

IMPLANTATION PROTOCOL FOR 3D PRINTED OSSEOINTEGRATED PROSTHESES FOR THE LIMBS OF DOGS AND CATS

OBJECTIVES

- Find solutions to restore the patient’s quality of life.
- Prevent deformations and degeneration of existing joints.
- Study ITAP type osseointegrated prostheses.
- Make custom prostheses using 3D technology for 2 clinical cases.

INTRODUCTION

Osseointegration surgery is an effective option to improve the quality of life of animals. This poster presents the design, 3D technology and implantation protocol.

MATERIAL AND SURGERY

Implant design:

- Use of CT to take the necessary measurements of the extremity.
- Use of 3D design programs such as Tinkercad, Freecad and Meshmixer.
- Making sketches and prototypes.

Fabrication:

- Printing the models using a Prusa i3 MK3S & MK3S+ 3D printer with PLA filaments.

Surgical procedure:

- Incision in the skin and muscle-tendon tissue.
- Vessel ligation and transverse osteotomy of the limb.
- Resection with margins and histological confirmation (in case of bone tumors).
- Creation of intramedullary tunnel for the stem.
- Suture of muscles and fascia.
- Placement of the porous ridge (outside the bone and under the dermis).
- Suturing the skin and muscles to the bone.
- Osseointegration period of 3-5 months.
- Connection of the external prosthesis by transcutaneous pin.

CLINICAL CASE 1

Rottweiler dog with an osteolytic lesion in the distal metaphysis of the left tibia, without involvement of other bones. Weight: 42.3kg.

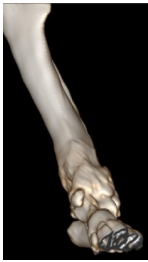


Figure 1 and 2: Reconstruction of the hind limb CT with a mass in the left hind limb at distal level. Figure by author.



Figure 3: Custom endoprosthesis. Figure by author.



Figure 4: Custom exoprosthesis. Figure by author.



Figure 5: Implantation of the osseointegrated prosthesis printed with 3D technology. Figure by author.

CLINICAL CASE 2

Maine Coon cat with soft tissue sarcoma or osteoclastoma in the left carpus. Weight: 7.5kg.



Figure 6 and 7: Reconstruction of the forelimb CT with a distal mass in the left forelimb. Figure by author.



Figure 8: Custom endoprosthesis. Figure by author.



Figure 9: Custom exoprosthesis. Figure by author.



Figure 10: Implantation of the osseointegrated prosthesis printed with 3D technology. Figure by author.

CONCLUSIONS

- Greater mobility and fewer musculoskeletal problems.
- Preoperative evaluation is always necessary.
- Technology and material play a fundamental role.
- More research to improve efficacy and safety in the future.