

Reviewer #1:

The aim of this paper is to examine the strength of bone-implant osseointegration of three porous titanium and one porous tantalum materials in normal and osteoporotic bone in rabbits. The paper is well written, however some grammatical typos should be fixed. The study is well described. Limitations of the study are the size of the sample and the use of one type of test to evaluate implant stability, but this does not devalue the study. Section "Study design" How was osteoporosis development confirmed on the 10 rabbits (5 non-OVX and 5 OVX), after months? Explanation given by authors is not clear/convincing enough.

The authors:

Thank you very much for the comments. Osteoporosis in rabbits was confirmed with the evaluation of the Cortical Thickness Index on radiographs. The Cortical Thickness Index was evaluated in the femoral area where porous implants were planned to be implanted. The analysis was performed 3 months after the beginning of the experiment in control and ovariectomized animals. This method is used as an alternative to measure the bone mineral density in the diagnosis of osteoporosis (Nguyen B.N. et al., 2018). We found that in ovariectomized rabbits the Cortical Thickness Index significantly decreased comparing with the control (non-ovariectomized) rabbits.

Our model of ovariectomy in rabbits is a validated model of bone loss characteristic of postmenopausal osteoporosis. According to other experimental studies in rabbits, 3 months after oophorectomy, bone loss occurs, characteristic of osteopenia / osteoporosis (Qi M. et al., 2012; Qiu Y. et al., 2015).

We improved the description of the method we used to confirm the development of osteoporosis in rabbits in the text of the manuscript. Changes in the text were highlighted.

The analysis of Cortical Thickness Index on radiographs of the femur was performed in 10 rabbits (5 OVX and 5 non-OVX) before implantation of materials to verify the osteoporosis model [14] (Figure 3). This method is used as an alternative to measure the bone mineral density in the diagnosis of osteoporosis[14]. Using «X-Rays» software (Kharkiv National University of Radioelectronics, Ukraine)[15, 16], the Cortical Thickness Index was automatically calculated basing on the measurement of the thickness of the cortical layer of the femur under the lesser trochanter in 10 rabbits. This software allows to perform a coordinate-brightness analysis of digital radiographs and provide a spatial sampling with an element sized 0.042 mm and a brightness quantization of 256 grayscale on radiographs. The analysis was performed by two independent experts.

Authors had checked and corrected grammatically the text.

1. Nguyen, B. N., Hoshino, H., Togawa, D., & Matsuyama, Y. (2018). Cortical Thickness Index of the Proximal Femur: A Radiographic Parameter for Preliminary Assessment of Bone Mineral Density and Osteoporosis Status in the Age 50 Years and Over Population. *Clinics in orthopedic surgery*, 10(2), 149–156. <https://doi.org/10.4055/cios.2018.10.2.149>
2. Qi, M., Hu, J., Li, J., Li, J., Dong, W., Feng, X., & Yu, J. (2012). Effect of zoledronate acid treatment on osseointegration and fixation of implants in

autologous iliac bone grafts in ovariectomized rabbits. *Bone*, 50(1), 119–127.
<https://doi.org/10.1016/j.bone.2011.10.011>

3. Qiu, Y., Yao, J., Wu, X., Zhou, B., Shao, H., Hua, T., Xiong, Z., & Tang, G. (2015). Longitudinal assessment of oxytocin efficacy on bone and bone marrow fat masses in a rabbit osteoporosis model through 3.0-T magnetic resonance spectroscopy and micro-CT. *Osteoporosis international*, 26(3), 1081–1092.
<https://doi.org/10.1007/s00198-014-2933-9>

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- 6 Recommendation: Conditional acceptance.

The authors:

- 1) The “Author Contributions” section added
- 2) Original pictures added
- 3) The “Article Highlights” section added
- 4) Any figures in manuscript not published elsewhere before
- 5) All references are relevant our study