

# Dental Implants or Root Canal Treatment-The Restorative Advantage

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**Abstract:** - A fundamental principle in traditional dental practice has been the preservation and rehabilitation of natural teeth. Endodontic treatment procedures have played a key role in this context in the retention and restoration to function of teeth affected by pulp and/or periapical pathosis. The extraction of hopeless teeth is considered as the last resort due to limited restorative options or financial constraints. With the emerging field of implant dentistry gaining fast acceptance, the prevailing opinions on treatment planning for diseased teeth are changing. Many practitioners consider the single-tooth implant as a reasonable alternative to the preservation of the natural dentition. Consequently, today's practitioner is faced with a fundamental dilemma, should a tooth be retained through nonsurgical endodontic treatment or should it be extracted and replaced with a single-tooth implant? This paper Reviews the factors influencing the treatment planning and decision making between both these viable treatment options and identifies key issues that need careful consideration in planning the most appropriate course of care in a given clinical situation.

**Keywords:** root canal treatment, implants, treatment planning.

## I. INTRODUCTION

Endodontic treatment procedures have played a key role in the retention & restoration of function of teeth affected by pulp and/or periapical pathosis. The extraction of the questionable tooth has been undesirable and a treatment of last resort as a result of limited restorative options and financial considerations<sup>1,2</sup>.

In recent years, however this paradigm has been challenged by the emerging trends in implant dentistry, with implant replacement being touted as equal or even superior to the preservation of the natural teeth. When dental implants were first introduced by Brånemark in 1977, they were envisioned as a replacement for missing teeth and indicated for patients who might otherwise have received removable prosthesis<sup>3,4</sup>. Until recently, the available options for restoring compromised teeth were limited to root canal treatment<sup>5</sup> but today, in addition single-tooth implants are also being proposed for compromised teeth.

An argument of "endodontic treatment vs. implant therapy" overlooks the crucial finding that it is often the restorative prognosis and not the endodontic prognosis *per se*, that becomes the critical decision-making determinant of whether a tooth is replaced or rehabilitated.

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## II. ARE THE INDICATIONS FOR BOTH SIMILAR?

An analysis of single-tooth implant study showed that the extracted teeth were replaced with implants, without resorting to alternative treatment modalities like retreatment and periapical surgery. Contrary to evidence, presence of apical periodontitis is increasingly being used to recommend tooth extraction and immediate implant placement<sup>5</sup>. Both root canal treatment & implants are being offered to a similar group of population<sup>6</sup>. There are clear indications for both so that when considered side by side, that there should be no controversy or competition, especially when patient's interest are put first.

## III. COMPROMISED TOOTH OR AN END STAGE TOOTH?

The criteria for defining a tooth as compromised and end stage are controversial and subject to differences in interpretation and conspicuously missing from the literature are uniformity, objectivity & a precise definition of what constitutes such a case. A compromised tooth is defined as 'a complex clinical syndrome that can result from any structural or pathologic disorder that impairs the ability of the tooth to function properly without some type of restoration. Such a tooth can be treated by removal of the diseased structures & the restoration of the same in the form of prosthetic restorations, endodontic treatment or endodontic surgery. Similarly an end stage tooth can be defined as a pathologic state or structural deficiency that cannot be successfully repaired with reconstructive therapies & continues to exhibit progressive pathologic changes & clinical dysfunction of the tooth. Strategies for treating end-stage tooth include extraction & restoring with a fixed/removable prosthesis or an implant supported restoration<sup>7</sup>.

## IV. CRITERIA FOR OUTCOME MEASURES; SUCCESS OR SURVIVAL

Evidence shows that both have similar, almost identical success rates. Endodontic clinical trials often define success by using outcome from clinical, subjective and radiographic evaluation. In contrast survival is defined as retention of tooth or implant depending on the studied intervention. Endodontic studies that categorize a decrease in size of apical rarefaction as an uncertain event will often show improved success rates during longer follow-up periods because some of these uncertain cases will become successful. On the other hand, implant studies evaluating survival as an outcome measure might show an opposite trend because some of the pathologically involved implants will be lost during longer

follow-up periods. Several studies reporting relatively large series of cases suggested that results of single-tooth implant treatment are excellent in the short run, but long term results are still largely undefined<sup>8</sup>, in contrast to root canal treatment is not only excellent in the short run but tend to improve with passage of time. According to a recent review, the survival of sound and even compromised and treated teeth surpassed that of oral implants, provided that implant loss before loading was added to that during function over 10 year<sup>9,10</sup>

Let us review certain local factors to be considered during treatment planning of a tooth to be considered either for root canal treatment or extraction and replacement with implants.

- 1) *Type of bone supporting the questionable tooth:* Fransson *et al.* reported radiographic evidence of progressive bone loss over a minimum five-year period in patients restored with Brånemark implant-retained prostheses. More recently, a significant relationship was identified between implant loss and periodontal bone of the remaining teeth at implant placement<sup>11,12</sup>. Hence any area with questionable or abnormal bone density or the presence of potentially problematic anatomical structures should persuade practitioners to retain teeth and choose the endodontic alternative.



- 2) *Influence of Coronal Restoration:* Root canal treatment is not considered complete without the placement of an appropriate coronal restoration. But only 13 articles in endodontic literature reported the outcome of root canal-treated teeth with coronal restoration<sup>13 14</sup>. Since coronal restoration of endodontically treated teeth represents the standard of care, outcome studies should be based on the restored endodontically treated tooth.
- 3) *Aesthetics:* It has been stated that esthetic failures in implant dentistry are known to outnumber mechanical failures, especially in the anterior dentition. Periodontal biotype is an important factor in treatment planning for implant versus restoration of a natural tooth. The loss or distortion of the dental papilla is the most common complication after implant placement and can result in “black triangles” and poor esthetic outcome. It has been hypothesized that a certain width of the peri-implant mucosa is required to enable a proper epithelial-connective tissue attachment, or else bone resorption may occur to ensure the establishment of attachment with an appropriate biologic width<sup>15</sup>. According to Torabinejad and Goodacre, when the periodontal biotype is thin but

healthy around a natural tooth then the preservation of the tooth through endodontic therapy might provide more appropriate soft tissue esthetics than does extracting the tooth and placing a dental implant<sup>16</sup>.



- 4) *Periodontal Status:* Both periodontal and endodontic treatment is usually required to save the tooth or the tooth may have hopeless prognosis requiring extraction. Poor oral hygiene is very closely associated with reduced survival rate of implants<sup>17</sup>



- 5) *Restorability:* An argument comparing “endodontic treatment vs. implant therapy” overlooks the crucial finding that it is often the restorative prognosis and not the endodontic prognosis *per se*, that becomes the critical decision-making determinant of whether a tooth is replaced or rehabilitated. Ability to get a good margin, optimal crown: root ratio, not violate biological width, cracks, strength of furcation are all important factors in determining the restorability of the tooth<sup>15, 16 17</sup>.
- 6) *Trauma:* Evidence of vertical or certain horizontal root fractures may require extraction of the tooth Under such circumstance it is feasible to extract and place an implant<sup>1</sup>
- 7) *Form & function:* Whereas endodontically treated teeth maintain the original proprioceptive mechanisms of the natural tooth, implants lack a periodontal ligament and hence lack the ability to perceive functional loads as well as the function of shock- absorption<sup>19</sup>.
- 8) *Systemic factors:* Clinical data show that a history of diabetes may have a negative effect on the healing of periapical lesions. People who have uncontrolled or poorly controlled diabetes, are immune-suppressed or smoke have an elevated risk of developing complications after implants have been placed. Osteoporosis, post-menopausal females without estrogen replacement, are also associated with reduced implant survival<sup>20</sup>.



- 9) *Complications:* Implant therapy complications can be biologic and technical. Early failures are associated with surgical or postoperative complications. Late failures can occur after the restorative phase due to peri-implantitis and biomechanical overloading. Biological complications also include reactions in the peri-implant hard and soft tissues that require adequate clinical and radiographic examination methods for detection. Technical complications include damage of the implant, implant components and superstructures. Unfortunately not all implantologists are equipped to deal with the complications of implants<sup>20, 21</sup>. Interestingly; a comparatively low rate of complications was associated with endodontically-treated post-retained crowns.
- 10) *Paradigm shifts in endodontics:* The beginning of the 21st century should be a secure time for endodontics. Major technological and biological advances like development of innovative new treatment strategies in both nonsurgical and surgical endodontics like Vital pulp regeneration therapies, improved instrumentation and disinfection procedures that include lasers & ultrasonics, modern pharmacological strategies & the use of the operating microscope in endodontic treatment, re-treatment and during surgical endodontic procedures. Thus the clinician is able to provide a greater range of treatment options, with predictable management of cases which may have been considered to be “heroic” in the past.

## V. CONCLUSION

Dental implants provide a useful alternative in replacing teeth poor prognosis. However, they evoke surgical-induced pain/inflammation, twice as expensive as nonsurgical endodontic therapy, are associated with greater post-treatment interventions and provide no better survival rates than the restored endodontically treated tooth. On the basis of these considerations, & in the light of the growing body of evidence on the **impact of oral health on overall health**, the routine selection of single-tooth implants cannot be recommended for the treatment of compromised teeth that could otherwise be saved by endodontic therapy. Because the techniques for dental implants and root canal treatment have been refined and their long-term outcomes have become better understood,

endodontists and implantologists must begin to treat different patient populations. A compromised tooth should be managed with a multidisciplinary approach, and dental implants should be reserved only for the patient with truly end-stage tooth failure

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