Immediate Rehabilitations Of Atrophic Jaws Using Tilted Implants

By Enrico Agliardi, Matteo Clerici, Matteo Consonni, Davide Romeo

S

ince many years, rehabilita-

tion according to the Brä-
memark protocol (Toronto-

ese) is the gold standard in case of full-arch fixed implant hybrid prostheses 1. This approach consists in the placement of six implants, axially placed in the pre-maxilla or well in the intermaxillary region of the mandible, supporting a final bridge with bilateral distal extensions (cannibales). 2-10 Implant and prosthetic success rates were very high, with a survival of up to 10 years, exceeding 20 years of follow-up 5-8. The original protocol entailed a healing period of at least 6 months for the mandible and 8 months for the maxilla, neces-
sary for the osseointegration of the implants before the prosthetic phases can start. 1 Professor Brånemark, who stated the first protocol for implant dentistry, 1 considered that period of time necessary for the integration of the implants. Today, this perio-
desis is no longer fundamental for the final success of the rehabilitation and implants can be loaded immediately after their insertion 11.

In fact, as testified by recent consen-
sus reports and systematic reviews 3,9, full-arch rehabilitation and im-
mediate implantation seems the predi-
stactic approach if precise guideli-
es during surgical and immediate pros-
thetic phase are followed. In all those papers, authors pointed out that the key factor for the immediate func-
tion seems to be a minimum implant primary stability of 35 Newton 7. This can be achieved by using specific implant morphologies and onosco-
nective surface in combination with a proper preparation of the surgical site that can guarantee a primary stability of 65 Newton 6. A proper stability seems to be a minimum requirement for the immediate function 8. Therefore, a rigid splinting of implants with a final bridge is also very important to provide a firm structures stabilization under occlusal load 9.

The use of tilted implants

The trend in modern implant den-
tistry is the raise of number of fixtures supporting a full-arch fixed restoration as well as the time dlap-
gation between surgical phase and pros-
thetic loading. The lowest number was recorded in the Brånemark Novum concept 10, in which three implants of 5 mm diameter were in-
serted in the intermaxillary area with the help of a surgical guide and prepla-
tified components. This approach was not very versatile because of the preselected components and it was indicated only in patients with a spec-
ific mandibular morphology and oc-
clusal pattern. Therefore, the use of tilted implants led to complete failure of the prosthetic structure in a high percentage of patients. Those results led to the conclusion that at least four implants properly distributed are required to support a fixed prostheses and ensure long-term success 9.

Early studies on immediate loading rehabilitations have included a high number of dental implants, 12 speci-
cally when applied in the mandible because of its poor bone density, but recent reports have shown good out-
comes with the use of only four or six implants.

In a recent technique called All-on-4 (Novum Brånemark, Swe-
den) 12-13, Paolo Malo proposed the use of two anterior implants placed axially in lateral incisors and two posterior fixtures tilted bet-


  

ween 30 to 45 degrees relative to the occlusal plane. A provisional screw-
rretained prosthesis with 10 teeth can be delivered after few hours from the surgery, while the final restora-
tion will be made after 8 months. Medium term results are very encour-
ing. Malo reported 95.5% implant survival rate for 867 mandibular den-
tal implants followed up for 10 years 14, while Agliardi showed 99.36% in the maxilla and 99.73% in the man-
dible, respectively, up to 60 months of loading 15.

One of the innovative aspects of this technique is the inclination of the di-
tal implant, which offers surgical and prosthetic advantages. By tilting the implants, it is possible to place longer fixtures and achieve higher levels of primary stability because of the pre-


terial implant surface in contact with the bone 16. Furthermore, the area of emergence of the inferior alveolar nerve and the anterior wall of the maxillary sinus are characterised by a good bone quality and this enables clinicians to find a solid mechanical support. Therefore, when implants are tilted distally, the prosthetic car-


should reduce the bending 18,19.

Implant survival rates for 867 mandibular dental implants showed that tilting implants causes no detrimental effect on the osseointeg-
ration process.

Immediate full-arch fixed prosthesis

Immediate loading procedures have gained high popularity among cli-


nicians. The reduction of total time of treatment and the possibility to deliver a functional implant bridge few hours after the surgery represent a notable advantage for patients. Therefore, partial edentulous patients with a failing residual dentition can avoid the psychological trauma and discomfort of a transitorial remov-
ble prosthesis 20.

The rehabilitation of edentulous jaws is often complicated by a reduced bone quantity, especially in posterior region, because of the pseudomi-


rization of maxillary sinus or for the superimposition of the inferior alve-


nerve. To face these limitations, clinicians have different therapeutic options, such as long distal cantilever 22, the use of short fixtures 23, sinus lift and bone augmentation 24 or im-
planted fixtures placed in specific anatomical areas such as pterygoid region 25, the tuber 26 or the regma 27.

Any of these procedures requires sur-


geons and osteosynthesis materials. The use of tilted implants can be considered as a minimum requirement for the success of the rehabilitation 28.

Immediate full-arch fixed prostheses

Immediate loading procedures have gained high popularity among cli-


nicians. The reduction of total time of treatment and the possibility to deliver a functional implant bridge few hours after the surgery represent a notable advantage for patients. Therefore, partial edentulous patients with a failing residual dentition can avoid the psychological trauma and discomfort of a transitorial remov-
ble prosthesis 20.

The rehabilitation of edentulous jaws is often complicated by a reduced bone quantity, especially in posterior region, because of the pseudomi-


rization of maxillary sinus or for the superimposition of the inferior alve-


nerve. To face these limitations, clinicians have different therapeutic options, such as long distal cantilever 22, the use of short fixtures 23, sinus lift and bone augmentation 24 or im-
planted fixtures placed in specific anatomical areas such as pterygoid region 25, the tuber 26 or the regma 27.

Any of these procedures requires sur-


geons and osteosynthesis materials. The use of tilted implants can be considered as a minimum requirement for the success of the rehabilitation 28.

Immediate full-arch fixed prostheses

Immediate loading procedures have gained high popularity among cli-


nicians. The reduction of total time of treatment and the possibility to deliver a functional implant bridge few hours after the surgery represent a notable advantage for patients. Therefore, partial edentulous patients with a failing residual dentition can avoid the psychological trauma and discomfort of a transitorial remov-
ble prosthesis 20.

The rehabilitation of edentulous jaws is often complicated by a reduced bone quantity, especially in posterior region, because of the pseudomi-


rization of maxillary sinus or for the superimposition of the inferior alve-


nerve. To face these limitations, clinicians have different therapeutic options, such as long distal cantilever 22, the use of short fixtures 23, sinus lift and bone augmentation 24 or im-
planted fixtures placed in specific anatomical areas such as pterygoid region 25, the tuber 26 or the regma 27.

Any of these procedures requires sur-


geons and osteosynthesis materials. The use of tilted implants can be considered as a minimum requirement for the success of the rehabilitation 28.

Immediate full-arch fixed prostheses

Immediate loading procedures have gained high popularity among cli-


nicians. The reduction of total time of treatment and the possibility to deliver a functional implant bridge few hours after the surgery represent a notable advantage for patients. Therefore, partial edentulous patients with a failing residual dentition can avoid the psychological trauma and discomfort of a transitorial remov-
ble prosthesis 20.

The rehabilitation of edentulous jaws is often complicated by a reduced bone quantity, especially in posterior region, because of the pseudomi-


rization of maxillary sinus or for the superimposition of the inferior alve-


nerve. To face these limitations, clinicians have different therapeutic options, such as long distal cantilever 22, the use of short fixtures 23, sinus lift and bone augmentation 24 or im-
planted fixtures placed in specific anatomical areas such as pterygoid region 25, the tuber 26 or the regma 27.

Any of these procedures requires sur-


geons and osteosynthesis materials. The use of tilted implants can be considered as a minimum requirement for the success of the rehabilitation 28.

Immediate full-arch fixed prostheses

Immediate loading procedures have gained high popularity among cli-


nicians. The reduction of total time of treatment and the possibility to deliver a functional implant bridge few hours after the surgery represent a notable advantage for patients. Therefore, partial edentulous patients with a failing residual dentition can avoid the psychological trauma and discomfort of a transitorial remov-
ble prosthesis 20.

The rehabilitation of edentulous jaws is often complicated by a reduced bone quantity, especially in posterior region, because of the pseudomi-


rization of maxillary sinus or for the superimposition of the inferior alve-


nerve. To face these limitations, clinicians have different therapeutic options, such as long distal cantilever 22, the use of short fixtures 23, sinus lift and bone augmentation 24 or im-
planted fixtures placed in specific anatomical areas such as pterygoid region 25, the tuber 26 or the regma 27.

Any of these procedures requires sur-


geons and osteosynthesis materials. The use of tilted implants can be considered as a minimum requirement for the success of the rehabilitation 28.
Panoramic x-ray evidenced to engage the bone area anterior to the sinodistal 30 degrees inclination, try Fig. 9a and 9b for the direction of surgical sites and the inclination of posterior osteotomies.

Fig. 8 Note the inclination of posterior surgical site compared to the anterior one. Thanks to the inclination, the posterior implant can be placed following the anterior sinus wall, getting an high level of primary stability. Fig. 9 Occlusal view showing implants distribution along the anterior maxilla. All implants have been placed with a 50 Newton torque. 36 degrees abutments are positioned in the posterior implants to correct their inclination, while 17 degrees abutments are screwed on the anterior fixtures for a favourable emergence of the prosthetic screw on the palatal side.

Fig. 7 Post-extraction gaps were filled with autogenous bone before flap closure. The flap was sutured in a way to create a minimum 2 mm collar of keratinized gingiva all around every abutment. This peri-implant seal will improve no lateral excursions.

Verification of passive fit of titanium CAD/CAM frameworks with nano-hybrid composites and low friction contacts between canines with metal abutments. Fig. 10a and 10b Proximal acrylic prosthesis containing ten teeth were delivered three hours after the surgery. Fig. 11a and 11b Full occlusal contacts are limited between canines with the final restorations. Fig. 12 Provisional acrylic prosthesis containing ten teeth were delivered three hours after the surgery.

Fig. 13a and 13b Final prosthesis will be realized with titanium CAD/CAM framework with nano-hybrid composite teeth and using the Bränemark implant. In the lateral view of patient’s smile the final restorations are axially inserted in position of 12 teeth. Full occlusal view of final prosthetic implants with abutments.

Fig. 14 Verification of passive fit of titanium CAD/CAM frameworks with nano-hybrid composites and low friction contacts between canines with metal abutments.

Fig. 15a and 15b Final prosthesis will be realized with titanium CAD/CAM framework with nano-hybrid composite teeth and using the Bränemark implant.

Intra-oral view showed no lateral excursions of the final restorations. Figs. 16a and 16b Full occlusal contacts are limited between canines with final restorations.

Fig. 17a and 17b Full occlusal view of final prosthetic implants with abutments.

Fig. 18 Lateral view of patient’s smile with the final restorations.

Fig. 19 Panoramic radiograph after one year of loading showing implants distribution and bone level maintenance.

References