A Tribute to Professor Per-Ingvar Brånemark

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Upon entering the last year of the eighth decade in the 20th century, it is appropriate that *JOMI* recognition be given to an individual who has made a significant impact on implant dentistry in the 1980s. Contributors to the inception, evolution, and ongoing development of alloplastic implantation in the oral and para-oral regions have been many and distinguished. In the modern era, however, few if any workers in the field have contributed more to the *scientific rationale* for alloplastic implant use than has Dr Per-lngvar Brånemark, currently the director of the Institute for Applied Biotechnology, Gothenburg, Sweden.

A renowned anatomist and orthopedic surgeon, Professor Brånemark has become an international personality who is devoted to the physical-mental improvement and maintenance of debilitated humankind. Perhaps no other individual in recent history has traveled the world so extensively to inform professional colleagues and the lay public alike that, for the dental cripple, there is hope for a better tomorrow.

The professional career of P-I, as he is known to all he has touched, began at the University of Lund, Sweden, where studies related to the concept of tissue-integrated prostheses began in the Laboratory of Vital Microscopy in 1952. In laboratory studies of blood rheology and wound healing, it is said that quite by accident, and astute observation, he recognized the biocompatible nature of titanium and potential applications this metal had for orthopedic reconstruction. In the ensuing decade, colleagues from other disciplines and institutions were sought out to provide adjunctive expertise in physics, chemistry, physiology, biomechanics, experimental biology, and the dental sciences, which was so essential to, in Brånemark's words, "define limits for clinical implantation procedures that will allow bone and marrow tissues to heal fully and remain as such, rather than heal as a low differentiated scar tissue with unpredictable sequelae."

The *osseointegration* concept evolved, closely coupled with the design of a cylindrical titanium screw with a particular surface treatment to enhance its bioacceptance. Laboratory animal and subsequently human clinical trials were performed to test the efficacy of concept and design. All were not universally or totally accepted by the Swedish dental profession as controversy swirled around Brånemark and pronouncements of early success. However, long-term studies continued and, while significant research investigations and anecdotal patient applications were regularly reported, it was not until 1981 that significant numbers of consecutive clinical cases were published for the scrutiny of an intrigued scientific community.

Interest in and demand for oral implant services has ballooned in the 1980s. The 1982 Toronto Conference on Osseointegration in Clinical Dentistry was the North American trigger mechanism for the introduction of new biomaterials, implant designs, and unlimited treatment recipes for success. A central figure in it all—Per-lngvar Brånemark, MD, PhD.

Beyond the aforementioned historical background to his arrival on the implant scene, there are innumerable spin-offs to Brånemark's catalytic participation. As more experience is gained with the osseointegration concept, the parameters of its definition beg re-examination and perhaps expansion. In coining the phrase, however, Brånemark has coincidentally stimulated international communication among implant disciples and concurrently broadened the scope and depth of scientific investigation and clinical application.

Increased emphasis on the need for scientific documentation of the adequacy of implantable alloplastic devices before professional acceptance has been prompted by Brånemark and colleagues' work. While the FDA has regulated all medical devices in the US since 1976, only recently have endosseous implants been placed in a Class III (premarket approval) category, which will soon require that, to be accepted, implants must stand on their individual scientific foundations acquired from data obtained from controlled preclinical and clinical investigations. As a result, practice and marketing ethics will be enhanced, with patients being the ultimate beneficiaries.

The patient will furthermore realize new levels of restoration success. Direct and lasting bony support for prostheses can result in improved masticatory function, more comfort, and indirectly, improved appearance and self-esteem. While the artificial cannot completely replace the natural dental mechanism, new approaches to treatment planning and service that include more extensive application of the implant modality have already evolved. The dental profession will demand expansion of its undergraduate, postdoctoral, and continuing education curricula to accommodate the growing volume of knowledge in the implant field.

More than likely, P-I Brånemark would be the last to insinuate that he be recognized for precipitating these changes and may be embarrassed even by mention of them here. However, the rush by professional organizations and institutions to bestow honors and awards upon him has been initiated by respectful research and practicing dental communities who are acutely aware of what has transpired. The profession has observed qualities of altruism, perseverance, intellect, congeniality, and partnership in Brånemark—the man and the professional. Above all, he has a particular concern for human flesh as well as heart and soul. He treats all living tissue as if it were his own and is the ultimate conservationist. He is honest, sincere, a gentleman, and in all of his professional endeavors has chosen to continue the pursuit of excellence. We reflect upon Dr Brånemark's accomplishments and pay tribute to him in this last year of the 1980s because he has stimulated a renaissance

in implant dentistry that has and will continue to enhance the quality of patient care.