Vertical reconstruction of soft peri-implant tissues

By Dr Tomas Linkevičius, Lithuania

Crestal bone stability around dental implants remains one of the most important features of successful implant treatment. Besides major clinical advantages for the patient, stable marginal bone provides the clinician with psychological comfort and satisfaction, because of the positive long-term outcome (Fig. 1). Therefore, we all need to be aware of possible causes of loss of crestal bone stability and exercise every method to prevent bone resorption.

For almost one decade, platform switching has been considered to be the most effective way to achieve this outcome. It is so effective that almost all implant companies have implemented platform switching as an essential feature of implant manufacture. It has generally been concluded that implant design is more important than the biology itself. However, recent clinical research conducted by our group has found that soft-tissue thickness is an important factor in preserving crestal bone stability around implants. It was determined that if vertical soft-tissue thickness is 2 mm or less, there will be crestal bone resorption of 1.5 mm in extent during formation of a biological seal between the soft tissue and the implant, abutment or restoration surfaces (Fig. 2).

Furthermore, it was clearly shown that even implants with platform switching could not maintain bone if at the time of implant placement vertical soft tissue was thin (Fig. 3). That returns us to the discussion of whether biology or implant design is more important. Well, we need to understand that vertical soft-tissue thickness is a prerequisite of the biological width around implants. Biological width around implants starts to form at the time of healing abutment connection and is complete after eight weeks. This biological seal is the only barrier protecting the osseointegrated implant from the contaminated intra-oral environment and hence most important. Thus, there is a direct connection between the peri-implant mucosa of an edentulous alveolar ridge and peri-implant soft tissue.

It seems that the soft-tissue thickness required to protect the underlying bone around implants is approximately 4 mm, which is longer than the biological width around teeth. There are two ways in which biological width around implants is formed with crestal bone loss without bone resorption. Which one would you like your patient to have? Or which one would you like your mother to have? That is the question we all as clinicians should answer sincerely.

So if we diagnose thin vertical tissue at the time of implant placement, what should we do? There are no current guidelines to follow; however, we need to do something. Considering the prosthetic superstructure and implant-crown ratio some implant manufacturers have launched implants of 4 mm in length, making soft-tissue thickness even more important for users of these products.

So what should the approach be? There are several options, some of which usually follow bone resorption. It is well known that the exposure of the rough implant surface enhances plaque accumulation and the development of peri-implantitis. In other words, the future of such an implant would only depend on the scrupulous cleaning abilities of the patient, what is usually not the case.

Another option might be reconstructing the bone during basic implant bed preparation, especially if a narrow ridge is present. Careful reduction and smoothing of the narrow ridge will not only provide a flat bone surface and a sufficiently wide area of bone for implant positioning, but will increase soft-tissue thickness as well (Fig. 5). While the concept of bone removal to preserve the bone might be acceptable to some clinicians, there is no strong clinical evidence that this procedure increases soft-tissue thickness and reduces crestal bone remodelling.

In conclusion, it must be emphasized that diagnoses of thin vertical soft tissue is very important in implant treatment. Only by acknowledging that tissue thickness is an important factor can we follow protocols that allow us to reconstruct vertical peri-implant tissue and reduce crestal bone loss.

Editorial note: A list of references is available from the publisher.