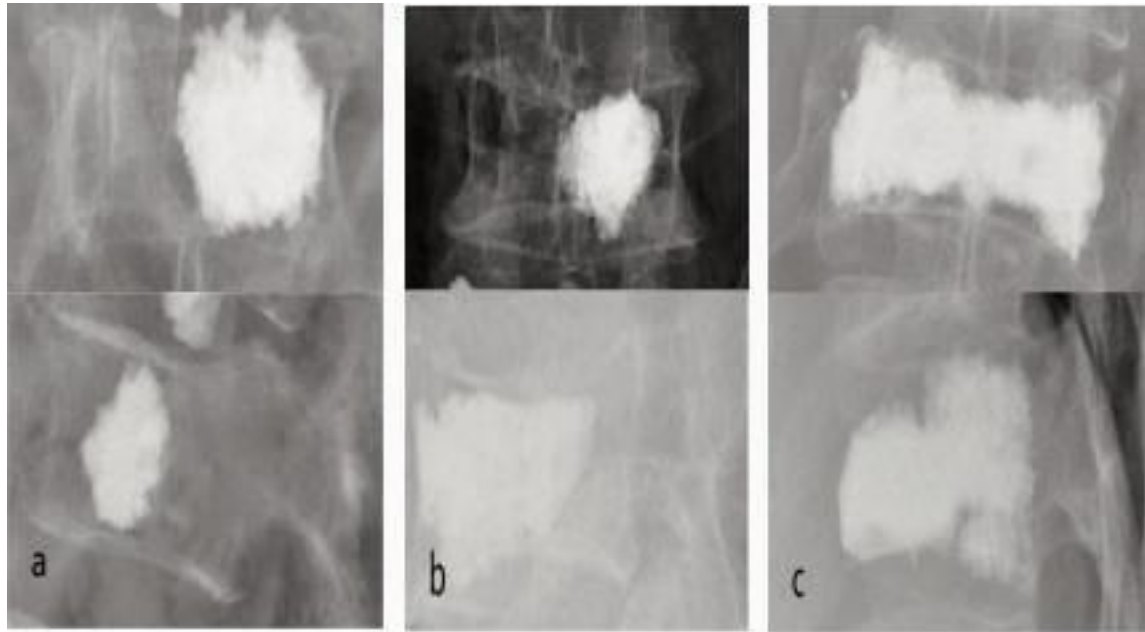


Cement dispersion grade

Based on the patients' postoperative day 2 review radiographs, the cement dispersion grade was categorized into 3 grades with reference to the method of Zhao Yubo et al.(Dose-effect relationship of bone cement dispersed level in vertebroplasty: https://med.wanfangdata.com.cn/Paper/Detail/PeriodicalPaper_gyjjsszz201501020) Grade I: bone cement projection $\leq 25\%$ on the ortholateral X-ray; Grade II: bone cement projection $>25\%$ seen on the orthopantomograph or lateral radiograph, and bone cement projection $\leq 25\%$ on the other projection plane; Grade III: bone cement projection $>25\%$ on both orthopantomographs.(supplementary figure 1)



Supplementary Figure 1: cement dispersion grade

Note: a: Grade I; b: Grade II; c: Grade III

Bone cement shape

Based on the patients' postoperative radiographs, the cement shapes were categorized into three types, block-type, diffuse, and mixed, with the diffuse and mixed types collectively referred to as non-block-type, with reference to the study criteria of Chen et al.(Three-dimensional finite element analysis of the influence of three subtypes of bone cement distribution on the postoperative stress of thoracolumbar vertebral body: <https://www.doc88.com/p-95629030275716.html>)(supplementary figure 2)



Supplementary Figure 2: bone cement shape

Note: a: block-type; b,c: non-block-type