



Dominique A Rothenfluh, MD, PhD

Consultant Spinal Surgeon

Oxford University Hospitals

Swiss board-certified (FMH) in Orthopaedic Surgery, Spine Surgery

Medical studie

- 1995 - 2001** School of Medicine, University of Berne
- 1997 - 2000** Student assistant at the Institute of Anatomy, tutoring students in gross anatomy and demonstrating dissections
- 1997 - 1999** President of the Swiss Medical Students Association Delegate to the Swiss Board of Medical Examinations
- 1998** School of Surgery, Paris (PD Dr. M. Leunig, Prof. Dr. R. Ganz)
- 2000** Senior year electives, Weill-Medical College Cornell University, Hospital for Special Surgery, New York
Hand Surgery (A.J. Weiland, MD), Trauma (D.L. Helfet, MD), Sports Medicine (D.W. Altcheck, MD)

Clinical positions

- 8/2009-1/2012** Oberarzt/Consultant/Attending Surgeon, Spinal Surgery Prof. Dr. Kan Min, Prof. C. Gerber
Department of Orthopaedics Uniklinik Balgrist
University of Zurich, Switzerland
- 7/2012-12/2013** Consultant/Attending Spinal Surgeon (Locum) Centre for Spinal Studies and Surgery,
Queens Medical Centre Nottingham University Hospitals NHS Trust, UK
- As of Jan 2014** Consultant Spinal Surgeon
Oxford University Hospitals NHS Foundation Trust As of May 2015
Senior Research Fellow (Principal Investigator)
Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS)
University of Oxford
- 2020-22** Chair of Education and Fellowship Council
- 2018-** Eurospine, The Spine Society of Europe
Vice President IGASS
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Publications

Citations: 1766, h-index: 15 (Google Scholar)

Oral presentations: conference and invited talks

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Over 100 presentations at Eurospine, AOSpine Course, SRS, IMAST, EFFORT and other conferences

Reviewer

European Spine Journal
The Spine Journal
Eurospine Annual Meeting

The transition from the degenerative spine to adult deformity : Biomechanics and predictive models of failure in the sagittal plane

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The loss of lumbar lordosis is the driver of sagittal deformities in the degenerative spine. According to Jackson & McManus, about 67% of the lordosis is in L4-S1 in healthy volunteers. As the majority of degenerative changes are observed between L4 and S1, it is quite logical that loss of disc height will result in a loss of lordosis and potentially segmental (affecting a segment) and local deformity (affecting the lumbar lordosis). Segmental deformities affect one or two segment and do not lead to malalignment, i.e. PI-LL still less than 10° as explained below. Segmental deformities need to be looked for as the PI-LL may be within normal limits because the adjacent segments are compensating for the loss of lordosis. Surgical techniques therefore need to be chosen to restore segmental lordosis. Segmental deformities such as a collapse of a disc space resulting into a kyphosis have inherent biomechanical consequences on the adjacent segments. In a study in which we used patient-specific modelling and an L4/5 fusion was simulated, shear stress increases subsequent to a hypolordotic or kyphotic fusion. This for example would also explain why in the degenerative lumbar spine, a single level degeneration with a segmental collapse would result into adjacent segment degeneration in the segment above in the absence of a fusion. In the balanced degenerative spine, PI-LL mismatch connects the degenerative spine to the deformity world and has been linked to higher rates of revision surgeries for adjacent segment disease. If PI-LL is above a calculated cut off value of more than 10° , 78% of patients required revision surgery compared to 25% in the aligned group. Patient-specific biomechanical modelling has revealed that higher shear stresses are observed in the intervertebral discs in malaligned spines with PI-LL mismatch. The question then remains what effect do local deformities have on the whole spine and when can failure in the sagittal plane, i.e. imbalance, be expected? In balanced patients, about 30% have been found to have PI-LL mismatch of more than 10° , more than 50% of those already have a pelvic retroversion, which means that they are already compensating for a sagittal deformity to maintain an upright posture. These are called latent deformities as they may not be obvious but need to be looked for by measuring the spino-pelvic parameters. The clinical impact of spino-pelvic parameters has been well-described for global imbalance. However, for PI-LL and PT in the degenerative spine the relationships to patient-related outcome measures (PROMs) is not so clear. A good prospective study specifically investigating this is lacking at present.



Literature:

- Jackson & McManus Spine 1994;19:1611-8
- Senteler et al. J Orthop Res 2017;35:131-139
- Rothenfluh et al. Eur Spine J 2015;24(6):1251-8
- Senteler et al. Eur Spine J 2014;23:1384-93