

## Zygomatic Implants

Edentulism is a chronic disease associated with significant rates of morbidity and health issues.<sup>1</sup> It is estimated that 12 million Americans are completely edentulous and 36 million are edentulous in one jaw. Restoring the edentulous maxilla when adequate bone is present is well managed with conventional endosseous root form implants. The Oral Health Quality of Life index (OHQOL) is vastly improved when immediate prostheses are used, and patients prefer this approach when given the option.<sup>18</sup> In a clinical scenario of severe maxillary osteomalacia, atrophy, surgical resection, or trauma, conventional implant placement may not be possible. The resorption of the maxilla in a posterior/superior direction results in a smaller osseous base that necessitates a larger volumetric replacement of the denoalveolar complex, presenting greater challenges to the team. The complications of sinus disease and enlarged pneumatized sinuses may create the need for multiple grafting procedures to develop suitable osseous tissue and may not present the most desirable pathway for patients.

Thus, the dental team is presented with two options: grafting versus graftless solutions. The “grafting approach” has advantages in that it is predictable,<sup>2</sup> the surgery is less complex, the patients have easier postoperative recuperations to endure, and implants tend to be where the final tooth alveolar envelope needs to be. The disadvantages are increased treatment time, multiple surgical procedures, morbidity of the donor site, and instability of the removable denture during the prolonged bone graft maturation period. When sinus elevations are used, the graft may be more palatal than the tooth position, immediate loading is generally not possible, and costs are usually higher.

The “graftless” option uses the zygomatic implant first introduced by Per-Ingvar Brånemark in 1988 and made available to the profession in 1998 after a decade of clinical use proved its viability.<sup>3,4</sup> The procedure is well documented in the literature with recent modifications to the surgical approach. The initial protocol involved the placement of two zygomatic implants and additional root form implants in the anterior maxilla splinted together supporting a screw-retained fixed dental prosthesis (FDP). This often resulted in implants placed medial to the alveolar ridge. Thus, the restoration was less than ideal for speech, hygiene, and comfort.

Recent protocols have evolved that use multiple zygoma implants in each zygoma.<sup>5,6</sup> A protocol has been established for the total rehabilitation of atrophic maxillae employing four zygomatic fixtures in an immediate loading system. The literature presents a 30-month clinical and radiographic follow-up.<sup>7,8</sup> A new approach to rehabilitate the severely atrophic maxilla using extra-maxillary anchored implants in immediate function<sup>9,10</sup> enables the placement of an immediately loaded prosthesis without the requirement for anterior root form implants in some patients. The zygomatic implants will emerge

within the tooth/alveolar envelope, thus yielding a more anatomically accurate prosthesis. The advantages are shortened treatment times, immediate placement of a fixed screw-retained interim prosthesis, potentially lower cost, and no need for adjunct grafting. Success rates for this approach are well documented.<sup>11,12</sup> There is an evidence-based prospective clinical study on titanium implants in the zygomatic arch for prosthetic rehabilitation of the atrophic edentulous maxilla with a follow-up of 6 months to 5 years.<sup>13-16</sup> A drawback to this approach is the potential loss of a zygomatic implant may result in partial or total prosthesis loss. The surgical procedure is also significantly more complex, and for patient comfort should be performed under general anesthesia. This often involves the need for an anesthesiologist.

It is the position of the American College of Prosthodontists that the use of the zygomatic implant in various clinical scenarios with multiple configurations enables the dental team to restore quality of life and gives patients an expedited and predictable option.

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