Natural Tooth Versus Implant: A Key to Treatment Planning

Rita Chandki, BDS, MDS*
Munniswamy Kala, BDS, MDS

Since time immemorial, man has constantly contrived to replace natural body parts that are either congenitally absent or lost subsequent to disease or injury, so as to maintain a perfect amalgam of form and function. Dental implants have recently become established as a standard treatment protocol for replacing missing teeth. Ostensibly, a dilemma has arisen whether the implant should obviate the necessity to preserve teeth with debatable restorative prognosis. This article attempts to review the work done hitherto and to formulate a combined perspective in such cases.

**Key Words:** natural tooth, implant, treatment

---

**INTRODUCTION**

The only constant in life is change.
—Heraclitus, Greek philosopher

The goal of modern dentistry is to restore normal contour, function, comfort, esthetics, speech, and health, regardless of the atrophy, disease, or injury of the stomatognathic system. For decades, the underlying objective of preserving natural dentition has provided the foundation for clinical decision making in dentistry. To patients and practitioners alike, tooth extraction has been relegated to be a last-ditch attempt when all other possible options fail. However, current trends in implant dentistry have made inroads in this age-old paradigm. A practitioner’s attention is now being drawn toward providing tooth substitutes, often touted as equal or even superior to natural teeth, and many clinicians have moved swiftly to adopt implant dentistry as the new standard of care, so much so that the rapidity of this shift has actually come to be a cause for concern. While it is true that implant dentistry holds a great deal of promise, when posed with a choice between endodontic treatment and implants, a cautious approach to embracing this technology has to be followed, especially since a dental implant is an invasive procedure, is financially more demanding to the patient, and involves the psyche of living with a foreign material within oneself.

**AN IMPLANT IS NOT A TOOTH: A GUIDELINE TO TREATMENT PLANNING**

Implants are fundamentally different from natural teeth in that they do not decay, have no dental pulps to function as early indicators of disease, and have no periodontal membrane. The factors involved in the decision-making process regarding whether a tooth should receive endodontic treatment or be extracted and replaced by an implant pertain to the patient, the tooth and periodontium, and treatment-related considerations.
PATIENT-RELATED FACTORS

Age

The fact that the implant behaves as an ankylosed unit restricts its use to individuals who have completed their jaw growth. There is no upper age limit to implant treatment provided that the patient is fit enough and willing to be treated.

Unresected dental disease and systemic diseases

Concomitant unaddressed systemic illnesses can be a limitation for implant success.

Severe mucosal lesions

Unhealed mucosal lesions are often more problematic around the natural dentition than around an implant site.

Tobacco smoking and drug abuse

Tobacco smoking is a very important risk factor in periodontitis and affects healing after implant placement.

Previous radiotherapy to the jaws

Radiation of the jaws results in endarteritis, which compromises bone healing and can lead to osteoradionecrosis.

Patient comfort and perceptions

Most endodontic procedures are performed with minimal patient discomfort and fewer complications compared with implants. Stereognostic ability is impaired in subjects rehabilitated with osseointegrated implants by about one-third to one-quarter compared with subjects with natural teeth.

TOOTH AND PERIODONTIUM-RELATED FACTORS

Biological considerations

A considerable number of patients we encounter in office practice feel plain frustrated because of recurring problems of caries and periodontal disease. Retaining such teeth via endodontic treatment may not be the best option because of frequently required reinterventions. It may be prudent to extract such teeth and place implants instead. In addition, implants may be a more viable alternative for patients who have a limited ability to maintain routine oral hygiene.

Teeth with unique color characteristics

Color matching can be a significant challenge for a highly visible tooth, such as one with unique dentin hues or large areas of enamel translucency. When such a tooth requires endodontic treatment but does not need a ceramic crown, it may be esthetically advantageous to retain the tooth. When such a tooth requires both endodontic treatment and a ceramic crown, it may not be possible to achieve an appropriate color match because of thickness limitations imposed by the amount of required tooth reduction; the dentist usually can achieve a better result with implants.

Quantity and quality of bone

Regions of low mineralization or poor trabeculation are often associated with a thin or absent cortex, referred to as type 4 bone.

Soft-tissue anatomy

The esthetic result around crowns can be affected negatively by an interdental papilla that does not fill the cervical embrasure space. When the biotype is thin but healthy around a natural tooth, preservation of the tooth through endodontic therapy may provide more appropriate soft-tissue esthetics than a dental implant.

TREATMENT-RELATED FACTORS

Adjunctive procedures

Retaining some teeth via endodontic therapy may result in the need for treatment for periodontal disease, crown lengthening through surgery or orthodontic extrusion, a core buildup or a post and core, or a crown.
Each of these procedures adds complexity. Implant therapy presents similar complexities. Before or in conjunction with implant placement, the clinician may need to perform grafting or distraction osteogenesis so that adequate bone is available.

**Procedural complications**

Endodontic treatment is occasionally associated with procedural mishaps, which can occur during access preparation, cleaning and shaping, obturation, and post space preparation. Complications such as hematomas, ecchymosis, and neurosensory disturbance, however, are not uncommon even with dental implants. Implant loss can occur as a result of the failure of the implant to integrate with the bone or due to bone loss subsequent to integration. Soft-tissue complications such as inflammation with or without proliferation, soft-tissue fenestration with or without concomitant dehiscence before stage 2 surgery, and fistulas have been reported. Mechanical complications such as screw loosening, screw fracture, prosthesis fracture, and implant fracture can also occur.

**Treatment outcomes**

Based on survival rates, it appears that more than 95% of teeth that have undergone endodontic treatment remain functional over time. Multiple previous studies have quoted 5-year implant survival rates of 95% and Kaplan-Meier estimates of 10-year survival of up to 90%.

**FROM THE EYE OF A PROSTHODONTIST**

When considering a fixed prosthesis vs dental implants, one must take the following factors into account:

- Jaw bone resorption: Implant placement prevents long-term bone loss in that area over a fixed prosthesis.
- Improved oral health: Dental implants do not affect the other healthy teeth, while prostheses may require the cutting down of healthy teeth.
- Durability: Dental implants seem to offer a more permanent solution over a fixed prosthesis.
- Oral hygiene: Individual dental implants allow easier access between teeth.
- Esthetics: Generally a dental implant has a better visible appeal due to modern technology, although results may vary with operator skill.
- Treatment plan flexibility: Dental implants enable more flexibility in treatment planning.
- Price: A fixed prosthesis is a more economic option.

**FROM THE EYE OF A PERIODONTIST**

Advanced periodontal disease may be addressed with extraction more frequently, provided that the resulting edentulous area offers sufficient bone for predictable endosteal implant placement and a more predictable prognosis.

“Herodontics” is, however, discouraged when the prognosis is poor, and failure of treatment may result in inadequate bone for implant placement. The cost of the questionable periodontal treatment may result in the inability of the patient to afford the more predictable implant therapy on a subsequent occasion. Endodontics, root amputation, post and core placement, and a nevertheless remaining angled root with poor root surface area are cost prohibitive for the service provided. On the other hand, the recent trend to extract teeth with good prognosis after corrective periodontal treatment is discouraged. The success of implants is not 100% predictable, and implants should not be substituted for natural teeth presenting a good or even fair prognosis.

The decision-making protocol can be summarized as follows.

**Prognosis**

- **>10 years:**
  - Keep tooth and restore as indicated.
5–10 years:
- Make independent implant restoration.
- If abutment must be included, make coping and retrievable prosthesis.
- Make tooth a “living pontic” by adding more implants or splinting to additional teeth.

<5 years:
- Extract and graft.
- Consider implant in site after healing.

FROM THE EYE OF A RESTORATIVE DENTIST

There is no perfect system, and the choice may be bewildering. It is easy for the clinician to believe that a new system is an advancement over the existing ones, but adequate consideration must be given to treatments aimed at preserving and restoring compromised teeth before rushing to extraction and replacement. An ideal treatment plan should address the chief complaints of the patient, provide the most durable and cost-effective treatment, and meet or exceed patients’ expectations whenever possible. And, in a large measure, it should be applicable to both the developed world and third-world countries, where poor dental hygiene is still a major health issue.

**Indications for endodontic treatment**

- Irreversible pulpitis
- Necrotic pulp
- Restorable crowns
- Treatable periodontal conditions
- Salvageable resorptive defects
- Favorable crown-to-root ratio

Endodontic treatment is contraindicated when there is limited remaining tooth structure and the definitive crown will not be able to engage at least 1.5 to 2.0 mm of tooth structure with a cervical ferrule. Implants are indicated when teeth cannot be prepared with adequate retention and resistance form. Other indications for implants include edentulous sites adjacent to teeth without restorations or the need for restorations and edentulous sites adjacent to abutment teeth with large pulp chambers and those with a history of avulsion or luxation.13

**EVIDENCE-BASED RECOMMENDATIONS**

“It is well documented that properly treated natural teeth with healthy but markedly reduced periodontal support, are capable of carrying extensive fixed prosthesis for a very long time, with survival rates of about 90%, provided the periodontal disease is eradicated and prevented from re-occuring.”14

“Based on assumptions that implants perform better than periodontally compromised teeth, teeth that could be saved and used as support, are extracted and replaced with implants, sometimes on doubtful indications.”14

“Peri-implantitis has been found to occur in 16–28% of implant patients after 5–10 years with higher prevalence among patients with multiple implants.”14

“Oral implants when evaluated after 10 years of service do not surpass the longevity of natural teeth even of those that are compromised, for either periodontal or endodontic reason.”15

“Implants do not have a better prognosis than teeth with reduced marginal bone support. The dentist should not recommend extraction of such teeth. There is no evidence available to support an aggressive approach in early extraction of teeth, to preserve bone for later implant placement.”16

“Partnership with commercial enterprise now dominates continuing education. We risk overlooking safety, simplicity and prudence in our clinical judgment.”16
CONCLUSION

Dental implants have an established place as a standard treatment protocol for replacing missing teeth. The debate that has arisen whether implants should obviate the necessity to preserve teeth is, as yet, far from having reached a point of culmination. Both treatment strategies have their respective advantages and shortcomings. It is important to realize that no treatment strategy is a panacea for all ills. A detailed, comprehensive clinical evaluation and understanding of patients’ concerns and expectations should be accounted for, before formulating a definitive treatment strategy. The natural tooth should be looked upon as a possibility rather than an obstacle, whether or not the treatment involves implant placement. In this sense, implants are here to replace missing teeth; they are not intended to replace the natural ones.

Mother Nature, after all, knows best.

REFERENCES


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Tooth</th>
<th>Implant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
<td>Calcium and phosphorus</td>
<td>Primarily titanium and titanium based alloys</td>
</tr>
<tr>
<td></td>
<td>(hydroxyapatite)</td>
<td></td>
</tr>
<tr>
<td>Nature</td>
<td>Living</td>
<td>Nonliving</td>
</tr>
<tr>
<td>Gingival sulcus depth</td>
<td>Shallow</td>
<td>Depends upon abutment length and restoration margin</td>
</tr>
<tr>
<td>Junctional epithelium</td>
<td>On enamel</td>
<td>On titanium</td>
</tr>
<tr>
<td>Connectivity issue</td>
<td>Perpendicular to tooth surfaces</td>
<td>Parallel and circular fibers; no attachment to implant or bone</td>
</tr>
<tr>
<td>Gingival fibers</td>
<td>Complex array inserted into cementum above crestal bone</td>
<td>No organized collagen fiber attachment</td>
</tr>
<tr>
<td>Crest of bone</td>
<td>1 to 2 mm apical to cementoenamel junction</td>
<td>According to implant design</td>
</tr>
<tr>
<td>Nerve supply</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Proprioception</td>
<td>Highly sensitive</td>
<td>No ligament receptors</td>
</tr>
<tr>
<td>Physical characteristics</td>
<td>Physiologic mobility caused by viscoelastic properties of the ligament</td>
<td>Rigid connection to bone, as if ankyllosed</td>
</tr>
<tr>
<td>Adaptive characteristics</td>
<td>Width of ligament can alter to allow more mobility with increased occlusal forces</td>
<td>No adaptive capacity to allow mobility; orthodontic movement impossible</td>
</tr>
<tr>
<td>Connection</td>
<td>Cementum, bone, periodontium</td>
<td>Osseointegration, bone functional anklylosis ligament</td>
</tr>
<tr>
<td>Junctional epithelium</td>
<td>Lamina lucida and lucida, lamina dense zones</td>
<td>Lamina, lamina densa, and sublamina lucida zones</td>
</tr>
<tr>
<td>Connective tissue</td>
<td>Thirteen groups: perpendicular to tooth surfaces</td>
<td>Two groups: parallel and circular fibers</td>
</tr>
<tr>
<td></td>
<td>Decreased collagen, increased fibroblasts</td>
<td>Increased collagen, decreased fibroblasts</td>
</tr>
<tr>
<td>Biological width</td>
<td>2.04 to 2.91 mm</td>
<td>3.08 mm</td>
</tr>
<tr>
<td>Vascularity</td>
<td>Greater, supraperiosteal and periodontal ligament</td>
<td>Less, periosteal</td>
</tr>
<tr>
<td>Probing depth</td>
<td>3 mm in health</td>
<td>2.5 to 5.00 mm</td>
</tr>
<tr>
<td>Bleeding on probing</td>
<td>More reliable</td>
<td>Less reliable</td>
</tr>
</tbody>
</table>


