



## In Honor of an Outstanding Role Model

For most people, the designation "Swedish" is likely to conjure up immediate word associations. Alfred Nobel's dynamite and his prizes come to mind; or Ikea and Ingmar Bergman movies; and of course Volvos and Saabs in spite of General Motors and Ford involvement. However, if you are a prosthodontist or in another specialty that does preprosthetic surgery, the name which comes to mind is Per-Ingvar Brånemark's. The genesis of osseointegration and its early nurturing are the results of his pioneering research activities, which have dramatically revolutionized the treatment of complete and partial edentulism as well as the management of maxillofacial deficits.

In May of this year, Dr Brånemark celebrated his 75th birthday and this Journal wants our readership to recognize the profound respect that we, the prosthodontic community, have for this scholar. The world of academia has already acknowledged P-I's contributions through numerous honorary degrees, prizes, awards, and international honors. Our recognition may be belated, but it is certainly deserved and opportune. After all, his is really a very remarkable story that deserves succinct repetition. Like most scientists working on the frontiers of knowledge, he used what must have appeared at the time to be uncertain techniques and materials, often with inadequately controlled conditions. He also encountered many events that could have invalidated his data, but he persisted in his thematic assumptions. Luckily, for us and our patients, he succeeded in introducing a treatment concept that harnesses the body's healing response induced by a scrupulous surgical protocol; chose a specific micro- and macroscopic dental implant surface design for a very specific alloplastic material; and reconciled each clinical step with a time-dependent and site-specific interval of healing *in situ* before occlusal loading was permitted. The rest, as is often said, is history.

I first met Tomas Albrektsson in the late 70s while he was one of Brånemark's many stellar PhD students. I

had visited P-I's laboratory to obtain firsthand insights into his early clinical work in osseointegration and we quickly became good friends as the emerging impact of the applied research rapidly worked its way into our traditional mindsets. So here we both are, over a quarter century later, trying to repeat our original experience and offer our readers a contemporary glimpse of P-I's scientific rearview mirror. We emailed him a series of questions which we felt a young researcher might ask him today. They were not that different from what Tomas and I had originally posed to him in 1977 in the Department of Experimental Anatomy in Gothenburg. They were questions about how and when the notion of osseointegration started; about his experiences growing up in southern Sweden; about the progression of change and influences in his life; and finally his retrospective view about the current status of his own scientific breakthrough. P-I's answers did not necessarily follow our scripted queries, an inevitable reminder of his prodigious lateral thinking capacity rather than following a linear pattern. Nonetheless, his stream-of-consciousness remarks provide fascinating insights that impact many current prosthodontic and surgical concerns.

This is our first IJP interview effort. We hope you will appreciate our conviction that journals such as ours should not only publish scientific papers, but also have a responsibility to bring extraordinary individuals such as Per-Ingvar Brånemark closer to our readership. And above all, we should join together once in a while to recognize and honor outstanding role models and wish them long life, happiness, and much serenity on such a special birthday.

George Zarb  
Editor-in-Chief

## On Looking Back with Per-Ingvar Brånemark

My major interests since school days have been biology, technology, and linguistics. In fact, Charles Dickens remains my favorite author. Since my genetic code is from the farmland in southern Sweden, Mother Nature has always been important in my life, since what grows in the soil is like marrow to the bone.

At University, I had a choice of studying either medicine or engineering, and I ended up with a combination of the two, or bioengineering. It was fortunate that in the 60s, the late Richard Skalak spent a year with my laboratory group, explaining the law and order of biomechanics as based on what we saw in human microcirculation, as well as the capacity of bone to carry and adjust to functional loads.

I finished my basic medical training and a PhD thesis in Lund, and then moved to Gothenburg. It was then a new University, with strong infusions of fresh blood and attitudes. In Lund, I had worked with Professor Philip Sandblom, who introduced meditative surgery, while in Gothenburg Professor Lars-Erik Gelin emphasized blood as a mobile tissue. Together, these became the basic ideas I sought to reconcile for osseointegration. The notion was really initiated during my basic research years in Lund.

Over the years I gradually modified my ideas on the basis of 43 academic theses in medicine and dentistry, which I guided.

The formal clinical introduction of osseointegration in 1965 was supported by Olle Hallén, Alf Öhman, Uno Breine, Jörgen Lindström, and many others. My PhD students were—and still are—very helpful. In fact, most of them now have higher clinical degrees and occupy senior positions in University hierarchy. Some have even retired and a few are watching us from above.

Why the edentulous patient, one might ask, when amputees would have been closer to my medical training? There is a very good reason for my focus on edentulism. In the early 50s, I spent a few summer vacations substituting for local district doctors. I encountered many young women, several of them

nurses, suffering from edentulism and not functioning well with dentures. Since I happened to teach at the new Dental School in Malmö, I referred them there for alternative therapy—but there was none. Later on, I realized that in the Plastic Surgery Department in Gothenburg, several treated cleft patients still had serious dental problems. I worked with Åke Olsson, who was a remarkable orthodontist and who helped me with my experimental animal work and also with the first patients treated with osseointegration. Now we are presenting data from the 150 patients



whom we treated between 1971 and 1975, and finding that the handling of tissue—in surgery and prosthodontics—remains the decisive concern.

I am reminded that Thales the Greek philosopher from 500 BC wrote; “The motive of profit is not decisive for intellectual activity.”

A most important achievement was the initial application of osseointegration to the maxillofacial region, particularly since we have actually followed the entire process of healing and function in these patients for now up to 39 years. But this also only confirms that precision is a signum of good dentistry. That is why I now try to bring dentistry—the oral amputee—together with hand surgery. Both specialties demand absolute respect for a predictable tissue response, as well as exposing the consequences of misjudgment and mistreatment.

I tried, with dedicated support from legal advisors, to keep control over components and procedures that had to be taken over by manufacturers. Unfortunately, I failed, so that now the patient risks becoming a consumer of products, delivering prognostic business success.

I have tried also, without success, to suggest a similar protocol for “dental implants” as we have in Scandinavia for hip and knee joint prostheses—via a center in Gothenburg. Unfortunately, we are now facing the reality of a return to the early years of oral implants. There remains only one relevant criterion for advising our patients on suggested therapy whether



replacing single or multiple teeth, or the anatomy of the jaws and face; and that is long-term multicenter investigations, scrupulously followed up and reported in refereed journals like *The International Journal of Prosthodontics*. Interest is regrettably minimal and protocols of 6 weeks of testing in rabbits with a new miraculous surface appear to make the marketing people happy, but for the patient this is a disturbing element. The most important question is: Why didn't they ask the patient? This is a reminder of the novelist P.J. Woodhouse's rhetorical question of a book title: Why didn't they ask Jeeves? May I remind you of the tragedy with hip joint prostheses in the USA, where production oil contamination resulted in thousands of failures, need for reoperation, and much pain and numerous problems. The same has happened with jawbone implants. We must therefore keep asking: who cares, who controls, who reports? The Toronto conference in 1982 opened the door of osseointegration to clinical dentistry, via the only reliable entrance—the dental Universities, and their frequently critical, reluctant and protective doctors.

Maybe, what we need is to clean the "dirty dental implant stables"—a new start, a new Toronto conference. We must avoid commercial contamination and have strong patient participation plus observers from politics and the media.

Finally, we must not forget that edentulism is equal to an amputation—biologically and psychologically. Respect for the oral invalid is what we should teach the young dental students; that the bone cell with its surrounding matrix does not know whether we expect it to participate in chewing or walking. The fact remains that whatever that cell communicates with (eg, the brain by perception), we can now use it in the function of jaw bone-anchored teeth in rehabilitation management, even after stroke.

My vision regarding the future is clear. We must continue with simplified, minimal surgical and prosthodontic procedures to provide immediate reconstruction of even major cranio-maxillofacial defects—congenital, posttrauma or tumor resection. Expanded teamwork will include cellular engineering or the provision of bone and marrow material by using presurgical cultivation of the patients multipotent stem cells in the circulating peripheral blood. This will prove to be decisive in the continuing evolution of osseointegration. It is tempting to compare Osseointegration to Ten del, which is the Dalai Lama's term for describing interactive coexistence.