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Introduction

To date, there is uncertainty about whether head and neck cancer (HNC) patients with prior root canal treatments, who are clinically asymptomatic but have specific radiographic risk factors, should undergo additional treatment before receiving radiation therapy (RT). Given the risk of oral complications in RT patients, ranging from mucosal to bone tissue impairments and weakened immune systems, this prospective observational cohort study aims to assess the impact of RT on asymptomatic root canal-treated teeth in HNC patients with periapical radiolucency (PARL), underfilled and overfilled canals, widened periodontal ligaments (PDL), and defective coronal seals.

Materials and Methods

The records of 956 HNC patients who underwent RT between 2018 and 2022 were retrospectively reviewed. We identified 286 patients with comprehensive dental, medical, and radiographic records, of whom 122 had at least one root canal treatment. Demographic information, cancer diagnosis, treatment details, pre-RT dental records, radiographs, and all dental records during RT follow-up were thoroughly reviewed. For the focused study, 18 patients (50 teeth) met the inclusion criteria. Symptomatic changes in teeth with specific characteristics were recorded through a comprehensive dental examination and updated radiographs, including panoramic and periapical images at various angulations to document changes.

References

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Results

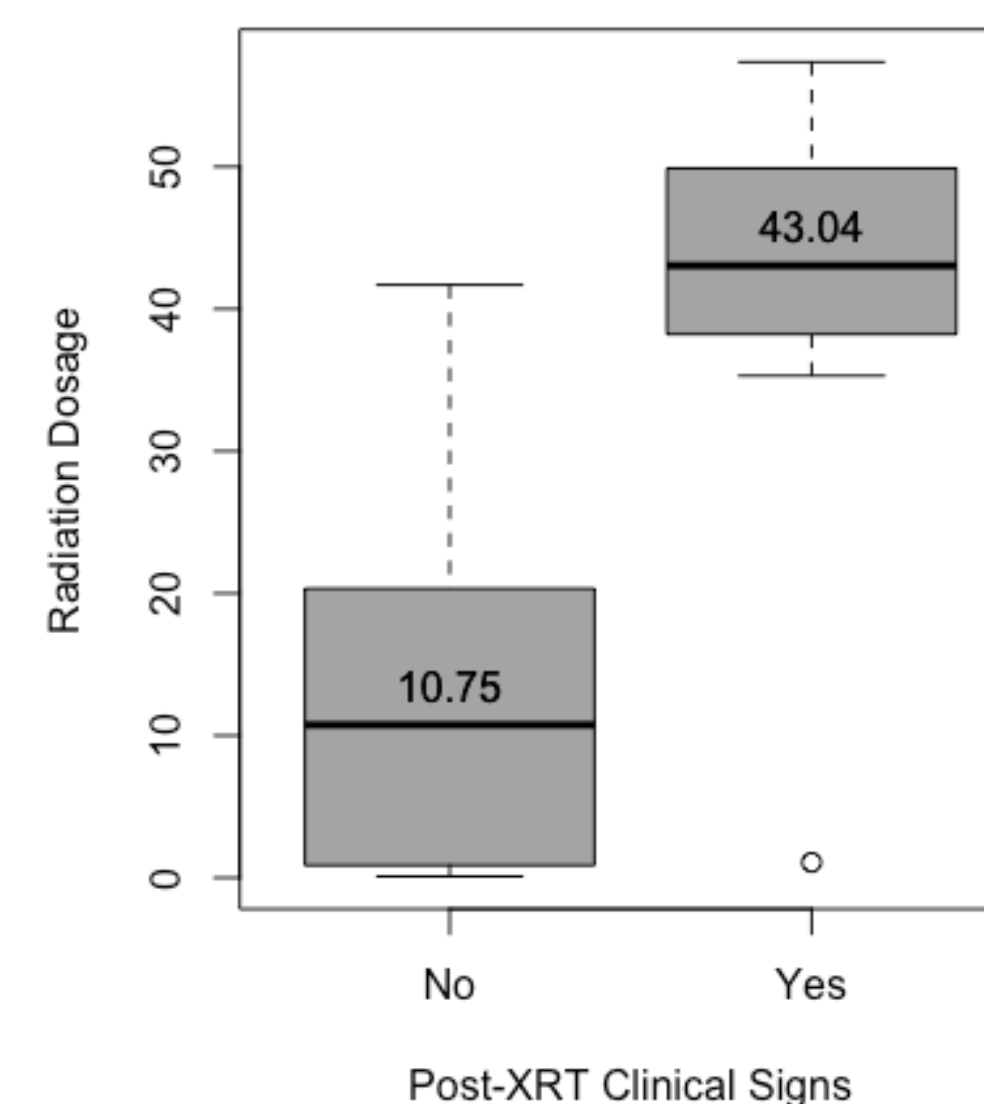
18 patients (female/male 61/39%) with 50 root canal-treated teeth with defects were included. Among 50 teeth, 24 had short root canal filling lengths, 1 tooth had overfilled root canal filling length, 41 had poor-quality root canal treatments, 11 had defective coronal restoration and 13 displayed PARL, and 15 showed a widened PDL before RT. Post-RT follow-ups (ranging from 6 to 30 months) and a median follow-up duration of 15 months showed changes in clinical signs, with defective restorations in 16% of the teeth and mobility in 16%. The radiation dose was significantly higher for teeth with clinical signs (43.04 to 10.75 Gy), differentiating patients with and without clinical signs. Evaluation of periapical radiographs to evaluate changes comparing pre and post-RT X-rays demonstrated stability despite clinical variations.

Table 1 . Post-Radiation Therapy Clinical Characteristics of Root Canal-Treated Teeth in the Sample Study of 18 Patients (50 Teeth)

Characteristic	No (%)
Pain on Palpation	
Negative	50 (100)
Pain on Percussion	
Negative	50 (100)
Restoration Quality	
Adequate	42 (84)
Defective	08 (16)
Mobility Status	
M0	42 (84)
M1	08 (16)
Periodontal Disease	
None or Mild	14 (28)
Moderate	33 (66)
Severe	03 (6)
Furcation Class	
F0	49 (98)
F1	01 (2)
Osteonecrosis	
Yes	01 (2)
Sinus Tract	
Yes	01 (2)
Xerostomia Status	
None	07 (39)
Mild	09 (50)
Moderate	01 (5.5)
Severe	01 (5.5)
Oral Hygiene	
Good	07 (39)
Fair	07 (39)
Poor	04 (22)

Table 2. Characteristics of RT teeth (n= 305), 122 patients

Characteristic	No (%)
Root Filling Length	
Flush (0–2 mm)	216 (71)
Short (>2 mm)	36 (12)
Overfilled	1 (0)
Root canal filling quality	
Optimal	191 (63)
Suboptimal	62 (20)
Restoration Quality	
Adequate	238 (95)
Defective	15 (5)
Periapical status	
Normal	212 (84)
AP	22 (8.5)
Widened	19 (7.5)
Extracted Teeth	52 (17)
Non-restorable	21 (40)
Uncontrollable Periodontal Infections	31 (60)



Discussion

Our study reveals that despite the risks of oral complications from radiation therapy, asymptomatic root canal-treated teeth with defects can be safely retained during treatment without worsening periapical issues. We've also uncovered a potential link between higher radiation doses and post-therapy symptoms. Our study highlights the importance of comprehensive radiographic assessment, including both panoramic and periapical radiographs, in evaluating and managing dental health in head and neck cancer patients undergoing radiation therapy.

Conclusion

The outcomes indicated that, despite the presence of factors predisposing the transition to a failed root canal treatment, the dental conditions remained unexpectedly stable.

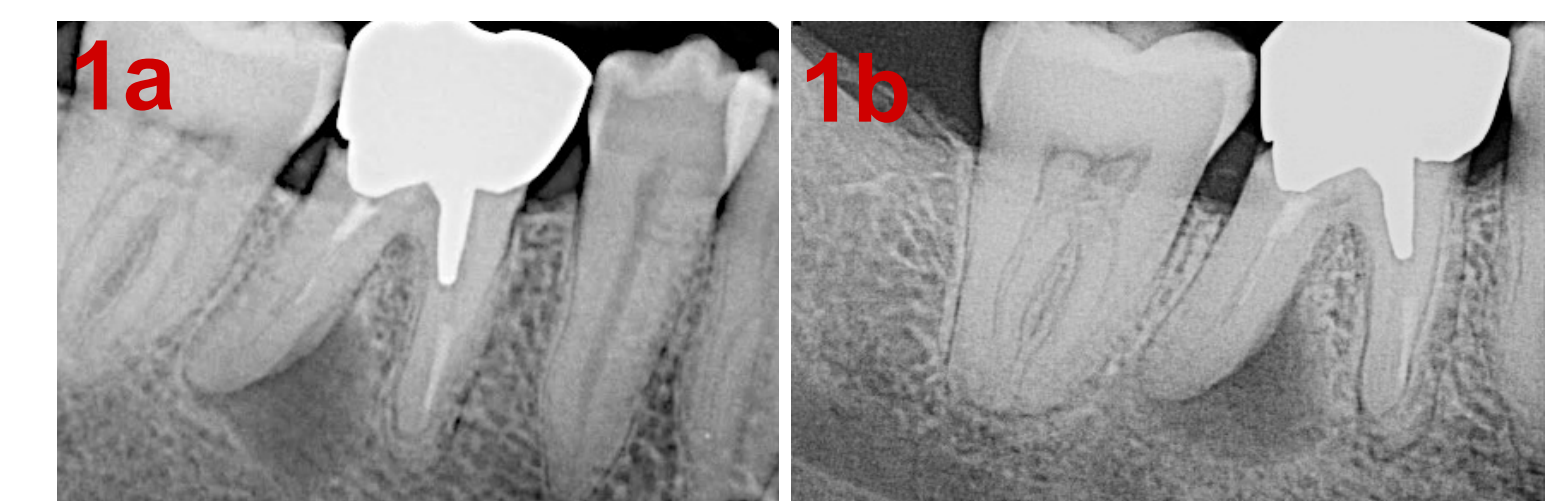


Fig.1 The 46-year-old male with stage II thyroid SCC., receiving a total dose of 66 Gy. The periapical dose to this tooth was 41.7 Gy. Fig. 1b shows the post-XRT dental condition, captured after 2.5 years.

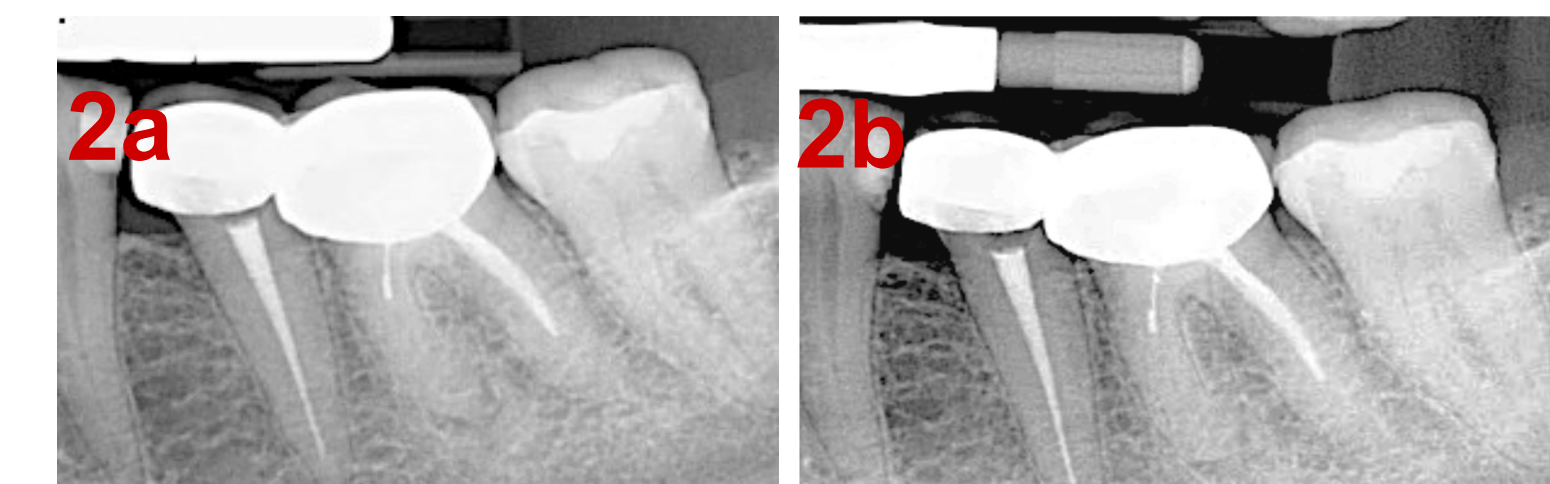
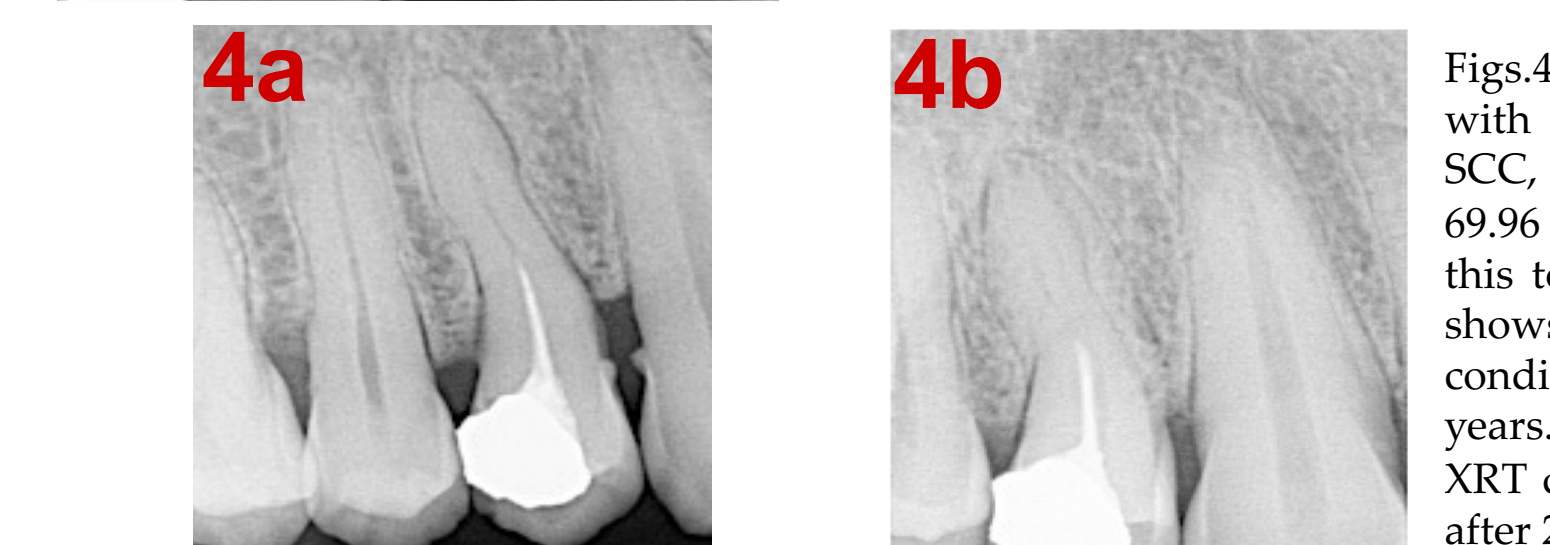


Fig.2 The 56-year-old female with stage IV LAD of the right neck, received a total dose of 36 Gy. The periapical dose to this tooth was 10.8 Gy; Fig. 2b shows the post-XRT dental condition, captured after 8 months.



Fig.3 The 71-year-old female with stage II laryngeal SCC, receiving a total dose of 70 Gy. The periapical dose to this tooth was 9.5 Gy. Fig. 3b shows the post-XRT dental condition, captured after 2 years.



Figs.4 The 48-year-old male with stage II nasopharyngeal SCC, received a total dose of 69.96 Gy. The periapical dose to this tooth was 38.3 Gy; Fig. 5b shows the post-XRT dental condition, captured after 2.5 years. Fig. 4b shows the post-XRT dental condition, captured after 2 years.