Steel Tested on Teeth

➤ A SUPER-STRENGTH steel created for powerful space rockets and deep-diving undersea craft is being tested in dental bridgework and caps for teeth. The appliances are stronger, thinner, lighter and much less expensive than those made with other dental materials.

This was reported at a meeting of the International Association for Dental Research in Miami Beach by dental materials researchers from the New York University College of Dentistry.

The development is expected to enable dentists to save more of the patient's tooth structure and fit him with more comfortable dental appliances.

A number of New Yorkers already are wearing caps and others soon will wear bridgework made of this Space Age metal as part of a long-term evaluation program. The metal is maraging steel, an alloy of iron, chromium, nickel, titanium, silicon and manganese.

This is one of many alloys that Dr. Edward G. Kaufman and his colleagues at the NYU dental materials laboratory tested and evaluated for possible dental use. Maraging steel, the type selected for the casing of the 3.6-million-pound thrust, solid-fuel rocket engine test-fired in Florida recently, showed promise for dental use. The NYU researchers, therefore, further developed it by directing steelmakers to create a stainless variety that is easily workable.

Co-authors of the report with Dr. Kaufman were Robert G. Tenold, a metallurgist and assistant research scientist in the NYU dental research laboratory, and Dr. George L. Kehl, a professor of metallurgy at the Columbia University School of Mines, a consultant on the project. Mr. Tenold presented the paper at the Miami Beach meeting.

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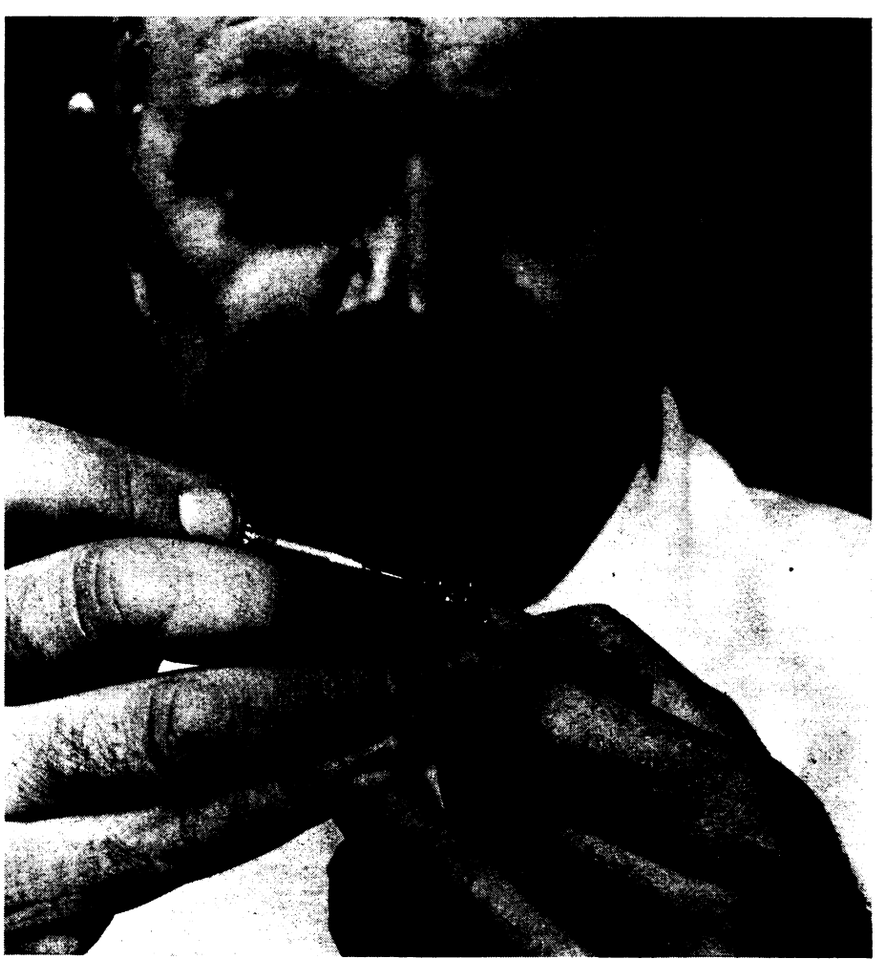

NYU

STEEL CROWN—Dr. Edward G. Kaufman of NYU polishes an experimental tooth crown made of stainless maraging steel. It is expected to be used for dental crowns and bridgework parts that are smaller, lighter and less expensive than those now in use. NYU researchers are currently evaluating it in patients.

High Protein Diet Makes Strong Teeth

➤ A TEAM of dental researchers at New York University has answered a long-standing scientific question about why some people are more susceptible to tooth decay than others.

The findings, reported at an International Association for Dental Research meeting in Miami Beach, emphasized the value of a well-balanced high protein diet for the development of strong, decay-resistant teeth in children.

For years researchers observed that a high carbonate content in the tooth enamel of animals or people was related in some unknown way to a low resistance to decay.

The relation could not be pinned down because researchers were unable to determine how carbonate was involved in tooth structure.

A popular theory was that it became attached to the surface of submicroscopic crystals that make up the hard part of teeth.

Researchers at the New York University College of Dentistry, however, demonstrated that carbonate actually becomes part of the crystal structure itself. The group also found that a high carbonate content, aside from affecting the tooth chemically, weakens tooth resistance to decay by influencing the size and shape of tooth crystals.

Phosphates available to the body in high-protein foods such as milk, meat and fish, are the building blocks for teeth. With adequate phosphate, the developing teeth of children are built up with large, needle-like crystals. This crystal shape is characteristic of strong, decay-resistant teeth.

Members of the research team, Drs. Edward Klein and Otto R. Trautz, and John P. LeGeros and Racquel Le Geros, however, found that tooth crystals grown in the laboratory with a high carbonate content are small and more spherical in shape.

In other words, experiments indicate that when adequate phosphate is not available, as in children with substandard diets low in phosphate, developing teeth are forced to use carbonate from the body as a substitute building material. This is similar to constructing a building with poor quality brick when good quality brick is not available.

With the aid of an electron microscope and X-ray crystallography, a technique for probing into the structure of crystals, the NYU researchers observed that carbonate produces definite, systematic changes in crystal structure—so systematic that they can predict crystal structure for a given carbonate-phosphate ratio.

The research was conducted in the Murry and Leonie Guggenheim Foundation Institute for Dental Research at the NYU College of Dentistry and supported by a grant from the National Institutes of Health.

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