

Joint Failures Potentially Linked to Oral Bacteria

ScienceDaily (Apr. 18, 2012) — The culprit behind a failed hip or knee replacements might be found in the mouth. DNA testing of bacteria from the fluid that lubricates hip and knee joints had bacteria with the same DNA as the plaque from patients with gum disease and in need of a joint replacement.

This study is one of many coming from the Case Western Reserve University School of Dental Medicine that have linked oral bacteria to health problems when they escape from the mouth and enter the blood.

Working with University Hospitals Case Medical Center researchers, the dental, orthopedic and arthritis researchers suggest it might be the reason why aseptic loosening or prosthetic wear of the artificial joints fail within 10 years when no infection appears to be present. The pilot study's findings were reported in the April issue of the *Journal of Clinical Rheumatology*.

Dr. Nabil Bissada, chair of the Department of Periodontics at the dental school, said the objective of the study, "Identification of Oral Bacterial DNA in Synovial Fluid of Patients with Arthritis with Native and Failed Prosthetic Joints," was to see if bacteria like *Fusobacterium nucleatum* and *Serratia proteamaculans* found in patients with gum disease were present in the fluid.

"For a long time, we've suspected that these bacteria were causing problems in arthritis patients, but never had the scientific evidence to support it," Bissada says.

The researchers recruited and studied 36 patients seeking care at the University Hospitals Case Medical Center for osteoarthritis (the wearing of the joints) and rheumatoid arthritis (an autoimmune disease).

These study participants had both natural and artificial joints. Researcher extracted samples of their synovial fluid, which is much like oil that keeps a door from squeaking. These patients also had signs of periodontitis or gum disease and undergone exams where dental plaque was obtained for the study.

Plaque build-up from the bacteria, associated with gum disease, breaks down the walls of the pockets around the teeth. The inflammation process from the bacteria acts like a gate that gives bacteria access to the blood stream. Once in the blood, the oral bacteria have induced inflammation in remote sites where the bacteria has been linked to heart, kidney and cancer diseases and premature births and fetal deaths.

Because these bacteria cannot be found with routine lab tests, detection of bacteria in the plaque and fluid was done through a process called polymerase chain reactions and DNA sequence analysis of specific genes (16S-23S rRNA). This is a sophisticated DNA tracking procedure.

Five of the 36 patients (14%) showed direct DNA links between the bacteria in the fluid and plaque from the mouth. The breakdown in patients was: one from a rheumatoid arthritis (RA) patient with a failed natural joint and one RA patient with a failed replacement joint; two osteoarthritis (OA) patients with failed artificial joints and one OA patient with a failed natural joint.

Bissada said researchers will continue exploring the oral health link in a larger study. "We have a link now and want to see just how much of a trend this is. We also will be able to see if treating the periodontal disease, can reduce the number of future costly joint replacements."

Collaborating with Bissada on the National Institutes of Health and Department of Periodontics-funded research were: Stephanie Temoin, Alia Chakaki, Ahmed El-Halaby, Yiping Han from the Case Western Reserve dental school, and Ali Askari, Steven Fitzgerald and Randall E. Marcus from University Hospitals Case Medical Center.

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1. Témoins, Stéphanie; Chakaki, Alia; Askari, Ali; El-Halaby, Ahmed; Fitzgerald, Steven; Marcus, Randall E.; Han, Yiping W.; Bissada, Nabil F. **Identification of Oral Bacterial DNA in Synovial Fluid of Patients With Arthritis With Native and Failed Prosthetic Joints.** *Journal of Clinical Rheumatology*, 18(3):117-121, April 2012 DOI: [10.1097/RHU.0b013e3182500c95](https://doi.org/10.1097/RHU.0b013e3182500c95)

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