

Oral Implants—Quo Vadis?

The advent of oral implants, initiated by Brånemark about 40 years ago, has no doubt revolutionized oral and dental medicine. Conservative prosthodontics have only survived because the financial means of patients in need of tooth replacement are limited. As implants have become reliable treatment options, indications for orthodontic, endodontic, restorative, and periodontal management have changed dramatically. In numerical and economic terms, annual growth rates around 20% worldwide, or even more in some countries, are likely for the future implant market. Growth rates will, however, largely depend on how prices develop. This, in turn, will be determined by whether implants continue to be innovative products or whether they become products for routine everyday use. Two alternatives are conceivable: (1) more innovations, generating more growth price-wise, or, failing this, (2) more low-cost me-too implants. A look at the drug market clearly shows the number of generic drugs to be on the increase. This also applies to implants.

There is no denying that state-of-the-art oral implant treatment can restore masticatory function perfectly well. Further improvements other than minor perfections in technique are unlikely. However, those who claim that a satisfactory esthetic outcome is reliably achievable throughout ignore the realities. An esthetically convincing outcome can usually be guaranteed for candidates for single tooth replacement with anatomically sound conditions. It is, however, highly questionable in patients with extensive gaps and severe bone loss. In edentulous patients, perfect esthetics matching the original natural looks are at best achievable sporadically. While hailed in presentations and lectures, perfect restitution of the teeth, the alveolar ridge, and the gingiva is the exception rather than the general rule. Providing it makes incommensurate demands on the patients surgically and financially, because an acceptable outcome would also need extensive prosthodontic management with tissue replacement.

Patient expectations are growing. Patients want perfect function combined with perfect esthetics. Removable prostheses for restoring the function of an edentulous jaw are considered poor value, even though they are just as good as fixed partial dentures. However, these high patient expectations are often exaggerated and/or the result of pressure from the industry.

Implant manufacturers tend to describe implant treatment in overly simple terms, as if implant placement were as easy as turning a screw into a piece of wood. What's more, they make both dentists and patients believe that an ideal outcome is more or less a matter of fact. Not surprisingly, more and more dissatisfied patients are suing for damages because of exaggerated expectations and because dentists of almost all orientations apparently feel compelled to offer implant dentistry, even if they lack both the training and the experience.

Meanwhile, further major innovations of the implants themselves are nowhere in sight. Going by long-term statistical data—and there is no reason to doubt it—there is little scope for further improvement. However, the conduction of long-term follow-up studies is becoming increasingly difficult, because the implants on the market are often modified after being sold for only short periods of time.

Research has stagnated in a number of areas of implant dentistry. Implant healing is another area with very little scope for future major improvements of clinical relevance. Attempts to improve bone-implant contact and accelerate its development with a number of bioactive materials have had very little effect on mechanical stress tolerance at the bone-implant interfaces. Using currently available tools, clinically effective accelerated maturation of the trabecular bone-implant contacts with better quality and earlier functional loading will continue to be utopian for some time to come. Improvements in the prosthodontic work associated with implant dentistry are a more realistic prospect. These include simplifying or perfecting the fabrication of implant-supported suprastructures. Mechanical connections also appear to have some potential for improvement. Although it is currently completely neglected in implant dentistry, occlusion may well regain importance. Virtual planning of implant surgery and computer-assisted suprastructure and crown fabrication undoubtedly hold considerable promise as areas of research. Current developments in these areas are quite encouraging, but routine use is still far away.

Tissue engineering will unquestionably play a more and more important role in simplifying and perfecting surgical implant placement. At the same time, ridge augmentation with bone autografts, still needed today before or during implant placement, will gradually lose its current importance. Easier and

more sophisticated techniques of tissue augmentation and replacement can also be expected to improve the esthetic outcome. However, the use of these techniques is fragmentary and hesitant. The development of artificial soft tissue for gingival repair is still fraught with problems. Hard tissue replacement continues to be dominated by osteoconductive materials, although these were about to be dumped years ago, and it is questionable whether this will change in the foreseeable future. Osteoinductive materials of different origins continue to be praised and are said to be ready for clinical use. However, clinical evidence of their suitability in implant dentistry is nonexistent. For the time being, their use is limited to potentiating the effects of simultaneously applied carriers. Although there is more reason for being optimistic about hard tissue than soft tissue engineering, it is not very likely that future developments along these

lines will reduce the expenses incurred for oral implant treatment and thus foster its more widespread use. Rather, the opposite may be true.

It goes without saying that the changes in the oral implant landscape are affecting the nature and orientation of reporting in pertinent journals. As more and more dentists become involved in implant dentistry, leading journals are forced to offer more mass-oriented information for the practice setting. However, as their circulation increases, the standard of excellence in reporting is bound to drop. It will be for the editors to strike a compromise between offering information on practical work and reporting research-based scientific evidence. If they fail, the quality of their journals will be at stake.

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Supplemental Issue on Landmark SSID Workshop Coming in Early 2007

The results of the Academy of Osseointegration's 2006 State of the Science of Implant Dentistry (SSID) Workshop will be published in a supplemental issue of the *International Journal of Oral & Maxillofacial Implants (JOMI)* in early 2007. SSID Cochairs Dr Vincent J. Iacono and Dr David L. Cochran brought more than 100 top experts in implant dentistry together to examine the available evidence on the following 8 questions:

Section 1: What is the effect on outcomes of time-to-loading to a fixed or removable prosthesis placed on implants?

Section 2: Which hard tissue augmentation techniques are the most successful in furnishing bony support for implant placement?

Section 3: In patients requiring single-tooth replacement, what are the outcomes of implant as compared to tooth-supported restorations?

Section 4: For teeth requiring endodontic treatment, what are the differences in outcomes of restored endodontically treated teeth compared to implant supported restorations?

Section 5: Does the type of implant prosthesis affect outcomes for the completely edentulous arch?

Section 6: Does the type of implant prosthesis affect outcomes in the partially edentulous arch?

Section 7: How do smoking, diabetes, periodontal disease affect outcomes of implant treatment?

Section 8: How does timing of implant placement after extraction affect outcomes?

The literature reviews conducted on these questions prior to the conference will be published in the supplemental issue along with the conclusions (consensus statements) of each section. This issue, edited by former JOMI Editorial Chairman Dr William R. Laney, will be an important addition to the literature. Look for it in your mailboxes and libraries soon!