Biomechanics of dynamic cervical plates may influence clinical results

Javier Melchor Duart-Clemente¹ · María Luisa Gandía-González² ·
Luis Álvarez-Galovich³ · Julio Vicente Duart-Clemente⁴

Received: 1 October 2015 / Accepted: 22 November 2015 / Published online: 19 December 2015
© Springer-Verlag France 2015

Authors should be congratulated for their effort in reviewing the usefulness of dynamic plate use in their paper “Dynamic cervical plate versus static cervical plate in the anterior cervical discectomy and fusion: a systematic review” [1], and the contribution in the conclusion of “similar clinical results with fewer hardware complications for one-level and better similar results for multiple level ACDF” is quite clarifying; nevertheless, we would like to point out some issues.

The main limitation of the study is the global approach of considering all types of dynamic plates as working identically; no distinction is made among several types of dynamic plates mentioned in the papers (CTEK in Nunley's [2], Atlantis in DuBois' [3], and ABC in Pitzen's [4]); they are different not only from static plates but also among them, depending on the dynamism based on either rotational (Atlantis) or translational = axial (uni -DOC- or bidirectional -ABC-, the latter also has some degree of combined dynamism). This is important because, of the three RCT studies for two-level ACDF, while one study shows no difference in clinical outcome or fusion speed with rotational type (Atlantis, unidirectional) [3], contrarily others favor dynamic for both C-TEK (better clinical outcomes for multilevel ACCF even with higher nonunion rate which—as stated in the paper—may be the consequence of the increased motion and toggling at the graft–bone

interface) [2], or ABC (faster fusion, including not only two but also at one level, with fewer hardware complications, which is the reason for progression in the plate design) [4]; on the other hand, even dynamic plates obtain same or superior fusion results with fibular allograft compared to using autologous crest plus static [5]. So the affirmation that “whether the dynamic plate is advantageous over the static plate in multilevel ACDF is still debated” has no longer enough strength, and dynamic (translational) plates should be considered superior not only biomechanically but also in the clinical arena even for one-level ACDF, as the hardware failure rate was higher in ACDF with static plates.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Li H, Min J, Zhang Q, Yuan Y, Wang D (2013) Dynamic cervical plate versus static cervical plate in the anterior cervical discectomy and fusion: a systematic review. *Eur J Orthop Surg Traumatol* 23(Suppl 1):S41–S46
2. Nunley PD, Jawahar A, Kerr EJ III et al (2009) Choice of plate may affect outcomes for single versus multilevel ACDF: results of a prospective randomized single-blind trial. *Spine J* 9:121–127
3. DuBois CM, Bolt PM, Todd AG et al (2007) Static versus dynamic plating for multilevel anterior cervical discectomy and fusion. *Spine J* 7:188–193
4. Pitzen TR, Chrobok J, Stulik J et al (2009) Implant complications, fusion, loss of lordosis, and outcome after anterior cervical plating with dynamic or rigid plates: two-year results of a multicentric, randomized, controlled study. *Spine* 34:641–646
5. Goldberg G, Albert TJ, Vaccaro AR, Hilibrand AS, Anderson DG, Wharton N (2007) Short-term comparison of cervical fusion with static and dynamic plating using computerized motion analysis. *Spine* 32:E371–E375

✉ Javier Melchor Duart-Clemente
jduart@uv.es

¹ Spinal Unit, Fundación Jiménez Díaz, Madrid, Spain

² Neurosurgery Department, La Paz Hospital, Madrid, Spain

³ Head of Spinal Unit, Fundación Jiménez Díaz, Madrid, Spain

⁴ Orthopedic Department, Complejo Hospitalario de Navarra, Pamplona, Spain