Background: Radiofrequency (RF) Kyphoplasty provides a new minimally invasive procedure to treat vertebral compression fractures. The monopedicular approach of the system can shorten operation time. Using radiofrequency-activated cement with high viscosity, leakages should be reduced and a high standard of patient safety assured. The RF-Kyphoplasty may therefore provide a safe and easy alternative to vertebroplasty or other kyphoplasty systems. The purpose of our study was to investigate the functional outcomes, safety and radiographic outcomes one year after the treatment of painful osteoporotic vertebral compression fractures with RF Kyphoplasty.

Purpose: To assess the efficacy and safety of RF-Kyphoplasty in treating thoracic and lumbar spinal osteoporotic fractures that result in pain, functional impairment or instability.

Materials and methods: 114 consecutive patients (mean age 70 years) with 210 fresh osteoporotic vertebral compression fractures (as determined through MRI imaging) were treated with RFK using the StabiliT Vertebral Augmentation System (DFine Inc. San Jose, CA). The StabiliT System provides a navigational osteotome to create a site and size specific cavity prior to delivering ultrahigh viscosity cement with an extended working time (done by applying radiofrequency energy to the cement immediately prior to entering the patient). 78 Patients were available for a follow-up after 12 month. Preoperatively, postoperatively and after 12 month, conventional radiographs were taken and assessed for vertebral body height and kyphotic deformity. Postoperatively and at follow up, adjacent level fractures and cement leakage were assessed. Patient-related outcomes of pain (Visual Analogue Scale) and disability (Oswestry Disability Index) were assessed pre- and postoperatively and at the follow up.

Results: Mean pain visual analogue scale (from 0: no pain to 100: maximum pain) improved significantly from pre- to post-treatment (84 to 25, p< 0.001). After 12 month, pain reduction continued down to 12. The Oswestry Disability Index decreased from pre- to postoperatively from 39% to 24%, and to 13% after 12 month (p< 0.001). An increase in vertebral body height as well as a decrease of the kyphotic angle was seen post-operatively and at the follow up. Cement leakage as evaluated on plain radiographs was noted in only 9 patients, none of the symptomatic. 4 patients had suffered an adjacent level fracture which was treated subsequently. No procedure-related serious adverse events were seen in the treated patients. General satisfaction with surgery was over 90%.

Conclusion: RF Kyphoplasty is a safe and easy invasive procedure that provides immediate pain relief and improved functional ability in patients with osteoporotic vertebral compression fractures. Functional outcome measures of pain and disability improved significantly immediately post-operatively and at the 12-month follow up. Cement leakage and complication rate can be reduced significantly compared to the rates reported for vertebroplasty. Site specific cavity creation and delivery of ultra-high viscosity cement in RF Kyphoplasty resulted in some height restoration and reduction of kyphotic deformity.