

## **"Composite biomaterials for bone repair and regeneration -reconstruction of orbital floor defects in an animal model- "**

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In the treatment of orbital floor fractures, bone is ideally regenerated. The materials currently used for orbital floor reconstruction do not lead to the regeneration of bone. Our objective was to render polymeric materials based on poly(trimethylene carbonate) (PTMC) osteoinductive, and to evaluate their suitability for use in orbital floor reconstruction. For this purpose, osteoinductive biphasic calcium phosphate (BCP) particles were introduced into a polymeric PTMC matrix. Composite sheets containing 50 wt% BCP particles were prepared. Also laminates with poly(D,L-lactide) (PDLLA) were prepared by compression moulding PDLLA films onto the composite sheets. After sterilization by gamma irradiation, the sheets were used to reconstruct surgically-created orbital floor defects in sheep. The bone inducing potential of the different implants was assessed upon intramuscular implantation.

The performance of the implants as orbital floor reconstruction was assessed by cone beam computed tomography (CBCT). Histological evaluation revealed that in the orbital and intramuscular implantations of BCP containing specimens, bone formation could be seen after 3 and 9 months. Analysis of the CBCT scans showed that the composite PTMC sheets and the laminated composite sheets performed well in orbital floor reconstruction. It is concluded that PTMC/BCP composites and PTMC/BCP composites laminated with PDLLA have osteoinductive properties and seem suitable for use in orbital floor reconstruction.