VALIDATION OF A METHOD FOR OPTIMIZING *IN VIVO* OSTEOINTEGRATION STUDIES OF TITANIUM IMPLANTS IN RABBITS

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INTRODUCTION

In osseointegration studies of titanium implants, often more animals are used than necessary to obtain statistically valid results due to the fact that the condylar area of the femur is used as the implantation area, which allows a maximum of two samples per rabbit. .

OBJECTIVE

Design and validate an in vivo surgical model that allows to reduce the number of animals without losing the number of samples and demonstrating the viability of the results in the assessment of osseointegration.

MATERIALS & METHODS

ANIMALS	20 ADULT FEMALE NEW ZEALANDER WHITE RABBITS
IMPLANTS	4 TITANIUM IMPLANTS WITH DIFFERENT SURFACE TREATMENTS
SURGICAL TECHNIQUE	PLACEMENT OF TWO TITANIUM IMPLANTS IN THE MEDIOPROXIMAL REGION OF BOTH TIBIAS.
EUTHANASIA	1 WEEK AND 3 WEEKS POST-SURGERY + TIBIA DISSECTION
HISTOLOGY	BACK-SCATTERED SCANNING ELECTRON MICROSCOPY

RESULTS AND DISCUSSION

Fig 1: Immediate postoperative L/L X-ray. titanium implants

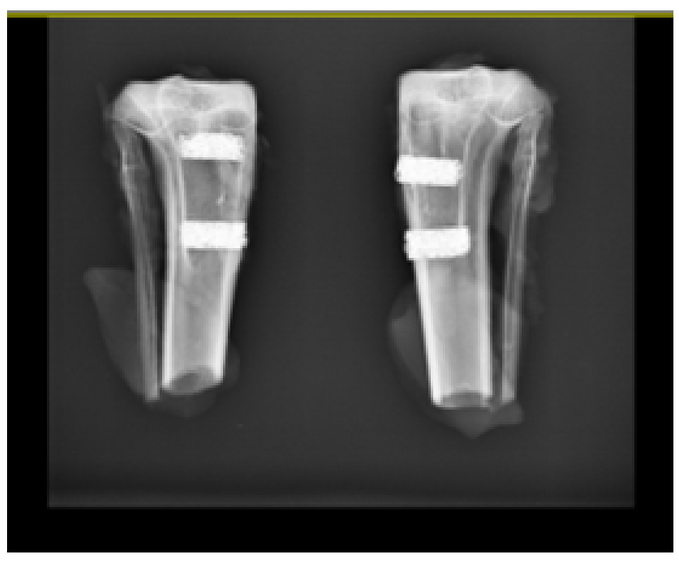

Fig 2: Dissected tibiae with titanium implants

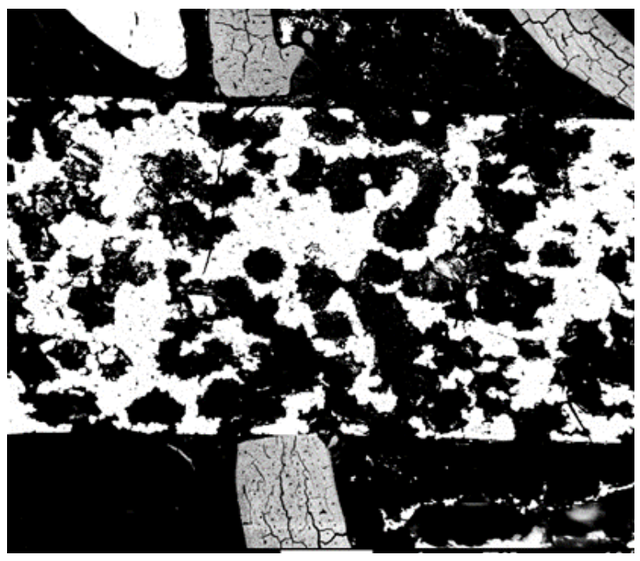

Fig 3: BS-SEM image of the implant

- The surgical method used allows a simple and less aggressive surgery compared to the standard method:
  - Shorter surgical time -> lower anesthetic risk.
  - 1 cm incision + absence of muscle coverage -> Less risk of post-surgical complications (skin scarring, infections, pain, inflammation, self-mutilation)
  - Faster recovery time
- Simple removal of the area of interest
- Sample processing is the same as in the standard method
- There is enough space for the placement of two implants without risk of fracture or fissure.
- There are other studies that support the effectiveness of the designed surgical method.

CONCLUSION

The surgical method designed allows the placement of two implants of up to 5mm in the proximal and medial region of the tibia with minimal risk of cracking or bone fracture in order to reduce the number of animals used in osseointegration studies of titanium implants in rabbits.

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