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## Management of Radiotherapy Induced Skin Reactions

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## Introduction

- Radiation induced skin reactions (RISRs) are a common side effect of radiation therapy
- Various contributing factors influence the risk and severity of skin reactions (e.g., radiation dose, skin pigmentation, smoking, age, body habitus, skin folds)
- Severe RISRs can warrant a temporary break from treatment to allow for skin healing
- Lapses in treatment result in reduced efficacy of treatment outcomes

## Skin Anatomy & Physiology

- Largest organ of the body
- Barrier between the body and the external environment
- Protects against infection, bodily trauma, and harmful UV light
- Provides receptors for external stimuli (e.g., cold, heat, pressure)
- Continuously renewing organ
- Rapidly proliferating and maturing cells
- Highly radiosensitive

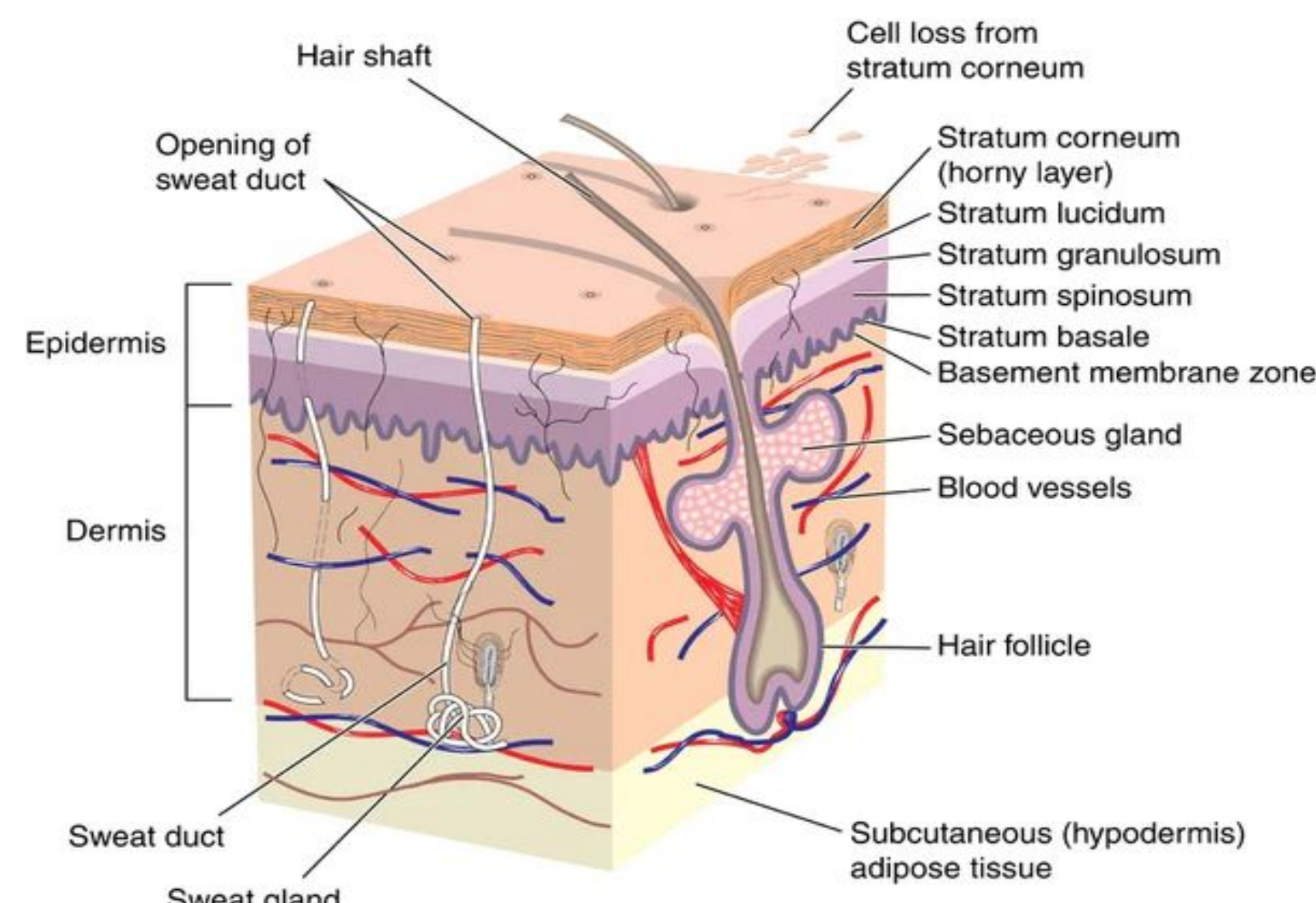
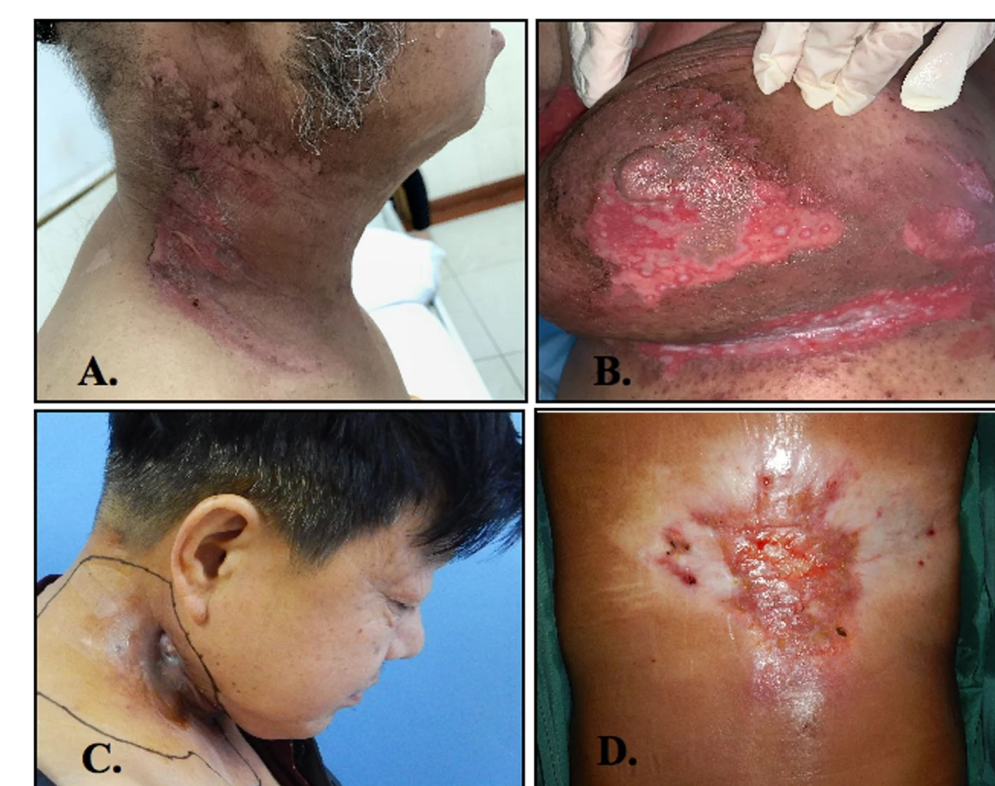


Figure 1. Anatomy of the skin  
<https://www.azurlis.com/pages/skin-anatomy>

## Clinical Presentation

- The Radiation Therapy Oncology Group (RTOG) scale is most commonly used for grading RISRs, 0-4 scale
- Acute reactions: Within hours to weeks
  - Erythema: red, swollen, irritated, sensitive
  - Dry desquamation: itchy, dry, flaky
  - Moist desquamation/ ulceration: tissue loss, blistering, wound weeping/drainage
- Chronic reactions: Months to years
  - Necrosis: severe tissue loss/tissue death
  - Fibrosis: development of permanent scar tissue

Figure 2. Severe RISRs in patients with:  
a. esophageal cancer,  
b. breast cancer,  
c. esophageal cancer,  
d. mycosis fungoides  
(Fang et. Al, doi :  
<https://doi.org/10.1186/s13287-021-02261-5>.)



Acute Skin Reaction	Onset	Dose (Gy)
Faint erythema	7-10 days	6 - 10
Definite erythema; hyperpigmentation	1-2 wk	10 - 40
Dry desquamation	3-4 wk	20 - 30
Moist desquamation	4 wk	30 - 40
Ulceration	5 wk	> 40

Table 1. Deterministic radiation effects

## Management & Prevention

- Good management and prevention prevents lapses in treatment
- Wear loose, breathable clothing
- Use mild soaps and do not scrub treatment area
- Avoid extreme hot and cold temperatures
- Avoid sun exposure to the treatment area
- Avoid chemical irritants that contain fragrance
- Avoid application of topical agents 2 hours prior to treatment

## Treatment

- Topical medication or bandages
  - Aquaphor
  - Hydrogels
  - Aloe Vera
  - Biafine
  - Topical corticosteroids
  - Topical antibiotics (Mupirocin)
- Mepitel film is a new form of treatment and prevention method for RISRs
  - Prevents shedding of corneal layer by reducing skin friction
  - One of the most promising techniques for moist desquamation prevention

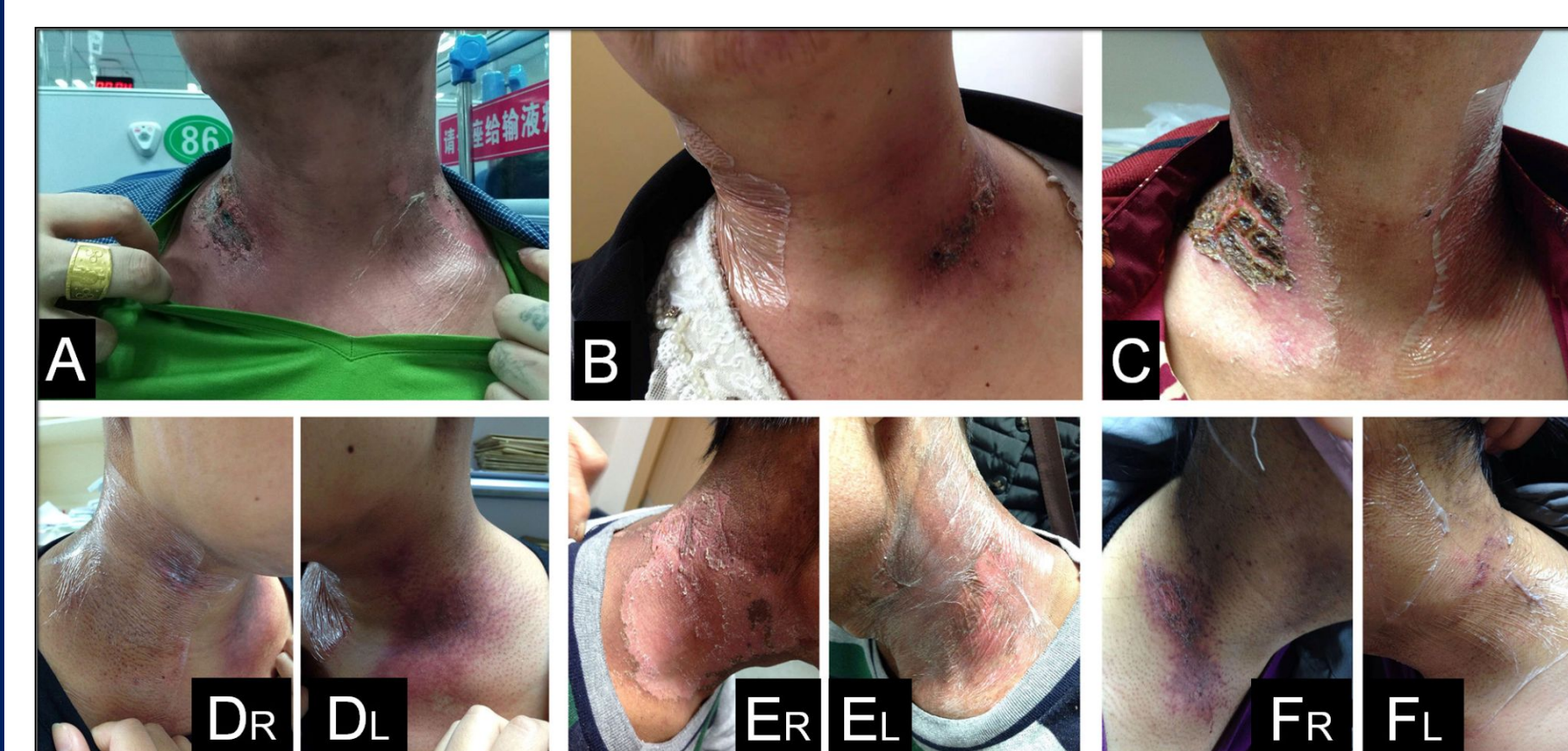


Figure 3. Treatment management using Mepitel film.  
<https://onlinelibrary.wiley.com/cms/asset/f6f4c418-fd77-4a72-83c2-0b33f868f233/jmrs397-fig-0004-m.jpg>



Figure 4. Mepitel film.  
<https://radiationtherapynews.com/2014/08/25/mepitel-film-may-prevent-radiation-skin-reactions-university-of-otago-study-says/>

Figure 5. RadiaAce Hydrogel  
<https://www.acemanan-tech.com/products/products-oncology>



Figure 6. Aquaphor healing ointment commonly given to patients.  
<https://www.heb.com/product-detail/aquaphor-advanced-therapy-healing-ointment-skin-protectant-jar/1009613>

## Conclusion

- Radiation oncology centers vary widely in what they recommended for RISR relief
- New research is needed to optimize management methods of severe RISRs
- Improvements in prevention and management techniques for RISRs would decrease the need for lapses in treatment
- RISRs significantly impact a patient's quality of life both during and after completion of RT