

Correction of surface deformities: Botox, soft-tissue fillers, lasers and intense pulsed light, and radiofrequency

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Radiofrequency devices

The technology of radiofrequency devices has evolved over the years to allow for more indications and flexibility in their use. Surgical and nonsurgical applications of these devices are discussed as they pertain to cosmetic surgery.

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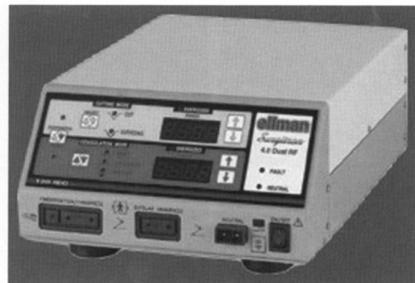


Fig. 27. Ellman Surgitron unit. (Courtesy of Ellman Corp., Oceanside, New York; with permission.)

Surgical uses

For use in surgery, the optimal radio wave is 4.0 MHz. An example of such a device is the Ellman Surgitron Dual Frequency 4.0 MHz (Fig. 27). These devices take an alternating current and convert it into a direct current, which then passes through a coil/rectifier to generate the radio waves. The shape of the waveform can be modified to produce one of four waveforms useful in surgery (Table 3). The same device can be used for creating an incision and for hemostasis. Radiofrequency devices generate less heat than electrocautery machines, which results in less collateral tissue damage. By minimizing collateral tissue damage, wound healing is not delayed significantly and there is less risk of scarring.

Various tips can be used with this device depending on the clinical indication (Fig. 28). For tissue incisions (eg, rhytidectomy, blepharoplasty) there are wire tips and tungsten microneedles. For pedunculated lesions, a loop tip (various shapes and sizes) can be used. For hemostasis or the destruction of certain superficial skin lesions (eg, acrochordons, seborrheic keratoses), a ball electrode can be used.

Advantages of using radiofrequency devices in surgery are similar to the use of CO₂ lasers but with less collateral tissue damage. The radiofrequency device also provides the advantage of giving the surgeon more tactile feedback than laser. The incisions can be made with little to no pressure. Another advantage is the need for fewer safety precautions necessary with these devices compared with lasers. Care still should be exercised around the intraoperative use of oxygen, and there should be adequate smoke plume evacuation.

Table 3

Radiofrequency waveforms used in surgery

Waveform	Modifications	Clinical Effect
Cut	90% cut	Cuts tissue with little collateral tissue damage
	10% coagulation	
Cut/coagulation	50% cut	Allows for cutting and coagulation if tissue with minimal collateral tissue damage
	50% coagulation	
Hemostasis	10% cut	Allows for direct and indirect hemostasis
	90% coagulation	
Fulguration	Spark gap	Can be used in bipolar or unipolar modes The large amount of char and collateral heat damage makes this useful for intentional destruction of tissue

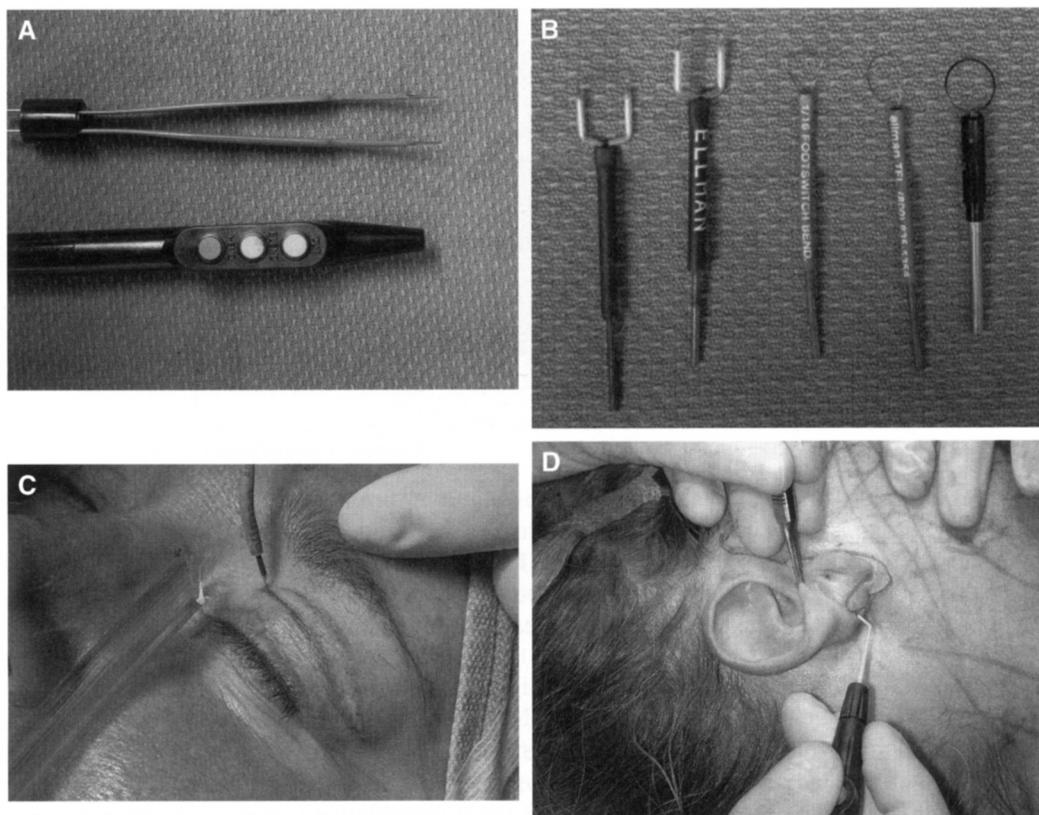


Fig. 28. (A) Bipolar and standard handpiece. Note the presence of buttons on the standard handpiece that correspond with three waveforms: cut, cut/coagulation, hemostasis. (B) Various sizes and shapes of loop tips for removal of lesions. (C) Use of wire tip for fine incisions, such as in blepharoplasty. (Courtesy of Joe Niamtu, III, DDS (Oral Maxillo Facial Surgeon); with permission.) (D) Use of the microneedle for incisions in cosmetic surgery, such as in rhytidectomy. (Courtesy of Constantine Stan, MD (Aesthetic Plastic Surgeon); with permission.)

Summary

The field of cosmetic surgery continues to be a rapidly changing and expanding one. With the understanding of the changes that take place in aging and contribute to photodamaged skin, technologic advances have become more based in science. Patients are aware of these changes and are enthusiastically tracking them through all media channels. It has become more important than ever for surgeons to stay abreast of this new knowledge.

Reference

Niamtu J III. 4.0 MHz radio wave applications in cosmetic facial surgery. Cosmetic Dermatology 2003;16(11):33-46.