

## Reexamining the Role of SRT in Treatment of Keloids

The SRT-100 delivers energy specifically to tissue of concern while avoiding effects on adjacent tissue, establishing a safe and effective treatment paradigm.



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**T**reatment of keloids presents a unique clinical challenge: clearing them the first time is not overly difficult, but preventing them from returning can be challenging. A number of modalities have been suggested to reduce recurrence; most strategies are pharmacologic in nature, including injected triamcinolone or fluorouracil (5FU). Use of platelet-rich plasma as an adjunct is also reasonable and can be effective in certain settings.

In the past, orthovoltage radiation was a popular choice as an adjunct to surgery for keloids. However, this modality largely fell out of favor due to equipment that was bulky, expensive to purchase, and hard to maintain. The past also lacked the science to understand the timed application of such energies to achieve a correction in the healing process to alleviate the overproduction of fibroblasts—the overproduction of fibroblast being the centerpiece in the formation of collagen bundles.

Newer superficial radiation therapy (SRT) platforms, however, offer the potential to significantly change this paradigm. The Sensus SRT-100 platform utilizes a short wavelength/tight penumbra beam to deliver specific and targeted energy only to tissue of interest, with no effect to adjacent tissue. Most importantly, it has been shown to be more than 90 percent effective in reducing recurrence of keloids in various clinical studies. This combination of safety and efficacy suggests that a form of radiation treatment once thought to be extinct is in fact quite viable for the treatment of keloids.

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### **BENEFITS FOR TREATING KELOIDS**

The SRT-100 offers several benefits over traditional superficial radiation platforms, starting with its small and compact size. The unit has a 30" X 30" physical footprint, so it is mobile. The SRT-100 is also cost-effective, requiring only a modest investment in the technology itself and little to no maintenance over time. Superficial radiation therapy is also typically a covered option under most patients' insurance plans, making it patient-friendly in terms of out-of-pocket costs. Because SRT reduces risk of recurrence (and there is certainly evidence to suggest this is the case), it would inherently lower the potential for future medical encounters, thus potentially amplifying its cost-effectiveness relative to other approaches for keloid.

Where SRT really differentiates from other modalities, however, is in how it delivers energy. Because it uses a short wavelength/tight penumbra beam that penetrates only 5mm below the skin surface, the energy delivery is concentrated to damage only targeted tissue while minimizing effects on normal surrounding cells.



Patient above is shown at baseline and 6 weeks post SRT treatment.

*Courtesy of Sensus*

Our typical protocol for treating keloids is to perform surgical incision at the site to remove the whole keloid and collagen bundles. Twenty-four hours after excision is performed, the first superficial radiation therapy (SRT) fraction is delivered. SRT is delivered within a treatment window of 72 hours with a Biological Effective Dose (BED) of 30 Gy. The BED of 30 Gy can be achieved by delivering: a single fraction of 1300 cGy Total Dose (single day), two fractions of 800 cGy, 1600 cGy Total Dose (two consecutive days), or three fractions of 600 cGy, 1800 cGy total Dose (three consecutive days). Even though it is theoretically possible to do the radiation in one session, fractionating the dose over time reduces the risk of hyperpigmentation. More fundamentally, the radiation dose serves to disrupt local fibroblast activity and subsequent collagen reformation at the incision site that may lead to keloid recurrence.

## PATIENT SELECTION

Superficial radiation is very safe for use on the skin, with the most notable side effects being hyperpigmentation and potential dermatitis at the treatment site. As noted, however, fractionating the dose helps mitigate the risk of these side effects. And because SRT is so safe, it is appropriate for use in most keloid presentations.

In my mind, the patient who would receive the greatest benefit from SRT is the one with relapsing keloids, especially if the secondary manifestation is larger in appearance than the first. Patients with painful keloids, especially if they occur in skin fold areas where they affect function, and those with deforming scars, such as on the earlobe, are also ideal candidates for SRT as a complement to surgical excision.

Perhaps a better way to think about patient selection for superficial radiation is to think about patients with either a relative of absolute contraindication, and there are only a few. The superficial radiation therapy will not affect internal organs due to the superficial nature of the energies used, and lead shielding helps to minimize unwanted effect on adjacent tissue areas, making its use entirely appropriate for creating a detail-focused field on the face, scalp, and back of the neck.

The only patients in whom I might avoid using SRT are those who are very young and pediatric patients.

SRT-100 is an FDA-approved treatment, which supplies an additional layer of confidence that it has been subjected to rigorous clinical trials, attesting to its safety and efficacy.

## TIPS FOR SUCCESS

The SRT-100 is an easy-to-use modality that can be easily integrated into the clinic or office setting. It is equipped with a series of applicators ranging from 1.5-18cm, permitting the ability to treat a range of keloid scar sizes. In terms of the procedure itself, the application takes about five minutes, with most of the time spent marking the area for treatment and lead shielding the areas we want protected from the radiation beam.

A number of different mechanisms have been proposed for treatment of keloids, either as an adjunct to treatment, or as front line monotherapy. Yet these approaches come with appreciable side effects that limit their utility. For instance, high-dose triamcinolone, while moderately effective, can cause skin atrophy, stretch marks, telangiectasia, and hyperpigmentation. 5FU may be associated with fewer treatment-related complications with equal if not better rates of initial success compared to injected corticosteroids, although long-term, lesions are likely to recur in more than 60 percent of cases.

Fundamentally, what each of these approaches is doing is attenuating the inflammatory response in the local skin, which is reasonable, yet perhaps insufficient on its own to effectively prevent recurrence. Achieving short- and long-term efficacy hinges on the complete removal of the primary lesion and factors that mitigate its future growth. There is evidence to suggest that the hypoxic environment of the collagen bundle may limit SRT effectiveness. This highlights the importance of a meticulous surgical excision and explains why shaving the lesion is often insufficient to prevent relapse.

Treatment of keloids using the SRT-100 after surgical excision is analogous to how many solid tumors are treated, with radiation following surgery; yet, the short wavelength/tight penumbra beam represents a much safer approach that is also much more effective than older orthovoltage radiation platforms. A number of published studies in the literature report cure rates over 90 percent, which is what I have observed in my clinic: I have many patients with two years of follow up and no recurrence. Overall, the safety, effectiveness, and cost friendly SRT-100 platform represent a new standard for treatment of keloids after surgical excision. ■

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