

Restoration of Endodontically Treated Teeth with and without Post Placement: An Update

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Although journal coverage of this subject is ubiquitous, confusion²² still exists regarding the original if, how, and when formula.¹ A recent Medline search yielded over one hundred articles between 1999 and 2004. All of the articles were peer reviewed, some were bench top in vitro studies and unfortunately, many were contradictory. It is this paucity of statistically significant clinical studies which "leads to less than optimal treatment selections".²

"Endodontically treated teeth form a unique subset of teeth requiring restoration due to several factors".²

Moisture Loss—There has always been controversy about the moisture content between the dentin in teeth with vital pulps and the dentin in teeth treated endodontically. Recent work by Huang et al³ and Papa et al⁴ showed no *statistical difference between the two*.

Dentinal Toughness—Papers by Huang et al³ and Sedgley et al⁵ *concluded that endodontically treated teeth are not "brittle as a result of an alteration in dentinal toughness*.

Collagen Alteration—early research indicated dentin consisted of type 1 collagen and its alteration might lead to brittleness.

Rivera and Yamauchi⁶ found no significant differences in the cross-link content between normal and treated pulpless teeth. *Endodontically treated teeth are not brittle as a result of an alteration in the collagen matrix*.

Architectural Changes—Reeh et al⁷ discovered a relationship between the amount of central tooth structure lost during cavity preparation and the amount of deformation under load. This research suggested the following: access opening (5% reduction in stiffness), occlusal preparation (20%), loss of one marginal ridge (46%), loss of two marginal ridges (63%); thus, the conclusion to preserve marginal ridges whenever possible. *Gutmann⁸ concluded that the cumulative loss of tooth structure from caries, trauma, restorative and endodontic access resulted in susceptibility to fracture*.

Sensory Apparatus—The loss of pressoreceptors and an elevated pain threshold leads to decreased protection of endodontically treated teeth during mastication.⁹

LONGEVITY OF ENDODONTICALLY TREATED TEETH

One of the most important factors in the success or failure of the post endodontic restoration not

reported in clinical studies is the amount of coronal structure remaining before the final restoration. Many of the clinical studies included teeth **with less** than 50% loss of coronal structure, thus the success rate included teeth which would have had a favourable prognosis regardless of the methodology. If this anatomic qualifier were added to a concept of biological or mechanical failure, statements such as "The primary cause of failure is inadequate restorative therapy followed by failure due to periodontal reasons"¹⁰ would be enlightened and expanded.

Aquilino SA and Caplan DJ¹¹ confirmed an earlier study, 20 years ago, by Sorenson and Martinoff¹² that recommended cuspal coverage of posterior endodontically treated teeth. As well research in the past decade has identified failure caused by the orthograde transport of salivary contaminants through an open access preparation or a faulty margin.¹³⁻¹⁵ Intact endodontically treated teeth are three times more fracture resistant when compared to teeth restored with dowels.¹⁶ Many times the long term results of treatment were directly dependent on the preoperative status of the pulp and the periapical tissue. Vital and non vital teeth without apical