

# Superficial Radiation Therapy (SRT) for NMSK

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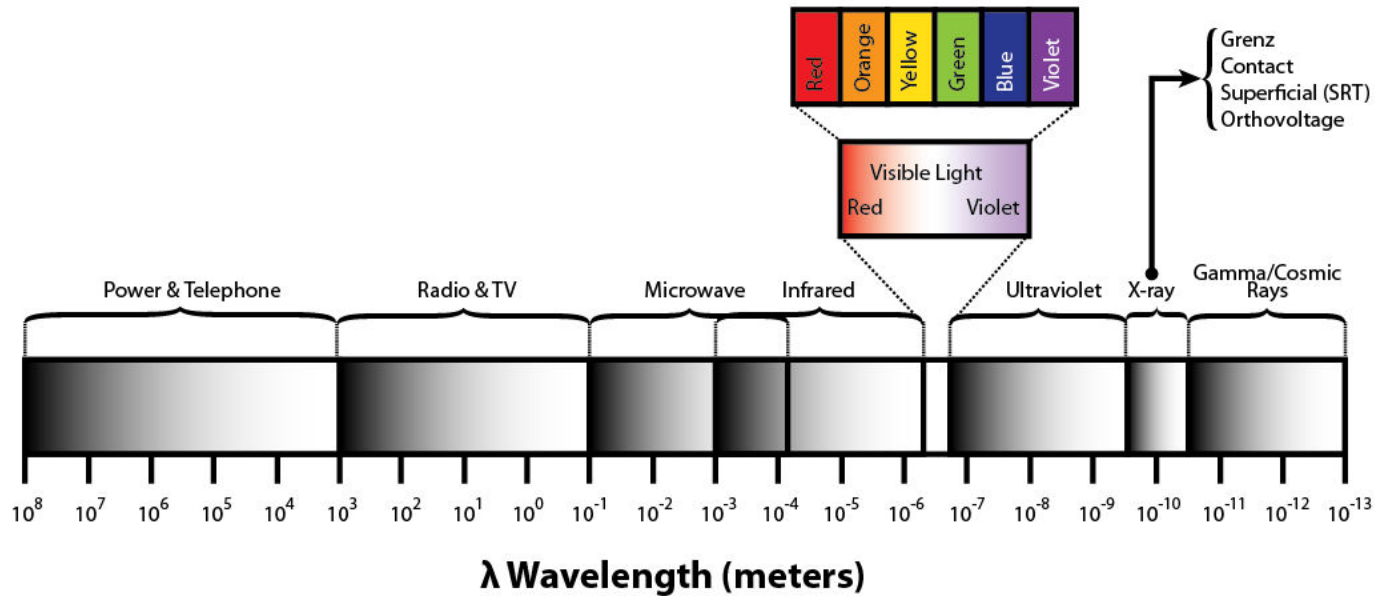
# Disclosure

- Consultant for Sensus
- I ran an ACGME Micrographic Surgery and Cutaneous Oncology Fellowship
- I am member of SRT Consensus Group

# Multiple Approaches

- Mohs Micrographic Surgery (Mohs) and other surgical approaches
- Other Destructive Methods
- PD-1 /Hedgehog Inhibitors
- Superficial Radiation Therapy (SRT)

# Superficial Radiation Therapy (SRT)



**Electromagnetic Spectrum**

# Modern SRT Equipment

- Utilizes low energy photon X-rays operating at variable peak voltages of 50, 70, and 100 kVp.

# Modern SRT Equipment

- Planned calibrated dose delivery is accurate with internal filtration technology.

# Modern SRT Equipment

- Unit automatically stops when cumulative amount of radiation is delivered.

# Modern SRT Equipment

- Easy to administer
- Effectively targets and treats lesions
- Delivers gentle indirect radiation which does not penetrate and impact the underlying healthy tissue.



# SRT

- FDA approved for total body treatment of non melanoma skin cancer (NMSC)
- Keloid

# Evidence Based Therapy

- The cure rate for 1715 primary nonaggressive NMSC treated with the SRT-100™ was 98% (Cognetta et al, JAAD 2012).

# Tumor and Patient Selection: Treatment Objectives

- To eradicate the tumor while maintaining or improving the patient's quality of life.

# NMSC

Most commonly treated with SRT

- Basal Cell Carcinoma
- Squamous Cell Carcinoma

# Tumor Site

- SRT may be used to treat tumors on all skin surface areas

## SRT may give a better cosmetic outcome:

- Scalp
- Eyelid
- External ear canal and helix
- Nasal ala

# Confusion

- The differences between superficial radiation therapy, electron beam, brachytherapy and electronic brachytherapy

# Consensus

- SRT more energy and deeper penetrating than Grenz ray
- Brachytherapy uses radioactive sources within or directly adjacent to tumor
- Electron beam therapy uses a medical linear accelerator



# Consensus

- EBT also requires higher energy to encompass many superficial skin cancers than does SRT
- SRT has higher cure rates and better cosmesis than both brachiotherapy and electron beam therapy
- SRT more cost-effective in terms of both equipment and patient cost

# Large Tumors

- SRT may present a simpler option than extensive surgery and reconstruction (skin grafting)
- Minimally higher risk of recurrence than surgery
- What about other benefits?

# Consensus

- SRT clearly more beneficial for many NMSC on lower extremities
- SRT has particularly favorable cosmetic benefit on alar rim of nose and periorbital area.

# Important factors to consider

- Treatment margin
- 8-10mm margins are common for BCC
- 10mm is used for SCC.
- Recommendations based on estimates of surgical margins

# Consensus

- Beam and delivered dose of SRT has only 1 mm lateral edge drop-off (penumbra) of the treatment site
- Radiation field should be small (umbra)
- So initial measurement of tumor size should be size of lesion plus 2-5 mm margin around the lesion
- Almost all lesions will have size of >2cm.

# Ideal Patients for SRT

- Elderly
- Poor surgical candidates

# Consensus

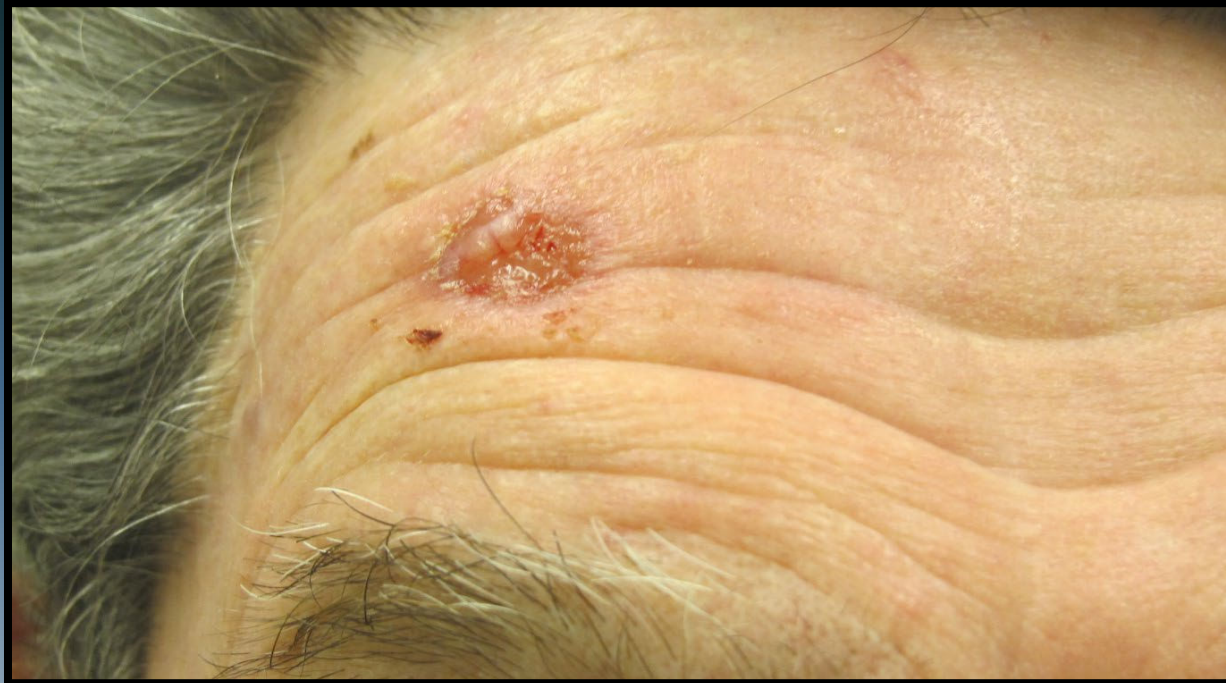
- SRT does not require that patients stop anticoagulants
- SRT can be used safely in patients with poor circulation
- SRT best for those who cannot do wound care
- SRT best for those with significant fear of surgery and scarring

# Contraindications for SRT

- Pacemaker or defibrillator within the treatment area
- Previous radiation therapy to the area of concern



# NMSC: BCC



# BCC R Forehead



# BCC Forehead 4 months post SRT





# BCC R Chest



# BCC R Chest



# BCC R Chest





# BCC R Chest Post SRT:4 weeks



# BCC L Temple

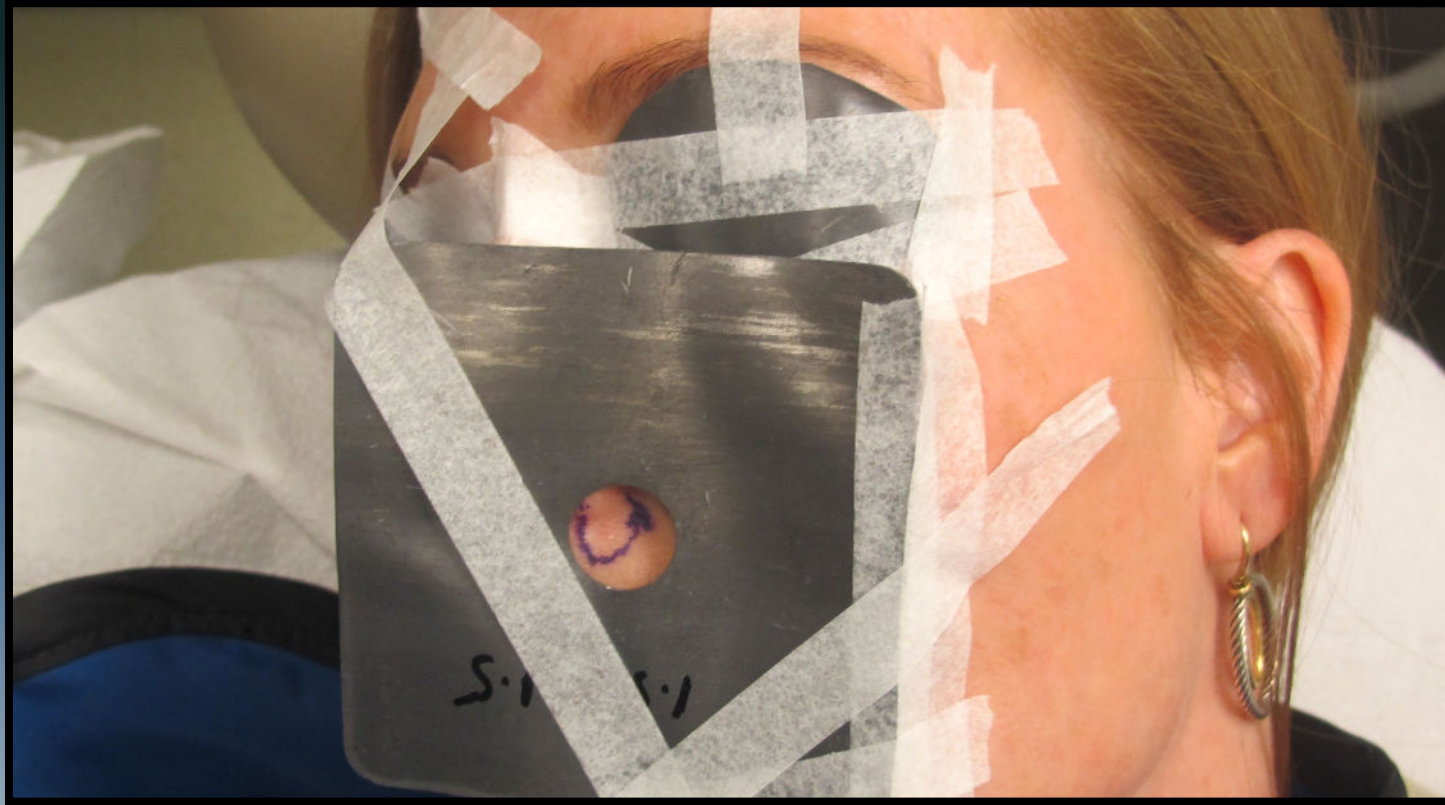




# BCC L Infranasal Area



# BCC L Infranasal Area



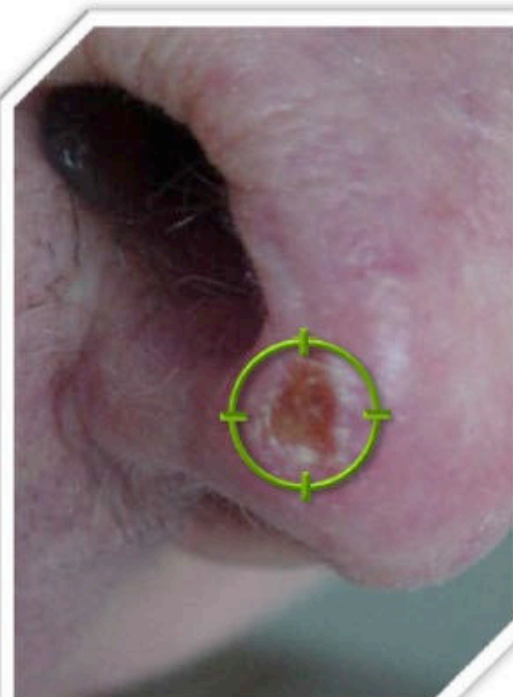
# BCC Nose

Size: 1cm x 1cm  
Location: Nose  
Dose: 571 cGY @ 7Fx  
Total Dose: 4,000 cGy

**At first treatment**



**2 weeks into SRT**



**3.5 months post SRT**





# BCC Scalp

Size: 1.5cm x 2cm  
Location: Scalp  
Dose: 320 cGY @ 16Fx  
Total Dose: 5,120 cGy

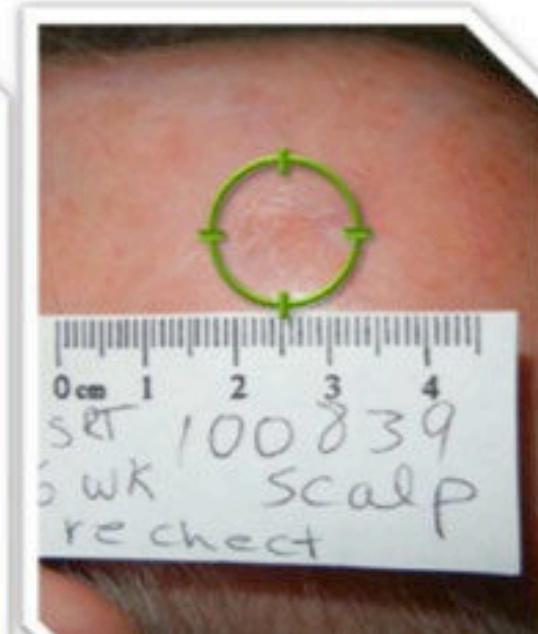
Simulation



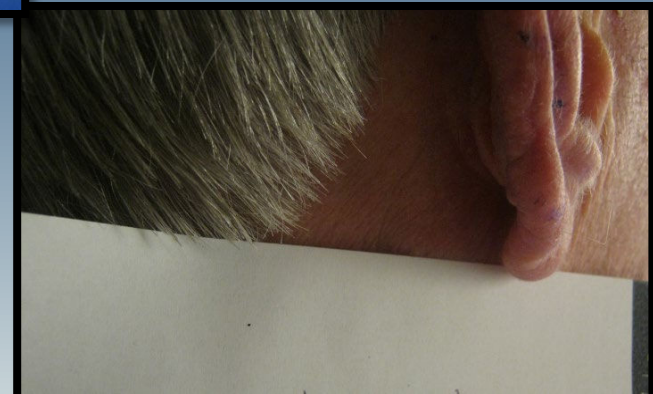
At 6<sup>th</sup> fraction



6 week follow-up



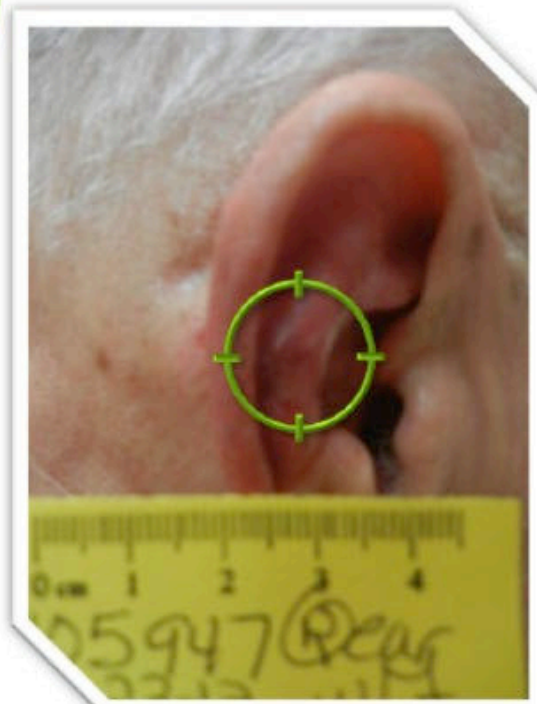
# SCC R Helix



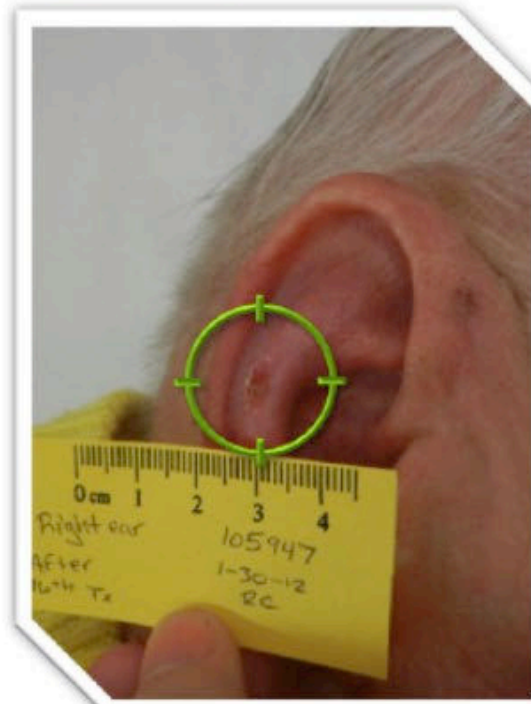
# SCC R Ear

Size:	0.5cm x 0.75cm
Location:	Right Ear
Dose:	320 cGy in 16Fx
Total Dose:	5,120 cGy

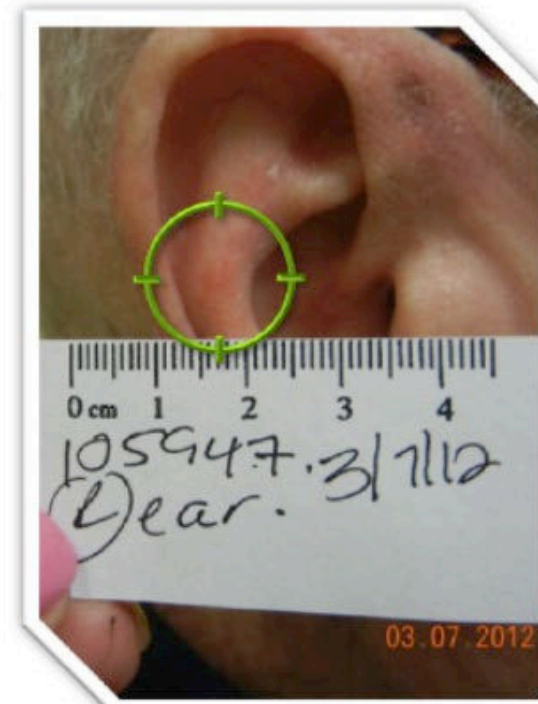
**Simulation**



**5,120 cGy/16 fractions**



**6 week follow-up**



# SCC L Lower Leg

Size: 2cm  
Location: Left Lower Leg  
Dose: 320 cGY @ 16Fx  
Total Dose: 5,120 cGy

Simulation



At 15<sup>th</sup> fraction



6 week follow-up





# SCC L Leg

Size: 1.5cm x 1.5cm  
Location: Left Leg  
Dose: 350 cGY @ 12Fx  
Total Dose: 4,200 cGy

**2 weeks post SRT**



**4 weeks post SRT**



**2 months post SRT**





# Complications

- Temporary erythema almost all patients for 7-10 days
- Erythema usually related to dose of radiation
- Hyperpigmentation most common in Fitz V-VI patients
- Radiation dermatitis occasionally seen. Treatment with silicone gels

# Consensus

- There is insufficient evidence to support or refute specific topical therapies for prevention or management of radiation-induced skin changes
- There is no evidence that use of anti-inflammatory agents have any impact on cure rates
- Management of radiation dermatitis based on severity of damaged skin
- SRT induced radiation dermatitis mild

# Radiation dermatitis



2 days of silicone gel treatment

# Reference

- Cagnetta AB, Wolfe CM, Goldberg DJ, and Hong HG. Practice and Educational Gaps in Radiation Therapy in Dermatology. *Dermatol Clin.* 34: 319-333, 2016

# Consensus Guidelines

- Nestor MS, Berman BB, Goldberg D, Cagnetta AB, Gold M, Roth W, Cockerell CJ, Glick B
- J Clin Aesthet Dermatol. 12: 2019

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