Joseph Y. Margulies

Reviewer's comment regarding: "Sagittal range of motion after a spinal fracture; does ROM correlate with functional outcome?" (R.B. Post et al.)

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Understanding the kinetics and kinematics of the spine is essential to any decision-making regarding treatment, yet so far the cause/result relationship between the mechanical situation and the outcome is not immediately clear.

Our understanding of spine mechanics has been developing steadily in the last few decades – intertwined, not surprisingly, with surgical techniques. Discussion of the spine used to focus mainly on the standing/static position. The boundaries of research in the field have expanded to include the pelvic vertebra in the discussion of sagittal balance, and the hips, knees and the joint between feet and floor are also taken into consideration. We now realize that posture and balance constitute only one particular case of the range of motion of the whole spine (What J. Dubousset referred to as "the conus of economy"). This ranges from moving while standing to walking and running.

Sagittal range of motion is probably the most fascinating field in this context. Twenty-four vertebrae between the head and the pelvic vertebra, with at least three joints between each two neighboring ones, offer almost infinite options of motion and position. However, the global range of motion of the spine over the pelvis

is not a down-aiming symmetrical cone, i.e., anteriorly directed ranges of motion are markedly wider than the posterior ones. In this sense, standing up is almost an extreme position, bringing the spine almost to its limit of range of motion. Bending backwards is, in fact, almost not physiological in our case, since we spend most of our time in erect position. In spite of large knowledge gaps, it makes sense that tampering with range of motion at the point where one direction is significantly restricted may have consequences on the whole mechanical system.

The body's mechanical system can be considered a dynamic system that needs a constant supply of energy to stabilize itself. In other words, with no energy invested the body cannot stay in equilibrium, and so it collapses. Straightening the spine into an erect position is an energy-consuming situation that demands constant muscular activity. This paper shows that the surgical solution did not change the impairment rate in a type of injury that mainly affects the sagittal balance. As important as the bony structure and alignment may be, it is not the only important factor in the musculoskeletal function, and research has to continue.

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J. Y. Margulies (✉)
8 Usonia Road,
Pleasantville, NY 10570, USA
Tel.: +1-914-7730973,
Fax: +1-914-2064173,
e-mail: yossi@jymargulies.com