



Spinopelvic Parameters: Lumbar Lordosis, Pelvic Incidence, Pelvic Tilt, and Sacral Slope

What Does a Spine Surgeon Need to Know to Plan a Lumbar Deformity Correction?

Paul C. Celestre, MD^{a,*}, John R. Dimar II, MD^b, Steven D. Glassman, MD^b

KEYWORDS

- Lumbar deformity • Lumbar lordosis • Pelvic incidence • Pelvic tilt • Sacral slope
- Pelvic parameters • Sagittal balance

KEY POINTS

- A thorough history and physical examination are essential to successfully treat patients with lumbar spinal deformity.
- In younger patients without spinal deformity, lumbar lordosis (LL) should be within 11° of pelvic incidence (PI).
- A normal pelvic tilt is less than 15°.
- PI-LL mismatch of greater than 11° and a pelvic tilt of greater than 22° is strongly correlated with an Oswestry Disability Index score greater than 40.
- Increasing pelvic tilt is a limited compensatory mechanism to maintain normal sagittal balance in the setting of PI-LL mismatch.

INTRODUCTION AND HISTORICAL CONTEXT

Observations of spinal deformity date to antiquity. Hippocrates described both the normal contours of the spine as well as deformities of the spine and their causes, grouping abnormal spinal alignments under the umbrella term *scoliosis*.¹ Galen of Pergamum defined the terms *kyphosis*, *scoliosis*, and *lordosis*; their use continues as Galen

described them to this day.¹ In 1935 Bohler² described compensatory mechanisms, including pelvic retroversion, for maintaining an upright posture in patients with posttraumatic kyphosis.²

Beginning in the 1970s, the investigations of multiple French surgeons led to a renewed interest in spinal balance.^{3,4} Building on this, Jean Dubousset and colleagues⁵ introduced the postural cone of economy that highlighted the

Disclosure Statement: Nothing to disclose (P. Celestre). Medronic: consulting, royalties; Norton Hospital: speaking, research funding; DePuy: consulting; Scoliosis Research Society: board member, Education Council Chair; Federation of Spine Associations: board member (J.R. Dimar). Medronic: intellectual property royalties, consulting; Scoliosis Research Society: board member (S.D. Glassman).

^a Department of Orthopaedic Surgery, University of Queensland Medical School, Ochsner Clinic, 1514 Jefferson Highway, New Orleans, LA 70121, USA; ^b Department of Orthopaedic Surgery, University of Louisville School of Medicine, Norton Leatherman Spine Center, 210 East Gray Street, Suite 900, Louisville, KY 40202, USA

* Corresponding author.

E-mail address: paul.celestre@ochsner.org

Neurosurg Clin N Am 29 (2018) 323–329

<https://doi.org/10.1016/j.nec.2018.03.003>

1042-3680/18/© 2018 Elsevier Inc. All rights reserved.

importance of the maintenance of upright posture with minimal physical effort. Duval-Beaupère,⁶ and later Jackson and Hales,⁷ quantified sagittal measurements of the pelvis, including pelvic retroversion, LL, and sagittal alignment, establishing the pelvis as central to global sagittal balance and PI the primary determinant of lordosis in a well-aligned lumbo-pelvic region.

In 2005, Glassman and colleagues⁸ demonstrated that positive sagittal balance directly correlates with patient-reported self-assessment measures, specifically that increasing positive sagittal imbalance was directly related to worsening symptoms. Lafage and colleagues⁹ further refined

this idea, demonstrating that pelvic incidence (PI) matches lumbar lordosis (LL) and that increasing pelvic retroversion directly correlates with worsening patient-reported quality-of-life measures. These observations are the cornerstones of contemporary adult spinal deformity surgery and define the goals of reconstructive surgery.

IMAGING

Preoperative evaluation of patients with adult spinal deformity begins with full-length standing 36-in posteroanterior and lateral radiographs (Fig. 1). From the lateral image, the physician

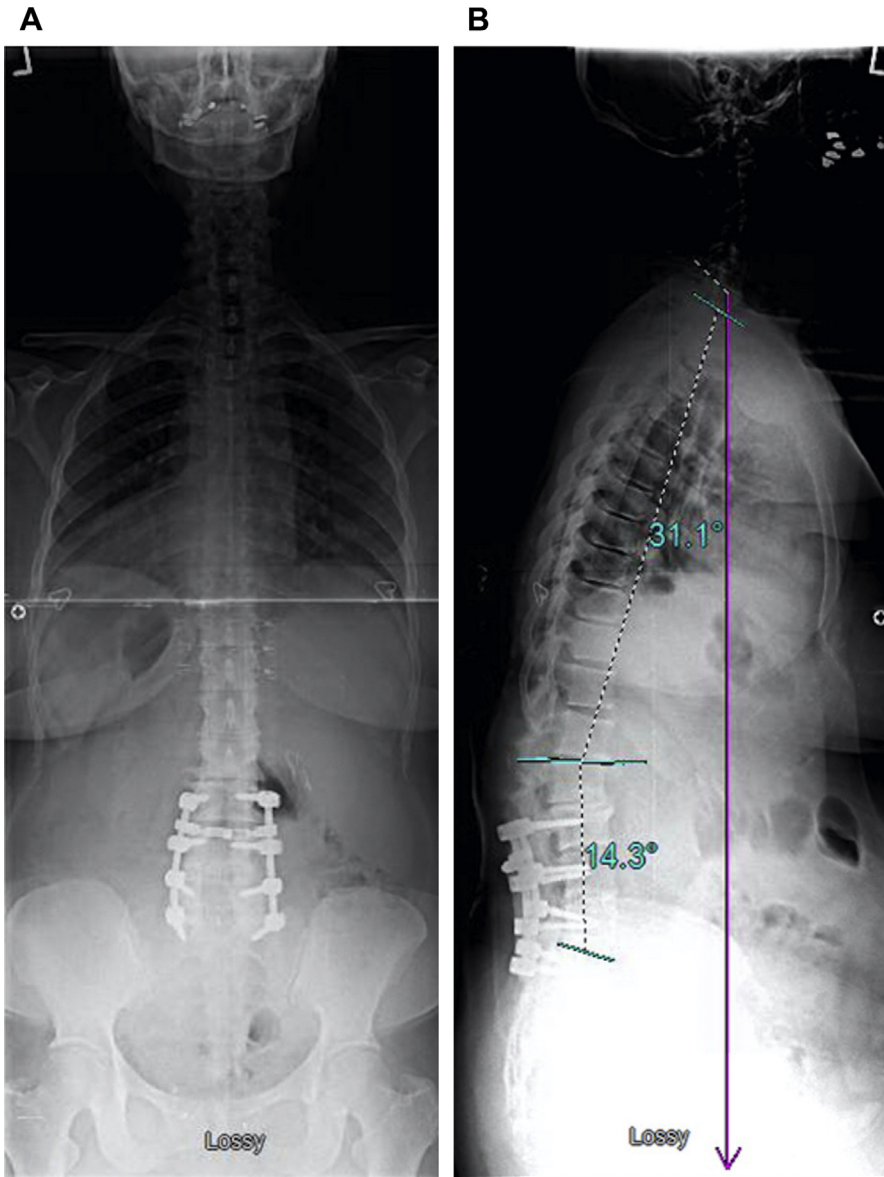


Fig. 1. The 36-in standing posteroanterior (A) and lateral radiographs (B) of a patient with sagittal imbalance.

Download English Version:

<https://daneshyari.com/en/article/8690297>

Download Persian Version:

<https://daneshyari.com/article/8690297>

[Daneshyari.com](https://daneshyari.com)