Abstract

Background: The presence of septa increases the risk of Schneiderian membrane perforation during sinus lift procedure, and therefore, the chance of graft failure increases. We present a safe method of managing septa and, in particular, overcoming small and palatally located septa.

Methods: After the elevation of the flap and the creation of a small bony window positioned anterior to the septum, the Schneiderian membrane is lifted carefully. A thin and narrow osteotome is then placed at the indentation created at the base of the septum, and mobilization of the septum is achieved by gentle malleting. The membrane is again carefully lifted up behind the septum.

Results: There was one small membrane perforation case in all 16 cases, and none of these patients showed postoperative complications such as implant failure, infection, or maxillary sinusitis.

Conclusions: This technique is useful for overcoming the problem of maxillary sinus septa hindering the sinus floor elevation procedure, leading to fewer complications.

Keywords: Maxillary sinus, Sinus elevation, Septum

Background
Sinus lift is a popular method for the placement of dental implants in the atrophic posterior maxillary area. Various causes of Schneiderian membrane perforation have been reported [1], and the presence of septa increases the risk of Schneiderian membrane perforation during this procedure, and therefore, the chance of graft failure increases. The prevalence of maxillary septa is reported to be 7.1–58.3% [2], which is too high to ignore. As expected, the frequency of perforation is higher in the presence of septa (42.9%) than in the absence of septa (23.8%) [3]. Various approaches to overcome the increased risk of perforation in the presence of septa have been proposed [4, 5]. However, these methods involve making wider windows to elevate the membrane around the septa and cannot be used on the small septa located in the palatal area. For these reasons, we will describe here a safe method of managing septa and, in particular, overcoming small septa.

Methods
Surgical technique
A crestal incision is made with a vertical releasing incision on the mesial and distal sides. The flap is then subperiosteally elevated. It is sufficient to create a single small window. The distal margin of the bony window is positioned anterior to the septum or extended distally to include the septum. The size of the bony window should be large enough to allow access of the sinus lifting instruments used to elevate the membrane.

Subsequently, the Schneiderian membrane is lifted carefully on all sides except at the septum. After this preparation is complete, a linear indentation with a round bur or piezoelectric instrument is made at the base of the septum. A thin and narrow osteotome is then placed at the indentation (Fig. 1). To avoid tearing...
the membrane, osteotomy should be performed with
gentle malleting. Mobilization of the septum is achieved
and the membrane is again carefully lifted up behind the
septum. The septum is now floating along with the
membrane. Removal of the septum is not recommended,
as this can cause an undesirable perforation. The Schnei-
derian membrane should then be macroscopically
inspected and the graft material inserted.

Results
We have operated on 16 patients (16 sides) (Table 1).
There were eleven men and five women, mean (SD) age
was 53.63 (8.94) years. All patients received the installa-
tion of dental implants and sinus lifting procedure sim-
ultaneously. Only one patient had a small Schneiderian
membrane perforation which was repaired with Bio-
Gide* (Geistlich Pharma AG*, Wolhusen, Switzerland),
and none of these patients showed postoperative compli-
cations such as implant failure, infection, or maxillary
sinusitis.

Discussion
We obtained a favorable result with the method de-
scribed herein, although further studies with larger sam-
ple sizes are required to validate our result. This
technique only requires one small window, which means
shorter operation times, decreased surgical discomfort,
and better bony in-growth to the grafted area. In
addition, since this method does not involve crossing the
instrument tip of the septum, the risk of tearing the

Table 1 Patients’ details

| Case no. | Age (years) | Sex | Dental implants | Surgery | Septum management | Complications       |
|----------|-------------|-----|-----------------|---------|-------------------|---------------------|
| 1        | 58          | M   | #14, 15, 16, 17| SL + DI + GBR | O                  | No                  |
| 2        | 63          | F   | #26             | SL + DI  | O                  | No                  |
| 3        | 68          | M   | #26, 27         | SL + DI  | O                  | No                  |
| 4        | 46          | M   | #26             | TE + SL + IDI | O        | No                  |
| 5        | 64          | M   | #15, 16, 17     | SL + DI  | O                  | No                  |
| 6        | 42          | M   | #16             | TE + SL + IDI | O        | No                  |
| 7        | 46          | F   | #26, 27         | SL + DI  | O                  | No                  |
| 8        | 46          | M   | #26, 27         | SL + DI  | O                  | No                  |
| 9        | 64          | M   | #16, 17         | SL + DI  | O                  | Membrane perforation |
| 10       | 56          | F   | #15, 16, 17     | SL + DI + GBR | R + O    | No                  |
| 11       | 48          | M   | #26, 27         | SL + DI  | R + O              | No                  |
| 12       | 65          | F   | #26, 27         | SL + DI  | R + O              | No                  |
| 13       | 45          | F   | #16             | TE + SL + IDI | P + O   | No                  |
| 14       | 55          | M   | #26, 27         | SL + DI  | P + O              | No                  |
| 15       | 45          | M   | #26, 26         | SL + DI  | O                  | No                  |
| 16       | 47          | M   | #26, 27         | SL + DI  | P + O              | No                  |

M male, F female, SL sinus lift, DI dental implants, GBR guided bone regeneration, TE tooth extraction, IDI immediate dental implant installation, O osteotom, R round bur, P piezoelectric instrument
membrane is also decreased. This method was useful for managing the septum in the maxillary second molar region and immediate implant placement after maxillary molar extraction, which were quite challenging with the conventional method.

**Conclusion**

We postulate that this technique is useful for overcoming the problem of maxillary sinus septa hindering the sinus floor elevation procedure, leading to fewer complications.

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Not applicable

**Authors’ contributions**

BYH, BSK, and JHJ performed the procedure, designed the study, and subsequently clinically verified by all authors. BYH, JHJ, and JWL wrote the manuscript. BYH and JHJ contributed equally to this manuscript as the first author. All authors read and approved the final manuscript.

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**Availability of data and materials**

Not applicable

**Ethics approval and consent to participate**

Ethics approval was not required. Information of the patient has all been anonymized.

**Consent for publication**

This manuscript does not contain any individual person’s identifier (including individual details, images, or videos).

**Competing interests**

The authors declare that they have no competing interests.

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