

# Effect of Silicon food supplement on bone tissue healing: histomorphometric and EDS analysis in human

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**Introduction:** Few clinical trials reported beneficial impact of Si on bone metabolism, but no study on alveolar bone healing has been published [1]. Aim of this study was to assess if daily supplementation of Si: i) increases amount of Si within the newly formed alveolar bone, ii) induces histomorphological changes of newly formed alveolar bone. **Materials and Methods.** 20 systemically healthy individuals requiring premolar tooth extraction were included and immediately after the tooth extraction were randomly assigned to group A (1 tablet/day for 4 months containing Si) or to group B (1 tablet/day for 4 months containing placebo). At 4 months post-op, a bone core biopsy was harvested from each healed site, processed for ground sections and stained. For morphological and histomorphometric analyses, slides were observed using a light microscope equipped with a digital camera and photos were acquired at magnification of 100X. Stereological analysis was done to obtain the proportions of the specimen occupied by every regenerated tissue: lamellar bone, woven bone, osteoid, medullary spaces. Sections were observed using a BSE-SEM system without additional fixation and previous coating of carbon film to assess level of mineralization of regenerated tissue. Slides were observed at energy dispersive spectroscopy to assess levels of silicon in regenerated tissue (% Mass). In both groups, mean and standard deviation were calculated for clinical data, percentage of connective tissue, osteoid and mature bone, % Mass of Si. Inferential statistics was also done. **Results.** Two patients withdrew from the study. Bone sample harvesting was done on 8 patients of group A and 10 patients of group B. The mean Si content in samples of group A was 0.9% and in samples of group B was 0.2% (no significant differences). Si concentration appeared higher in medullary spaces than in the bone. Si concentration in the mature bone appeared lower than in the bone in the phase of mineralization and in the medullary spaces. Volume fraction of lamellar bone was significantly higher in group A than in group B, and volume fraction of osteoid matrix was significantly lower in group A than in group B ( $p < 0.05$ , Wilcoxon rank sum test). Newly formed blood vessels were  $9.75\% \pm 1.56$  for group A and  $9.53\% \pm 3.24$  for group B (no significant difference). **Conclusions.** Supplementation seems to increase Si levels in healing bone tissue and seems to accelerate maturation process of mineralized connective tissue.

## References

- [1] Eisinger J. and Clairet D. (1993) Effects of silicon, fluoride, etidronate and magnesium on bone mineral density: a retrospective study. *Magnes Res* 6:247-9.

## Key words

Bone healing, Silicon, BSE-SEM.