

Robotics and Automation & Biomaterials and Nanomaterials

October 22-23, 2018 | Frankfurt, Germany

New fiber reinforced composite material for custom-made craniofacial implants

Lazar MA

University of Medicine and Pharmacy, Romania

The aim of the present research was the elaboration and the characterization of new fiber-reinforced composites (FRCs) that will serve cranial bone reconstruction, particularly in the cases of large bicortical calvarial defects. Four new formulations of FRC were obtained using polymeric matrices (combinations of monomers bisphenol A glycidylmethacrylate (bis-GMA), urethane dimethacrylate (UDMA), triethylene glycol dimethacrylate (TEGDMA), hydroxyethyl methacrylate (HEMA)) and E-glass fibers (300g/mp). Every FRC contained 65% E-glass and 35% polymeric matrix. The new materials were extensively characterized and tested for their chemical, physical and biological properties, using well established methods (high performance liquid chromatography, scanning electron

microscopy, atomic force microscopy, X ray diffraction, flexural and compression strength tests, cytotoxicity and implantation tests) and the best formulation was selected. The selected material was used to produce personalized implants for the reconstruction of critical size defects of rabbit calvaria. Local and general impact upon animal health, quality of reconstruction, bone and dura reaction to the material were investigated by means of clinical, imaging and histological analysis. The results of our research pointed out that the FRCs based on UDMA resin reinforced with E-glass fibers could be an optimized alternative to the similar nowadays available materials used for the reconstruction of bone defects in the cranio-maxillofacial area.

e: madilazar@yahoo.com

*Notes:*