

## ASK THE EXPERTS

### Part 1: Vertebral Height Restoration

#### **What is the need for vertebral height restoration in the surgical treatment of osteoporotic vertebral compression fracture?**

R. Gunzburg, M.D., Ph.D. & M. Szpalski, M.D.

Percutaneous vertebral augmentation procedures have become commonplace in the treatment of symptomatic osteoporotic vertebral fractures. Many techniques have been proposed such as vertebroplasty and balloon kyphoplasty. Some techniques involve devices aimed primarily at vertebral height restoration. The question however is how important this vertebral height restoration is from a clinical point of view and to which extent the cost and invasiveness of such procedures is justified.

The main driver to intervene surgically is the perseverance of pain after an osteoporotic vertebral compression fracture. Machinis et al (2006) found that in regard to pain relief, kyphoplasty is safe and effective, even when no significant vertebral body height restoration is achieved. In a paper comparing kyphoplasty and vertebroplasty, Kim et al (2018) found that both techniques showed similar improvements in pain reduction and significant height restoration, yet that progressive vertebral height loss was inevitable. With this in mind, it is probably not imperative to restore vertebral height in the first place. This attitude is supported by the findings of Mooney et al (2019) who found in a study of fifty-nine patients assessing the associations of vertebral height restoration and pain following kyphoplasty for osteoporotic vertebral compression fractures that although a majority of patients demonstrated increased vertebral heights, none of the outcomes showed association with the degree of height restoration. Dong et al (2013) came to the same conclusion in a similar study of eighty-six patients with osteoporotic vertebral compression fractures: vertebroplasty and kyphoplasty both are effective in pain reduction, but correction of vertebral height and local kyphosis have minimal effect on pain reduction. Liu et al (2010) randomised hundred cases of osteoporotic vertebral compression fractures to either balloon kyphoplasty or vertebroplasty. In terms of clinical outcomes there was little difference between the treatment groups. They concluded that aiming at restoring vertebral height by using a balloon kyphoplasty was not justified because of the higher cost. In a long-term follow-up study, Liu et al. (2015) found that excessive restoration of vertebral height in the treatment of osteoporotic vertebral compression fracture can lead to adjacent fractures. In a review paper Bousson et al. (2018) state that the degree of kyphosis reduction achieved by kyphoplasty and percutaneous implant techniques, compared with vertebroplasty, is not sufficient to justify the additional cost and the use of a somewhat longer and traumatic procedure.

In summary it can safely be concluded from the above literature review that the main goal of treatment in osteoporotic vertebral compression fracture is pain reduction. Vertebral height restoration is nice, but in the absence of significant clinical differences between simple vertebroplasty and the techniques needed for vertebral body height restoration, the cost and surgical invasiveness appears not to be justified.



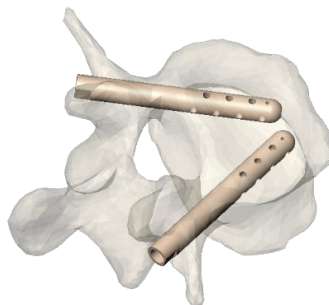
## REFERENCES

- T. Machinis, K. Fountas, C. Feltes et al. Pain outcome and vertebral body height restoration in patients undergoing kyphoplasty. South Med J, 2006
- S-I Kim, K-Y Ha, Y-S Cho et al. Delayed height loss after kyphoplasty in osteoporotic vertebral fracture with severe collapse: comparison with vertebroplasty. World Neurosurg, 2018
- J. Mooney, J. Amburgy, M. Self et al. Vertebral height restoration following kyphoplasty. J Spine Surg, 2019
- R. Dong, L. Chen, T. Tang et al. Pain reduction following vertebroplasty and kyphoplasty. International Orthopaedics, 2013
- J. Liu, W. Liao, W. Tan et al. Balloon kyphoplasty versus vertebroplasty for treatment of osteoporotic vertebral compression fracture: a prospective, comparative, and randomized clinical study. Osteoporosis Int, 2013
- J.-T. Liu, C-S Li, C.-S Chang et al. Long-term follow-up study of osteoporotic vertebral compression fracture treated using balloon kyphoplasty and vertebroplasty. Neurosurg Spine, 2015
- V. Bousson, B. Hamze, G. Odri et al. Percutaneous vertebral augmentation techniques in osteoporotic and traumatic fractures. Semin Intervent Radiol, 2018

## About V-STRUT® Vertebral Implant

Hyprevention has developed V-STRUT® Vertebral Implant indicated to treat vertebral fracture due to osteoporosis or bone metastasis.

The medical device reinforces the full vertebrae thanks to a PEEK implant providing a unique pedicle anchorage and allowing to share loading between the anterior and posterior column to limit subsequent and adjacent fracture.



COMING SOON  
ASK THE EXPERTS Part 2: Pedicle anchorage