Has the Predictability of "Osseointegration" Eclipsed That of Advanced Periodontal Treatment?

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Recent systematic reviews suggest that oral implants, when evaluated after 10 years of service, do not surpass the longevity of periodontally compromised yet successfully treated natural teeth.[1,2] While implants are used to replace teeth with questionable or poor long-term prognoses, in most studies reviewed, the prognosis of implant therapy has been compared to teeth that may have originally had a favorable or fair prognosis with traditional therapies.[1] Similar concerns can be applied to the confusion stemming from comparisons of the longevity of natural teeth and implants. Whether implants have a longer life span than that of natural teeth derived from data of epidemiologic studies or routine dental patients is not of interest.[2] During the decision-making process, clinicians should focus on whether implants will survive better than the questionable teeth they are meant to replace, or whether implant therapies will have a more predictable prognosis than the traditional treatment modalities that tend to use these compromised natural-teeth abutments.

Predictability of Advanced Periodontal Therapies

A recent review suggested that tooth abutments with severely reduced but healthy periodontal support compare favorably with periodontally intact abutments.[3] It is worthwhile to mention that in this review, only six papers were included and all periodontal and prosthetic treatments were provided in the specialist clinics of two Swedish universities. It is also important that such a comprehensive treatment was provided only to highly motivated patients, willing and capable of maintaining a high standard of plaque control. This conclusion may not be generalized since after an average of 14 years the total failure rate was 26.4%, and a survival rate of 52.8% at year 20 was reported for long-span fixed dental prostheses.[3]

Even with highly compliant patients, clinical parameters were ineffective in predicting the response of a tooth to periodontal therapies when a tooth was diagnosed as having a questionable prognosis.[4] The sensitivity of using clinical parameters (such as pocket depth or furcation involvement) as predicting factors of tooth loss was 0.60 and specificity was 0.90 (Table 1). Thirty percent of teeth regarded as having a question-able prognosis based on pocket depth or furcation involvement were lost after a minimum maintaining period of 15 years (median treatment time: 20 years). Furthermore, 65% to 88% of questionable teeth were lost in 17% of the 600 patients who responded poorly to the periodontal therapies. These data suggest that the response of periodontally compromised teeth to traditional periodontal therapies may not be predictable initially and early active intervention with strategic extraction may be indicated for 17% of patients. But how predictable is the implant therapy in these patients?

Prognosis of Implants in Replacing Periodontally Involved Teeth with Questionable Prognoses

In studies comparing the mid- or long-term data of the implants lost in patients with and without destructive periodontal disease, the data suggested that the survival rates of the implants were well above 90% and very similar in both groups.[5] If the success rates instead of survival rates were compared and probing depth and annual bone loss were added to the success criteria, then the implant success rate after 10 years was lower in patients with a history of chronic periodontitis (71.4%).

What if we compare the prognosis of the implants to the periodontally involved teeth with questionable prognoses? Randomized controlled clinical trials and comparable long-term studies between implants and natural teeth are not available. However, as mentioned above, the survival rates of implants replacing the periodontally involved teeth were 90% to 92% after 10 years, and that of the periodontally treated teeth regarded as having a questionable prognosis was 70% after an average maintaining period of 22 years.[4,5]

Table 1 Periodontal Clinical Parameters as Predicting Factors of Tooth Loss[4]

	Outcome	
Prognosis*	Lost	Survived
Questionable	666	1,475
Favorable	444	13,096

*A tooth was considered to have a questionable prognosis if it had one or more of the following: furcation involvement, a deep noneradicable pocket, extensive alveolar bone loss, or marked mobility (2 or 2½ degrees on a scale of 3).

Further studies are needed to investigate the prognosis for implants in patients refractory to the traditional periodontal therapies who lost 65% to 88% of questionable teeth in long-term follow up.

Most studies reviewed compared the survival/longevity outcome. Further studies are needed to evaluate the physiologic/physical and behavioral/psychosocial outcomes in comparing the two treatment modalities.

Conclusion

The predictability of osseointegration may not eclipse that of the advanced periodontal treatment in teeth with favorable prognoses, but favorable initial results were observed if implants were compared to teeth with questionable prognoses, especially in a specific group of patients.

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Temporomandibular Disorders

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Definition

"Temporomandibular disorder" (TMD) is a collective term that embraces a number of clinical problems that involve the masticatory muscles, the temporomandibular jont (TMJ) and its associated structures, or both.[1] TMD includes clusters of related disorders such as masticatory muscle disorders, disc displacement disorders, and inflammatory disorders of the TMJ that have many common symptoms. Therefore, it is clearly demonstrated that TMD is not a single disease but a term describing a group of related disorders in the masticatory system.

Etiology

Occlusion was once regarded as the primary etiologic factor for TMD. Therefore, prosthodontists were taught that occlusion should be idealized to treat TMD. However, recent scientific evidence suggests that occlusion may have only a small role in the etiology of TMD. Yet, occlusal factors may be the result, not the cause, of TMD. Obrez and Stohler[2] demonstrated that jaw pain induced by a saline injection to the masseter muscle caused significant displacement of the gothic arch apex and changes in the occlusal contacts. Occlusal change does not induce pain but pain induces changes in occlusion. If there is a cause and effect relationship, causes should precede effects. However, occlusal change did not precede the pain in this experiment.[2] Even if clinicians find an occlusal abnormality in a jaw-pain patient, this may not be the cause of the pain but a sequelae from it.

There are additional criteria to prove the cause and effect relationship, one of which is a dose-response relationship. Correlation between the prevalence and severity of TMD and the amount of retruded contact position to intercuspal position slides is not significant in both patient and nonpatient populations. Furthermore, a significant correlation between the prevalence and severity of TMD and the amount of vertical and horizontal overlap has not been reported either. Thus, a dose-response relationship between occlusion and TMD has not been proven. Strength of the association is also a criterion for causality. Multiple logistic regression analysis on the occlusal characteristics in TMD patients and an asymptomatic control group revealed that the occlusal factors explained no more than 4.8% to 27.1% of cases.[3] Thus, the association between occlusal factors and TMD is weak. Another requirement to prove the causality is consistency of the association. In other words, results from studies employing different research designs should coincide. However, papers dealing with the relationship