# OSTEOTOME SINUS FLOOR ELEVATION WITHOUT GRAFTING MATERIAL: A 5-YEAR FOLLOW-UP

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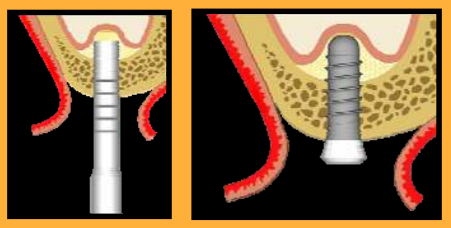
*Topic: Long-term studies*

## Abstract

**Background and aim:** In a previous study (Nedir et al. COIR 2006, 2009), the 1- and 3-year predictability of an osteotome sinus floor elevation procedure without grafting material were evaluated. Here are reported the 5-year long-term results.
**Methods and materials:** 25 Straumann SLA implants (length ≤ 10mm) were placed in 17 patients to rehabilitate 16 molar and 9 premolar maxillary sites. The mean residual bone height was 5.4±2.3mm. Five years after placement, endo-sinus bone gain, crestal bone loss (CBL) and protrusion length were measured on apical radiographs.
**Results:** One patient with 1 implant dropped out. All other implants fulfilled survival criteria and gained endo-sinus bone (3.2±1.3 mm; range 1.0-4.7 mm). Since the 1-year control, additional bone gain was measured for 20 implants. Protrusion length into the sinus decreased from 4.9±1.9 mm after surgery to 1.5±0.9 mm after 5 years. The mean CBL was 0.8±0.8 mm; it stabilized over the 5-year period.
**Conclusion:** This study confirms the bone formation potential of the posterior maxilla beyond the anatomical limits of the sinus floor. Grafting material is not needed to gain at least 3 mm of bone in the atrophic maxilla. The augmented area does not shrink with time; rather, bone gain tends to increase after 1-year.

## Background and Aim

Until now, no study documented the long-term outcome of the newly formed bone without grafting material when the Schneiderian membrane was lifted beyond the anatomical limits of the sinus. Does the endo-sinus bone shrink after 1 year? Does it remain stable over 5 years? This prospective pilot study relates the 5-year long-term performance of short ≤ 10 mm SLA implants inserted in posterior maxillae by means of an osteotome sinus floor elevation (OSFE) procedure without grafting material. It includes clinical assessment and radiological measurements of the bone levels around implants.

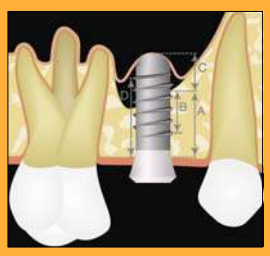


*OSFE procedure gives access to the sinus membrane through a crestal approach with osteotomes.*

*It is less invasive and time consuming than lateral sinus lift.*

## Methods and Materials

**Number of patients**: 17
**Mean age**: 54.2 ± 9.6 years
**Residual bone height:** 5.4 ± 2.3 mm
**Sites:** 16 molar, 9 premolar sites
**Implants**: 25 Straumann SLA implants
10 mm in length (8 and 6 mm when membrane perforation)
**Membrane perforations:** 4 implants
**Healing period**: 3.1 ± 0.4 months
**Restorations**: 4 single crowns, 13 fixed partial dentures



***Parameters measured on radiographs:***

***A:*** *residual bone height under sinus.*

***B:*** *distance from the most coronal implant thread to the most apical visible implant-bone contact.*
*B increase: endo-sinus bone gain.*

***C:*** *implant length protruding in the sinus.*

***D:*** *distance from the most coronal bone-implant contact to the most apical implant thread.*
*D decrease: crestal bone loss.*

## References

- *Nedir, R., Bischof, M., Vazquez, L., Szmukler-Moncler, S. & Bernard, J.P. (2006) Osteotome sinus floor elevation without grafting material: a 1-year prospective pilot study with ITI implants. Clinical Oral Implants Research* ***17****:679-686.*
- *Nedir, R., Bischof, M., Vazquez, L., Nurdin, N., Szmukler-Moncler, S. & Bernard, J.P. (2009) Osteotome sinus floor elevation without grafting material: 3-year results of a prospective pilot study. Clinical Oral Implants Research* ***20****:701-707.*
- *Nedir, R., Nurdin, N., Szmukler-Moncler, S. & Bischof, M. (2009) Placement of tapered implants using osteotome sinus floor elevation technique without bone grafting: 1-year results. The International Journal of Oral and Maxillofacial Implants* ***24****:727-733.*

## Results

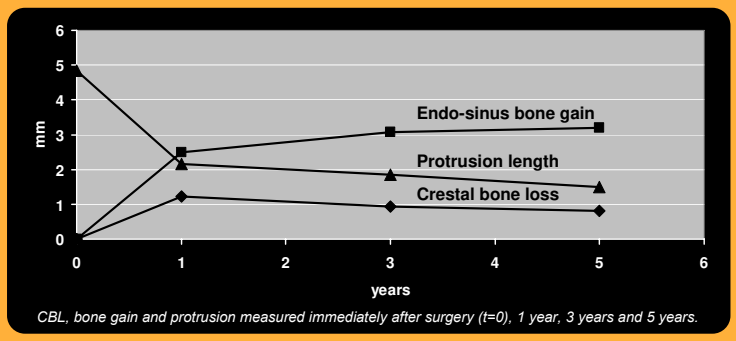
**Drop-out**: 1 implant.
1 patient was out-of-reach.

**Survival rate**: 100%.
All implants were clinically stable.

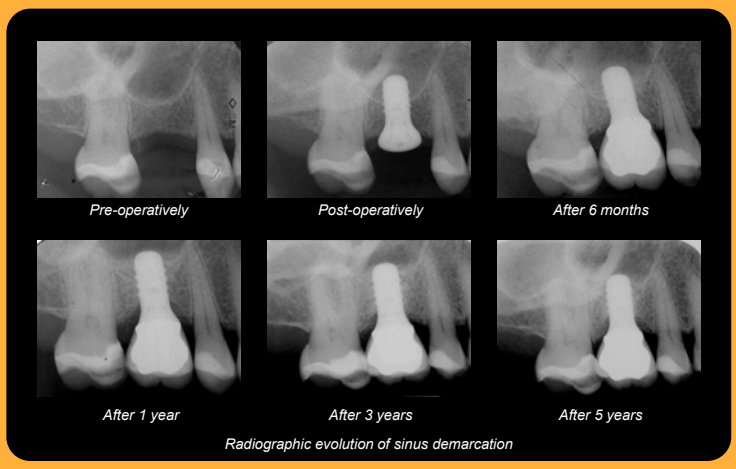
**Mean crestal bone loss**:
0.8±0.8 mm
*CBL was 1.2±0.7 mm after 1 year.*
*It did not increase after 1 year.*

**Mean endo-sinus bone gain**:
3.2±1.3 mm; *range 1.0-4.7 mm.*
*6 implants gained apically ≥ 4 mm.*
*Gain was 2.5±1.2 mm after 1 year.*

**Protrusion length after 5 years:** 1.5±0.9 mm
*The 4.9 mm high protrusion at implant placement retained the Schneiderian membrane and allowed gaining 3.2 mm endo-sinus bone after 5 years. Perforation of the Schneiderian membrane had no effect on the long-term survival rate .*




*CBL, bone gain and protrusion measured immediately after surgery (t=0), 1 year, 3 years and 5 years.*




*Radiographic evolution of sinus demarcation*

5.4 mm of RBH was sufficient to ensure osseointegration and early loading ; 4.9 mm of sinus floor elevation allowed obtaining 3.2 mm of endo-sinus bone gain. These heights were sufficient for long-term stability. The combination of short implants and regenerative properties of the crestal bone beneath the sinus floor can solve almost all clinical situations in a very simple and straightforward way.

## Conclusions

This is the first long-term clinical report of bone formation beyond the anatomical limit of the sinus floor when the Schneiderian membrane is lifted and implants are simultaneously placed without any grafting material. The survival rate after a follow-up of 5 years was 100%. Perforation of the Schneiderian membrane did not harm either osseointegration or bone formation. The reduced CBL measured at the 1-year control remained stable over the 5 years. Bone gain obtained at the 1-year control did not shrink; bone gain tended to increase and reached 3.2 mm after 5 years.

***This pilot study confirms the long-term predictability of the OSFE technique and the potential of bone formation beneath the sinus membrane in the posterior maxilla. It assesses that neither bone grafts nor grafting materials are a pre-requisite for bone formation in the atrophic maxilla.***

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