This is the Oral paper of my lecture for the

-Federation dental international

_"CAD-CAM material "

From Professor Francois DURET

Thusday, 11 September 1990 (1530-1545 h)
Pan Pacific Hotel- Gateway 3 & 4

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nota : -The lecture could be diffrent a little
-on one projector

CAD/CAM material is a subject that is often approached by professionals who want to understand the possibilities and limits of this technique. So that everyone agrees, we will say that any material can be milled and is limited only by the economic factor. So milling gold would seem economically absurd. However, nothing prevents us from milling a mold used in casting.

CAD/CAM is made up of 3 elements: impression, design, and milling. The impression lets us obtain a model from the correlation of numerous views, for example, up to 16. The second step, the computer design, from this model ensures the internal and external construction of the future prosthesis. Finally, the third step, the milling phase, involves the object of this report, the material.

From the time the first of our crowns was made at the at the beginning of the '80's until this element was made in a special new material, a long road had to be travelled. First of all, we were tempted to use certain ceramics such as zircon or vita which was studied especially for the Cerec system.

We then turned to a ceramic whose reputation has been made because of its exemplary quality. I'm speaking of Dicor by Dentsply. Milling of this material and the difference in casting confirms allows us to affirm the crown at the height of the finition line. However, even if we work more than even with Dicor and we recommend it, it is really towward new materials that CAD/CAM is directed. Let's remember that the tooth is hetergeneous and anistropic and we are limited because the materials we use in casting are homogenous and isotropic. This chemical aberration is such that we quickly tried to find heterogenous and anisotropic structures to work with. The work of Dos Santos showed that the application of a force on the occlusal surface of a tooth provokes internal reactions whose orientation is known today to be zero, 45 and 90 degrees essentially. We therefore tried to create a new material that had a heterogenous structure made up of fibers oriented to face forces applied to the crown. We had the same idea as the automobile designers of the '50's who substituted a heavy and rigid chassis with thin, composite, and tubular structures. These new materials are therefore architectural. It is the meshing of fibers and not the mass that ensures the excellent performance of this material. As we can see, the orientation of these fibers respects the zero and 45 degrees decribed previously. Against the occlusal forces, the surface and the structure of the tooth respond globally and directionally. If we look closely at the composition of this material, we see that, like enamel, in addition to being heterogeneous, it has a composition of fiber and matrix, 80 and 20% respectively. This general table shows that among certain resistances to forces, its performance is similar to that of the tooth. Of course, several biological studies have shown that, because this material is prefabricated under controls, it has an irreproachable biological performance. CAD/CAM is the only method that ensures the practitioner that the fabricated matgerial will not undergo any transformation between the factory control and the patient's mouth. We know enough about the consequences of casting and their properties. Correct radiological performance involves esthetics and the resistance to wear which is the object of constant modifications. As you can see, this material responds esthetically to the requirements even if the coloration is deposited superficially. These different views show you the results

obtained on the esthetic level. The quality and function are close to those of the tooth on incisors as well as molars.