

Literature Review: Management of Chronic Radiation Dermatitis

Table 1. Summary of Guideline and Delphi Study Recommendations for Management of Chronic Radiation Dermatitis

Author, Year	Focus	Summary of Recommendations
Wong, 2013 ¹ (MASCC)	Radiation-induced telangiectasia and fibrosis	<ul style="list-style-type: none"> • Weak recommendation for the use of pulse dye laser to achieve greater satisfaction over the visual appearance (Level of evidence III, Recommendation Grade B); • insufficient evidence to support a recommendation for or against pentoxifylline and vitamin E for the reduction of fibrosis in standard clinical practice (Level of evidence II, Recommendation Grade B).
Wilson, 2022 ² (Delphi, international)	Chronic radiation dermatitis and fibrosis	<ul style="list-style-type: none"> • Inclusion of laser therapy in the management of chronic radiation dermatitis and fibrosis (96% consensus) • Vascular lasers for telangiectasias and vascular changes (77% consensus) • Fractional ablative laser for fibrosis and induration (75% consensus among those with expertise in laser therapy) • Q-switched laser for hyperpigmentation (100% consensus among those with expertise in laser therapy) • Fractional ablative laser for skin contractures (90% consensus among those with expertise in laser therapy)

Table 2. White Literature for Management of Chronic Radiation Dermatitis (Published Between 2010-01-01 and 2026-02-23)

Author, Year	Study Type, LOE	Objective	Patients	Intervention Details	Results
Telangiectasia					
Rossi, 2018 ³ PMC7588258	Prospective, single arm, cohort study LOE: V	Evaluate effects of pulsed dye laser on QOL of BC pts w telangiectasias	N=22 BC pts w radiation-induced breast telangiectasias after mastectomy + RT Average age: 56y Telangiectasias across breast, decolletage and axilla: 59% Grade 1/2 ARD: 64% No reconstruction: 55% Exclusion: oral steroid use, daily therapeutic anticoagulation, pregnancy or lactation, prior laser therapy, suntan in tx area	<ul style="list-style-type: none"> 595nm pulsed dye laser at 4-6 wk intervals (n=22) Average time since RT: 7.7 year (SD 4.1). Telangiectasias started within 1yr of RT for 73% of pts. Radiation dose: 48-50.4Gy in 24-28 fractions. Impact measured through Skindex-16, Breast-Q Adverse Effects of Radiation, and HR-QOL administered before and after laser therapy.	16/22 of pts (73%) had 50% clearance, and on average 1.6 treatments were needed to achieve >50% clearance. Follow-up questionnaires completed by 11/16 pts. Improvement in emotional and functional Skindex-16 HR-QOL domains and in overall Skindex-16 HR-QOL score. Breast-Q scores also improved, meaning a decrease in specific physical and cosmetic concerns. Common AE: transient post-treatment pain and redness.
Skin and soft-tissue necrosis					
McGlynn, 2023 ⁴ PMID 36820802	Retrospective cohort study LOE: V	Effectiveness of hyperbaric oxygen on vaginal soft tissue radionecrosis	N=6 pts w radiation-induced vaginal soft tissue necrosis	<ul style="list-style-type: none"> HBOT, 40-60 sessions, 90-120 min once daily, 2-2.5 ATA 	4/6 pts reported improvement of radio necrosis, and 4/5 pts w pelvic pain reported resolution of their pain.
Niezgoda, 2016 ⁵ PMID 26650092	Retrospective cohort study LOE: V	Effectiveness of hyperbaric oxygen on dermal soft tissue necrosis	N=608 pts with dermal soft tissue radio necrosis	<ul style="list-style-type: none"> 2.3 ATA, 90 min, median 30 sessions (range 1-90, IQR 18), mean 2.1 months 	Mean symptom improvement score: 3.16 (SD 0.649) Improved/resolved: 86.7%
Tahir, 2015 ⁶ PMID 25382755	Retrospective cohort study LOE: V	Effectiveness of hyperbaric oxygen on skin necrosis	N=189 pts (93 H&N, 79 pelvic, and 17 others) with chronic radiation-induced toxicities (265 cases total)	<ul style="list-style-type: none"> HBOT, 2.4 ATA for 70 min, 7 days per week 	Median follow-up: 3.8y Less severe soft tissue necrosis in H&N pts (n=12, ORR 83%, p=0.002) and other

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			<p>Mucosal: 71 pts H&N cutaneous SCC: 14 pts Prostate: 55 pts Rectal/anal: 19 pts Breast: 11 pts Sarcoma: 3 pts Other: 16 pts</p> <p><i>H&N vs pelvic vs other:</i> Median age: 58, 68, 52y Conventional fractionation: 77, 80, 53% Median dose: 64, 66, 60 Gy Definitive RT: 60, 89, 6% Concurrent chemo: 28, 16, 0%</p> <p>Exclusion: tumour recurrence, symptoms not bc of radiation exposure</p>	<p>Median interval between RT and HBOT: 16.9mo for HNC, 18.9mo for pelvic, 23.4mo for other pts.</p>	<p>locations (n=7, ORR 84%, p=0.03).</p> <p>Non-significant improvement neck fibrosis (n=7, ORR 71%, p=0.125), pelvic soft tissue necrosis (n=4, ORR 100%), chest wall fibrosis (n=2, ORR 100%), wound healing complications (n=4, ORR 100%).</p> <p>Adverse effects reported in 29/189 pts, mostly ear barotrauma.</p>
Fibrosis					
<p>Harpso, 2025⁷</p> <p>PMID 40542130</p>	<p>Retrospective cohort study (single arm)</p> <p>LOE: V</p>	<p>Effectiveness of pentoxifylline and vitamin E on RIF in C and HNC pts</p>	<p>N=54 BC and HNC pts w severe and symptomatic RIF</p> <p><i>BC (n=24):</i> Median age: 62y Median radiation dose: 45.7Gy (2-2.67Gy/fraction) Median time till tx: 31mo</p> <p><i>HNC (n=30):</i> Median age: 65y Female: 37% Median radiation dose: 67.8Gy (2Gy/fractio) Median time till tx: 42mo</p>	<ul style="list-style-type: none"> Oral pentoxifylline 400mg and vitamin E (290-350mg) twice daily <p>BC pts were scored with the LENT-SOMA scale.</p> <p><i>Median tx duration:</i> BC: 14mo (effect), 6mo (no effect). HNC: 12mo (effect), 5mo (no effect).</p>	<p>Improvement reported by 18/24 (75%) BC pts and 7/30 (23%) HNC pts, confirmed clinically as partial or complete regression of RIF in 17/24 BC and 6/30 HNC pts.</p>

Author, Year	Study Type, LOE	Objective	Patients	Intervention Details	Results
Offenbacher, 2025 ⁸ PMID 41024454	Case study LOE: V	Effectiveness of Pravastatin on RIF in sarcoma patients	N=7 children with sarcoma receiving radiation to joints, having developed RIF	<ul style="list-style-type: none"> Pravastatin 20-40mg/d, duration ranged between 6mo and >1year 	<p>Improvement in 3 out of 3 pts</p> <p>No RIF developed in 4 pts who was administered pravastatin preventatively.</p>
Bourgier, 2019 ⁹ PMID 30776452	Phase II, single arm, clinical trial LOE: V	Effectiveness of pravastatin on RIF in HNC pts	<p>N=60 pts w HNSCC, having developed grade ≥ 2 cutaneous and subcutaneous RIF after RT (w or wo chemo)</p> <p>Mean age: 59y Primary tumour location: Oropharynx: 42% Oral cavity: 20% Hypopharynx: 20% Surgery: 53% Chemo: 95% Median radiation dose: 70Gy</p> <p>Exclusion: abnormal kidney and hepatic function, long-term steroid therapy, concurrent statins/ fibrates/ cyclosporine, history of severe heart failure</p>	<ul style="list-style-type: none"> Pravastatin 40mg/d for ≥ 11 mo (n=42) or < 11 mo (n=18) <p>Neck motion exercises and scar manipulation were not SOC.</p> <p>Mean time between RIF diagnosis and tx: 17.1 mo Mean time between RT and RIF: 9.9mo</p> <p>RIF thickness was measured at thickest point with high-frequency US and compared to neighboring normal skin. Pts were also administered VQ-Dermato questionnaire.</p>	<p>13% of pts had grade 2+ AE and stopped pravastatin before 11 mo.</p> <p>Reduction in RIF thickness in 40 pts with ≥ 11 mo pravastatin was 17% (SD 39%). Reduction of $\geq 30\%$ was observed in 15/40 pts (36%). At 12-mo evaluation, RIF severity was decreased in 21/40 pts (50%).</p> <p>No rebound effect was observed after treatment completion.</p> <p>Pts reported improved self-perception, mood state, and social functioning.</p>
Griffin, 2019 ¹⁰ PMID 31389085	Retrospective cohort study (single arm) LOE: V	Effectiveness of lipotransfer to treat RIF and restore volume loss in HNC pts	<p>N=38 HNC pts after surgery and RT, with 2-yr DFS, with complaints of RIF and volume defects after RT or surgery + RT/chemo</p> <p>Male: 58% Average age: 51y Primary tumour location mandible: 45% SCC or adenocarcinoma: 46% Sarcoma: 44% Ablative + reconstructive surgery: 97%</p>	<ul style="list-style-type: none"> Lipotransfer (n=38) <p>Adipose tissue was harvested from pts abdomen and injected using Coleman techniques (single procedure in 44% of pts and multiple procedures in 55% of pts).</p> <p>Improvements rated by pts and clinicians, and included SF-36, POS-head/neck, UW-QOL V4, VAS and DAS24</p>	<p>Mean follow-up: 32 mo</p> <p>37/38 pts (97%) reported esthetic and functional improvements in RIF and volumetric defect (63% major, 34% minor improvements)</p> <p>Improved psychological health and QOL scores across all instruments.</p>

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			Radiotherapy: 63%		
Kaidar-Person, 2017 ¹¹ PMID 29687536	Systematic review LOE: II	Effectiveness of pentoxifylline and vitamin E in BC pts w RIF	2 studies were included (n=80) on treatment (median time from RT 7-15.5mo) 3 studies were included (n=162) on prevention (median time from RT 0-3mo)	<ul style="list-style-type: none"> • Treatment: PTX 400 mg + vitamin E 500IU twice daily • Prevention: PTX 400 mg + vitamin E 100mg or 400IU three times daily 	94-100% compliance AEs: grade 1 nausea 1/2 treatment studies found an improvement. 2/3 prevention studies found improvement, either in RIF or in volume
Van Geel, 2011 ¹² PMC3032904	Retrospective cohort study LOE: IV	Evaluate efficacy of partial mastectomy and m. latissimus dorsi reconstruction	N=9 BC pts w severe complaints of RIF after breast-conserving therapy, failure of conservative therapy	<ul style="list-style-type: none"> • Partial mastectomy and m. latissimus dorsi reconstruction (n=9) 	Mean follow-up: 46 mo 8/9 pts experienced improvements in RIF and shape of the breast.

AE, adverse events; ARD, acute radiation dermatitis; ATA, atmosphere absolute; BC, breast cancer; DFS, disease free survival; Gy, Gray; HBOT, hyperbaric oxygen therapy; HNC, head and neck cancer; HR-QOL, health-related quality of life; LOE, level of evidence; PTX, pentoxifylline; QOL, quality of life; RIF, radiation-induced fibrosis; RT, radiation therapy; SCC, squamous cell carcinoma; SD, standard deviation; US, ultrasound;

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Appendix A: Search Strategy

Database	Date	Search Terms	Results
Medline	February 23, 2026	1. exp Neoplasms/rt [Radiotherapy]	207,814
		2. exp Neoplasms/	4,213,067
		3. (cancer* or neoplasm* or carcinoma*).mp.	4,599,624
		4. exp Radiotherapy/	222,235
		5. (radiotherap* or radiation therap*).mp.	458,456
		6. 1 or ((2 or 3) and (4 or 5))	403,999
		7. exp Radiodermatitis/	2,772
		8. (radiation dermatitis or radiodermatitis or dermatitis or radiation-induced or "late radiation tissue injury" or late toxicity).mp.	178,720
		9. 7 or 8	178,720
		10. *Telangiectasis/	2,983
		11. telangiectasia*.mp.	22,622
		12. exp Fibrosis/	229,215
		13. radiation-induced fibrosis.mp.	461
		14. breast edema.mp.	162
		15. (edema adj3 (breast or skin or cutaneous or "soft tissue")).mp.	2,202
		16. radionecrosis.mp.	1,349
		17. ((necrosis or ulcer) adj5 (skin or cutaneous or "soft tissue" or pelvic)).mp.	22,742
		18. 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17	278,752
		19. th.xs.	8,857,656
		20. ph.fs.	4,064,397
		21. (manag* or treat* or alleviat* or lessen* or control*).mp.	14,392,080
		22. 19 or 20 or 21	19,538,635
		23. 6 and 9 and 18 and 22	1,191
		24. limit 23 to (clinical trial, all or comparative study or controlled clinical trial or guideline or meta analysis or multicenter study or network meta-analysis or observational study or practice guideline or randomized controlled trial or "systematic review")	180
		25. exp Retrospective Studies/	1,356,942
		26. exp Cohort Studies/	2,855,685
		27. cohort.ab,ti.	1,037,814
		28. 25 or 26 or 27	3,302,477
		29. 24 or (23 and 28)	398
		30. limit 29 to (english language and yr="2010 -Current")	233

Appendix B: Levels of Evidence

- Level I – evidence from at least one large randomized controlled trial (RCT) of good methodological quality with low potential for bias or meta-analyses of RCTs without heterogeneity
- Level II – small RCTs, large RCTs with potential bias, meta-analyses including such trials, or RCTs with heterogeneity
- Level III – prospective cohort studies
- Level IV – retrospective cohort studies or case-control studies
- Level V – studies without a control group, case reports, or expert opinions