Nanostructured synthetic bone substitute material for treatment of bone defects. Results of an observational study

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Key Points:

- Complication rates of up to 30% have been described in the literature for autograft procedures, necessitating development of synthetic bone graft alternatives.
- This prospective, consecutive patient study compared fracture healing and complication rates of patients treated with NanoBone with published data on autograft.
- The synthetic bone graft showed equal fracture healing rates and a lower complication rate than autograft.

Abstract

Autologous bone grafting is still the gold standard for the reconstruction of bone defects from fractures. Complication rates up to 30% have been described in the literature for bone grafting procedures. Thus, research is concerned with the development of alternative bone substitutes, which satisfy the high requirements of bone inductivity, bone conductivity and osteogenesis. This study compared the complications and fracture healing rates of patients with bone defects treated with synthetic silicate substituted calcium phosphate. Concerning complications and fracture healing rates, the results of our study are comparable to the results of autologous bone grafting in the available literature.

Despite limited comparability, the complication rate of the treatment of bone defects with silicate substituted nanohydroxyapatite seems lower than the combined complication rates for bone harvesting and grafting together. In our study synthetic bone substitutes did not show poorer results concerning complication rates and fracture healing compared to the gold standard. These materials should be considered as an alternative for the treatment of bone defects in fractures of the extremities and pelvis. The strength of the study lies in the prospective and consecutive design. A computed tomography of all included patients would have been desirable but could not be performed due to financial and radiation hygiene reasons.

Keywords

Bone substitute · Bone defect · Bone