

Teeth and Dental Implants: When to save, and when to extract.

One of the most difficult decisions a restorative dentist has to make is when to refer a patient for extraction and placement of dental implants. This is a difficult decision on many levels. Often these patients have been in the practice for several years. The restorative dentist may have placed all of the restorations on a particular tooth only to see them fail and ultimately need extraction. At times these situations occur at very difficult times in a patient's life creating emotions; sadness, anger, and often these feelings are complicated by pain and discomfort.

The purpose of this lecture and handout is to give the restorative dentist parameters for referral based on solid scientific evidence found in the literature, and clinical experience. The hope is that this will be useful in discussing the clinical situation and aid in recommending referral.

***Treatment Planning:* The initial treatment plan can be simple or complex depending on the clinical situation the patient presents with. It is important to concentrate on the ideal treatment plan from the start. According to Torrabinijad and Goodachre in JADA, the ideal plan must satisfy the following parameters:**

- 1. The ideal treatment plan must address the patient's chief complaint.**
- 2. Provide the best option for long lasting care with the understanding that nothing in dentistry is permanent.**
- 3. Be cost effective if possible. This is not to mean it needs to be inexpensive.**
- 4. If possible, the treatment should meet or exceed the patient's expectations.**

Problems associated with treatment planning include the issues brought to the table by the stake holders in the plan. These include the restorative and surgical doctors, the patient and insurance companies. As insurance rarely covers dental implants, and reimbursements have not increased appreciably in over 30 years,

(Thornton, Implant Dentistry 2002), the ideal treatment plan truly should not be insurance driven.

A simple treatment planning algorithm can be constructed by looking at the following parameters for individual teeth when deciding whether an extraction of a tooth is indicated in lieu of conventional restoration.

Life Expectancy of Crown and Bridge on Natural Teeth:

It is well known that restorative dentistry has a finite life span. It may be better to say that the restoration may be will not decay, etc, but the tooth beneath it will. Fayed published in 1996 in the Journal of Oral Rehabilitation on 156 fixed partial dentures. He found there to be a 35% failure rate at 10 years. The average life span of a failed bridge was 6.1 years. Interestingly the failure rate was significantly higher in private practice, 46.2% when compared to dental schools, 15.4% over that same period of time. It can be surmised that the difference is due to case selection.

In 1996 Quinn published in the Journal of the Irish Dental Society a study that indicated that the 10 year survival rate of crown and bridge restorations on natural teeth was 76.5% +/- 5.99%.

In 2002, Napangangas published also in the Journal of Oral Rehabilitation a study that showed a 16% failure rate at 10 years. He studied the difference between long and short span bridges as well. He found that fixed bridges that were less than 5 units in length had a greater survival rate compared to those that were 5 units in length or more. He also stated that dry mouth, high levels of bacteria, occlusion, oral hygiene and habits may contribute to increase failure of bridges.

Life Expectancy of Endodontically Treated Teeth:

In 2007 Torabinijad and Goodachre published in JADA a review of over 300 articles on endodontic success. They found that 95% of teeth treated endodontically were functioning five years after treatment. The published 5 year radiographic success rate was 81.5%. This did correspond with other authors in the endodontic literature. The radiographic healed rate of endodontically treated teeth without pre-treatment apical periodontitis was 92%. The healed rate with a pre-treatment apical lesion was 74%.

In 2002 Shimon Friedman published in *Endodontic Topics* an article that stated that contraindications for endodontic therapy include; non-restorable teeth, periodontally guarded or hopeless teeth, patients with extensive dental problems and patients with limited socio-economic resources.

When looking at additional treatments needed to restore some endodontically treated teeth, it is important to remember that often these treatments will shorten the life expectancy of a tooth. Yip published in *Implant Dentistry* parameters for ideal post and core size. Two approaches were discussed. The Preservationist approach would require a minimum of 1.75mm of sound dentin surrounding the post in all dimensions. The Proportionist would state that the post should be less than 1/3 the root diameter. It is obvious that both of these parameters are difficult if not impossible to prove as teeth are not symmetrical, and plane films are 2 dimensional. The post should be as long as the clinical crown of the restored tooth.

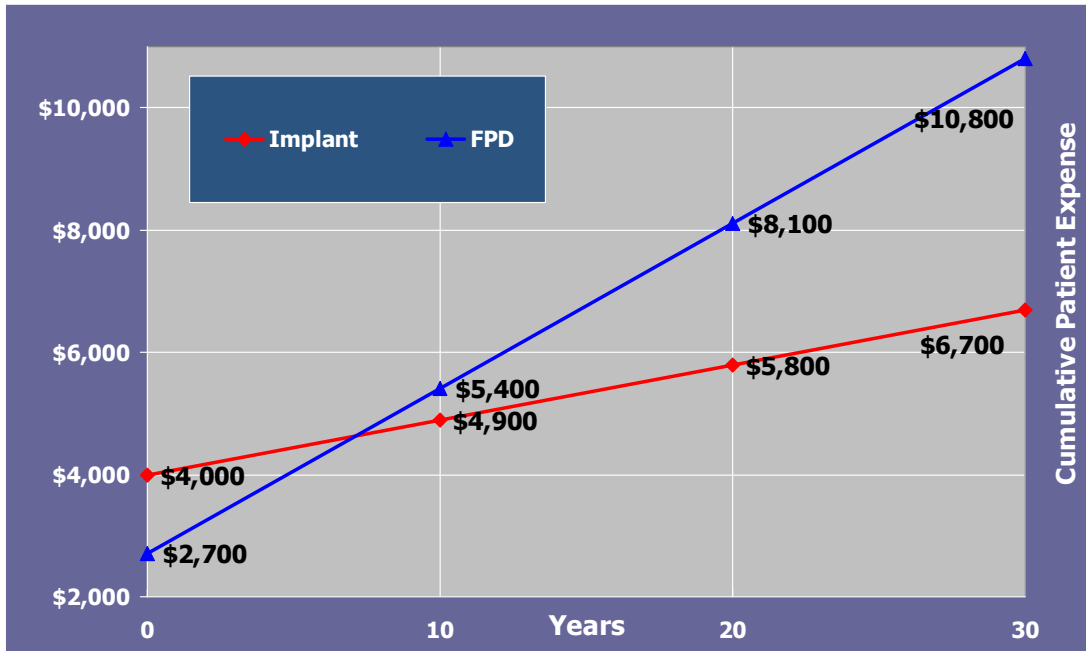
In the same article, he gave survival rates for endodontically treated teeth in differing clinical situations. It was reported that the 5 year survival rate of a tooth treated with RCT and a post and core was 95%. The survival rate of a tooth with RCT and a post and core supporting a fixed partial denture as an abutment was 89%. The survival rate of a tooth treated with RCT and a post and core used as a removable partial denture abutment was 77%.

For a tooth to be considered restorable, there must be at least 2mm of sound tooth structure above the gingival tissue margin for ferrule. Without this there will not be adequate support for the restoration. It was further stated that at least 1mm of sound tooth must be available apical to the post and core margin for a stable restoration.

According to Greenstein in *Compendium 2008*, post failure has been reported to be as high as 22% at 5 years in some studies. He also stated that creating ferrule with crown lengthening surgery can not only compromise crown/root ratio, but can also create un-esthetic results by making teeth artificially long compared to their adjacent teeth.

Life Expectancy of Teeth Adjacent to Dental Implants: In 1999 Dr. Priest published a study in the *International Journal of Oral and Maxillofacial Implant* that evaluated teeth adjacent to dental implants over a 10 year period of time in his private practice. He found dental implants to be 97.4% successful. In the study, he looked at 196 teeth

adjacent to the edentulous spaces. Three teeth were restored as part of the original treatment plan. In ten years only one tooth required a replacement restoration, and one tooth was extracted. The success rate of teeth adjacent to edentulous spaces when a dental implant was placed was 98.98%. In a later article, Dr. Priest showed that a patient who has a dental implant replace a tooth rather than a fixed partial denture will break even at 7 years financially showing that this treatment is truly cost effective for a patient.



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Life Span of Dental Implants: Many articles have been published on dental implant longevity. Most of these articles quote success rates in patients with normal risk to be between 96% and 98%. The studies range from as few as one year to as long as 22 years and sample sizes ranging from the low hundreds to over eight thousand. In 1996 the ADA's Council on Scientific Affairs looked at over 1400 implants with success rates ranging between 94 to 99%. Lower rates were found in high risk patients such as smokers and those with uncontrolled diabetes as an example. Success rates on immediate loading were found to range between 94 and 96%.

Conclusion: A treatment planning algorithm can be surmised from the discussion presented in this lecture. It is based on the bibliography and clinical experience. It may be simply put that more

treatment a tooth needs to be restored, the less likely it should be restored. It can be concluded that:

- 1. Teeth with a crown/root ratio that is greater than 1:1 should be considered extraction.**
- 2. Teeth that are Class II mobile or greater should be considered for extraction if they can not be treated predictably with equilibration or splinting.**
- 3. Bone loss on questionable teeth that jeopardizes the support of adjacent teeth should be considered for extraction.**
- 4. Teeth with a guarded periodontal prognosis or worse, need crown lengthening surgery for ferule that may alter esthetics, or the support of the adjacent should be considered for extraction.**
- 5. Teeth with a guarded or poor endodontic prognosis due to the size of an apical lesion, need for a large post and core for support, or lack of ferule should be considered for extraction.**
- 6. Teeth adjacent to edentulous spaces that require several procedures to save and may be in a beneficial place for dental implants should be extracted due to the strategic nature of its position, and potential benefit to the restoration.**