

Radiowave Surgery to Remove Moles

Ablate lesions with simultaneous hemostasis while causing minimal tissue damage and scarring



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Mole removal is an extremely common procedure for any cosmetic surgeon. Traditionally, this has been accomplished with



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cryotherapy, electrosurgery, scalpels, laser, and cautery. Although all these modalities are effective, unfavorable scars often result. Due to the ease and popularity of liquid nitrogen, many lesions are treated with it, patients frequently are left with hypopigmented depressed scars. In addition, many patients are advised not to remove benign lesions for fear of a negative cosmetic result.

A new technology, 4.0 Mhz radiowave surgery (Ellman International, Bayside, N.Y.) has put a new spin on scarless nevi removal. Radiowave surgery is quite different from electrosurgery. It did not take long after the discovery of electricity for it to be used for surgery. Early electrosurgery was crude and it was used to sear or destroy tissue. In 1928, Harvard surgeon William Bovie, M.D., developed the first refined electrosurgical device that could provide incision with simultaneous hemostasis. Modern electrosurgery units used in offices and hospital operating rooms today have not changed

much from the early technology.

Electrosurgery generally occupies a place on the electromagnetic spectrum from 350 KHz to 1.7 Mhz. The lower the Mhz, the more lateral tissue damage produced with tissue incision. In electrosurgery, the electrode tip provides the resistance during ablation. The tip heats up and significant heat is transferred to the target tissue. This heat also affects the surrounding normal tissues, resulting in lateral tissue damage that can produce scarring. Common dermatologic office electrosurgical machines operate at low frequencies (500 to 750 KHz, about 500,000 cycles per second), and this results in significant lateral tissue damage.

Radiowave surgery operates at a frequency of 4.0 Mhz, which is about 4 million cycles per second. This is the optimum wavelength for precise incision with minimal lateral tissue damage. The reason that radiowave surgery is much more tissue friendly than electrosurgery has to do not only with the 4.0 Mhz wavelength but the fact that the electrode tip does not provide the resistance and hence does not get hot. It is the tissue that provides the resistance. Radiowaves are transferred to tissue through an electrode. Radiowaves cause a process known as intracellular volatilization whereby steam is produced in the cells, causing them to rupture. Another difference between radiowave surgery and electrosurgery is the

ground plate. With electrosurgery, it is possible to shock or burn the patient. Radiowave surgery does not employ a ground plate but rather an antenna that gathers the radiowaves and channels them back to the machine. The antenna, which does not need to be in direct contact with the patient, is Teflon coated so it cannot shock or burn the patient.

Multiple studies have compared radiowave to both electrosurgical or scalpel incision (4-6). Any modality that disrupts the skin, including scalpel, will cause lateral tissue damage. A 4.0 Mhz radiowave incision will produce about 20 microns of lateral tissue damage, which is similar to that of scalpel incision but with the advantage of simultaneous blood coagulation. In contrast, low frequency

electrosurgery can cause more than 650 microns of lateral tissue damage.

TREATMENT PROTOCOL

All lesions should be evaluated for danger signs of malignancy and if suspicious, they should be biopsied. Because it results in minimal lateral tissue damage, radiowave surgery does not create artifact that could obscure pathologic diagnosis. With a suspicious lesion, I use a loop electrode with the radiowave machine set on pure cutting to remove the bulk of the lesion to send for biopsy. The remainder of the lesion is then ablated as described later.

Mole removal is a very common procedure in my practice. Radiowave technology has produced virtually scarless results. I tell patients that no one can guarantee the absence of a postoperative scar, in my experience with removing thousands of moles in the past 20 years, no patient has ever felt that the postoperative scar was worse than the original lesion. I also inform patients that a cosmetic scar requires conservative surgery and about 2 percent of patients may require a retreatment to remove residual lesion.

The entire mole procedure takes less than one minute on average. Lesions are first marked with a surgical marker to define the borders prior to local anesthetic administration, which consists of 2% lidocaine with 1:100,000 epinephrine infiltrated subcutaneously around the base of

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the lesion. The area is adequately anesthetized when the skin blanches. The radiowave setting is set to pure cutting at about 7 watts. Various electrode tips may be used, including fine tip needle, loop, or ball. I prefer a #133 electrode, which is about the size of a pencil lead. Then I use a smooth clean and light stroke and wipe the electrode over the lesion to sweep away skin layers with a paint brush motion. The light, smooth stroke is imperative to shave off small layers of tissue to keep the heat generation to a minimum. A smoke evacuator is used to remove the smoke plume. The light sweeping is repeated and the lesion is gently shaved down. Charred tissue is wiped away after each three to four passes and the ablation continues to the base of the lesion. Wearing loupes can assist in determining the treatment endpoint.

Generally, the procedure is stopped when the base of the lesion is flush with normal skin. Residual lesion usually is more chamois color and a conservative ablation just below the skin surface can be performed. Deep craters should be avoided. For exceptionally deep lesions, a repeat treatment is recommended. The golden rule of mole removal is that "you can always take more away, but it is difficult to put

Lateral tissue damage is comparable to that of scalpel surgery.

it back." After the procedures, lesions are covered with a triple antibiotic ointment for the next four to five days. The lesion will undergo re-epithelialization over the next seven days. By 30 days, the lesion is often indistinguishable from surrounding skin.

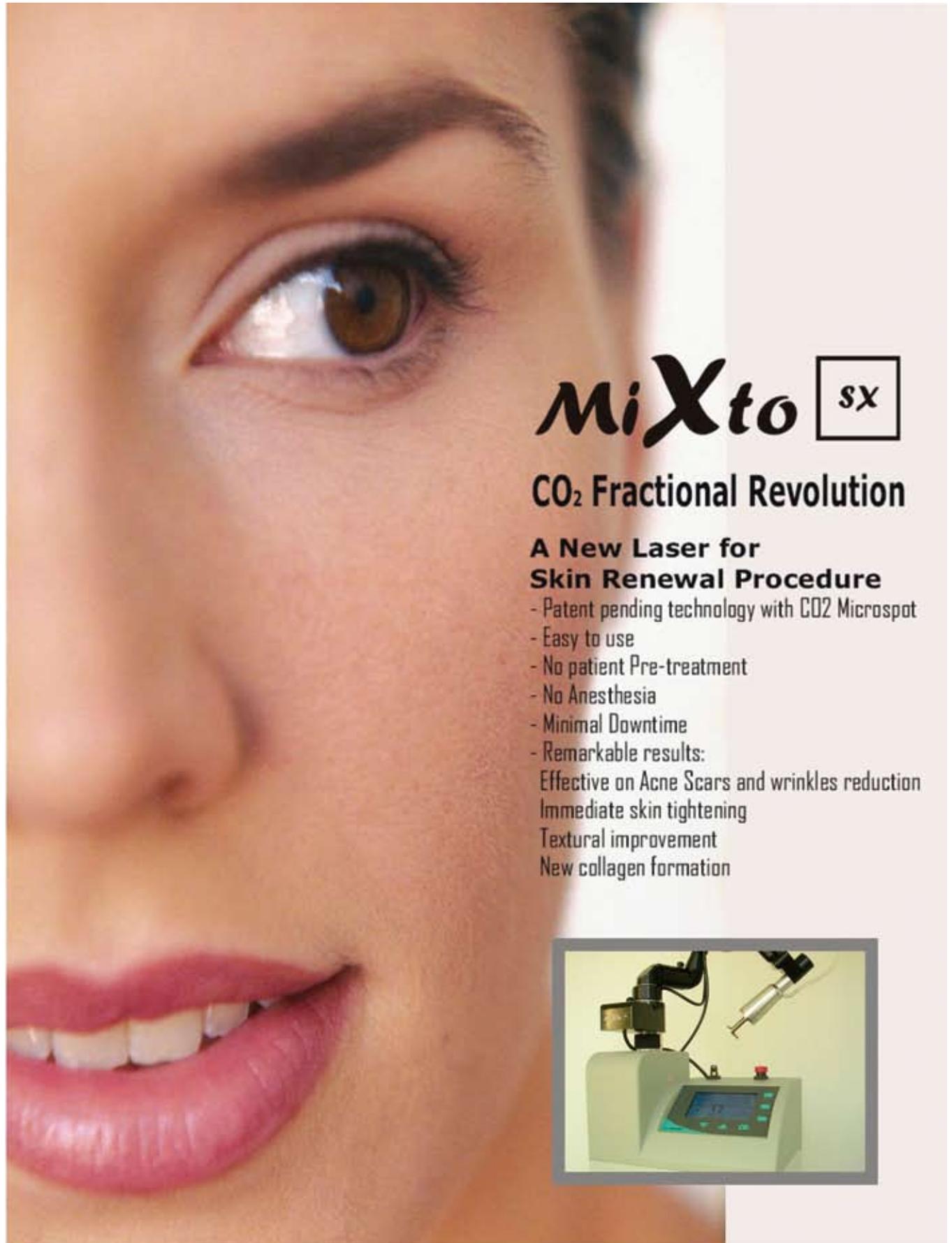
With radiowave surgery, I have removed up to 96 lesions from a single patient using local anesthesia. I have had excellent success with patients who desperately wanted moles removed but were told by other practitioners that an unsightly scar would result. Lentigos or flat dyschromias can also be treated with radiowave surgery, but the power must be low and tissue removal should be extremely conservative. Milia are easily treated without anesthesia by quickly taping the electrode on the lesion and then expressing with a comedone extractor. Small hypertrophic scars or rhinophyma can also be treated with more aggressive ablation.

CONCLUSION

Radiowave surgery at a 4.0 Mhz frequency is a newer technology that has many applications in cosmetic dermatologic practice. It produces incision with simultaneous hemostasis and is an excellent alternative to a scalpel. When used correctly with the proper

settings, lateral tissue damage is commensurate with that of scalpel incision. Knowing that conventional electrosurgery can produce lateral tissue damage of 650 microns, the 20 micron damage of 4.0 Mhz radiowave surgery is an obvious advantage for scarless removal of moles and other lesions.

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