Alternative filling material

Scientists test new nanodiamond biomaterials for root canal therapy

Gutta-percha is malleable, inert and biocompatible, and is the standard of care for endodontic treatment today. However, it has been associated with a number of shortcomings, including leakage, root canal reinfection and poor mechanical properties. In order to address these issues, researchers have developed and tested nanodiamond-reinforced gutta-percha as an alternative root filling material.

Nanodiamonds are particles formed as byproducts of diamond refining and mining, and have been widely explored for use in dentistry, cancer therapy, imaging, regenerative medicine, and other applications.

In the current study, which used extracted human teeth, the enhanced material performed as effectively as conventional gutta-percha obturation material. In addition, the researchers observed that gutta-percha combined with nanodiamonds loaded with amoxicillin, a broad-spectrum antibiotic used to combat infection, effectively prevented bacterial growth.

During the next two years, the UCLA team plans to optimize the formulation of the new nanodiamond material and begin clinical trials at the university.

Editorial note: The study, titled “Nanodiamond–Gutta Percha Composite Biomaterials for Root Canal Therapy,” was published online on Oct. 9 in the ACS Nano journal ahead of print.

Using a dental dam

Only half of US dentists use recommended dental dam during root canal treatment

Using a dental dam during root canal treatment is believed to enhance patient safety and optimize the chances of successful treatment. However, a new study has found that only 47 per cent of US dentists always use a dental dam. It further revealed substantial variations in dental dam use and dentists’ differing attitudes towards it.

In the survey, conducted by the National Dental Practice-Based Research Network, 1,490 general dentists were asked about dental dam use using an anonymous questionnaire. It found that only 47 per cent of dentists always use a dental dam during root canal treatment, with an additional 17 per cent reported using it 90–99 per cent of the time.

Although using a dental dam during all root canal treatment is considered the standard of care in dental textbooks and the American Association of Endodontists recommending it, the survey found substantial variation in attitudes toward its use.

Some dentists questioned whether the scientific evidence is strong enough to prove that dental dam use is the only way to improve the odds of successful treatment, while others reported that they use other ways that they feel are safe and effective to isolate the tooth being treated.

“Beliefs that dental dam use is inconvenient, time-consuming, not effective, not easy to place or affected by patient factors were independently and significantly associated with lower use of a dental dam,” said Dr Gregg Gilbert, professor and chair of the Department of Clinical and Community Sciences at the University of Alabama (UAB) School of Dentistry. “These attitudes explain why there is substantial discordance between presumed standards of care and actual practice.”

Generally, the results of the study call into question whether there is a common standard of care in this aspect of dental care, given that most general dentists are not following that standard.

However, dentists who were supporting the use of a dental dam in every case felt very strongly about it, the study found. They encouraged patients to become advocates of their own care by asking that a dental dam always be used during root canal treatment.

The National Dental Practice-Based Research Network, headquartered at the University of Alabama in Birmingham, is a national consortium of dental care providers and dental organizations that conduct studies to better inform clinical decision-making. Founded in 2002, the network includes about 4000 clinicians and 750 practices or clinics.

Editorial note: The results of the study, titled “Discordance between presumed standard of care and actual clinical practice: The example of rubber dam use during root canal treatment in the National Dental Practice-Based Research Network”, were published online on 9 December in the BMJ open journal.

A 3-D image of a tooth filled with nanodiamond-enhanced gutta-percha (left), and an individual gutta-percha point. (Image: UCLA School of Dentistry)

Although using a dental dam during all root canal treatment is considered the standard of care, a new survey found substantial variation in attitudes toward its use.

Photograph: Filip Obr/Shutterstock