ASSESSMENT OF PURE-PHASE β – TRICALCIUM PHOSPHATE (β – TCP) CYLINDRICAL CERAMIC IMPLANT OSSEOINTEGRATION USED IN CRITICAL SEGMENTAL BONE DEFECTS OF THE RADIUS OF RABBITS

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Introduction and objective
Although grafts show excellent skeletal incorporation, host's morbidity and graft acquisition and quantity limit their use. Alternatively, synthetic materials play an important role in reconstructive orthopaedic surgery. To assess the occurrence of osseointegration using a customized β-TCP implant.

Methodology
Eighteen adult New Zealand rabbits were divided into 3 groups (n=6 per group). A defect was created in the mid-diaphysis of each left radius with a high-speed drill. In Group-A and Group-B, β-TCP and allogenous cortical bone grafts respectively were placed intro the radical defect, while the defect remained empty in Group-C. Pain, swelling, limb alignment, lameness, foreign body reactions, osseo integration and implant resorption were assessed through cãnical examination and qualitative radiographic, analysis immediately postoperatively and 30, 60, 90 and 120 days postoperatively. All animals were euthanized on day 120, and µCT and histological assessments for calcified and uncalcified specimens were performed.

Results and discussion
No clinical alterations were observed in any rabbit after 120 days. On radiographic and µCT images, as well as upon histologic assessment, complete bone healing was observed in all rabbits in Group-B. Non-unions were observed in all rabbits in Group-A and Group-C. Implant resorption was not observed in Group-A. This study showed that β-TCP did not elicit any osteoconductivity and osseointegration. The lack of ceramic bioactivity and resorption observed with β-TCP was probably due to low implant porosity and/or other implant shape features. However, expected biocompatibility was present. Our hypothesis was that by reducing porosity and gainingrigidity, we could have an alternative to maintain a good mechanical characteristic, without forcing and breaking the implant and at the same time, allowing blood vessels, cells and growth factors permeate the poresof the implant and form new bone throughout. But this feature was not enough to promote the conduction of bone cells nor the integration between them in our implant. Certainly, the porosity that we gained from the sintering process was too low to allow osseoconduction, which differed from the works of other authors.

Conclusions
The customized β-TCP implant did not show such osseoconductive and osseointegrative characteristics mentioned by other authors and they were not effective for the consolidation and integration between the hosts bones and biomaterials. Further studies must be carried out to provide more information to classify it as a proper material for use in the routine of orthopaedic reconstructive surgery in veterinary medicine.

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