Preservation of the natural dentition is the primary goal of dentistry. Published surveys indicate that patients generally value preservation of their natural teeth and have a desire to save their natural dentition in favor of extraction whenever possible. Significant technological and biological improvements have been made with a focus on improving long-term retention of natural teeth, when feasible.

Endodontics has evolved into a science focusing on noninvasive preservation of teeth. Endodontic treatments have evolved from a salvage option provided in the face of irreversible pulpitis to a routine procedure to preserve teeth with reversible pulpitis. The majority of endodontic treatments are performed to remove necrotic pulps and regenerate or maintain noninfectious pulp tissues. Thus, the root canal procedure now serves not only as a destructive therapeutic intervention but also as a powerful regenerative technique.

Tooth retention from a restorative perspective requires comprehensive, interdisciplinary treatment planning. The development of implant dentistry has provided a viable alternative to tooth extraction in situations when endodontic therapy is contraindicated or other treatment modalities are used to enhance the utilizable biologic capacity of the remaining tooth.

### Treatment planning: Retention of the natural dentition and the replacement of missing teeth

Endodontic treatment is performed to maintain a tooth with pulp inflammation or necrosis. The tooth is treated with the goal of removing all necrotic material and aggressively decontaminating the root canal space. The pulp chamber and root canals are thoroughly instrumented to remove all necrotic remnants and irrigated with antimicrobial solutions.

**Endodontic treatment outcomes** can be adverse if not performed according to published guidelines. The process begins with accurate diagnosis to determine if root canal therapy is indicated, along with appropriate treatment planning to maximize the longevity and success of the retained tooth.

**Conclusion**

Endodontic treatment offers a viable alternative to tooth extraction with a high probability of long-term success. However, it is critical to recognize that endodontic therapy is not a cure for periodontal disease. Therefore, patients should be advised to maintain good oral hygiene and attend regular dental checkups.

### Table 1: Survival rates following initial nonsurgical root canal treatment.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Number of Teeth</th>
<th>Follow-up years</th>
<th>Survival percentage</th>
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<tr>
<td>Meta et al.</td>
<td>4,163</td>
<td>6</td>
<td>85</td>
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<tr>
<td>Lin et al.</td>
<td>64</td>
<td>15</td>
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**Fig. 1a:** Pre-op image of tooth #19 with pulp necrosis and symptomatic apical periodontitis. The patient desired to preserve this tooth for esthetics and future root canal procedures.

**Fig. 1b:** Three-year recall image. The patient has benefited from root canal treatment and implant therapy. Courtesy of Dr. Tyler Peterson and the University of Minnesota School of Dentistry.

**Fig. 2a:** Pre-op image of tooth #29 with pulp necrosis and chronic apical abscess. The patient requested a second opinion from an endodontist.

**Fig. 2b:** Two-year recall image reveals both excellent endodontic and restorative results. Note healing of lateral radiolucency and complex anatomy.

**Fig. 3a:** Pre-op image of tooth #31 with pulp necrosis and asymptomatic apical periodontitis. The patient desired to preserve this tooth for esthetics.

**Fig. 3b:** Four-year recall image demonstrates apical healing following nonsurgical retreatment. Accurate diagnosis prevented the unnecessary treatment of tooth #31. Courtesy of Dr. Martin Rogers.

**Fig. 4a:** Pre-op image of tooth #30 with previous endodontic therapy and apical periodontitis. A dentist initially recommended extraction and replacement of this tooth with an implant. The patient requested a second opinion from an endodontist who determined the tooth to be treatable.

**Fig. 4b:** Four-year recall image demonstrates excellent endodontic healing and clinical success. Laboratory cast confirms an endodontic opinion and treatment planning.

**Fig. 5a:** Pre-op image of tooth #19 with pulp necrosis and chronic apical abscess.

**Fig. 5b:** Two-year recall image demonstrates apical healing following nonsurgical retreatment. The patient requested a second opinion from an endodontist who determined the tooth to be treatable.
In systemic and local factors, it is critical to include the patient’s concerns during treatment planning. Common patient-centered factors include costs, treatable availability of dental insurance may also impact choices. Endodontic treatment options are formulated based on significant considerations for the patient. If a tooth is not endodontically treated, the risk factors that may be associated with decreased survival of root canal-treated teeth include smoking, diabetes, systemic illness, periodontal disease, and poor oral hygiene. 

- Nearest to the root canal door, the second factor may not be influential in multiple areas of tooth survival. Risk factors that may be associated with decreased survival of root canal-treated teeth include smoking, diabetes, systemic illness, periodontal disease, and poor oral hygiene.

- Grafting and root extraction:

- Surgical intervention and maintenance visits may need to be done frequently, affecting the patient's quality of life.

- Cost of treatment:

- Endodontic failure can usually be addressed successfully by retreatment rather than extraction and potential implant placement. Intervention after implant failure may require extensive repairs to multiple corrective surgeries and/or the use of a different prossthesis.

- Nonsurgical retreatment, or revision, is often the first choice to address post-treatment apical periodontitis, provided that the tooth is painless and can reach further restoration and that the restoration will have a good long-term prognosis (Figs 4a, b). 

- Endodontic and restorative treatment is the short time frame necessary, dental implants provide an alternative treatment option that has potential for further restoration and replacement with an implant. 

- The restored endodontically treated tooth is often in the patient's best interest. 

- Consultation regarding a question arises from the publisher, and also at the AAE.org website is available at www.aae.org/colleagues. 

- Clinicians are uniquely positioned to evaluate and address the etiology of post-treatment disease. 

- The AAE's Endodontic Case Discussion program was performed extraorally. 

- Furthermore, the clinician can aid in retaining the natural dentition and planning to assist patients and referring colleagues in making an informed choice regarding all replacement options. Only then is the decision to extract a tooth considered. Extraction is an irreversible treatment option, and dental implants provide an excellent option to replace missing teeth (Figs 6a, b).

- Case report: A case report (Figs 7a-d) demonstrates an alternative treatment option for a patient to save a natural tooth. A 75-year-old female presented to an endodontist’s office with a complaint of persistent pain in biting. Tooth #31 had a history of root canal treatment and coronal restoration. Tooth #31 was categorized as questionable or unfavorable in multiple areas of evaluation. This tooth was considered as appropriate for an endodontic treatment. Only then is the decision to extract an informed choice. Extraction is an irreversible treatment option, and dental implants provide an excellent option to replace missing teeth (Figs 6a, b).

- Ethics and interdisciplinary consultation:

- Clinicians are ethically bound to inform patients of all reasonable treatment options, explain the risks and benefits, and discuss potential endodontic treatment options. 

- The clinician can aid in the retention of the natural dentition and determining whether to treat a compromised tooth. This information should be viewed as partners in the decision-making process and sharing valuable information.

- Interdisciplinary communication and collaboration during treatment planning maximize this likelihood. 

- Restorative and endodontic specialists should be viewed as partners in the decision planning to assist patients and referring colleagues in making an informed choice regarding all replacement options. 

- Endodontic treatment followed by an immediate restoration of equal or better results provide patients with service and function while maintaining their esthetics for the long-term. 

- Large-scale studies provide strong support that the restored endodontically treated tooth offers a highly predictable, long-term approach to preserving “nature’s implant” — a tooth with an ideal periodontal ligament.

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