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# 3D PRINTING IN CRANIOFACIAL CLINICAL PRACTICE & RESEARCH

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## SUMMARY

Following the invention of the first computed tomography (CT) scanner in the early 1970s, many innovations in three dimensional (3D) diagnostic imaging technologies have occurred, leading to a wide range of applications in craniofacial clinical practice and research. This advance in craniofacial medical imaging has allowed the 3D reconstruction of anatomical structures for medical applications, including the design of patient specific implants based on computer-aided design and computer-aided manufacturing (CAD/CAM) platforms. This technology has provided new possibilities to visualize complex medical data through generation of 3–dimensional (3D) physical models via additive manufacturing that can be eventually utilised to assist in diagnosis, surgical planning, implant design, and patient management. Current state-of-the-art multidetector CT (MDCT), also known as medical CT, has an important role in the diagnosis and management of craniofacial injuries and pathology. Three-dimensional cone beam CT (CBCT), pioneered in the 1990s, is gaining increasing popularity in dental and craniofacial clinical practice because of its faster image acquisition at a lower radiation dose. Recent innovations in micro-computed tomography (micro-CT) have revolutionized craniofacial biology research by enabling higher resolution scanning of bone and teeth beyond the capabilities of MDCT and CBCT, presenting new prospects for translational clinical research. This may revolutionize any surgery and implies the printing of viable tissues (scaffolds and bioresorbable materials), allowing to open up an entirely new surgical era (tooth printing, bone printing, congenital or surgical defect repair).