RESEARCH TOPIC DASMEN9

ANALYSIS AND EVALUATION OF THE MRI MODIFICATIONS UNDER PHYSIOLOGICAL LOAD

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Abstract

This study will employ volumetric MR sequences acquired in both supine and stand-up positions to generate an objective representation of the movement among the vertebral bodies in normal subjects and patients, and compare the performance of this approach with those of the standard clinical presurgical procedure.
Automatic evaluation of the dimensions of the spinal canal and of the neural foramina will be pursued. Similar analyses will be also performed on brain MRI.

Main technical approaches

Though the employment of open-source programming languages, and image analysis softwares, new algorythms for automatic or semi-automatic image segmentation will be performed using volumetric sequences in both supine and stand up positions. An ibrid approach will be employed, using edge detection tools for vertebral segmentation and finite body analyses.

Scientific references related to the present project

[1]R. Botchu, A. Bharath, A. M. Davies, S. Butt, and S. L. James, “Current concept in upright spinal MRI.,” Eur. Spine J., vol. 27, no. 5, pp. 987–993, May 2018.

[2]J. Inklebarger and T. P. Clarke, “The case for standing X-rays: Clinical indications for weight-bearing lumbar spine imaging in younger athletic populations presenting with chronic lower back pain,” Int. Musculoskelet. Med., vol. 37, no. 1, pp. 12–16, Apr. 2015.

[3]A. Jalalian, I. Gibson, and E. H. Tay, “Computational biomechanical modeling of scoliotic spine: Challenges and opportunities,” Spine Deform., vol. 1, no. 6, pp. 401–411, 2013.

Type of contract

PhD scholarship of € 18.000 gross per year or equivalent contract.

Borsa di dottorato di € 18.000 annui lordi o forme di sostegno finanziario equivalenti.

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