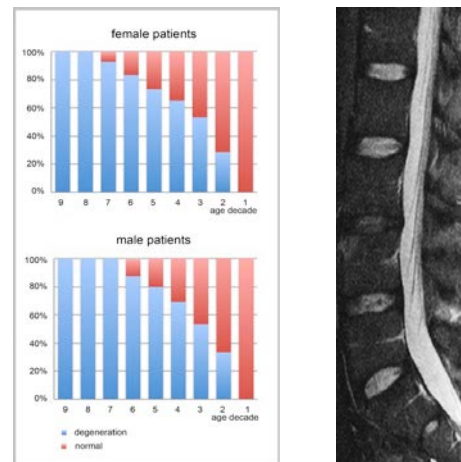


Fig. 3: Disc degeneration

Results :

In a first trial 200 MR-examinations of consecutive patients (100 male patients and 100 female patients) with low back pain of different age were encoded. The mean time for encoding was 3 minutes. Examples of correlation were done with respect to age and gender. There was strong correlation of disc degeneration with age. There was no difference in frequency of degeneration for male and female patients (Fig. 3). The number of phenotypes using different algorithms, depends on the number of categories and modifiers introduced in the encoding system

Conclusion :

The presented proposal for phenotypisation of changes of the lumbar spine seems to be a valuable tool to describe these changes. The system can easily be extended by additional characteristics.

- Patient-based lumbar spine phenotype recording, management and analysis
- Automatically anonymization of patient personal data
- Intuitive and easy acquisition of lumbar spine phenotypisation data (ca. 3 minutes per patient)
- Patient-based etiopathological tracking and analysis
- Fixed preset of statistical analysis, based on recorded phenotypisation data
- User-customizable statistical analysis
- 2D and 3D static and dynamic graphical representation of statistical data
- Worldwide patient records data sharing and exchange due to internet
- Offering and supporting worldwide medical research and development