We have been using osseointegrated implants and bone regenerative techniques for almost 30 years. This article looks at where we started from and where we have got to – and perhaps most importantly explores where we are going.

Osseointegration has given us one of the most predictable treatments in dental medicine, characterised by success rates in excess of 95%. Until recently we had all got used to telling our patients: ‘Failures happen during the first few months and affect fewer than 5% of implants. If your implants are stable after a year, they will continue to function for the rest of your life.’ Late failures were an extremely rare event.

Unfortunately, the situation has since changed. More and more patients come to our practices with dramatic peri-implant tissue inflammation associated with severe and progressive bone loss. Some researchers and clinicians predict a tsunami of peri-implantitis that risks engulfing our patients in a very rare event.

What did we change?

Let’s briefly go through the different periods of osseointegration:

1. From 1965 to 1980, Professor P-I Brånemark and his co-workers developed the concept of osseointegration, along with the famous Brånemark System.

2. From 1980 to approximately 2000, the Brånemark System was extensively and successfully used all around the world to treat thousands of totally and partially edentulous patients. A particular characteristic of the system was the use of the so-called fixture, a cylindrical implant with threads and a relatively smooth machined surface that was usually positioned using a two-stage surgical approach. Today, 75% of the articles in the literature still relate to this particular machined fixture and describe success rates above 95%, along with a prevalence of peri-implantitis of around 2.5% after 20 years of function.

3. From 2000 onwards, implant companies started producing so-called active surfaces. The implant surface was roughened by sand-blasting, etching, a combination of the two treatments, or anodic oxidation. The rationale was to promote faster and better osseointegration, thus allowing reduced healing periods before implant loading (or in some cases immediate loading). Despite the weakness of evidence of real clinical advantages, these new implant surfaces rapidly invaded the market in the early 2000s, generating a lot of consensus and enthusiasm among most clinicians.

4. Around 2005, the initial problems started coming to light. As had happened some years previously with HA coated implants, a small percentage of patients began to show peri-implant soft tissue inflammation and progressive bone loss. Unfortunately, year by year, the prevalence of peri-implantitis reported in the literature increased alarmingly to between 12% and 43%.

Studies involving ligature induced peri-implant disease demonstrated greater bone loss in implants with moderately rough surfaces, compared with those with machined surfaces. Moreover, the latter exhibited a complete resolution of the disease and no further bone loss after peri-implant ligature removal.

As a result, our confidence in implant treatment has decreased and we no longer feel confident telling our patients: ‘Your implants will function for the rest of your life.’ The reputation of implant treatment itself risks falling to pre-Brånemark era levels, when implantology and implantologists were considered to be the black sheep of dentistry.

When something is wrong, those who can take action have a responsibility to do so. Therefore, I believe the most respected researchers and clinicians – rather than the companies – will take collective responsibility for leading the way back to the traditional Brånemark concept of an implant with a machined surface, loaded only after a sufficient period of time for the bone to adapt to a foreign body, which rather than being called an implant is known as a ‘fixture’. This will restore confidence and credibility to our work, and more importantly provide a long-term safe treatment option for our patients.

Figure 1. Machined implants (red arrows) either side of a failed micro-rough implant (white arrow).

References


