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 (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 expose the implants and membrane. It was noted that there was adequate bone height to properly house implants. 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 7). 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 (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).

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pose the membrane. The membrane was removed, excess bone removed and PEEK healing abutments were connected to the implants. As seen in figure 7, the implants were totally enclosed in newly formed bone, and the ridge had been regenerated to the desired height.

Case 2 Regeneration of an extremely narrow ridge

A 93 year old female presented with two congenitally missing teeth in the premolar area of the upper jaw, resulting in a very narrow atrophic ridge, with inadequate bone width to properly house implants (Figure 8). The treatment plan included regeneration of the ridge using Neogen™ Ti-Reinforced Membrane and simultaneously placed 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 9) and palatal dehiscences (Figure 10). A Neogen™ 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). Radiographic assessment confirmed bone regeneration around the implants (Figure 18). After 3 months of soft tissue healing (50 months after membrane placement) the implants were temporary restored (Figure 19).

Case 3 Vertical ridge augmentation in the aesthetic 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 Neogen™ Ti-Reinforced Membrane – Medium Interproximal and simultaneous implant placement of Neoss ProActive Straight implants.

After 7 months, second stage surgery was performed. A mid-crestal incision with releasing incisions was used (Figure 21). The flap was lifted to expose the membrane (Figure 29). Autogenous bone cylinders (1.4 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 22). A Neogen™ Ti-Reinforced Membrane Medium Interproximal was trimmed, shaped, and fitted at the surgical site and secured buccally with two tacks (Figure 23). 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).

Conclusion

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 Neogen Ti-Reinforced Membrane.
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 with implants as an option with unfounded claims of 98% success rates. Most of the survival statistics have evaluated implants for full mouth reconstruc-
tions through profuse 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 situa-
tions. The original Branemark research was done on oescentulous 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 connotation 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 implants and 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-
volved in implant dentistry because the education is being blessed by companies and not through univer-
sities or instutions.

After being involved in implants for over 20 years, I find it to be an hum-
blessing experience with cases that I treat planned two decades ago returning to me for maintenance. Seeing these cases today, I wish I had this experience at that time so I could have served my patients bet-
ter. Today it has taught me a lot in treatment planning. I am able to prognosticate the outcome and its maintenance in the event of an un-
toward incident. The lessons in bio-
mechanics has complemented the initial biokinetic responses that can be predicted initially so that the surviv-
als of implant therapy is prolonged.

I am a firm believer of long term data and I fear the rapid evolution of products and techniques that claim to be faster and easier. If only I could train my patients osteoblasts to work harder and faster so their bones can heal rapidly, all of the problems can be eliminated and failures can be a thing of the past. The life cycles of cells have been a constant over a mil-
lion years and we are told that implants are approved for immedi-
ate load and the cells can adhere to inanimate objects through unique surfaces. My understanding of cell biology may be limited but it is com-
mone knowledge that behavior of cells cannot be hastened because the mitotic cycle for the DNA takes the programmed time period for turn over. Only in disease this rapid un-
controlled proliferation takes place. If this normal cycle is upset then we are look at metaphasic or anaplastic changes according to the turn over rate. Claims made by certain compa-
nies that, bone heals faster with their implants is presumptuous. Bone levels are magically maintained with their unique surface modification is also far from the truth. I have used over 16 different implant systems in my practice over the years and in my training programs and I have found that the osteoclasts are notoriously unbiased. Bone loss is controlled by every system and modifying the sur-
face or creating morphological shifts does not predictably deter bone loss.

In the courses I teach, I recommend waiting for a period of three years after any new feature or biologic product is introduced into implant dentistry. There is no room for lat-
est or newest in clinical practice. If a company is constantly introduc-
ing new product lines and changing their designs, there is only one con-
fusion – They are having trouble and hence they have to change. A robust system that works seldom needs modification for getting pre-
dictable results. Aspirin can never be debunked for its efficacy, be-
cause so old and dated. The original Branemark external hex (now made out of type 4 Titanium but designed in 1965) is still very functional and a work horse for hybrid prosthesis. The surfaces have improved much but its basic design and biomechana-
cal considerations will be valid for another 50 years. Premature adop-
tion of technology or materials is fraught with shortcomings and unknown consequences. Classical examples of potential catastrophic failures include the TPS coatings, HA surface modifications, sintered surfaces, flapless surgeries, guided surgeries, immediate loading, costly BMPs and the list goes on.

The message is very simple – one dribbles 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 com-
plete 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-
tem. 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 Predictive-
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-
tative and conventional 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 substi-
tute for evidence based practice.
7. Consider every implant as a failing.
entity and the trick is to do the best you can to maintain it as long as you can.

8. Select the system that does not change its product line every year.

9. There are no short cuts or faster change its product line every year.

10. The success rates of implants are inversely proportional to the number of years you practice implants.

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 my practice for rehabilitation and management of a failing maxillary implant reconstruction. She reported having some implants 27 years ago and it has been a trouble free experience with symptoms of sinus infections and movement of the entire maxillary prosthesis (Fig 1). Radiograph revealed bone loss around the unilateral subperiosteal implants and the blade implants in the anterior sextant (Fig 2). After careful examination, it was decided that none the maxillary implants was salvagable. Treatment plan was formulated to stage the case to perform subperiosteal and the blade implants and the anterior cantilevered crowns provide for optimal esthetics in the extremely resorbed 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 4 months check-up.