

CAD/CAM Dentistry

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Context

Over the last 30 years, technological improvements have benefited each step of the computer-aided design and computer-aided manufacturing (CAD/CAM) process; process, by developing high definition 3D scanning devices, more accurate, faster and simpler design Software, and precise subtractive or additive manufacturing of innovative materials.

CAD/CAM processes concern all branches of dentistry involving custom-made medical devices. Such devices include those fabricated for use in restorative dentistry, prosthetic dentistry, dental implant procedures, and orthodontics, all of which having seen new or improved therapeutic solutions emerging from the use of CAD/CAM technologies. CAD/CAM systems offer an alternative to processing indirect dental restorations and fixed dental prosthesis. The use of digital impressions eliminates a number of clinical and laboratory steps, leading to fast and effective delivery of the final custom made medical device.

Everyday dental practice is, or soon will be, affected by the use of CAD/CAM dentistry. Dentists and laboratory technicians use new tools developed for digital impression, computer-aided design and fabrication with subtractive or additive manufacturing (such as laser sintering and 3D printing including stereolithography), all of which require good practice procedures to ensure the quality of the final product.

Research and development in innovative machinable ceramics, resins and hybrid materials bring to the market new therapeutic indications and procedures, as well as risks and dangers, that dentists must be informed about by manufacturers. Dentists should also report back to manufacturers and relevant health agency any unwanted event or effect related to the practice of CAD/CAM dentistry, as this will help manufacturers improve the technology and prevent recurrent adverse effects.

The development of open systems requires international standards to ensure interoperability within the process; between digitizing devices, CAD software products, and the numerical control machine tool. New types of ceramic, resin and hybrid products require fast development of standards for safety and quality of the final product.

Reducing time and human resources needed to produce CAD/CAM medical devices, together with the development of the market, lead to cost reduction in custom-made medical devices. Furthermore, reducing materials used for impression and casting, along with electronic transmission instead of transport, also have a positive impact on the environment.

Definitions

CAD/CAM dentistry

Process of designing and manufacturing a custom-made dental device, or a patient-specific dental device from an industrialized product, with the aid of a computer.

Policy

FDI supports:

- The research and development of CAD/CAM dentistry to improve the quality of the final product and allow for cost reduction.

- A strong collaboration between manufacturers, academics and all stakeholders in continuous education, to better inform and educate dentists on innovative therapeutic solutions, their indications and contra-indications.
- The development of open systems and international standards by ISO TC106 to ensure interoperability between dental CAD/CAM systems.
- The development of international standards by ISO TC106 for ceramics and hybrid materials used in CAD/CAM dentistry systems.
- The implementation of initial formation and continuous professional development on CAD/CAM dentistry, for dentists and laboratory technicians, at the national, regional and international level.
- The development of users' networks at a local level to mutualize the weight of equipment investments.

Keywords

Dental education, clinical practice, professional training, dental laboratory, medical device, dental products, dental implants, dental material, standards, technology

Disclaimer

The information in this Policy Statement was based on the best scientific evidence available at the time. It may be interpreted to reflect prevailing cultural sensitivities and socio-economic constraints.