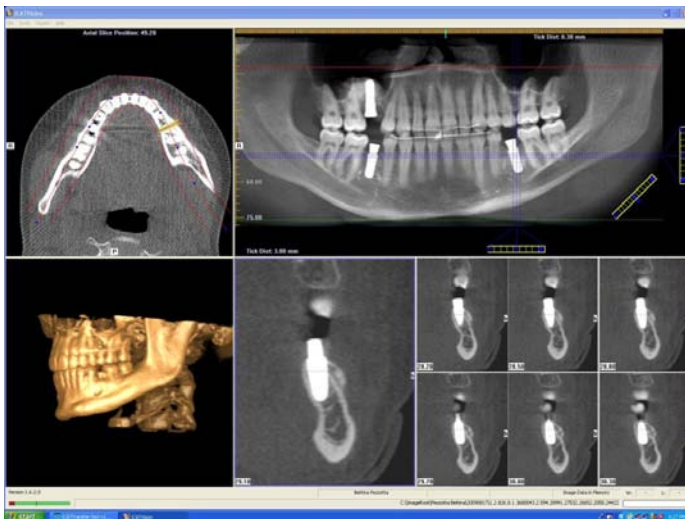


AESCUAR®

Functional Innovations in Pre-Implantological Bone Block Osteosynthesis

Andres Stricker



iCAT volume tomography of the well osseointegrated Implant after exposure

Enossal implantation has been established as a predictably reliable option for treatment after tooth loss. Aiming for actual “restitutio ad integrum”, the implant should meet not only functional requirements, but also aesthetic expectations. As the insertion should be perfect in all three dimensions, this means the end for the postulate of simply using the residual bone available and the beginning of prosthetically perfect implant positioning. Consequently, such perfect implant positioning very often involves accompanying augmentations, since bone deficits need to be reformed either before or during the implantation.

For advanced alveolar crest atrophies less than three millimeters wide, simultaneous procedures can be contraindicated, since the implantation failure rate is significantly increased. In these cases it is preferable to pursue a two-stage approach, in which, ideally, an autologous bone graft from appropriate autologous donor sites should be transplanted to the deficient alveolar crest atrophy region prior to the actual implantation. After a healing period of at least three months, the result is an osseous implant bed optimally integrated in three dimensions, ready for perfect implant positioning. In pre-implantological augmentation surgery there is a clear tendency towards intra-oral bone grafts from the retromolar region, possibly also from the chin region or the zygomaticoalveolar crest, but away from extra-oral transplants from the iliac crest. The congeneric origin and, therefore, similar bone structure, due to the neuroectodermal formation of the viscerocranium and the mandible, make intraoral bone grafts the

superior solution, especially regarding the significantly better absorption properties compared to extra-oral iliac crest grafts, which originate from enchondral ossification.

The decisive criteria for successfully healing and integrating bone transplantations are secure and predictable fixation of the bone grafts and tension-free suture closure. Soft tissue management, however, regarding incision control and lobe design, deserves at least as much attention in the procedure as the contouring and fixation of the bone block. Both factors are interdependent, as excessive stress on the suture leads to dehiscence of the soft parts, eventually resulting in the total or partial loss of the transplant. The results of secondary implantological procedures in partially integrated transplants tend to be esthetically less satisfactory. Therefore, solid fixation and secure suturing are absolutely prerequisite for successful bone transplantation. At the same time, the handling during insertion of the transplant and its fixation at the atrophied residual bone should be as easy as possible. The principles of functionally stable osteosynthesis, which also apply to the implantation of bone grafts, have been known for many years, even before the introduction of enossal implantation. These principles demand, on the one hand, safe and clear fixation in the residual bone and, on the other, avoiding excessive compression of the transplant at the transplant bed, which would entail the risk of fracture and, consequently, partial absorption or complete transplant loss.

In most cases, to minimize the stress on the bone block transplant at the level of the screw heads, a small countersinking groove is reamed into the bone transplant in the region of the sliding hole, using a Rosen burr. This used to be the only method to prevent the round-head screw from exerting excessive pressure during insertion of the transplant. Alternative procedures without a countersinking groove required that the screw head was left protruding and fixated above the transplant. For the surgeon, this situation presented the following dilemma: Either the screw heads were to be countersunk, or the soft tissue treatment would be complicated by the protruding screw heads, which had exerted increased pressure on the soft tissue lobes. To take neither of the two measures would have resulted in a failed bone transplantation, because the screw head pressing on the transplant used to cause stress cracking within the transplant, resulting in secondary absorption or failure, while the protruding screw head accompanied by heavier suturing led to suture dehiscence and, eventually, complete loss of the transplant. The most straightforward way to overcome these challenges was to drill a slight groove in the transplants with a Rosen burr, by which the pressure on the transplant was minimized, and the mucosal adaptation improved.

Fig.1: The intraoral appearance indicates severe atrophy



Fig.2: Intraoperative presentation of the alveolar crest atrophy



Fig.3: Fixation of the retromolar bone graft

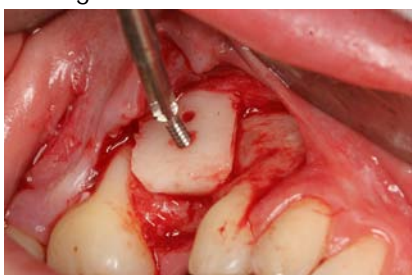
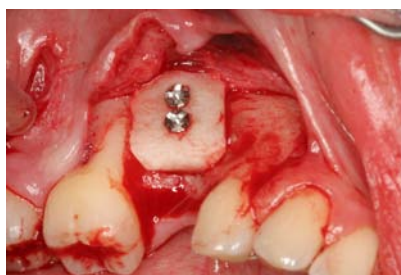


Fig.4: Presentation prior to suture closure



With the osteosynthesis screws developed and supplied by Aesculap as part of their Ergoplant bone fixation sets, there is now a screw with a very flat screw head, which will still not shear off, thanks to the material strength of this titanium screw. The flat screw head minimizes the pressure on the bone transplant without necessitating the precaution of countersinking with a Rosen burr. It also makes the soft tissue management significantly easier, as the suture tension due to increased volume expansion is less pronounced. The micro thread of the screw allows quick fixation, with only a few turns, even in very thin residual bone.

Fig.5: Intraoral appearance after two months



Fig.6: Presentation of the well healed bone transplant after three months augmentation



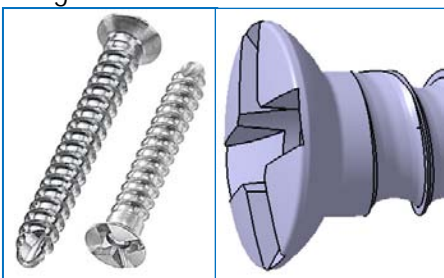
Fig.7: Secondary implantation three months



Fig.8: Implant exposure three months after implantation and six months after augmentation



Fig.9: Innovative screw head design



In conclusion, it can be stated that the innovative screw head design of the new bone fixation screw, combined with the new micro thread and the very robust titanium material, allows very predictably good and successful osteosynthesis for the fixation of bone transplants. For the implantologist performing augmentations, this means high-quality results through successful and functionally stable osteosynthesis by a simpler and quicker procedure.

DR. DR. ANDRES STRICKER

Wessenbergstr. 6
78462 Konstanz
Germany
Phone +49 (0) 75 31 / 91 71 10

