

Root-cause Failure Analysis of Indirect Pulp Therapy on Posterior Teeth

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INTRODUCTION

The success of indirect pulp therapy (IPT) is well documented (94-96%) in literature. IPT is a recommended treatment option for asymptomatic or reversible pulpitis diagnosed in primary and permanent teeth with deep carious lesions approximating the pulp. IPT has the highest success rate among all types of vital pulp therapy for posterior teeth.

OBJECTIVE

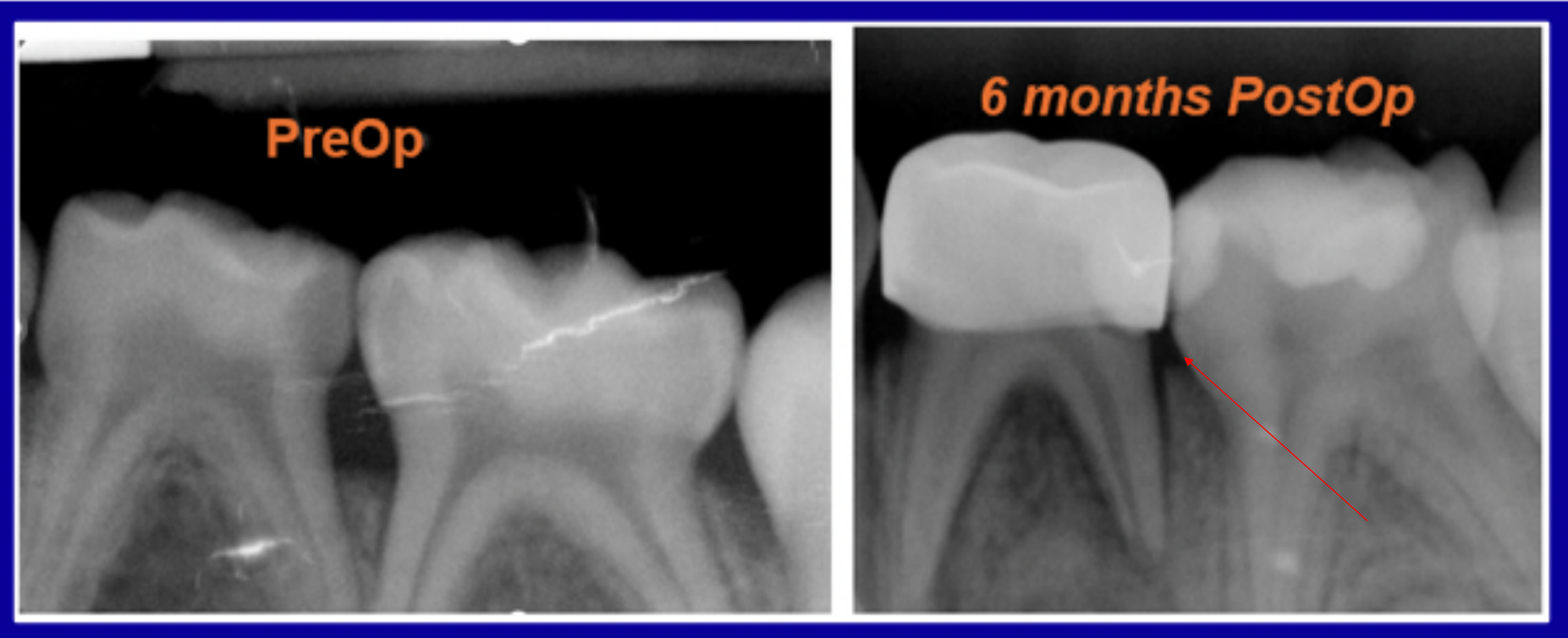
Despite IPT's high success rate, the reason(s) for failure have been understudied. The purpose of this study was to investigate predictive factors of IPT failures.

METHODS

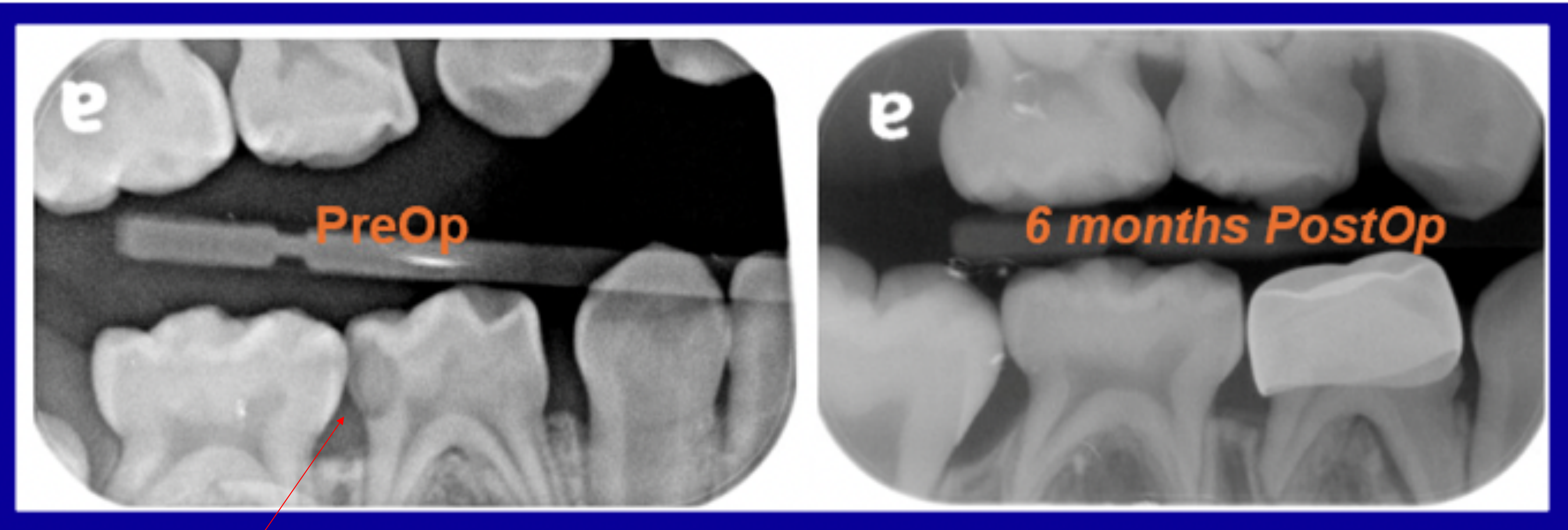
A retrospective chart review was completed of otherwise healthy patients (3-18 years) treated with IPT and a final restoration at the University of Florida. Inclusion criteria included at least 6 months follow-up in pre-operative asymptomatic/reversible pulpitis teeth with deep caries. Post-operative pain, infection, need for root canal treatment, or extraction were considered failures. Frankl ratings at treatment time, dentition, tooth type, restoration margin quality, lesion depth and location, and CEJ lesion extension were evaluated.

RESULTS

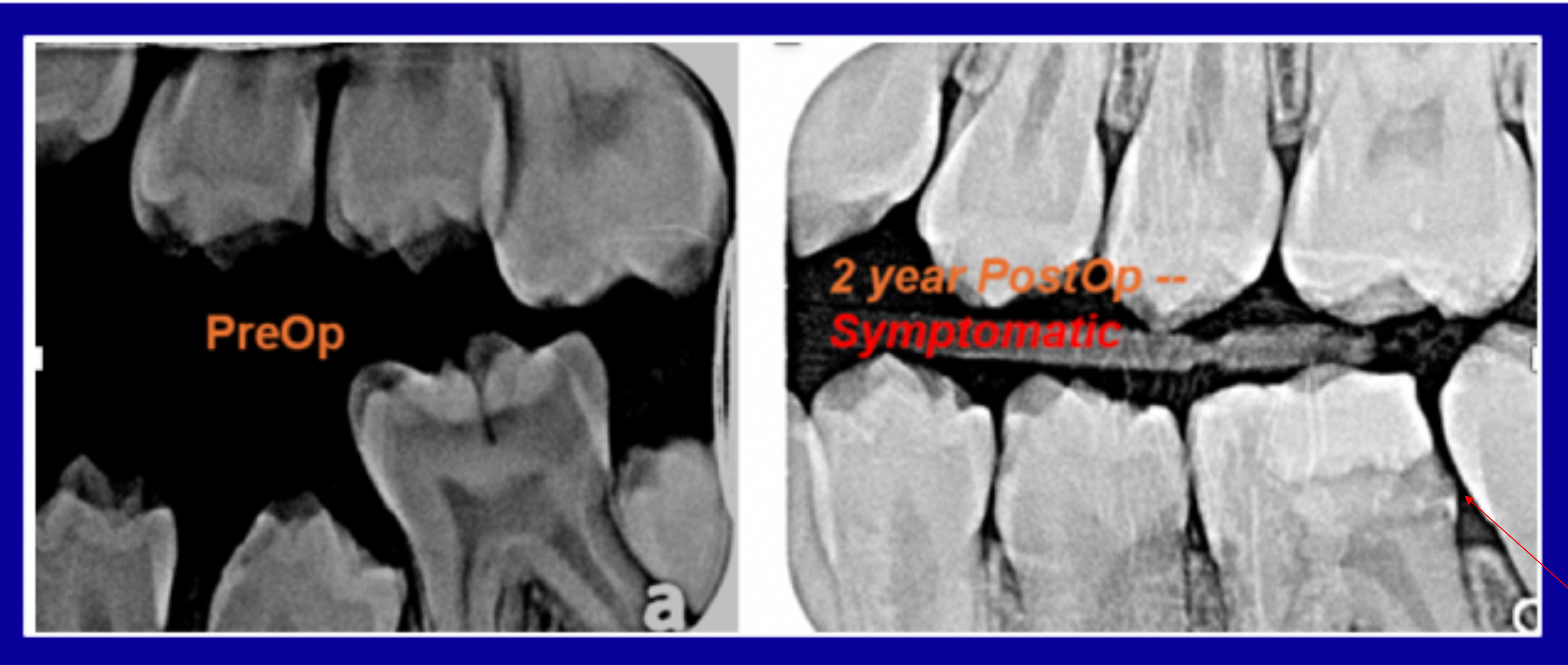
Of 495 patients with 562 teeth, 270 teeth (234 patients) met the inclusion criteria. Eighteen failures (6%) were noted.



Failures from: Caries below the CEJ preoperatively and open margins of final restorations



Failures from: *Extremely* deep carious lesions



Failures from: Defective margin of final restoration

	Treatment status		p-value
	Success	Failure	
	n (%)	n (%)	
Radiographic margin			< .001
Open	18 (66.7)	9 (33.3)	
Closed	234 (96.3)	9 (3.7)	
Extent of lesion			< .001
Above the CEJ	105 (94.6)	6 (5.4)	
Below the CEJ	3 (42.9)	4 (57.1)	
RDT of at least 1mm			< .001
Yes	230 (97.5)	6 (2.5)	
No	22 (64.7)	12 (35.3)	
Occlusal	15 (75.0)	5 (25.0)	.257
Proximal	2 (66.7)	1 (33.3)	
Both	5 (45.5)	6 (54.5)	

CONCLUSIONS

- Proximal caries margins below the CEJ resulted in inadequate coverage of final restorations leading to leakage and statistically significant contributors to failures of IPT.
- Extremely deep caries were statistically significant contributors to failures of IPT.
- Proximal* caries more than 2/3rd into dentin were clinically significant contributors to failures of IPT.