Osteotomies of the spine: “Technique of the Decade”?

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Aging of the population and increased active life expectations has triggered a growing number of patients to seek care for complex spinal deformities, previously considered as a normal consequence of aging. Hence, new onset deformity of the spine in the elderly (“de novo” deformity) and progression or degeneration of adolescent deformity otherwise quiescent during adult life (progressive degenerative deformity) represent the second peak in incidence of deformity problems. A better understanding of the pathology, and significant improvements in the instruments, surgical techniques and anesthesiological care have allowed us to offer complex reconstructive surgery to an increasing number of patients.

During the last years, a rising number of surgeons have tackled the problem and shared their experience. The number of scientific articles on adult scoliosis and sagittal balance has grown almost exponentially in the last three decades (Fig. 1).

Data on spinal alignment in normal subjects have been gathered and published. New ideas, starting with Duval-Beaupère [1], on assessment and interpretation of spinal morphology and sagittal alignment have given raise to a new understanding of adult deformity: a so-called “French revolution” [2, 3] of sagittal balance. Simultaneously, important collaborative initiatives have blossomed, such as the ISSG and the Complex Spine Study Group or the European Spine Study Group amongst others. In these

cases, patient data pooling from multiple centers have provided a significant volume of data, informing us about risk, outcomes and technical details necessary to improve the surgical results. We now have a much richer understanding on how to diagnose, interpret, and treat adult spine deformity [4].

Currently, we are able to assess and quantify the degree and type of the deformity based on spino-pelvic parameters with correlations, rules, and classifications [5]. This allows us to direct candidates to a surgical or non-surgical management, to establish a preoperative plan based on precise calculation of surgical goals, and intraoperatively measure the degree to which the objectives are being achieved. In addition, an impressive number of technical details have been accumulated to improve the effectiveness and safety of the surgical procedures.

In this context, spinal osteotomies, otherwise challenging surgical techniques are permanently being refined and improved, and applied to a wider variety of pathologies of the spine. Whereas in the past years, it was a sancta sanctorum reserved for a reduced number of elected surgeons, its use is extending to more and more centers. Though a discussion is needed on the appropriateness of extending the use of these procedures in every hospital, one possible scenario is (as was with the use of pedicle screws) that in a near future their use may become a part of the armamentarium of every spine surgeon.

This is not a completed work. We still need to improve in the clinical evaluation of patients and in determining the likelihood of a single patient of having benefit from surgery. Appropriate standards of conservative care have yet to be defined and tested to reduce the number of unnecessary surgeries. Standardization of preanesthesiological evaluation, intraoperative and perioperative anesthesiological care (with special attention to hemodynamic and

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Fig. 1 Number of references per year in Medline for Adult [MEsH] AND Scoliosis [MEsH] and for Sagittal Balance (text)

fluid management), postoperative pain therapy and nutrition are still a challenge in adult deformity care. In the surgical perspective, there is room for improvement in the prevention of complications such as infection, hardware failure and junctional deformities [6, 7]. New technologies such as patient-specific templates, navigation tools applied to rod contouring and deformity correction and disease-specific implants that improve the reproducibility of adult spinal deformity surgery are promising fields in which progress has been done and more is yet to come.

We hope that you find this supplement issue on Osteotomies of the Spine useful and enjoyable. In it, you will find a summary of the state of the art techniques and applications of spinal osteotomies to a large variety of clinical scenarios by some of the most expert surgeons in the field in Europe and America.

Conflict of interest None.

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