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Design and manufacturing of customised maxillofacial prostheses

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Customised implants created by Computer-Assisted Surgery (CAS) techniques and used in maxillofacial reconstruction indicate improved outcomes over conventional techniques.
''Non-functional'' multistaged procedures are commonly carried out in the treatment of malignancy, often involving the harvesting of hard and soft tissue from a second surgical site. External approaches are associated with an increase in surgical trauma.
Large titanium implants, as a facsimile of the resected bone and designed on a biomodel, used by Mr. Ninian Peckitt, have used many techniques of CAS to address functional surgical reconstruction and evidence-based results have indicated savings in time, cost, intensive care unit time, ambulation, morbidity and mortality. Furthermore, in some cases it is possible to perform the procedures on patients with compromised medical conditions.
In this research an existing, successful implant has been taken further down along the road of CAS by improving the design and manufacturing process. A method has been devised by using solid modelling techniques to create a customised implant. The procedure initiates with a CT scan, which is converted and transferred to CAE software. The implant is designed virtually with respect to the patient anatomy and is thus accurate and patient specific. The implant can then be created by rapid manufacturing techniques.
The purpose of the present research is to further advance the technology used by Mr. Peckitt in order to create maxillofacial implants which are more accurately designed and manufactured in a completely different way. The result will be to create implants more accurately, faster and at less cost to the patient or health care provider.

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