High frequency radiosurgery in general dentistry

Jeffrey Sherman explains the benefits of high frequency radiosurgery

Today, the general dentist is faced with a wide range of daily procedures. These can range from routine extractions to more complex forms of periodontal or oral surgery. The general dentist must constantly update his/her base of knowledge for the rapidly changing procedures and materials becoming available.

The private general dental practice usually features a component of periodontal therapy as well as the restorative and crown and bridge elements. Effective soft tissue management is fundamental to success in these disciplines. The choices of tissue removal are by curette, scalpel, electrosurgery, laser and, now more commonly, with higher frequency radiosurgery.

Radiotherapy instrument

High frequency radiosurgery is one of the most important and versatile instruments in dentistry today. It is used on many occasions. The radiotherapy instrument should be readily available in each operatory for ease of set up and use. Many dentists now prefer the radiotherapy modality for its safety, versatility and predictability for the effective removal of tissue.

Radiosurgery is the removal of soft tissue with the aid of a radio signal. This radio signal operates within the frequency of 3.0-4.0 megahertz (MHz). The older electro-surgical instruments performing similar procedures operate at a frequency of 1.0-2.0 MHz.

Research has shown that these low frequencies produce more lateral heat to the surrounding tissue and should be avoided when in close proximity to bone.

Electrosurgery should be considered as contraindicated for periodontal or delicate surgery and updated to the newer, higher frequency radiosurgery.

Radiosurgery at 3.8-4MHz in frequency offers the advantages of a safe, fast and efficient micro incision with an excellent field of visibility. Published research studies confirm adjacent non-target tissue ablation at 35 to 30 microns with the 4MHz device.

The patient experiences a pressureless incision with a minimal amount of bleeding, which often requires no suturing and reduces bacteria and healing time. The radiosphere produces a fine, less traumatic incision and, therefore, has been seen increased usage in all forms of delicate periodontal and cosmetic surgery.

Soft tissue procedures

The use of the high frequency new radiosurgery instrument allows the doctor to perform a larger variety of soft tissue procedures more quickly and with more predictable results. These procedures are more affordable for both the dentist and patient.

The Elman Dento-Surg Radiolase (Figure 1) offers three different waveforms, a frequency of 4MHz and auto claveable RF matched micro electrodes and handpieces. I prefer to use and teach radiosurgery at 4 MHz in my own practice because of its precision, control, ease of use and consistently predictable results.

The waveforms include ‘filtered’ for incising tissue and ‘fully rectified’ for incising tissue with concurrent coagulation being performed.

The filtered waveform is used for any incisions that may be deep or in close proximity to bone.

The radiosurgical instrument can be finely tuned and, when used with the filtered waveform, can produce micro smooth incisions that can perform the most delicate of periodontal procedures.

The fully rectified waveform is useful in all forms of tissue removal that are superficial and not close to the bone. A partially rectified waveform is used only for haemostasis of the soft tissue and never to make an incision (Figure 2).

With a scalp knife, the point of application is the precise point at which the incision is made. Similarly, with the high energy radio waves of the radiosurgery electrode tip, the incision is visible at the point of application, with the energy reducing rapidly as it is dispersed into the tissues from the high intensity at the applied tip. This means that the effect of the application can be accurately observed to allow fine judgement and tuning of the instrument for optimum performance and tissue safety (Figure 3).

Radiosurgery offers the ability to perform an incision with a micro fine, single frequency matched surgical wire (Figure 4).

These straight or loop electrodes are used with either of the two cutting modes to remove or recontour, delicately and efficiently.
Dr. Sherman is available to work with dental school faculties that are interested in adding radiosurgery to their curriculum, either as a required course or as an elective. His textbook *Oral Radiosurgery* and the Video Atlas are both available from Ellman UK.

The most common procedures performed by the general dentist are gingivectomies and gingivaloplasties. These procedures are performed to expose subgingival decay, establish a more cosmetic smile line prior to veneer or crown placement and cosmetically increase the crown to root ratio. The tissue is incised with either the filtered or fully rectified waveforms. The filtered waveform is used in areas where the tissue is delicate and minimal tissue alteration is desired. The fully rectified waveform is used where the tissue is thick and fibrotic or in areas of hyperemia that require immediate haemostasis. Haemostasis can also be established with the aid of the partially rectified waveform. This waveform is most important in ensuring a dry, blood-free environment for placement of a more aesthetic bonded restoration.

When making incisions for tissue removal, the fine straight wire Vari-Tip #118 electrode is used. The tip is placed in close proximity to the tissue before the power is activated. The tip is kept parallel to the tooth to prevent removal of excessive tissue height. The incision is made in layers, waiting 10 seconds before reentering the same surgical site (Figure 11). After adequate tissue removal, any necessary haemostasis can be accomplished with the use of the pencil-shaped electrodes #113P and #117. These electrodes are used with the partially rectified waveform.

Broad areas of haemorrhage not involving interproximal tissue can be accomplished with the aid of the ball-shaped #135 and #136 electrodes. A post-operative dressing is indicated for all areas of radiosurgery. Areas of minimal tissue removal, such as exposing subgingival decay or for toughening crown preparations, can be protected by irrigating the surgical area with 0.12% chlorhexidine gluconate or Perioci.

A coating of biocent (tissue adhesive) can also be applied to areas of minor surgery. More extensive tissue removal, as for pre-prosthetic surgery, would warrant a periodontal pack such as Cee-Pak, Zone or Barricate. The increased number of procedures that can be performed with high frequency radiosurgery will more than compensate the doctor for the time and expense in becoming proficient with the technique.

The procedures are reimbursable. These fees vary from region to region and can be obtained by speaking with a local periodontist or oral surgeon. Radiosurgery is a modality that belongs in every general dental office. It is safe, easy and predictable.

I strongly recommend taking a participation course to become fully versed in the use of radiosurgery.

### References


Sherman JA (2001) Radiosurgery: The safe, indispensable technology in dentistry. 1200 Goms Update Spring, 19-21