
POINT TO DEBATE**WHAT IS THE LINK BETWEEN DENTAL ULTRASONIC SCALERS AND CARDIOVASCULAR IMPLANTABLE ELECTRONIC DEVICES?**

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BACKGROUND

Today, there is no dearth of information on the connection between oral health and systemic health. The cardiovascular disease status is an important determinant in treatment planning, patients' acceptance for elective treatment, and treatment methods. Cardiovascular patients with implantable electronic devices require special consideration with regard to the dental equipment to be used for their treatment and the required precautions^{1–3}.

PERIODONTAL DISEASES AND CARDIOVASCULAR PATIENTS

There are two main types of periodontal diseases: gingivitis and periodontitis. In gingivitis, the inflammation is confined to gingival tissues. It is usually accompanied by redness and painful tender gums. In periodontitis, the inflammation spreads deeper to affect the alveolar bone and cementum covering the tooth root and periodontal ligament. This leads to infected pockets of gummy pus, the type that raises the worry for heart problems. It allows bacteria and other toxins to spread below the gum line. Several studies show that periodontal diseases are associated with heart diseases; however, the

exact cause-and-effect relationship has not yet been proven. Research indicates that periodontal diseases increase the risk of heart diseases⁴. The main etiologic factors of periodontal diseases are bacterial plaque biofilm and calculus deposits. The first phase in the treatment of periodontal diseases is to remove the bacterial plaque and calculus deposits using manual instruments or air and ultrasonic scalers. The latter could cause negative side effects for cardiovascular patients, especially those with implantable electronic devices such as pacemakers and implantable cardioverter defibrillators^{5, 6}.

LINK BETWEEN DENTAL ULTRASONIC SCALERS AND CARDIOVASCULAR IMPLANTABLE ELECTRONIC DEVICES

Ultrasonic dental equipment have been implicated in electrical interference with the normal functioning of implantable cardiac devices and the use of such equipment for patients with these devices has been a source of controversy. There are two methods of producing ultrasound based on the magnetostriction and piezoelectric principles. The piezoelectric principle is based on the deformation of crystals when an electrical charge is applied; this deformation is converted into mechanical oscillations without the production of heat⁶. Magnetostriction, a property of ferromagnetic materials, converts electromagnetic energy into mechanical energy; vibrations and heat are produced during this process^{7, 8}.

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A study by Roedig *et al.* in 2010 proved that the use of an ultrasonic scaler interfered with the pacing activity of a dual-chamber pacemaker at between 17 cm and 23 cm from the generator or leads, and a single-chamber pacemaker at 15 cm from the generator⁶. Operation of the ultrasonic cleaning system interfered with the activity of a dual-chamber pacemaker at between 15 cm and 23 cm from the generator or leads; it interfered with the activity of a single-chamber pacemaker at 12 cm.

CONCLUSION

The use of ultrasonic scalers based on the magnetostriction principle may produce deleterious effects in patients with implantable cardiac pacemakers.

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