Name(s)

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Project Number

S0313

Project Title

Laser Fluorescence Detection of Dental Caries

Abstract

Objectives/Goals

This study was performed in order to determine if laser fluorescence is a more effective means of detecting occlusal caries, or decay on the tooth's surface, than the standard procedure currently in use by dentists.

Methods/Materials

Ten extracted posterior teeth, without dental restorations, were selected to ensure the presence of questionable occlusal caries. Each tooth was tested for occlusal caries by five dentists, who used a new Brasseler dental explorer to perform routine visual and tactile caries diagnosis. Laser fluorescence caries detection (KaVo's DIAGNOdent) was then used to diagnose each tooth. The ten teeth were sectioned using a high speed dental handpiece and diamond bur, and then visually analyzed for the presence of caries. The presence or absence of dental caries was compared to the diagnoses of the dentists and DIAGNOdent.

Results

The dentists were correct in their diagnoses only 84% of the time (with a range from 60% to 100%), while the DIAGNOdent was 100% accurate in diagnosing occlusal caries.

Conclusions/Discussion

In recent years a new trend in dental caries has developed, in which the wide spread use of fluoride has resulted in harder enamel surfaces, causing many occlusal caries to go unnoticed. These caries, called "hidden caries," can be difficult, if not impossible, to detect using the standard visual, tactile, and radiographic techniques. While our sample size was small, the data indicates that the DIAGNOdent, by KaVo, may be essential to the proper diagnosis of occlusal caries in the future.

Summary Statement

Our study was to determine whether laser fluorescence is a more effective means of detecting occlusal caries, or tooth decay on the surface of a tooth, than the standard procedure currently used by dentists.

Help Received

Dr. Kimball helped with using dental equipment; Dr. Kimball, Dr. Springe, Dr. Campbell, Dr. Barbieri, and Dr. Micheal diagnosed teeth; Dr. Naffah, Dr. Phillips, Dr. Spano, and Dr. Lacy donated teeth.