Loading with either a fixed prosthetic restoration or bar over-denture was performed over a 4- to 6-month period. A total of 3 implants were considered failures. The remaining 133 implants showed good soft tissue anatomy that was clinically acceptable. Radiographic examination of all remaining implants did not show any peri-implant radiolucency. The total failure rate was concluded to be 2.3%. A total implant success rate of 97.7% was established (Chart 3).

Discussion

Patients often need to be evaluated for the amount of bone in the posterior maxilla. The posterior maxilla often presents a challenge to the implant dentist due to inadequate bone volume from the crest of the bone to the floor of the maxillary sinus. Unpredictable bone loss can occur after tooth extraction, particularly if there is an existing bony defect or radiolucency present. Early tooth loss often leads to pneumatization of the sinus, the lack of bone in the posterior maxilla is a challenge to the clinician needing to place dental implants.

Many techniques have been advocated for treating the posterior maxilla including subperiosteal implants\(^1\), tube-rosety implants\(^2\), zygomatic implants\(^3\), osteotome sinus elevation (Summer’s Technique\(^4\)) and hydraulic sinus condensation techniques.\(^5\)

The lateral window osteotomy technique, as first described by Tatum, is a highly predictable method to introduce bone augmentation material to the elevated sinus floor. Although many augmentation materials have been described in the literature, there is always the risk that any material may not mature into living bone. Although alloplastic materials are plentiful and inexpensive, concerns arise as to their predictability in achieving bone replacement prior to implant placement.

Often a fibrous connective tissue encapsulation of the residual graft particles occurs, which can delay or complicate dental implant placement.\(^6\) The use of human allograft has been long established as a good alternative to patient autogenous grafting since it avoids the need for bone grafting from other sites.

Mineralized human allograft has the advantage of providing both the BMP and minerals necessary to achieve osseointegration properties.\(^7\) A recent report has demonstrated that mineralized allograft is a predictable material for grafting extraction sockets and for sinus elevation procedures.\(^8\)\(^9\)

This report demonstrates a reliable method for regenerating bone predictably in sinus elevations prior to implant surgical placement. The results obtained in this study show that the placement of dental implants after grafting with mineralized allograft allows for maturation of bone that can support fixtures for prosthetic load.

The authors of this report have placed particular mineralized bone allograft into 56 sinuses. The mineralized allograft was easy to utilize and resulted in good healing of the grafted areas. Most grafted sites were allowed to heal for a period of 4- to 6-months prior to re-entry for dental implant placement.

After healing, the graft material clinically appeared to form a dense bony structure within the grafted site, which allows the surgeon to place implants in a conventional manner. The cases in which resorbable HA was mixed with mineralized allograft did not appear to have any different clinical healing. Upon reentry for dental implant surgery, the material generally appeared hard and resistant to periosteal probing on the lateral wall preparation.

This material was clinically useful to develop bone volume prior to implant placement. The grafted sinus sites were sufficiently dense enough to withstand an osteotomy drilling procedure within a period of 4 to 6 months. The density of bone was usually of D3 or D4 quality. Tapered shaped root form implants were placed in these patients to provide compression into immature bone for greater implant stability.

Following a 4- to 6-month healing period, examination of the lateral windows grafted appeared to have a bony hard consistency. 136 Tapered Screw Vent implants were placed into 52 grafted sinuses. Of the 136 implants placed, all were uncovered and restored to date, except for 3 implants, making a total of 133 restored implants.