

The Changing Relations between the Allied Disciplines

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A b s t r a c t

Relations between the allied disciplines of prosthodontics, oral and maxillofacial surgery and periodontics over the last 30 years are reviewed, together with the development of clinical activity progressing from the pre-osseointegration era to the present day. New developments are foreseen in the coming 30 years.

MeSH Key Words: *interprofessional relations; patient care team; prosthodontics/trends*

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Looking at the changing relations between the allied disciplines implies reviewing the past, present and future roles of oral and maxillofacial surgery, prosthodontics and periodontics, and how our areas of involvement have changed over time. I would like to add the subtitle, “The way it was and what we have done with it.” For the sake of simplicity, I suggest that the period under review should be, like Gaul, divided into 3 parts: the pre-osseointegration era, the Brånemark era and the future.

The Pre-Osseointegration Era

In this first period, the contributions of oral and maxillofacial surgery to prosthodontics consisted of what was called preprosthetic surgery. Many operative procedures were devised in an attempt to facilitate the work of the prosthodontist with the difficult denture patient. In general, these procedures were directed toward 2 ends: the surgical removal of obstacles to prosthetic treatment and attempts to increase the denture-bearing area. By the removal of obstacles, I mean the elimination of excessive undercuts, the removal of tori and frena, the closing of openings and so on. Attempts to increase the denture-bearing area included vestibuloplasty in its various forms and methods to increase alveolar ridge height. The latter commonly involved some form of bone grafting or, occasionally, the use of alloplastic materials. The success of these procedures was commonly limited by the fact that the causes of the bone loss and ridge reduction continued to operate after the surgery so that, for example, rib grafts augmenting the mandible would gradually melt away over the following years, leaving the patient and the prosthodontist no better off than before. With

endless ingenuity, the mandible was divided at every conceivable place and in every conceivable plane — for example, by the visor osteotomy, the reverse visor osteotomy, the sandwich osteotomy, and so on and so on — all in an attempt to gain more ground for the surface-borne prosthesis.

Probably the most durable contribution made by oral surgeons was that of improving intermaxillary jaw relationships by orthognathic surgery so that markedly disproportionate jaws or asymmetries could be rectified before denture construction.

Overall, however, we must admit that true success in these preprosthetic endeavours was limited and, jointly, we were often unable to deliver to the patient what was really needed.

In some circles, brave attempts at implant surgery were made, but successes were spasmodic and, with few exceptions, reporting was anecdotal. There was much hope but little science. I have seen one truly outstanding success with a subperiosteal implant and one with a ramus frame implant — but these were exceptions.

Although I gladly pay tribute to the ingenuity and perseverance of those earlier pioneers, I think it is fair to draw a parallel between old-time implantology and the game of golf. It is the occasional spectacular success that keeps hope alive. This was the era of empiricism and, in truth, what was available was aptly described by George Zarb¹ as “halfway biotechnology.” Charlatanism was not uncommon and in many academic circles implantology had such a bad name that some reputable academics were even wary of attending

the 1982 conference held in Toronto, which was organized by our visionary friend, George Zarb.

If we look at the relations between oral surgeons and prosthodontists in that pre-osseointegration era, we know that many good partnerships and lasting friendships were formed. But at the same time, as the Scottish poet Robert Burns² reminds us, it is not always easy to see ourselves as others see us and, behind the scenes, we might have found something like this. The oral surgeon, looking at himself, might see someone who was innovative, resourceful and dextrous, whereas his prosthodontic colleague might see someone who was overconfident, unrealistic and perhaps ineffective. On the other hand the prosthodontist might look at himself and see a true artist, with the hardest job of all (satisfying the patient). His surgical colleague might see the prosthodontist as someone who was not only very demanding, but also grudging in acknowledgement of the surgical contribution.

Jointly then, we were often unable, at least in a predictable way, to provide what was really needed. I have heard George Zarb refer to himself in those days as a mere manipulator of wax and plastic. This fit of self-deprecation was of course inappropriate, but it indicates the deep dissatisfaction that I suspect sensitized him to the wonderful potential of the Brånemark message.

The Brånemark Era

Let me now move on to the Brånemark era, in which I include the last 24 years or so. For many of us in North America, this began with the Toronto Conference of 1982. Against the chequered background of previous implantology, the Brånemark message was intentionally launched with an extremely cautious protocol. After all, here was a prescription for predictable results in implant rehabilitation and the last thing anyone wanted was for it — as a system — to be abused, precautions disregarded and for it to gain a bad reputation. From the beginning, emphasis was placed on teamwork; teams consisted initially of a surgeon and a prosthodontist, and later a surgical nurse and a laboratory technician. Training was provided for teams at 3 levels of complexity:

- Management of the straightforward edentulous mandible. This was the “starter kit,” so to speak, and trainees were strongly advised to complete 10–15 cases before returning for the next level of training.
- Management of the edentulous maxilla; the partial case; the single tooth replacement; the compromised patient including the irradiated patient; developmental problems such as ectodermal dysplasia; and so on.
- A third level for those with special interests consisted of the use of extraoral implants for craniofacial defects, bone conduction hearing aids, etc.

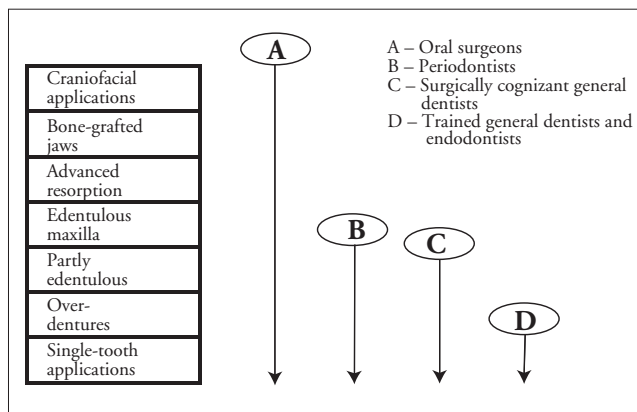


Figure 1: Forecast made in 1989 about the range of procedures likely to be undertaken by oral and maxillofacial surgeons, periodontists and selected general dentists. (Reprinted with permission from The Brånemark Osseointegrated Implant.³)

To spread the “gospel” beyond Toronto, 4 centres in the United States were chosen to try the system, hopefully establish a track record of success and eventually become teaching centres. These were the Eastman Clinic in Rochester, New York; the Mayo Clinic in Rochester, Minnesota; the University of Washington in Seattle; and the University of Texas at San Antonio.

Later it was realized that one surgeon could “occupy” the time of several prosthodontists; periodontists were added to the teams and eventually and more recently training has been directed toward general dental practitioners.

The need for meticulous training was well recognized — training encompassing diagnosis and treatment planning; surgical procedures and restorative steps; and, not least, the topic of maintenance and, inevitably, problems and complications.

The fact that periodontists and general practitioners were not included from the beginning undoubtedly and understandably caused some resentment. There were charges of elitism. Later, as our periodontist colleagues were included in the training sessions, they were able to make their own distinct and highly significant contribution to what was essentially a long process of esthetic refinement.

It is interesting to look back to 1989 when our distinguished prosthodontic colleague Patrick Henry³ ventured to forecast who would be likely to do what. He predicted that oral and maxillofacial surgeons would probably be involved in a wide range of procedures (Fig. 1) whereas periodontists and certain general dentists might more likely concentrate on other items. I think that as a broad generalization, with a few notable exceptions, this forecast has proved remarkably accurate. The fact is, there is enough here for us all to share; but it is natural that some individuals and some specialty groups will focus on specific areas of clinical endeavour.

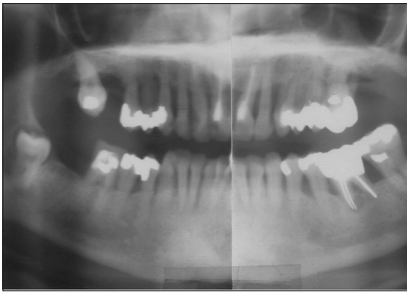


Figure 2a: Female patient in her thirties with relentlessly progressive periodontal disease, despite expert treatment.

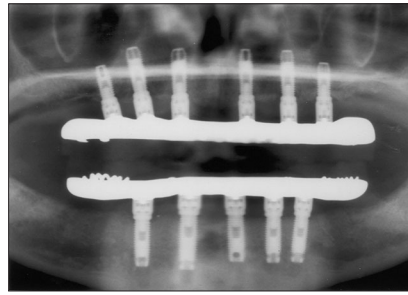


Figure 2b: Panoramic radiograph taken in 1989 showing condition after maxillary and mandibular implants were placed.

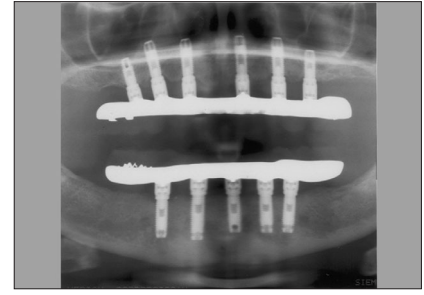


Figure 2c: Panoramic radiograph taken in 2004 showing no impressive bone loss over the last 15 years.

For example, periodontists may choose to concentrate on single-tooth replacement and partly edentulous cases where a high level of esthetic achievement is required. Conversely, some oral and maxillofacial surgeons will undertake major bone grafting cases and reconstruction after severe trauma. There is a case to be made for the treatment of severe developmental problems, irradiated patients and craniofacial patients in special centres where experience can be accumulated and documented.

Furthermore, as training became more widespread, it was appreciated that there were important geographic variations; in some countries the definition of specialties was blurred, and sometimes specialties were not available or not interested.

Training was provided by those in the North American centres to colleagues in the community. The Brånemark system had instant wide appeal because it was based on science, not faith or pious hope; it had behind it lengthy trials, first on animals and later on humans. And it was presented in a professional way.

Importance was properly attached to predictability of results, as well as versatility and retrievability. The Brånemark system was noted for its minimal morbidity.

Most oral and maxillofacial surgeons embraced the new teachings with enthusiasm. A few, accustomed to and excited by more major surgery, were initially disdainful of this dentoalveolar surgery, but they soon realized that in the competitive world of private practice they could not afford to exclude implant surgery from their repertoire. For the prosthodontists, there was great relief, as rehabilitation of the difficult edentulous mandible became possible.

As periodontists became involved, they made significant contributions in many areas but most notably in the detailed esthetic management of implants. By nature and by training they were well suited to dealing with the minutiae of peri-implant anatomy. In a very real sense osseointegration has been the salvation of periodontics because, as Patrick Henry³ wrote in 1989, “the demise of the patient, not of the dentition, is the ultimate limiting factor in periodontal treatment.”

Let me illustrate this by reference to a patient treated by Professor Brånemark, my former prosthodontic colleague, Charles Bolender, and me in 1985. The woman, who was in her thirties, suffered from periodontal disease that appeared relentlessly progressive despite treatment by one of the world’s most renowned periodontists. She underwent complete dental extraction, had immediate complete dentures, then later both upper and lower implants, and we have watched her progress over the last 15 years (Figs. 2a, 2b and 2c). With no continuing bone loss such as she had had previously, this patient shows that the periodontal patient can now look forward to implant reconstruction and maintenance recalls throughout life.

In addition to spearheading the improvement in implant care in the esthetic zone, our periodontal colleagues have made contributions to the detailed management of the peri-implant anatomy and that topic would justify a lecture of its own.

In 1992, a modest little paper by Tarnow and others⁴ focused attention on the importance of the papilla and what we might call “little black triangle disease.” This was a very important contribution, in my opinion, in achieving esthetically pleasing appearances.

Let us look at the changes that have taken place in the subsequent years. Dental school educational programs have been altered to include implant reconstruction in the grand scheme of restorative treatment. Programs of patient education have been developed. For a time, I ran sessions for insurance carriers to educate them in what was now possible and to illustrate the benefits of modern reconstruction.

Changes have taken place within the teaching centres. We now find that “straightforward” cases are treated in the community and the patients who are referred to the academic centre are a special group. In fact, we have been able to develop a true specialty practice where we deal with what one might call end-stage atrophy of the jaws, severe trauma reconstruction, cancer reconstruction and, in particular, irradiated patients. These, together with the craniofacial cases, the hearing aids and so on, represent the bulk of our university practice.

One might ask what has happened to the Brånemark system itself over the years? I will not comment on the endless changes in components — surfaces, shapes, threads, etc. New techniques have been developed, such as the zygomatic implant — the Novum system of “teeth in a day.” Now we even have “teeth in an hour.” There are constant calls for accelerated treatment. Some of these trends give cause for deep concern.

It is interesting to consider the extent to which the original Brånemark protocol has been tested, used and abused. The Brånemark philosophy that had such an appeal to those versed in human biology in general and wound healing in particular was based on the principles: avoiding contamination; minimizing surgical trauma; maximizing precision; and maintaining sterility. Fundamental to the concept of “harnessing the body’s healing capacity” were the ideas of achieving initial implant stability and a period of undisturbed healing. The recommended protocol for the surgical placement of implants was strict and restrictive. But this was surely wise given the uneven and unhappy record of implant surgery in previous years. The recommendations that emanated from Professor Brånemark and his coworkers were not exactly 10 commandments, but they were certainly more than tentative suggestions!

Let us digress to see what we have done to the original recipe. First, we were advised to bury our implants, that is, to use a 2-stage system to avoid connection with the hostile environment of the oral cavity and also to favour protection from premature loading. Within a few years, reports flooded the journals proposing single-stage surgery instead.^{5,6} It was argued that one could use a 2-stage system in a single-stage protocol and that that would be shorter and quicker. The question asked was, would this amended system work? It should have been, would the shorter procedure work as well, as often?

We were told to use sterile surgical operating room technique for implant placement, with elaborate draping of the patient including exclusion of the nares from the operative field. Before long, some authors⁷ claimed to show that the use of “clean” technique as opposed to “sterile” technique was just as successful. Furthermore, exclusion of the nasal airways during surgery was shown to be unnecessary.⁸ This is interesting on 2 counts: first, this paper was written by one of Professor Brånemark’s most staunch disciples; and, second, it has to be seen against the present-day debate about the presence of methicillin-resistant staphylococci in the nares and the possible need to deal with this threat in other forms of surgery. Although surgery under antibiotic cover was regarded as normal and recommended, in 1998 Gynther and others⁹ argued that it was not necessary.

Gentle recommendations to proceed with caution in immediate implant placement into extraction sockets fell on deaf ears. Innumerable papers testified to the success

of immediate implant placement, although frequently without detailed descriptions of how the site should be prepared.^{10–12}

Similarly, advice against loading implants during the healing period were also disregarded and we entered a phase of early loading and even immediate loading in a rush to see to what extent the system could be abused and still have it succeed.^{13–16} It seemed that we were intent on practising on the basis of what we could get away with, rather than what we knew was right.

We were advised to treat the edentulous mandible using a labial vestibular incision and reflecting a lingually based mucoperiosteal flap. This too was disregarded and the virtues of crestal incisions were extolled.^{17,18}

It seemed in accord with good surgical principles that implants should be placed into healthy, uninfected, non-contaminated bone. But in 1995 we find colleagues¹⁹ placing implants into sites that were infected and contaminated — yet with some success.

Initially, we were cautioned against the use of radiation, even in the small doses of panoramic radiographs during the period of osseointegration. Within a short time, Basquill and others²⁰ set out to prove that this too was an example of excessive caution.

What then, you may ask, remains of the original orthodox recommendations? You may well ask! I think we should be cautious in our rejection of those early recommendations. There is everywhere an emphasis on speed, and the advertising literature continually refers to “accelerated treatment.” As my maxillofacial prosthodontic colleague puts it, “How is it we can always find time to do it over, but not enough time to do it right?”

What of the Future?

We are now seeing many changes. The use of implants in orthodontics is increasing. We see the greater use of immediate implant placement, early and even immediate loading. There is more emphasis on implant site improvement, bone grafting (both inlay and onlay), ridge splitting and distraction osteogenesis. These are — mostly — exciting times. *Tempora mutantur et nos mutamur in illis.*

What then of the future? What may we expect in the coming years? Already in 2004 there is a steady growth in medicolegal work related to implant reconstruction. Both surgeons and prosthodontists are vulnerable. We need to keep in mind that there is no foolproof barrier between success and failure, between triumph and disaster. Nerves have been irreparably injured; implant components and instruments have been ingested and inhaled, many times with the expected legal repercussions. Death has even followed implant surgery. The litigious trend will continue in the future, particularly if less-well-credentialed colleagues are launched forth with what may prove to be inadequate training.

I think we will see further improvements in imaging methods, which will be helpful in both the planning and the execution phases. We will see much greater use of computer-guided implant placement. We will see more widespread use of bone morphogenetic proteins and possibly the development of better bone substitute materials. Finally, I think genetic engineering will have much to offer us, possibly beyond our present comprehension. Already we have the production of laboratory cartilage and, in Germany at least, the production of genetically engineered bone.

It seems that we sometimes progress very quickly — not always wisely — and I would like to remind the practising community of the old saying, “Be not the first by whom the new is tried, nor yet the last to cast the old aside.” Meanwhile, we should practise *not* on the basis of what we can get away with, but on the basis of what we know is right.

In conclusion, a tribute to George Zarb to whom I believe we owe so much: let us not underestimate the value of self-criticism. It was, I think, George’s self-critical discontent with his existence in the old days that made him so receptive to the profound significance of the Brånemark message. Contentment may mean happiness, but discontent means progress. George was indeed a visionary. He saw the potential of osseointegration while remaining scientifically sceptical and critical. It was George Zarb who served as a conduit for osseointegration to come to North America and for that, and for what he has achieved in many other fields, we are deeply and forever in his debt. ♦

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