

## **Computer-assisted restorations could eliminate need for impressions**

Combining the sophistication of a computer and the precise cutting capability of a milling machine, the design and formation of a crown, inlay, onlay, or denture can be completed in a fraction of the time required by traditional methods, said Dr. Francois Duret at Sunday's scientific session.

Conceived and developed by Dr. Duret, the CAD/CAM (computer-assisted design/computer-assisted manufacture) system could eliminate the need for tooth impressions, limit the patient to one office visit in some cases and decrease production time for fabricating replacement teeth.

The CAD/CAM system comprises an optical probe (a laser/scanner camera), an image processing system, a digital controller and a micro-milling machine, all of which are attached to a centralized computer system.

### **How CAD/CAM works**

The process to fabricate a single crown begins by using the optical probe to take computerized, three-dimensional measurements of the tooth to be treated. These measurements are stored in the computer's memory.

The dentist then prepares the tooth in the traditional manner for crown application. A second set of measurements is then taken of the prepared tooth and stored in the computer's memory.

The computer, instructed by the dentist, designs the crown by comparing the patient's original and prepared tooth measurement to the computer's data of an "ideal" tooth.

The ideal tooth structure is altered through the image processing system which has recorded the measurements taken by the optical probe, and has sorted the information to match the size and space of the patient's mouth. The processing system calculates the dimensions needed to fabricate the crown.

These dimensions, which can be modified by the dentist depending on the patient's individual needs, are sent to the milling machine via the digital controller.

Operating through the computer, the digital controller directs the milling machine's cutting tool to make the crown requiring only final polishing.

Once learned, the procedure could take less than one hour from beginning to end.

With its proposed applications in dentistry, the CAD/CAM system is believed to be limited only by the imagination of the user, according to Dr. Duret.