

Team examines how to rapidly assess children's tooth decay risk

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Researchers at the Oregon Health & Science University School of Dentistry have determined that ATP-driven (adenosine triphosphate-driven) bioluminescence — a way of measuring visible light generated from ATP contained in bacteria — is an innovative tool for rapidly assessing in children at the chair-side the number of oral bacteria and amount of plaque that can ultimately lead to tooth decay.

The study is [published online](#) in the May-June 2010 issue of *Pediatric Dentistry*.

Caries (microbial disease) prevention is one of the most important aspects of modern dental practice. Untreated, large numbers of cariogenic [bacteria](#) adhere to teeth and break down the protective enamel covering, resulting in lesions and cavities. There is a critical need in dentistry to develop better quantitative assessment methods for [oral hygiene](#) and to determine patient risk for dental caries, because disease as well as restorative treatment results in the irreversible loss of tooth structure. Previous caries risk assessments have focused on social, behavioral, microbiologic, environmental and clinical variables.

The goal of the OHSU study was to examine the use of microbiological testing, specifically ATP-driven bioluminescence, for quantifying oral bacteria, including plaque streptococci, and assessment of oral hygiene and caries risk. Thirty-three randomly selected OHSU pediatric patients, ages 7 to 12, were examined, and plaque specimens, in addition to saliva, were collected from one tooth in each of the four quadrants of the

mouth. The oral specimens were then assessed to count total bacteria and streptococci and subjected to ATP-driven bioluminescence.

The OHSU team found statistical correlations, linking ATP to the numbers of total bacteria and oral streptococci. Their data indicated that ATP measurements have a strong statistical association with bacterial numbers in plaque and saliva specimens, including numbers for oral streptococci, and may be used as a potential assessment tool for oral hygiene and caries risk in children.

"The use of ATP-driven bioluminescence has broad implications in dentistry and medicine and can be used translationally in the clinic to determine the efficacy of interventional therapies, including the use of mouth rinses and perhaps in the detection of bacterial infections in periodontal and other infectious diseases," noted Curt Machida, Ph.D., principal investigator and OHSU professor of integrative biosciences and pediatric dentistry.

Provided by Oregon Health & Science University

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