

Effect of Investment dies of SPF on the proliferation and differentiation of Human Dermal Fibroblast cells

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Abstract: The element Titanium, confined within an ore (called rutile ore), was discovered by a German chemist Martin Klaproth in 1795. Historically, titanium has been used extensively in aerospace, aeronautical and marine applications because of its high strength and rigidity, its low density and corresponding low specific weight, its ability to withstand high temperatures and its resistance to corrosion. Today, titanium and titanium alloys are used widely in medicine and dentistry for the fabrication of prosthetic joints, surgical splints, stents and fasteners, dental implants, dental crowns and partial denture frameworks and cranioplasty. This current research study is one of the pioneering investigations into the effect of the investment material on the surface of Superplastic Forming Titanium material, and the affect upon biocompatibility of SPF titanium and their contact with the soft tissue cells (Fibroblast cells). Where six different treatment of superplastic forming Ti6Al4V disks, were tested in their contact with the HDF cells, this exposed the effect of the leachable ions of the phosphate bonded investment on the surfaces of the titanium disks and recognized them as favourable surfaces for fibroblast cells proliferation and biocompatibility. Direct and Indirect contact tests have been performed in order to test the biological cellular response and the cytotoxicity correspondingly of the different titanium surface treatments . It was observed that all the different treatments of the titanium surface were cytocompatible in their contact with the human dermal fibroblast cells (HDF). And they showed good cellular response and proliferation of the fibroblast cells particularly the material spTi64 which was heated for 20 mins. 2 The titanium is highly reactive metal that under normal ambient conditions is protected by a passive oxide film, and during the superplastic forming process of the titanium disks at high temperatures, the oxide becomes soluble in the metal,