Management of Soft Tissue Irritation Around Exposed Zygomatic Implant in a Hemimaxillectomy Patient: A Technical Report

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Patients missing portions or all of the maxillary alveolar bone who are restored with zygomatic implants frequently have threads exposed that can be a mucosal irritant. If such irritation is reported, covering the threads with a highly polished titanium sleeve is recommended. The technique of placing said custom sleeve is described. This adjunctive treatment method has eliminated mucosal irritation. Int J Oral Maxillofac Implants 2015;30:e17–e20. doi: 10.11607/jomi.3615

Key words: *maxillectomy, oral mucosal irritation, osseointegration, zygoma, zygomatic implant*

Since its initial introduction into implant prosthodontics by Brånemark[1] in 1988, the zygomatic implant has proven to be a successful anchoring system for fixed prostheses in patients who present with severe atrophy or total loss of all or part of the maxilla.[1–7] Numerous clinical studies have shown high success rates with immediate function.[8–11] For patients who have even "eggshell" thickness residual maxillary bone, the zygomatic implant obtains osseointegration at the apical region in the zygoma and at the coronal region in the sparse bone in the remaining maxilla. However, in patients with portions of the maxilla missing from trauma or pathology, the zygomatic implant solely engages and integrates with the zygoma bone, oftentimes leaving a portion of the coronal aspect of the implant in the oral cavity.[12] A minor complication arises when there is movement of the mucosal tissues around the exposed threads of the implant, creating a chronic irritation. This technique report will illustrate one solution to obviate this clinical condition. The objective of this technical treatment approach requires the placement of a smooth and highly polished titanium sleeve that covers and protects the exposed threads of the zygomatic implant.

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TECHNIQUE

In Fig 1, the Brånemark System zygomatic implant (Nobel Biocare) is successfully osseointegrated in the zygoma bone in a Caucasian woman aged 52 years who is 10 years post cancer surgery. There are approximately 15 mm of exposed threads between the mucosa and the buccal surface of the screw-retained fixed prosthesis. To place the titanium sleeve, the prosthesis must be removed from the patient, and the angulated abutment must also be removed. It is critically important that angulated abutments be indexed by scoring a faint line on the abutment and implant shoulder using a flame-shaped fine diamond bur (Diamond FG, Premier Dental) in a high-speed handpiece (Fig 2). This is necessary because angulated abutments have 12 different orientations in which they can seat on the Brånemark System zygomatic implant. The ideal titanium sleeve is obtained from the sterile transport packaging of the zygomatic implant (Nobel Biocare).

Because the titanium sleeve has two internal diameters that mimic the implant that it is designed to protect during shipping, the clinician must be careful to select the wider-diameter end of the titanium sleeve. Once this is determined, the sleeve can be shortened to an approximate length that will adequately cover the exposed threads. The next step is designed to provide rigid anchorage to the surface of the exposed zygomatic threads.

Approximately 5 mm from the coronal end of the sleeve, a small hole is created using an inverted cone carbide bur (no. 34; SS White) (Fig 3). Using a carbide steel thread tap (Screw Tap Repair Brånemark System RP, Nobel Biocare) with the same thread pitch as the Brånemark System Abutment Screw, threads are very carefully tapped into the newly created hole in the

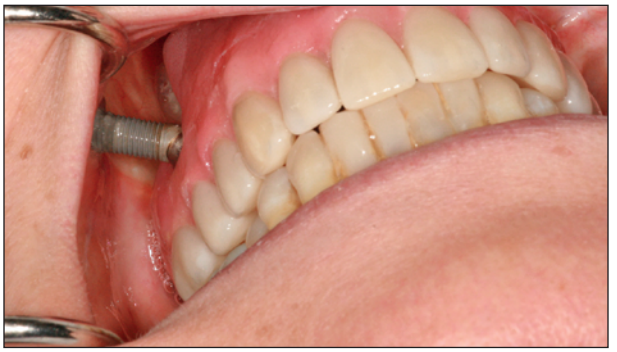

Fig 1 Retracted view of definitive CM Ceramic Prosthesis (CM Prosthetics) supported by zygomatic and pterygomaxillary implants bilaterally. Due to the carcinoma and subsequent surgical removal of the right maxilla, the coronal aspect of the zygomatic implant is exposed in the oral cavity.

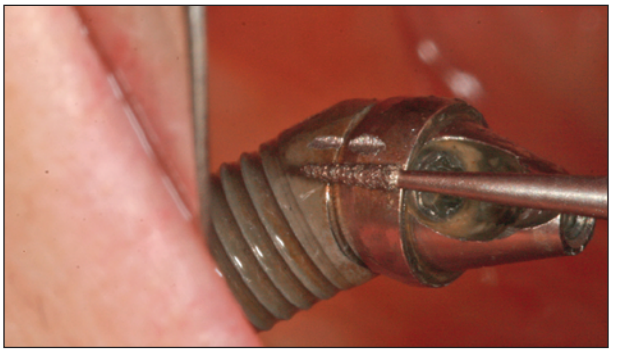

Fig 2 The zygomatic implant shoulder and the angulated abutment are scored with a bur to create a reference for reinsertion of the abutment following the placement of the custom titanium sleeve.

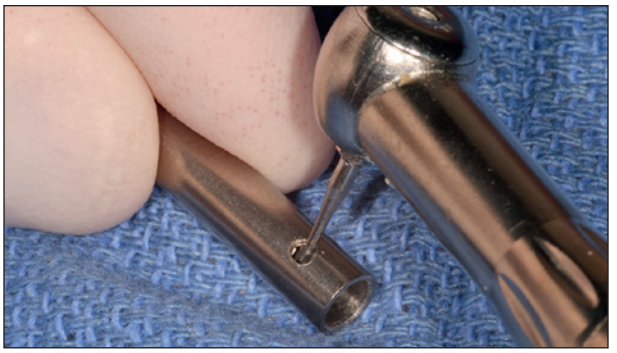

Fig 3 A small hole is opened into the wider end of the titanium carrying sleeve of the zygomatic implant.

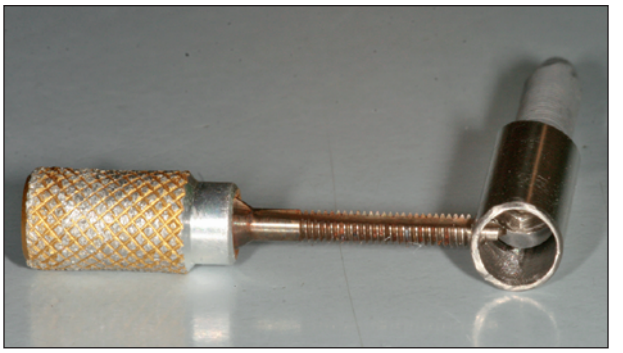

Fig 4 The thread tap for the Brånemark System abutment screw is used to create the thread pitch for the locking screw that will hold the titanium sleeve securely to the zygomatic implant.

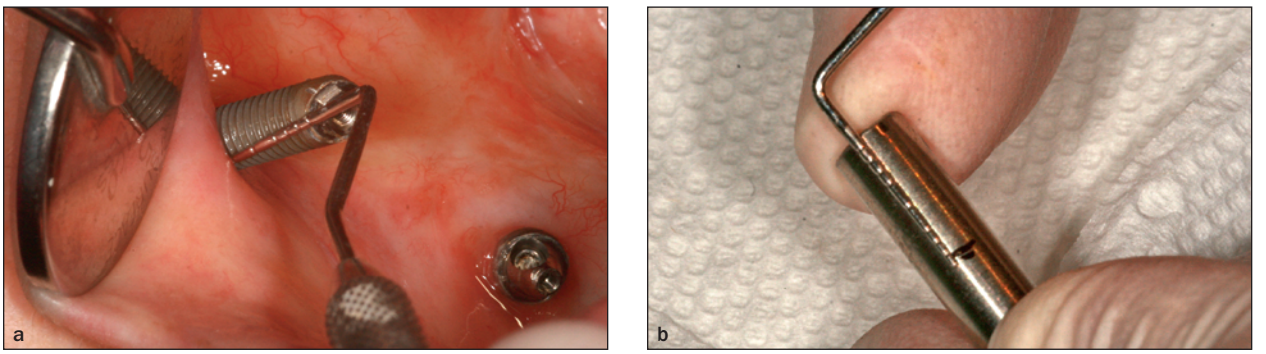

Fig 5 The distance from the mucosal tissues to the shoulder of the zygomatic implant is measured *(a)* clinically and then *(b)* transferred to the titanium sleeve.

wall of the titanium sleeve (Fig 4). The zygoma fixture mount screw, which has the same thread pitch as the Brånemark Abutment Screw, can be reused and introduced into the threaded portion of the titanium sleeve. The precise length of the sleeve can be determined clinically by simply measuring the distance from the mucosa to the last coronal thread of the zygomatic implant (Fig 5a). That measurement can then be transferred to the titanium sleeve (Fig 5b) and marked for precise sectioning. A carborundum disk (Red Flash Separating Disk, Keystone) is used to section the titanium sleeve in a perpendicular fashion, creating a 90-degree angle at the end of the sleeve (Fig 6). The 90-degree angles are then rounded and

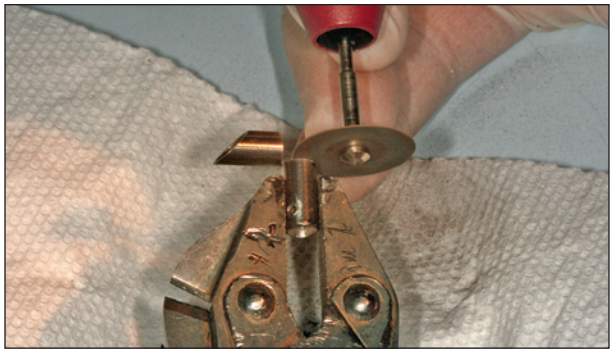

Fig 6 The disk sections the titanium sleeve to the proper length as measured intraorally.

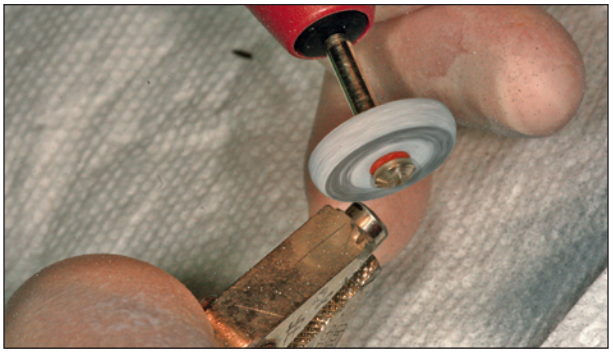

Fig 7 The rubber wheel polishes the sharp 90-degree edge created by the disk to a smooth finish.

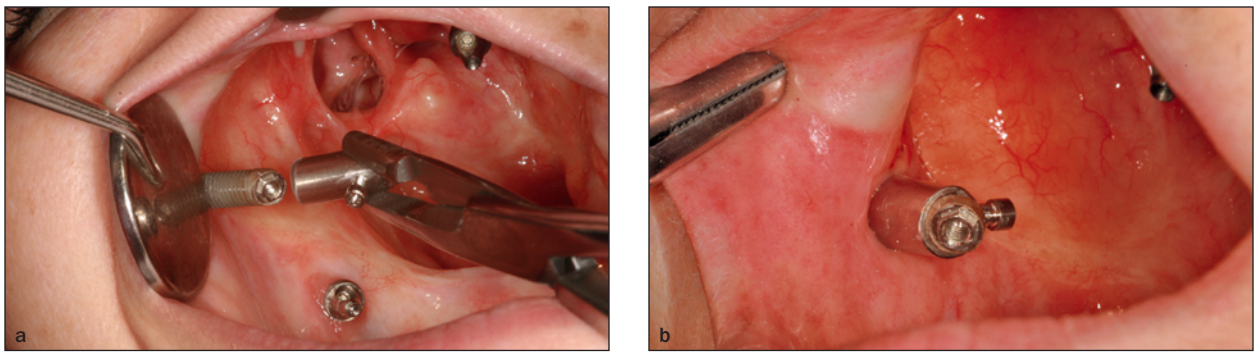

Fig 8 The titanium sleeve is *(a)* delivered to the patient and *(b)* secured into place so that the locking screw will not interfere with the redelivery of the prosthesis.

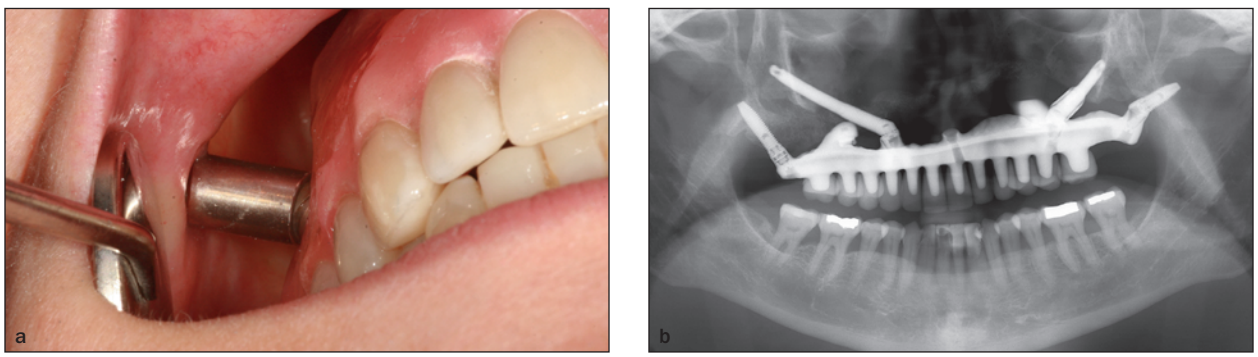

Fig 9 The prosthesis is redelivered to the patient. Proper seating is confirmed *(a)* clinically and *(b)* radiographically.

polished using a diamond-impregnated rubber wheel (220 Wheel, Brasseler) (Fig 7).

The protective sleeve and its locking screw can be steam-cleaned and autoclaved in preparation for placement. A carbide-tipped needle holder can be used to position the sleeve over the exposed threads to the precise level of the mucosal tissue (Fig 8). The edge of the sleeve is positioned so it is in contact with the mucosa with no visible pressure. Then, using a unigrip driver, the locking screw is firmly tightened against the threads of the zygomatic implant, immobilizing the sleeve. The zygomatic abutment can be placed using the index line created prior to its disassembly. The prosthesis is then redelivered (Fig 9).

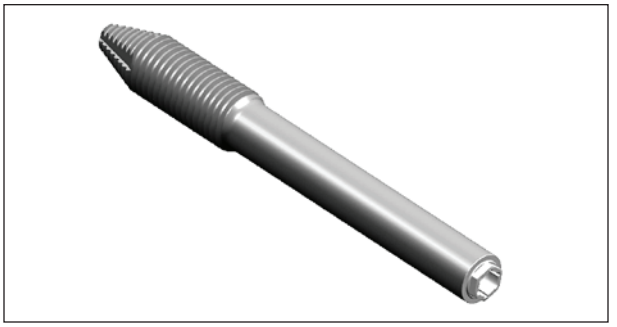

Fig 10 The extramaxillary zygomatic implant does not have threads at the coronal aspect of the implant (Courtesy of Nobel Biocare).

DISCUSSION

For the patient illustrated above, the reported irritation was immediately relieved. The relief has been maintained over a 2-year period following the placement of the sleeve, and the sleeve has remained stable during this same timeframe. Because there is no high-pressure loading on the sleeve, and there are three visible threads tapped into the wall, it is expected that the sleeve will remain in place and the locking screw will not loosen. Intraoral modification of the surface of the implant is not recommended because of the potential for heat generation and the inability to adequately polish the roughened titanium surface. To the authors' knowledge, there is no literature that endorses the manual polishing of implants intraorally. While it is understood that plaque and other small debris may enter the space under the sleeve in the valley of the threads of the zygomatic implant, the positive response shown by the adjacent mucosal tissues is promising. If mucosal irritation were to increase, the sleeve could be removed and the implant could be thoroughly cleaned. After cleansing, the sleeve could then be replaced once again for continued protection.

An alternative to using a protective sleeve is to place an extramaxillary zygoma implant (Nobel Biocare), as its design is such that the coronal aspect of the implant is smooth, without any threads. A drawback with the extramaxillary implant is its lack of a 45-degree bend at the coronal aspect (Fig 10). However, a 45-degree multiunit abutment exists if needed for the extramaxillary zygoma implant.

The locking screw must be oriented in a position that will not interfere with the reinsertion of the prosthesis. The locking screw should also be oriented in a position that will not irritate the mucosal tissues.

While this patient example illustrates an angulated abutment, any abutment placed on the zygomatic implant must be removed whether it is straight or angulated. The diameter of the abutment collar is greater than that of the sleeve.

CONCLUSION

The custom sleeve fabricated in the described manner was successful in eliminating mucosal irritation by covering the rough surface of the exposed portion of the zygoma implant. The sleeve remains in function with a 2-year follow-up, the locking screw has not needed to be retightened, and there has been no movement of the protective sleeve.

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