Army of micro-robots battle dental plaque

By Katherine Unger Baillie, Science News Officer, University of Pennsylvania

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 Hyun (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 agents.

Serendipitously, the Penn Dental Medicine team found that groups at Penn Engineering led by Steager, Vijay Kumar, and Kathleen Stebe were working with innovative resins that could catalytically activate hydrogen peroxide to release free radicals that can kill bacteria and destroy biofilms in a targeted fashion.

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.
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)

*MICRO-ROBOTS*, page A1

Together, the cross-school team designed, optimized and tested two types of robotic systems, which the group calls catalytic antimicrobial robots, or CARs, capable of degrading and removing biofilms. The first involves suspending iron oxide nanoparticles in a solution, which can then be directed by magnets to remove biofilms on a surface in a plow-like manner. The second platform entails embedding the nanoparticles into gel molds in three-dimensional shapes. These were used to target and destroy biofilms clogging enclosed tubes.

Both types of CARs effectively killed bacteria, broke down the matrix that surrounds them and removed the debris with high precision. After testing the robots on biofilms growing on either a flat glass surface or enclosed glass tubes, the researchers were able to move bacterial biofilms not just from a tooth surface but from one of the most difficult-to-reach parts of a human tooth. The CARs were able to degrade and remove bacterial biofilms not just from a tooth surface but from one of the most difficult-to-access parts of a tooth, the isthmus, a narrow corridor between root canals where biofilms commonly grow.

"The CARs were able to degrade and remove bacterial biofilms not just from a tooth surface but from one of the most difficult-to-access parts of a tooth, the isthmus, a narrow corridor between root canals where biofilms commonly grow.

"Existing treatments for biofilms are ineffective because they are incapable of simultaneously degrading the protective matrix, killing the embedded bacteria and physically removing the biodegradable products," says Koo. "These robots can do all three at once very effectively, leaving no trace of biofilm whatsoever." By plowing away the degraded remains of the biofilm, Koo says, the chance of it taking hold and re-growing decreases substantially. The researchers envision precisely directing these robots to wherever they need to go to remove biofilms, be it the inside of a catheter or a water line or difficult-to-reach tooth surfaces.

"We think about robots as automated systems that take actions based on actively gathered information," says Steager. In this case, he says, "the motion of the robot can be informed by images of the biofilm gathered from microcameras or other modes of medical imaging."

To move the innovation down the road to clinical application, the researchers are receiving support from the Penn Center for Health, Devices and Technology, an initiative supported by Penn’s Center for Health, Devices and Technology, and in the divisions of pediatric dentistry and community oral health.

Steager is a research investigator in the School of Dental Medicine and Elizabeth E. Hunter of the School of Engineering and Applied Science.

The study was supported in part by the National Institute for Dental and Craniofacial Research (grants DE025848 and DE018023) and National Science Foundation.

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Find the ‘Power of the Complete Team’ in Florida

Discover the "Power of the Complete Team" at the 2019 Florida Dental Convention (FDC), June 27-29, at the Gaylord Palms Resort and Convention Center in Orlando. This year’s program focuses on collaboration among the entire dental team. FDC2019 offers 130-plus courses to enhance and refine skills for everyone on the dental team. Attendees can earn up to 20 hours of C.E. credit.

Course highlights include topics such as Botox/dermal fillers, dental implants, all-on-four dentures, insurance coding, reading body language and much more. Exclusively at FDC2019, "Dawson Seminar 1: From TMJ to Smile Design" is being offered for a substantially discounted price. In this introductory seminar to The Dawson Academy's “The Concept of Dentistry® Series,” participants will learn the timeless message that good, esthetic and complete dentistry must begin with a thorough understanding of dental occlusion and the functions of the masticatory system.

In addition to this Dawson Seminar 1, attendees will be able to take advantage of individual breakout sessions being presented by a number of Dawson Academy faculty members.

New this year, attendees can visit the exhibit hall for free with an "Exhibit Hall Only" pass. It’s available to any dental professional or guest who opts to register as "Exhibit Hall Only" to take advantage of the offer. More than 300-plus exhibiting companies and organizations will be on the exhibit floor with the profession’s latest technology, materials, instrumentation and other products and services.

The adage, “Come for the C.E. and stay for the fun,” takes on new meaning at the Gaylord Palms Resort. Without ever having to leave the site, attendees will be able to relax at the adult-only pool or tap into their inner child on one of the many waterslides. Other fun events during FDC2019 include Thursday’s “Beer Tasting in Paradise,” featuring a five-course tasting and beer pairing where all proceeds will benefit the FDA Foundation. Next, you can join your colleagues at an all-request show at "Dueling Pianos." On Friday, you can walk the plank to "Pirate Island" for live music and family-friendly fun. And finally, if you are looking for nightlife, end the day celebrating the new dentists and ASDA students at "The After Party."

Beyond the on-site events, you can “Stay for the Magic” and enjoy the area’s Walt Disney World theme parks at a discounted price for convention attendees.

Meeting organizers encourage you to bring your team and join your colleagues, June 27-29, to discover the “Power of the Complete Team.” You can register at www.floridadentalconvention.com. For questions, you can email fdc@floridadental.org or call (850) 681-3629.

(Source: Florida Dental Convention)
New hands-free infrared technology

**High-def, uniform light at maximum intensity**

By Designs for Vision Staff

Designs for Vision is introducing patented hands-free infrared technology with the Wireless™ IR HDi™ and the Micro IR HDi headlights. These headlights feature HDi, Designs for Vision’s exclusive advanced photonic design that provides uniform light distribution with maximum intensity. The patented feature optically focuses the light from the LED to provide 45 percent more light with uniform distribution.

The patented IR feature enables better infection control by letting practitioners operate the headlight without touching the system. The IR headlights use a built-in infrared signal to enable the user to turn the light on or off simply and safely. Onboard biometrics sense the position of the headlight to filter out unintended signals while working.

Designs for Vision has added the High Definition Imaging to all of its headlights, including the LED DayLite® WireLess IR and the LED DayLite Wireless Mini, providing a lightweight cordless solution with light intensity comparable to many cabled headlights. You can choose high definition imaging with either a wired or wireless design to meet your preference, and any of the HDi headlights will illuminate the entire oral cavity.

Designs for Vision’s WireLess headlights free you from being tethered to a battery pack. The simple modular designs uncouple the headlights from a specific frame or single pair of loupes. Prior technology married a cordless light to one pair of loupes via a cumbersome integration of the batteries and electronics into the frame. The compact design of the LED DayLite WireLess headlights is independent of any frame/loupes.

The LED DayLite Micro HDi uses the new high-definition imaging with a very lightweight headlight in combination with the Micro power pack. The Micro power pack is the lightest and smallest power pack. The complete unit includes two power packs, and each power pack can run up to 10 hours.

Designs for Vision is also featuring the REALITY 5 Star rated Micro 3.5EF Scopes and Micro 4.5EF Scopes using a revolutionary optical design that reduces the size of the prismatic telescope by 50 percent and reduces the weight by 40 percent while providing an expanded field view of the oral cavity.

Designs for Vision is also excited to announce that it has recently expanded into its new 67,500-square-foot location on Long Island at 4000 Veterans Memorial Hwy. in Bohemia, NY.

You can see the Visible Difference® yourself in June by visiting the Designs for Vision’s booth (No. 307) at the American Dental Hygienists’ Association annual conference in Louisville, Ky., as well as at its booth (No. 15) at the Florida Dental Convention in Orlando, Fla.

You also can arrange a visit in your office by contacting the company at (800) 345-4009 or via info@dvimail.com.

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**ADHA BOOTH NO. 307**

**FDC BOOTH NO. 15**

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**Photo/Provided by Designs for Vision**

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Dentsply Sirona taps new CTO

Dr. Cord Friedrich Stähler has joined the Dentsply Sirona management team as chief technology officer effective May 1. Stähler will lead the global strategy for product development and innovation in dental technology across all areas.

Stähler’s background is in healthcare, life science and diagnostics. He holds a PhD in human genetics and brings years of experience in leadership roles with global companies. “We are delighted to have Cord Stähler join us. His expertise makes him the ideal choice for consistently advancing our course of realigning our global strategy and raising our profile as a leading provider of innovative dental solutions,” said CEO Don Casey.

Michael Geil, managing director at the Bensheim, Germany, site, said, “Cord Stähler’s varied experience in technology management and company development is a huge asset for us. He will further strengthen the position of Bensheim as a location for innovation.”

“I am looking forward to giving new impetus in a dynamic market environment at a global leader like Dentsply Sirona,” Stähler said.

Stähler joins Dentsply Sirona from Merck KGaA, where most recently he was senior vice president and head of the global medical device and service business in Geneva. In this role, he managed activities such as product development, key account management and customer training.

He was responsible for expanding the digital strategy of Merck Healthcare. Previously, Stähler held the position of CTO and member of the executive committee at Siemens Healthcare in Erlangen, Germany, and Berkeley, Calif., for five years, and was responsible for the technology base and innovation pipeline of the global health-care unit.

He was a driving force behind the successful development of companies in the United States, Europe and Asia. Throughout his career, the multi-award-winning company founder and researcher helped to develop more than 70 products, for which patents have been filed.
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Booth # 15
The Magnificent City: Chicago!

In June, the American Academy of Implant Dentistry will host its 2019 Central District Meeting in Chicago. (Photo/Provided by www.freeimages.com)

2019 AAID Central District Meeting: ‘Staying Out of Trouble’

By Sierra Rendon, Managing Editor

Understanding how to apply the most effective and innovative troubleshooting techniques can be a challenging journey. However, it’s not one you have to endure alone. This is why the American Academy of Implant Dentistry (AAID) gathers leaders in implant dentistry on a regular basis — to provide its members with an educational forum to distinguish attending clinicians with the latest research and techniques to advance his or her practice.

From June 7-9, the AAID will host its 2019 Central District Meeting in Chicago at the Marriott Downtown Magnificent Mile. The theme of the event is “Dental Mile. The theme of the event is “Dental implant complications.” The program covers topics that will help equip you with the tools to successfully navigate through the most difficult implant cases.

At this event, you’ll
- Advance your knowledge with the latest innovations in full-arch solutions
- Understand when to go freehand or guided surgery
- Learn how to prevent and manage implant complications
- Some featured sessions include:
  - “Trying to Restore Less-Than-Ideally Placed Implants,” with Dave Resnick, DDS, FAIAID, DABOI/ID
  - “Risk Management: Defense Augmentation,” with Frank R. Recker, DDS, JD
  - “Peri-Implantitis Prevention,” with Hilt Tatum, Jr., DDS, FAIAID, DABOI/ID
  - “How to Avoid and Manage Implant Complications in the Esthetic Zone,” with Suheil Boutros, DDS
  - “Staying Out of Trouble Starts With the Basics,” with Michael Fioritto, DDS, FAIAID, DABOI/ID

After a reception in the exhibit hall, Friday evening’s dinner will honor Frank Recker, DDS, JD. Recker has served as general counsel for the AAID for more than 26 years and, on behalf of the AAID, has obtained judicial decisions striking down multiple state restrictions on the advertising of AAID and ABOI/ID credentials, as well as obtaining court decisions that permit ABOI/ID diplomates to advertise as “specialists” in implant dentistry.

Recker’s private legal practice involves representing dentists nationally. His firm has an “Of Counsel” relationship with the firm of Flannery/Georgalis in Cleveland, which provides criminal defense counsel for dentists being investigated or accused in such actions.

Recker lectures nationally before dental groups, state dental boards and local dental societies. He is a member of local, state and national bar associations and state dental boards and local dental societies. He is a member of the American Academy of General Dentistry, American Dental Association, American College of Dentists, American College of Legal Medicine and American Association of Dental Boards.

AAOMS
Henry Schein Cares present grants to volunteers

The American Association of Oral and Maxillofacial Surgeons (AAOMS) and the Henry Schein Cares Foundation are supporting the volunteerism of four oral and maxillofacial surgeons (OMSs) through the joint Global Outreach Program.

For the fourth consecutive year, AAOMS and the foundation are presenting $2,500 grants to four doctors to help fund their oral and maxillofacial surgery care in the United States and around the world. The program also offers each recipient $2,000 in health-care products courtesy of Henry Schein Cares, which aims to increase the delivery of health-care services and information to at-risk and underserved communities.

“Oral and maxillofacial surgeons deliver vital health care to patients in underserved communities around the world,” said AAOMS President A. Thomas Indresano, DMD, FACS. “Since 2015, the Global Outreach Program has provided grants to help oral and maxillofacial surgeons use their expertise to make a significant difference around the world.”

The 2018 grant recipients are:
- Joli Chou, DMD, MD, FACS, of Philadelphia – Chou plans to use the grant for a two-week surgical mission trip with Africa Mercy to Guinea. She and other health-care providers from more than 30 countries will conduct approximately 60 major oral and maxillofacial surgeries on patients of all ages. Continuing education also will be provided to local health-care providers. Chou has received four grants from the program to fund trips with Mercy Ships, a nonprofit that operates a fleet of ships to offer health-care services in developing countries.
- Clay Van Leeuwen, DMD, MD, of Fairbanks, Alaska – The grant will cover licensing and supplies as well as hospitalization, food and travel for patients from remote locations treated by Global Medi

See SCHEIN, page B2
ADA, AAP mourn loss of Dr. Robert J. Genco

By AAP Staff

Robert J. Genco, DDS, PhD, a pioneer in periodontal research and a leader in the broad recognition of the perio-systemic link, died on March 6 at the age of 80.

Genco earned his dental degree from the State University of New York (SUNY) Buffalo School of Dental Medicine in 1963. He went on to simultaneously pursue both specialized periodontal training and immunology at the University of Pennsylvania, where he was mentored by periodontist D. Walter Cohen, DDS, and immunologist Fred Karush, PhD.

Genco received his certificate in periodontics and doctorate in microbiology and immunology in 1967. As a result of this unique educational background, Genco would go on to become an internationally recognized expert in oral biology. He was one of the first researchers to connect periodontal disease with other diseases (such as heart disease and diabetes), and his more than 370 scientific papers are regarded as some of the most important work establishing a link between periodontal health and systemic health.

Genco’s research earned him many awards, including the 1991 Gold Medal Award for Excellence in Dental Research and 2003 Norton M. Ross Award from the American Dental Association (ADA), and the 1995 Gold Medal Award and 2012 Distinguished Scientist Award from the American Academy of Periodontology (AAP). He was also a seasoned educator, serving as chairman of the University at Buffalo Oral Biology Department for 25 years and being named Distinguished Professor of Oral Biology, Microbiology and Immunology in 1994.

Cal and Surgical Teams, a small group of doctors and nurses. Last year, the group partnered with a clinic in Kyotera, Uganda, to perform cleft lip and palate surgeries. The group is scheduled to return for follow-up and to perform additional primary lip and palate repairs.

• Gary R. Parker, DDS, of Lindale, Texas – During approximately nine months in Conakry, Guinea, Parker and his team plan to treat about 250 patients. He also expects to participate in a full-time surgical mentoring program for surgeons. Parker has been a full-time volunteer OMS with Mercy Ships for 31 years. Every year since 2015, he has received a grant from the Global Outreach Program for his service with Mercy Ships.

• Edward Zebovitz, DDS, of Bowie, Md. – The grant will cover supplies and medications for procedures to be performed during Surgeons for Smiles’ trip to Eritrea, Africa. The procedures will include prosthetic reconstruction of the TMJ, facial reconstruction, tumor management and cleft lip and palate reconstruction. One mission trip can provide 35 to 50 surgeries, and patients range in age from 8 months to 80 years.

About AAOMS

The American Association of Oral and Maxillofacial Surgeons is a professional organization representing more than 11,000 oral and maxillofacial surgeons, OMS residents and OMS professional staff in the United States.
Glidewell Dental to present 3rd annual educational symposium in Orlando

By Glidewell Dental Staff

Glidewell Dental, a leader in dental education and a technological innovator in restorative dentistry for nearly 50 years, has announced the third annual Glidewell Dental Symposium. Scheduled for Nov. 8–9, at the Hilton Bonnet Creek and Waldorf Astoria in Orlando, Fla., the event will provide practical clinical and business education, with a first day of fast-paced presentations and a second day of in-depth lectures and hands-on programs crafted specifically to help doctors overcome the challenges of everyday dentistry. Attendees enrolled for both days will earn up to 12 hours of continuing education (C.E.) credits.

“This is an exciting time to be involved in dentistry,” said Dr. Neil Park, scientific chair of the Glidewell Symposium and vice president of clinical affairs at Glidewell Dental. “From innovative technologies to progressive clinical techniques, there are many opportunities to help improve oral health and transform the smiles of patients.

“The Glidewell Symposium, now in its third year, aims to bring dentists the emerging science, technology and clinical methodologies that will define the future of dentistry. The curriculum is intended to help clinicians learn new tools and techniques to expand their service offerings, overcome challenges and meet the needs of patients.”

Dentists have conveyed a growing need for practical and hands-on dental education, as demonstrated by last year’s Glidewell Symposium, which more than doubled in size from the previous year and sold out three months before the event. In recognition of this strong enthusiasm, and to accommodate dentists in 2019, the Glidewell Symposium has moved to a world-class location in Orlando and will bring together even more experts from diverse areas of dentistry.

During this weekend of networking and education, topics will include everything from dental implants, restorative techniques and esthetic dentistry, to in-office milling, sleep-related dentistry and practice management. All courses are designed to provide real-world clinical and business solutions so that attendees can achieve immediate, tangible results when they return to their practices on Monday.

“In the general session on Friday, we will have a full day, with 16 fast-paced presentations that eliminate the non-essential information and get right to the heart of the clinical technique or business strategy being presented,” Park said.

“On both days of the event, attendees will also be able to browse interactive exhibits that feature the latest in 3-D printing, intraoral scanning, in-office milling, the CAD/CAM workflow, dental implants, and regenerative and restorative materials. There will be live demonstrations, virtual reality tours and opportunities for one-on-one discussions.

The 2019 Glidewell Dental Symposium is for dentists, hygienists and chairside and front-office staff. Tuition for the Friday general session is $95, and to register for sessions on both Friday and Saturday, tuition is $320. Friday tuition includes a complimentary breakfast, lunch and cocktail reception with hosted bar. Saturday tuition includes breakfast.

Because last year’s symposium sold out quickly, attendees are encouraged to register early to secure seats.

For the complete symposium agenda and to register, visit glidewellsymposium.com or call (866) 791-9539.
Annual ADHA meeting cruising into Louisville

The 96th Annual American Dental Hygienists’ Association Conference will be from June 21-23 in Louisville, Ky. According to meeting organizers: “The largest, most comprehensive and cost-effective event for dental hygienists in the U.S. (the annual conference) is the only conference entirely focused on dental hygienists, by dental hygienists.”

All events, including two days of exhibits, will be held at the Kentucky International Convention Center, which recently completed a $207 million renovation and expansion. Located in the heart of downtown Louisville, the center neighbors more than 6,000 hotel rooms, dozens of fine dining and casual restaurants and an array of museums, distilleries, gift shops and other attractions.

Shaping the future

The three-day event offers a broad and deep program featuring industry-leading keynotes and speakers, hands-on sessions and workshops and presentations exploring the most topical subjects shaping the future of dental hygiene.

According to the meeting organizers, the annual conference reflects the core issues of dental hygiene – seamlessly blending inspiration and practical application with an expert program boasting more leading oral-health-care minds focused exclusively on dental hygiene than offered anywhere else, along with hands-on workshops, an awards function and networking opportunities.

ADHA has secured discounted rates for a limited block of rooms at six hotels steps away from the Kentucky International Convention Center.

Attendees will have the opportunity to participate in a wide selection of cutting-edge, interactive continuing education courses.

(Source: ADHA, GoToLouisville.com)

Dental hygiene education project for Scouts expands

High interest among Scout troops across the U.S. has led to quick expansion of the America’s ToothFairy’s Health Education and Resource Outreach (HERO) Program through which Scouts can earn an Oral Health Action HERO patch.

Contributions from DentaQuest have enabled 4,000 patches to be available to Scouts participating in the program.

The HERO program engages participants in addressing oral health issues unique to their geographical area by conducting research, teaching children, teens, parents and community leaders about the importance of oral-health, and promoting positive oral health behaviors in their communities. Since November, 23 troops have completed projects and collected more than 3,600 oral care products for children in their communities.

Through the program, Scouts choose three oral-health-related activities from a list of projects focused on changing perceptions, changing behaviors and changing the environment of children’s oral health.

(Sources: America’s ToothFairy, America’s BoyScout Troop Huga 4042)
**Handpiece motor shielded from microorganisms**

**By Avid Dental Products Staff**

The Avid Premier™ hygiene handpiece system includes a lightweight, low-speed, maintenance-free air motor with four replaceable sleeves. One sleeve is used for each patient and then sterilized, while the motor can be used on up to 12 patients before needing to be sterilized. There is no need for multiple standard hygiene handpieces, which according to Avid Dental Products, will save practices time and money.

The company consulted an industry professional and hired an independent laboratory to validate the claim that its positive-air-pressure technology prevents the ingress of debris and microorganisms between the sleeve and the motor.

The purpose of the testing was to identify and quantify microorganisms from collected samples taken from the motor used in actual prophylaxis procedures on public health patients. The lab tested for the following microorganisms with all results reported as “not detected.”

- *Streptococcus* (all species)
- *Staphylococcus* (all species)
- *Fungi* (most common types)
- *Heterotrophic plate count* (HPC)

All industry disposable prophylaxis handpiece motors can be used on up to 12 patients before needing to be sterilized, reducing need for multiple standard hygiene handpieces. Photo/Provided by Avid Dental Products
See the expanding family of **HDi** – High Definition Imaging headlights

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