Safe Reconstruction of Peri-implant Aesthetics

Peri-implant tissue should be regenerated as closely to nature as possible. At the International Symposium Osteology Monaco, 10–12 May 2007, approximately 2,500 participants were shown how to do this reliably. World-renowned experts demonstrated that post-extraction volume loss can be stopped and that connective-tissue transplants could soon be replaced by collagen products.

Physiological bone loss in the wake of tooth extractions may compromise the aesthetic result of implant treatments. Implantologists therefore increasingly seek to stem the bone loss by taking appropriate countermeasures. The doyen of peri-implant tissue research, *Professor Jan Lindhe* (Gothenburg, Sweden), spoke about this highly relevant topic in Monaco, presenting new research on the natural collagen bone-replacement material, Bio-Oss Collagen (Geistlich Biomaterials). In dog experiments, *Lindhe* found that tissue volume in the coronal third of extraction sockets could be completely preserved by inserting Bio-Oss Collagen into the socket and applying it to the buccal bone lamella. With this treatment, the soft-tissue socket cover remains stable for up to three months following extraction; the sockets in the control group were not preserved. This means that more tissue is available for plastic coverage in delayed implantation or augmentation procedures and that part of the bone loss can be compensated for.

Membranes and red aesthetics

Membranes should be integrated into the surrounding connective tissue as soon as possible. According to *Professor Jürgen Becker* (University of Düsseldorf, Germany), they support wound healing and regeneration and exclude undesirable cells from the defect region. According to *Becker's* workgroup, the best material to achieve this is a chemically unmodified collagen membrane (Bio-Gide, Geistlich Biomaterials). To prolong the barrier function of the membrane, various experimental collagen membranes with cross-linked structures were tested. While providing good integration, they sometimes caused inflammation of dehiscences, which in some cases could only be brought under control by removing the membrane. As *Becker* concluded: "Bio-Gide achieves favourable bone regeneration and bone contour. It would seem that this membrane is very difficult to improve on."

"Tissue volume is completely preserved when using Bio-Oss Collagen." Professor Jan Lindhe presented new research on the topic of socket preservation.

A replacement for connective-tissue transplants?

According to *Professor Massimo Simion* (University of Milan, Italy), a sufficient amount of keratinized gingiva is an important prerequisite for peri-implant soft-tissue stability. *Simion's* workgroup is currently testing a novel collagen membrane used in an open-healing procedure as a possible replacement for connective-tissue transplants. *Simion*: "The possible aesthetic result is not perfect, but still very good." However, recommended indications for this membrane are not expected to be published until at least one year from now.

Thanks to the use of connective-tissue transplants, the soft-tissue volume can be augmented and hard-tissue augmentation dispensed with in some cases. However, this requires tissue grafts of considerable thickness, and collecting these grafts frequently gives rise to complaints. To avoid this, a three-dimensional experimental collagen matrix that is sutured in place below the flap is currently being studied at the University of Zürich. Very good results have already been obtained for soft-tissue integration and with regard to the quantity and quality of the keratinized tissue.

Will openly healing membranes soon replace connective-tissue transplants? Professor Massimo Simion reported on a new concept and initial results.

A maritime view: The Côte d'Azur from its sunniest side.

Predictable implant aesthetics

Following local augmentation, long-term studies showed stable peri-implant tissue: Professor Daniel Buser.

"Save implant-supported restorations in the aesthetic zone almost invariably require bone augmentation." According to *Professor Daniel Buser* (University of Bern, Switzerland), the reason is that the buccal bone lamella in the anterior region tends to be very thin and is partially lost to resorption following the extraction of the tooth. "The result is tissue recession – to the extent that the aesthetic result is potentially compromised." *Professor Buser* performs more than 90 per cent of his augmentation procedures directly at the time of implant insertion. The remaining 10 per cent of the augmentation procedures, which in most cases involve more extensive edentulous areas, implant insertion will be performed in a second step (staged approach). The material used is a mixture of autologous bone and a natural bone replacement material (Bio-Oss, Geistlich Biomaterials) as well as a collagen membrane (Bio-Gide). Long-term studies at the University of Bern indicate that no infection or recession occurred and that the bone remained stable.

Trailblazer of tissue engineering

For the future, experts are hoping for a natural replacement material for bone and soft tissue, resorbable membranes that double as spacers and bioactive replacement materials. Intensive research is taking place along these lines, not least with the support of the Osteology Foundation. Bone morphogenetic proteins (BMP) have proven their value in dental implantology as growth and differentiation factors in dental implantology, as have platelet-derived growth factor (PDGF) for periodontological applications. The biofunctional structure and favourable remodelling behaviour of natural bone replacement material (Bio-Oss) may be some of the reasons why this material is particularly suitable as a carrier material for growth factors. As early as 2003, *Jung* and coworkers found in a clinical study that rhBMP-2 improves bone maturation and enhances the contact rate between the bone and Bio-Oss in the context of peri-implant augmentation procedures.

Enthusiastic discussions in the lobby of the Grimaldi Forum.

One system for (almost) all indications

Natural bone replacement materials, frequently in combination with non-cross-linked collagen membranes, are routinely used by leading international experts in the field of bone regeneration. Indications cited for this combination of materials included – in addition to socket preservation and limited peri-implant augmentation – maxillary sinus elevation, for which their suitability is well-documented. A combination of Bio-Oss or Bio-Oss Collagen with the Bio-Gide membrane has also proven its value in regenerative procedures around natural teeth. *Dr Giulio Rasperini*, periodontologist in private practice in Piacenza, Italy, presented impressive and highly aesthetic solutions. He emphasized that the chance of achieving significant gains in clinical attachment using guided tissue regeneration is twice as high, according to the literature, as when a simple flap operation is used.

Conclusion

Approximately 2,500 dentists and oral surgeons from 61 countries attended the International Symposium Osteology Monaco to learn more about the regeneration of periodontal and peri-implant tissues. Supplementary workshops, some of a very practical clinical nature, further enhanced the overall programme. The beautiful surroundings of the Congress Centre, located directly on the Côte d'Azur, were a perfect backdrop for the discussion of aesthetics. All attendants – and of course their patients! – will benefit from the practical implication of the latest research findings.

Dr Martin Gollner, Bayreuth, Germany ■