A visit to the dentist typically involves time-consuming and sometimes unpleasant scraping with mechanical tools to remove plaque from teeth. What if, instead, a dentist could deploy a small army of tiny robots to precisely and non-invasively remove that buildup?

A team of engineers, dentists and biologists from the University of Pennsylvania developed a microscopic robotic cleaning crew. With two types of robotic systems — one designed to work on surfaces and the other to operate inside confined spaces — the scientists showed that robots with catalytic activity could ably destroy biofilms, sticky amalgamations of bacteria enmeshed in a protective scaffolding. Such robotic biofilm-removal systems could be valuable in a wide range of potential applications, from keeping water pipes and catheters clean to reducing the risk of tooth decay, endodontic infections and implant contamination.

The work, published in Science Robotics, was led by Hyyun (Michel) Koo of the university’s School of Dental Medicine and Edward Steager of the School of Engineering and Applied Science.

“This was a truly synergistic and multidisciplinary interaction,” says Koo. “We’re leveraging the expertise of microbiologists and clinician-scientists as well as engineers to design the best microbial eradication system possible. This is important to other biomedical fields facing drug-resistant biofilms as we approach a post-antibiotic era.”

“Treating biofilms that occur on teeth requires a great deal of manual labor, both on the part of the consumer and the professional,” adds Steager. “We hope to improve treatment options as well as reduce the difficulty of care.”

Biofilms can arise on biological surfaces, such as on a tooth or in a joint or on objects, such as water pipes, implants or catheters. Wherever biofilms form, they are notoriously difficult to remove, as the sticky matrix that holds the bacteria provides protection from antimicrobial agents.

In previous work, Koo and colleagues have made headway at breaking down the biofilm matrix with a variety of outside-the-box methods. One strategy has been to use iron-oxide-containing nanoparticles that work catalytically, activating hydrogen peroxide to release free radicals that can kill bacteria and destroy biofilms in a targeted fashion.

Serendipitously, the Penn Dental Medicine team found that groups at Penn Engineering led by Steager, Vijay Kumar, and Kathleen Stebe were working with a robotic platform that used very similar iron-oxide nanoparticles as building blocks for micro-robots. The engineers control the movement of these robots using a magnetic field, allowing a tether-free way to steer them.

Kettenbach celebrates 75 years

Kettenbach GmbH & Co recently celebrated the 75th anniversary of its 1944 founding. Kettenbach in all of its forms and offices, according to the company, is committed to bringing quality silicone impression materials and a portfolio of innovative resins to dental practices throughout the world.

The company advises dental professionals to look for new product information to come later this year as it embarks on the next 75 years of helping dental offices operate more efficiently and with greater cost effectiveness.

About Kettenbach LP

Kettenbach LP is based in Huntington Beach, Calif., and is the exclusive U.S. distributor for Kettenbach GmbH & Co, which is based in Eschenburg, Germany. Founded by August Kettenbach, the organization was created to develop and market medical and dental products. Today, it is one of the leading global producers of impression materials and is also known in other surgical areas. The company can be contacted at (877) KEBA-123 or visited online at www.kettenbach.com.

(Source: Kettenbach)
AGD 2019 in Connecticut

Mohegan Sun Casino and Resort in Uncasville is host site for event

The Mohegan Sun Casino and Resort in Uncasville, Conn., is the host site of the Academy of General Dentistry’s 2019 Scientific Session, July 18-20.

The Mohegan Sun has night clubs, spas, 50 bars and restaurants, 40 shops and a golf club. Nearby are Ocean Beach Park, the U.S. Naval Submarine Base, Mystic Museum of Art, Mystic Seaport, Mystic Aquarium and other attractions.

Registration for AGD2019 includes the opening session, exhibit hall, scientific E-poster presentations and invitation to the president’s welcome reception.

Optional ‘course-packages’ are spaced to not overlap, giving attendees a quick way to create a schedule around a primary interest. There are 11 packages at various costs: Esthetics, Periodontics, Endodontics, Fixed Prosthodontics, Oral Surgery, Oral Medicine, Pediatric Dentistry, Basic Science, Sleep Solutions, Special Patient Care, and Anesthesia and Pain Management.

Find more information and registration details at AGD2019.org.

(Source: AGD)

Main lobby of the Mohegan Sun. The casino and resort property has night clubs, spas, 50 bars and restaurants, 40 shops and a golf club. Photo/Provided by Mohegan Sun Casino and Resort