WHITE PAPER

ON

3D PRINTED

CUSTOM PROSTHETICS

BRIEF INTRODUCTION

Prosthesis is defined as an artificial substitute for a missing part of the body, used for functional or cosmetic reasons or both. Prosthetic limbs are used by patients who have undergone amputation for various reasons like trauma, disease, congenital conditions etc. The prosthesis is suggested to the patient based on the residual organ, lifestyle, body weight etc. Prosthetics for cosmetic purposes help the patient psychologically to regain confidence and lead a normal life.

APPLICATIONS OF 3D PRINTED PROSTHETICS

- Prosthetics that cover the deformity after maxillofacial surgeries can be manufactured using 3D printing as cosmoses is of prime importance.

- Auricular implant holding prosthetics can be 3D printed easily when compared to the traditional manufacturing process.

- Abutments for fingers with the residual stumps or implants (osseointegration) can be manufactured using 3D printing.

- 3D printed artificial limbs can be manufactured using a variety of materials considering weight, strength and durability. These parameters can be arrived at based on the intended use.

- The constituent parts for robotic prosthetics can be manufactured at a cheaper price using 3D printing.

ADVANTAGES OF 3D PRINTED PROSTHETICS OVER TRADITIONAL ONES

TRADITIONAL PROSTHETICS	3D PRINTED PROSTHETICS
❖ The traditional method of measuring stump involves a complex process	❖ 3D Scanning gets an accurate model of the stump
❖ Need to follow the complex chart of measurements for the body to determine the size of the prosthesis	❖ 3D Scanned data can be used to determine the size of prosthesis and the socket for a perfect fit
❖ Vacuum forming and injection moulding techniques are used to manufacture the plastic parts of the prosthetic limb	❖ Plastic parts in the prosthetic can be 3D Printed directly and cumbersome process of moulding can be avoided.
❖ Involves the process of sculpting wax ear in the case of auricular prosthesis by skilled anaplastologist	❖ Easy to reproduce the mirror image of other ear hence no wax sculpting required for auricular prosthesis.
❖ Involves laser facial scans to reproduce anatomical details	❖ The aesthetic aspects of the prosthesis can be determined through the 3D virual model even before it is manufactured

APPLICATIONS OF SURGICAL PLANNING

❖ The implants can be molded or shaped prior to the surgery in Cranioplasty by using a patient specific 3D printed skull.

- 3D printed models can be used by Orthodontists to print Crowns, bridges and many more Orthodontic objects for better fit on the teeth. Preoperational procedures help the orthodontist arrive at the right orientation and access of the tools to be used in the procedure.

- Maxillofacial surgeons can use 3D printed models of the affected part for preoperative planning as the procedure needs to be minimally invasive and the outcome should be aesthetic.

- Osteoarthritis has the risk of unequal leg length. The risk can be minimized by pre operating on the 3D printed model.

- Oral, Orthognathic, Vascular surgeons etc., can also use 3D models for surgical preplanning.

PROCESS TO MANUFACTURE PATIENT SPECIFIC 3D PROSTHETICS

- The stump and the body are 3D scanned. For maxillofacial and similar deformities, DICOM images are studied.

- Accurate 3D virtual model of the affected area is created.

- The templates for 3D printing or moulding are generated using modelling software.

- The virtual templates once signed off are 3D printed using additive manufacturing technique.

- Moulds are generated from the templates where required and the constituent parts are manufactured.

- The individual parts after manufacturing are assembled to form the prosthesis.

- Robotic prosthetics can be 3D printed entirely.

HOW TO GET THESE ANATOMICAL MODELS

- Send the patient specific images, instructions and your contact details to info@think3d.in or upload it at www.think3d.in/dicom-3d-models
- We will go through them and have a teleconference with the doctor to confirm requirements.
- 3D Views of the templates of the constituent parts of the prosthesis are shared for feedback.
- The prosthesis is manufactured and shipped to your site.

CONTACT US

Drop an email to info@think3d.in / callus @ 040-30191007. You can chat with us by logging to www.think3d.in

ABOUT THINK3D

think3D is India's leading 3D printing platform with sales & support offices in Hyderabad, Mumbai, Delhi, Bangalore, Chennai, Ahmedabad, Coimbatore and Visakhapatnam. We provide 3D Printers, Scanners, and also offer 3D Printing/ Designing/ prototyping services for multiple sectors.

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