Clients with Cardiac Pacemakers

Cardiac pacemakers are increasingly common in the aging population. With an estimated 3.25 million functioning cardiac pacemakers worldwide, dental hygienists are encountering clients with cardiac pacemakers and implantable cardioverter defibrillators (ICD) more frequently than in the past. In planning individualized dental hygiene services, dental hygienists assess the current medical status of all clients to determine those who are at high risk for emergency situations and to determine whether special precautions are necessary.

Background

Implanted cardiac devices (ICD) and implanted pacemakers are used to treat cardiac arrhythmias associated with damaged heart muscle. A pacemaker and ICD consist of a battery generator contained in a small metal box (approx. 5 x 5 cm) usually implanted subcutaneously, in the chest wall below the clavicle. Attached to the generator are one or two thin wires (leads) that pass into the venus circulation into the heart. The leads both monitor the heart rate and deliver the pacing impulse as required. An ICD has the capacity to deliver a cardioversion / defibrillation current.

Most clients who have implanted cardiac devices have been provided with a device identification card by their cardiologist. This card identifies the model number, manufacturer and medical contacts. This information will assist the dental hygienist in identifying any contraindications for proceeding with dental hygiene treatment.

Risk Factors

If a client reports having a pacemaker, or any other implanted device, a medical consultation may be required prior to initiating dental hygiene care. The usual health history should be supplemented with information contained in the identification card along with the underlying disease condition.

Endocarditis

There is a theoretical risk of bacterial endocarditis due to the presence of the pacemaker as a foreign material in the circulatory system. However, the American Heart Association has classified the pacemaker and ICD as a negligible risk factor for endocarditis and does not recommend prophylactic antibiotic coverage for dental hygiene treatment. A medical consultation would be prudent if the client reports any other heart or medical conditions that may be indicators of additional risk or if the implant has been inserted within the last 6 months.

Electromagnetic Interference

Pacemakers and ICDs are sensitive to strong electromagnetic signals that may temporarily interfere with function. Most devices are now designed with safeguards that include electronic filters or shields that insulate in the presence of electromagnetic interference (EMI). Most dental hygiene / dental procedures do not involve strong electromagnetic signals and are unlikely to interfere with a shielded pacemaker or ICD. Those considered safe are: dental radiographs; dental hand pieces; composite curing lights; sonic scalers and piezoelectric scalers. There is some evidence that, older
Implications for Dental Hygiene Treatment

- **The presence** of a pacemaker or an ICD indicates a medically compromised heart condition. The usual health history should be supplemented with information about the underlying condition and the specifics of the implanted device.
- **Consultation** with the client’s cardiologist or the cardiological unit responsible for follow up of the client’s pacemaker or ICD is recommended when planning therapeutic services.
- **Antibiotic prophylaxis** is NOT recommended unless indicated by the cardiologist.
- **Magnetostrictive** (Cavitron) instruments may affect unshielded cardiac implanted devices. If the use of a magnetostrictive ultrasonic is contraindicated, a sonic or piezoelectric instrument may be used.
- **Covering** unshielded pacemakers with a lead apron may offer protection from electrical interference. Care should be taken not to place electrical cords over the client’s chest or operate the magnetostrictive hand piece within 6 inches of the implanted cardiac device.
- **Caution** should be taken in the selection of local anaesthetic.
- In the event of a suspected implanted device malfunction, follow your medical emergency protocol. Dental hygiene records should be accurate and all-inclusive with a detailed record of the incident. A report of the incident should be forwarded to the CDHO and your liability insurer.

**Power Toothbrushes**

There are no known or reported interactions from electric and most battery powered toothbrushes. A precaution has been issued by one leading cardiac implant manufacturer for the use of sonic toothbrushes with a battery charger. They caution clients to maintain a distance of at least 6 inches between the battery charger unit and the implanted device and to have a distance greater than 1 inch between the toothbrush and the implanted device.

**Local Anaesthetic**

Epinephrine or other vasoconstrictors are contraindicated in all intractable arrhythmias and should be used with caution (reduced dose with careful monitoring) in clients with pacemakers and implanted defibrillators.

**Symptoms of Pacemaker Malfunction**

Clients may report unusual activity or discomfort from their implanted device. Observable symptoms of a malfunction include, difficulty breathing, dizziness, light-headedness, changes in pulse rate, swelling in chest, ankles, arms, wrists, chest pain, prolonged hiccoughing, and muscular twitching. In the event of a suspected malfunction, turn off all suspected sources of interference and activate your medical emergency protocol. In most instances, the implanted cardiac unit will return to normal function when interference has been discontinued. An interference incident should be reported to the client’s cardiologist to determine the need for a medical follow-up.

**References**

- College of Dental hygienists of British Columbia, Tab 7: Interpretation Guidelines, p.p. 34-36
- Medtronic, Dental Equipment and Pacemakers or ICDS, Rev: 10.01