Guided Bone Regeneration using NeoGen Ti-Reinforced Membranes: Case Reports

By Neoss Ltd, Cases by Dr. Norbert Hassfurther, Germany

Membranes are used in Guided Bone Regeneration (GBR) to aid in the regenerative healing of bone defects. The membrane is surgically placed under the oral mucosa. It stops the soft tissue from growing into the defect and creates space for complete fill of the defect with regenerated bone.

In many cases where substantial bone regeneration is required, such as vertical bone augmentation, a titanium-reinforced non-resorbable membrane is required to achieve predictable results.

NeoGen Ti-reinforced Membrane is a new generation of non-resorbable titanium-reinforced membrane combining the handling and tissue interactions of expanded PTFE with the enhanced barrier function offered by dense PTFE. The membrane has a three-layer design. The outer, soft tissue friendly, PTFE layer has a tight texture that is impermeable to bacteria; the middle layer is a strong and highly shapeable titanium mesh that retains its shape throughout the healing period; and the inner PTFE layer has an expanded texture that enables predictable hard tissue integration. This combination results in a membrane that is easy to handle and protects the augmentation site in a predictable manner.

This article describes three cases of GBR using a Ti-reinforced PTFE membrane and simultaneously placed dental implants without the use of bone substitutes.

Case 1
Vertical ridge augmentation of severely resorbed mandible

A 52 year old male was referred to the clinic with a severely resorbed anterior mandible due to a failed bone graft after removal of a large cyst (Figure 1). Pre-treatment radiographic assessment (Figure 2) showed that the bone height was inadequate to properly house implants. It was decided to perform a vertical ridge augmentation using NeoGen™ Ti-Reinforced Membrane and simultaneously placed dental implants.

A full thickness flap with releasing incisions was opened and four Neoss ProActive Straight implants were placed; two anterior and two posterior. The vertical defect between the two anterior implants was 5-6 mm (Figure 3). Autogenous bone cylinders (3.4 x 4-5 mm) were harvested from the oblique line of the mandible in the molar region and placed between the two anterior implants to accelerate regeneration and to act as space fillers. A NeoGen™ Ti-Reinforced Membrane Large was trimmed, shaped, and fitted at the surgical site and secured buccally with two tacks (Figure 4). A stable membrane configuration was achieved using the implants as tent posts (Figure 5). Stress free flap closure was achieved by releasing the periosteum on the buccal side. The soft tissue healing was uneventful (Figure 6).

After 4-5 months, second stage surgery was performed. A mid-crestal incision was used to lift a flap and excise the membrane.
A 19 year old female presented with a narrow ridge. The treatment plan included regeneration of the ridge using Neocen™ Ti-Reinforced Membrane and simultaneous placement of Neoss ProActive Straight Implants.

A full thickness flap was opened, osteotomies were prepared on the palatal aspect of the ridge, and two Neoss ProActive Straight implants were placed. Both implant sites had fenestrations on the buccal side (Figure 10). A Neocen™ Ti-Reinforced Membrane Medium was trimmed, shaped, and fitted at the implant site. Autogenous bone chips collected during drilling of the implant osteotomies were used to fill the palatal dehiscence (Figure 11). No material was used to fill the buccal fenestration. The strength of the mesh created the space for bone regeneration. The membrane was secured with two tacks buccally (Figure 12). Flap closure was achieved, and the soft tissue healing was uneventful (Figure 13).

After 7 months, second stage surgery was performed. A mid-crestal incision with releasing incisions was used to lift a flap and expose the membrane (Figure 14). The titanium mesh kept the membrane shape stable for the entire healing period. Removal of the membrane revealed that the whole volume enclosed by the membrane had been regenerated with new bone and a new wide ridge had been created (Figure 15). Excess bone on top of the cover screws was removed (Figure 16). PEEK healing abutments were connected to the implants and the flap was closed (Figure 17). Radiographs assessed confirmed bone regeneration around the implants (Figure 18). After 6 months of soft tissue healing (50 months after membrane placement) the implants were temporary restored (Figure 19).

Case 3 Vertical ridge augmentation in the esthetic zone

A 40 year old patient presented with a missing central incisor and a resorbed ridge (Figure 20). It was planned to perform a vertical ridge augmentation with Neocen™ Ti-Reinforced Membrane – Medium Interproximal and simultaneous implant placement of Neoss ProActive Straight implant.

After 7 months, second stage surgery was performed. A mid-crestal incision with releasing incisions was used to lift a flap and expose the membrane (Figure 21). A Neoss ProActive Straight implant was placed an 8 mm vertical defect (Figure 22). Autogenous bone cylinders (3.4 x 4-5 mm) were harvested from the oblique line of the mandible in the molar region and placed around the implant to accelerate regeneration and to act as space fillers (Figure 23). A Neocen™ Ti-Reinforced Membrane Medium Interproximal was trimmed, shaped, and fitted at the surgical site and secured buccally with two tacks (Figure 24). Stress free flap closure was achieved by releasing the periosteum on the buccal side (Figure 25). The soft tissue healing was uneventful (Figure 26-27).

After 6 months, second stage surgery was performed. A mid-crestal incision with releasing incisions was used (Figure 28). The flap was lifted to expose the membrane (Figure 29). The soft tissue can easily be separated from the membrane after healing. The membrane was removed. Newly formed bone fills the entire space created by the membrane (Figure 30). Excess bone on top of the cover screw was removed to get access to the implant (Figure 31). A PEEK healing abutment was connected to the implants and the flap was closed (Figure 32). Radiograph taken directly after abutment connection shows that bone has been successfully regenerated up to the level of the implant platform (Figure 33). The cases show that vertical ridge augmentation and horizontal ridge widening with optimal bone fill can be achieved in a predictable manner when performing GBR using the Neocen™ Ti-Reinforced Membrane.

Conclusion

Bone grafting techniques.

Dr Norbert Hassfurther
MD, DDS, Dr med (PhD), Oral and Maxillofacial Surgeon, Germany

Norbert Hassfurther qualified and was licensed to practice medicine in 1982 at the Jodok-Liebig University in Gissen, Germany. In 1985 he completed his training and qualified to practice dentistry. He completed his Specialist degree in Oral and Maxillofacial Surgery in 1991 and was appointed as Senior Physician at the Department of Oral and Maxillofacial Surgery at the University of Gießen, Germany. In 1994 he established his own private practice in Wetttinberg, Germany where his main focus is in the area of dental implantology and bone grafting. He has lectured throughout Europe on his bone grafting techniques.
Considerations for Long Term Success
Implants are Never Forever!

By Dr. Shankar Iyer, USA

This article will emphasize the impor-
tance of factors to consider be-
fore treatment planning for full
arches with implants. It is not un-
common to make misleading prom-
ises about success rates in im-
plants as an option with unfounded
claims of 98% success rates. Most of
the survival statistics have evaluated
implants for full mouth reconstruc-
tions through preoperative citations
of the original Branemark’s work pub-
lished in 1981. Repeated citations of
this article and the subsequent fol-
low-up articles have made claims of a
high percentage of success with im-
plants. While this is partially true, the
circumstances under which these
implants survived has been incor-
rectly extrapolated to other clinical
situations. The original Branemark
research was done on eponymous
arches with hybrid prosthesis op-
posing either complete dentures or
prosthesis of similar construction.

Patients are now wondering with
these highly overstated survival
rates, why their implants are ail-
ing and need maintenance within
a short span. The answer lies in the
lack of understanding of biomech-
anics. The contention that anything
works has led to confusion in the
field. The diametrically opposite
views of short vs long implants, axial
vs angled implants, graft vs graftless
solutions, regular vs minis, delayed
vs immediate, one piece vs two piec-
es, guided vs free hand placements
and platform switching concepts
have only caused anarchy in the
discipline of implant dentistry. Po-
dium concepts have gained popular-
ity through corporate support and
we see opinion leaders vociferously
making unsubstantiated claims
through limited clinical evidence. A
novice finds it very difficult to get in-
olved in implant dentistry because
the system can be utilized. Let’s not
place the cart before the horse. The
same is true for implant
dentistry. The novice today has a
run. The same is true for implant
surgery, immediate loading, costly
surfaces, flapless surgeries, guided
HA surface modifications, sintered
examples of potential catastrophic
results. Aspirin can never be
debunked for its efficacy, be-
cause so old and dated. The origi-
nal Branemark external hex (now made
out of type 4 Titanium but designed in
1960) is still very functional and a
work horse for hybrid prosthesis.
The surfaces have improved much
but its basic design and biomechani-
cal considerations will be valid for
another 50 years. Premature ado-
cption of technology or materials is
fraught with shortcomings and
unknown consequences. Classical
examples of potential catastrophic
failures include the TPS coating,
HA surface modifications, sintered
surfaces, flapless surgeries, guided
surgeries, immediate loading, costly
BMPs and the list goes on.
The message is very simple – one
crawls before they walk and you
must learn to walk before you can
run. The same is true for implant
dentistry. The novice today has a
wide choice – you can become a
complete arch implant specialist with 4
implants and guided surgery over a
weekend or spend a year learning the
basics and judiciously treatment plan
cases with customized solu-
tions. Half of the participants of our
Maxicourses that we run in the U.S.
and overseas have practitioners who
have placed hundreds of implants
and got their training through cor-
porate education. One does not be-
come a musician by buying a piano
or a musical instrument, nor can you
become a pilot by buying a plane.
Training in implant dentistry has be-
come a fad. Most courses are offered
through companies and the com-
pany’s sole interest is to sell their sys-
tems. There is a whole world of treat-
ment plans that is out there before
the system can be utilized. Let’s not
place the cart before the horse. The
void is very apparent the time is now
for implementing judicious treat-
ment plans. Let’s serve our patients
with what they need and not what
we want them to have.

Iyer’s Top 10 Guidelines for Predict-
able Implantology
1. Diagnose the problem first and
don’t treat because you have a tool
that you can use.
2. Measure the disease and provide
the therapy, don’t sell concepts.
3. Leave what’s new and latest to the
risk takers, stick with proven and
tried systems.
4. Implants are the last resort in treat-
ment planning – exhaust all conserv-
ative modalities.
5. Implants should replace missing
teeth not replace teeth.
6. Expensive implants don’t mean
success rates are better, cheaper does
not mean everything works – you get
what you pay for. There is no sub-
test for evidence based practice.
7. Consider every implant as a failing
implant.

Fig. 1 Pre-op Patient Presentation
Fig. 2 Radiographs of the Falling Maxillary Implant Reconstruction
Fig. 3 Removal of implant FPD
Fig. 4 Tissue Remnants After Removal of Prosthesis and Implant
Fig. 5 4 week post op - after tissue conditioning
Fig. 6 panoramic Views - after take down showing 1 implant
Fig. 7 Bilateral Sinus Lift and Implant Placement
Fig. 8 Stage II Impression for Abutment selection
Fig. 9 Universal Modified abutments for tissue level connection
Fig. 10 Verification Jigs
All of the platforms equi-gingival (Fig 5). An edentulous abutment was utilized to bring the implants into position (Fig 6). A Universal modality was employed to maintain the integrity of the bone tethering the remaining bone. This allowed for healing of the inflamed soft tissue and resorbed bone.

Case Report

This case report will provide a rationale for a sound sequential treatment plan in the management of long-term failure of dental implants.

A 78-year-old Caucasian female presented to our practice with symptoms of sinus irritation and inability to chew her food (Fig 1). Radiograph revealed bone loss till the anterior nasal spine. The patient was informed of the options. She reported having some implants fail in the anterior sextant (Fig 2). After careful examination, it was decided that none the maxillary implants were salvageable. Treatment plan was formulated to stage the case to prepare the patient for the implant supported soft tissue and resorbed bone.

The entire maxillary frame had to be sectioned and removed piecemeal (Fig 3, 4). An immediate denture was fabricated and the tissues were allowed to heal for a period of two months (Fig 5). A stereolithographic model was created to assess the condition of the remaining bone (Fig 6). A decision was made to reconstruct the maxilla with bilateral sinus augmentation. This was performed after a healing period of two months. The implant supported soft tissue and resorbed bone.

Six months following the augmentation, nine implants were placed in the augmented bone (Fig 7). A ventilation jig was utilized to check for passive and accuracy of the positions of the abutments (Fig 10). The metal frame was indexed, cast and tried in (Fig 11, 12). Face-bow transfer record was obtained for orientation relationship. Porcelain overlay for an AFDP prosthesis was processed and inserted (Fig 14, 15). A mutually protected occlusal scheme was designed (Fig 16). The patient’s vertical was maintained. The post op radiograph reveals a stable outcome (Fig 17). The anterior cantilevered crowns provide for optimal esthetics in the extremely resorbed anterior maxilla. The post operative outcome provided an esthetic and functional rehabilitation of the failing implant FPD (Fig 18). The provision of pontics enhanced the outcome in the esthetic zone and in this case it favored the design due to the atrophy that precluded implant placement in the premaxilla. The case has been in function for over 5 years and the patient has been on regular care every 4 months.