

BIOENGINEERING AND MEDICAL-SURGICAL SCIENCES

In-hospital Technologies in Cranio-Maxillo-Facial

Funded By	UNIVERSITA' DEGLI STUDI DI TORINO [P.iva/CF:02099550010]
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Context of the research activity	<p>Three-dimensional printing application is a subject of growing interest in craniomaxillofacial. In recent years, with the interpenetration of medical imaging and computer technology, the emergence of three-dimensional reconstruction images makes it possible for the visual space vision of bone and soft tissues morphology.</p> <p>Patient-specific applications of 3-dimensional printing include skeletal models, intraoperative cutting guides, surgical tools and customized implants.</p> <p>Reported benefits include improved preoperative planning, operative precision, reduced operating room time, reduced rates of redo operations and improve resident training. Historically high cost of printers, the requirement of highly technical imaging and modeling software drove surgeons outsource printing to off-site vendors. Although remote printing may eliminate technical requirements associated with printing on site, it is expensive and may take up to three weeks to deliver the model. Consequently it is not feasible for acute situation and routine surgery.</p> <p>Recent developments in imaging software and 3-Dimensional printing technology enable surgeons at large maxillofacial centers to have access to on-site 3D lab and printers. Such in-hospital 3-dimensional printing will render this technology applicable to a large number of patients.</p>
	This project aims to demonstrate that virtual planning and 3d printing of

Objectives

surgical tools is reliable with the aid of an in-hospital 3D laboratory and a short learning curve. 3D printers provide anatomical models and surgical guides that are feasible for daily clinical practice at a reasonable costs. Different guides and surgical tools with different shapes could easily be produced with benefits during surgery compared to those produced by commercial companies. This could enable every healthcare facility to use low-cost 3D printing as a valuable feature for patient-specific medical treatment and educational purposes.

In conclusion, the aim of this project is to explore whether the in-hospital digital workflow is feasible and to assess clinical outcomes and surgeon-based performance using computer assisted surgery.

We would like to be able to share our experience and to support other surgical teams using digital in-hospital workflow.

Skills and competencies for the development of the activity

Candidate should have:

- medical and surgical skills in maxillofacial surgery
- basic knowledge on technologies and the use of virtual design software
- the ability to plan complex procedures in cranio-maxillo-facial field
- previous work experiences with Medical Engineers.