

Digital Workflows Comprising Additive Manufacturing in Facial Prosthesis Production

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Abstract

Facial mutilations affecting the head and neck region involve essential anatomical structures such as the ears, nose, and eyelids. Causes may be congenital, traumatic (resulting from accidents), or oncological in origin. While dental surgeons are qualified to work in the field of maxillofacial prosthetics, few professionals are trained in this area, as the fabrication of these prostheses requires significant manual skill and time. This shortage of specialists drives up the cost of prostheses, making them inaccessible to the vast majority of the population with limited financial means. This paper presents case studies demonstrating the results of collaborative efforts that have popularized the use of medical-grade silicone maxillofacial prostheses. The emergence of digital technologies—specifically computed tomography (CT), computer-aided design (CAD), and additive manufacturing—has revolutionized this process. However, although these tools enable high-precision anatomical reproduction and exact shape customization while significantly reducing costs and production time, integrating clinical expertise with digital workflows remains essential. This interdisciplinary approach has led to more predictable, reproducible, and patient-centered outcomes, thereby expanding access to high-quality prosthetic solutions. It was observed that incorporating assistive technologies and digital methodologies into facial rehabilitation not only improved functional and aesthetic results but also redefined the professional's role, fostering interdisciplinary collaboration and innovation to promote rehabilitation practices that are more humanized, precise, and accessible.