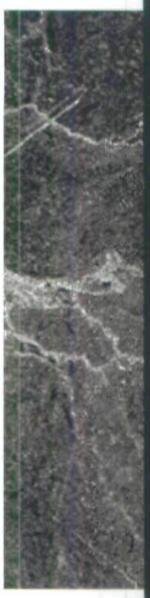

# Perspectives

## IMPLANT OR ROOT CANAL THERAPY: A PROSTHODONTIST'S VIEW

I read with interest the editorial by Dr. Martin Trope in Volume 17, Number 3, 2005, of the *Journal of Esthetic and Restorative Dentistry*. Clearly, dental implant therapy has emerged as a viable treatment modality for the replacement of single or multiple missing teeth, and dental implants have experienced significant levels of clinical success. While I generally agree with Dr. Trope's assessment that root canal therapy (RCT) should be the first choice of therapy for a tooth that exhibits signs and symptoms of irreversible pulpitis (rather than extracting and replacing them with dental implants), I do not concur with his assessment that other categories of teeth in need of RCT are necessarily better served by re-treatment. A careful assessment of published data for both treatment modalities is required to provide patients with sufficient data to make an informed decision about their treatment.

An assessment of the literature suggests a very high level of clinical success for dental implant therapy. A comprehensive systematic review of implant-supported fixed partial dentures (FPDs) reports that dental implants supporting FPDs are successful at the 95.4% level at 5 years and at the 92.8% level at 10 years.[1] Reports of single-tooth implant replacements have claimed success rates of 97% via meta-analysis.[2] Five-year periimplant biologic complications (soft tissue mucosal lesions) have been calculated to occur in 8.6% of all implants assessed.[1] Obviously, with dental implant therapy, pulpal- and caries-related biologic failures are nonexistent.

Crowns and FPDs supported by the natural dentition similarly experience high levels of clinical success. Two meta-analyses reported success rates for FPDs of 85% to 89.1% at 10 years but showed a decline in success to 66% at 15 years.[3,4] Interestingly, when complications for FPDs are evaluated, caries is the leading cause of FPD failure (18% of all FPD abutments), followed by pulpal complications (11–17% of all abutments).

Teeth often require full-coverage restorations to replace diseased, missing, or damaged tooth structure. Although crowns and FPDs have been used in dentistry for over a century, they are not without complications. Studies by many authors report that between 5 and 17% of all teeth that receive crowns or FPDs will ultimately require root canal therapy.[5–10] And, several of these studies suggest that RCT was required in 27 to 31% of the teeth in their studies *prior* to crown or FPD placement.[7,9,10] Authors of another study report that this incidence increases over time, with 2% of the teeth being affected at 5 years and up to 17% requiring RCT by 25 years.[11] With 35.3 million crowns and 10.2 million FPDs placed in the patients in the United States annually,[12] it seems that there will be sufficient numbers of teeth in need of RCT to keep us all very busy.

For those teeth that do require root canal therapy, followed by a crown or FPD, the complications do not end there. Classic studies of restored endodontically treated teeth demonstrate failure rates of teeth that have undergone RCT and received dowels and cores at 5.2% for single crowns, 10.2% for FPD abutments, and 22.6% for removable partial denture abutments; failure rates for teeth that have undergone RCT with no crown or dowel were 24.2%.[13–15]

Yes, Dr. Trope is correct in stating that there "are enough spaces in

our patients' mouths that legitimately require implant therapy"—according to the US surgeon general's report, 9.7% of the adult population (18 yr or over) are completely edentulous; by age 17 years, 7.3% of US children have lost at least one permanent tooth to caries; and by age 50 years, American adults have lost an average of 12.1 teeth.[16] Additionally, a recent report projected that the unmet need for FPDs and removable partial dentures (and perhaps dental implants) to replace missing teeth in the partially edentulous population will increase from 488 million hours (in 2005) to 560 million hours in less than 15 years.[17]

Published endodontic success rates vary widely. We have known for decades that a root canal system infected with bacteria will develop a periapical lesion.[18] We also know and fully appreciate that careful endodontic instrumentation, and excellent disinfection and meticulous obturation of the root canal space can result in a successful RCT. However, authors have reported that clinical success rates decline by 10 to 20% *if* a periapical lesion is present radiographically.[19] Additionally, a recent report states that a patient with a periapical lesion *and* type 2 diabetes is less likely to have a successful RCT than is a nondiabetic patient.[20] With clinical obesity and diabetes increasing in the United States, this may ultimately affect a large patient cohort. And, clearly, the literature supports the notion that endodontic specialists have success rates that are much better than general practitioners. Dr. Trope indicated in his editorial that re-treatment of teeth that have previously undergone RCT has a success rate of 60 to 75%; however, given the published success rates of dental implant therapy, is that really good enough for our patients? I believe he may have made the case for consideration of implant therapy for these "at risk" teeth very convincingly.

Yet, the controversy continues. Although data is available, reasonable methods for the longitudinal assessment of a given tooth in a particular patient are lacking. Say, for example, a patient presents with a mandibular second molar crown that has debonded, with recurrent caries that results in a carious exposure, and with the need for crown extension surgery to provide a sufficient "ferrule effect" to the proposed replacement crown. Although there may be at least five or six different ways to treat this particular tooth, do we know the risk-to-benefit ratio for each treatment option? Have we assessed the cost for each treatment modality? And, do we know the "best" outcome scenario to present to our patient? Is it not time for the specialties to develop clinical criteria that allow the practitioners to assess the level of "risk" a particular tooth presents, along with objective methods to treat this "at risk" tooth?

Perhaps it is time to promote a comparative trial funded by the US National Institute of Dental and Craniofacial Research (and, yes, it would have to be 10 years in duration or longer) to assess outcomes between RCT and dental implant therapy. I, for one, along with my colleagues in the American College of Prosthodontists, would be delighted to partner with our colleagues in the American Association of Endodontists to develop a proposal for a federally funded, multicenter trial to give us the information we collectively need.

This is a considerable amount of data to assess. However, whereas Dr. Trope believes there is "'tension' between the specialties as to which treatment choice is best for the patient," I would observe that this doesn't have anything to do with the specialties but rather involves the quantity (and more importantly, the quality) of the information we present to our patients to allow them to make an informed decision about their proposed care. Knowledge is power, and it's time to equip our patients with the information they need to make rational, informed decisions about their dental care.

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