
Intraoperative Nasal Transillumination for Maxillary Sinus Augmentation Procedures: A Technical Note

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This article presents a simple, inexpensive method for precisely locating the floor of the maxillary sinus, as well as the presence of any septa, at the time of sinus augmentation surgery. Using an anesthesia light wand placed transnasally to illuminate the sinus, the surgeon can reliably elevate the lateral maxillary wall overlying the sinus with relative ease without fear of placing the osteotomy cuts too far from the sinus floor. The same procedure can be used postoperatively to evaluate the density of the bone graft placed into the sinus prior to closure. (INT J ORAL MAXILLOFAC IMPLANTS 1998;13:569-570)

Key words: light wand, maxillary sinus, sinus augmentation, transillumination

Intraoperative nasal transillumination is a simple method to assist the surgeon performing maxillary sinus augmentation procedures. The long-term success of endosseous implants has spawned a desire to place them into a wide variety of locations in both the mandible and maxilla. The quality and quantity of bone available for implant placement are as varied as are these locations.^{1,2} One particularly challenging area has been the posterior maxilla. The location, size, and anatomic variations of the maxillary sinus have contributed greatly to this challenge.^{1,3} In the sinus augmentation procedure, placement of an autologous particulate bone and cancellous marrow graft (PCBM), autologous corticocancellous bone graft, allogeneic demineralized bone, or hydroxyapatite, or a combination of these materials, is a surgical attempt to enhance the quantity and quality of bone in the edentulous posterior maxilla.^{1,3-6} The presence of aberrant sinus anatomy or septa can make this procedure difficult.^{3,6,7} Such variable sinus

anatomy are reported to be present in 20 to 58% of cases.^{7,8} This report describes a simple method to identify the exact morphology of the sinus floor and locations of septa, if present.

Methods

A standard crestal incision is made over the edentulous maxillary alveolar ridge with an anterior oblique releasing incision extending beyond the mucogingival junction. A full-thickness mucoperiosteal flap is then reflected laterally to expose the lateral maxillary wall. An anesthesia light wand (Aaron Medical Industries, St. Petersburg, FL) (Fig 1) covered with sterile arthroscopy tubing is then introduced by a surgical assistant approximately 1 cm into the ipsilateral nostril. The operating room theater lights are then turned off and the light wand is illuminated, providing the surgeon with an illuminated outline of the maxillary sinus as well as any sinus septa present (Fig 2). The tip of a no. 15 scaler is used to mark points in the buccal cortical bone along the outline of the sinus floor. At this point, the light wand is turned off and the operating room lights are turned back on. The sinus wall osteotomy and infracturing is performed in the usual fashion. After placement of the bone graft, the density of the graft can be confirmed by transillumination. Any voids in or the uneven placement of the graft will be illuminated by the light wand.

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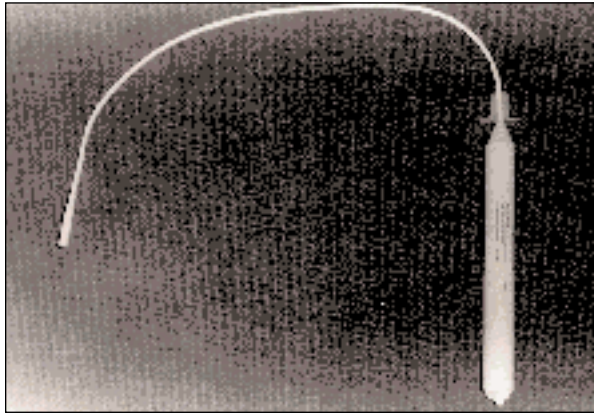


Fig 1 The anesthesia light wand used for the transillumination procedure.

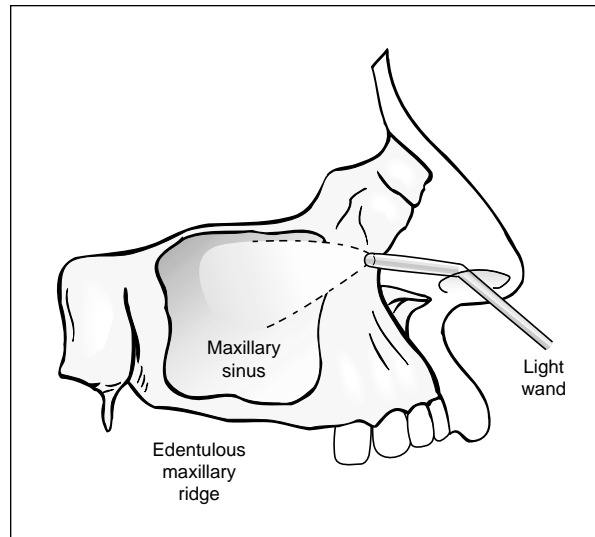


Fig 2 A diagrammatic representation of maxillary sinus transillumination showing the transnasal placement of the light wand and illumination of the sinus floor.

Discussion

Although the presence or absence of sinus septa can be demonstrated radiographically, it can be difficult to determine their exact location intraoperatively.^{2,3,7} Clinical tests such as palpation and percussion are similarly inexact.⁷ So as to minimize the chances of inadvertent perforation of the Schneiderian membrane, it is helpful for the surgeon to know the exact margins of the sinus and any septa. This report presents a simple method for accomplishing this task. The technique can be used in the sedated patient by using topical intranasal anesthetic spray preoperatively in the same manner as would be performed in nasopharyngoscopy. The procedure is well tolerated and would be amenable to the ambulatory surgery environment.

Summary

Intraoperative nasal transillumination has several advantages for the surgeon. It facilitates both accurate diagnosis of aberrant sinus anatomy and precise determination of the exact location of the sinus floor relative to the maxillary wall at the time of surgery. This information guides placement of the sinus wall osteotomies. The same technique can also be applied after sinus bone grafting to confirm graft density and location, improving graft placement and the ultimate success of implants in the posterior maxilla.

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