COMMENTARY

IMMEDIATE LOADING OF THE MAXILLA WITH PREFABRICATED INTERIM PROSTHESIS USING INTERACTIVE PLANNING SOFTWARE, AND CAD/CAM REHABILITATION WITH DEFINITIVE ZIRCONIA PROSTHESIS: 2-YEAR CLINICAL FOLLOW-UP

Stephen Rimer, BDS*

The authors address a very current theme in implant reconstruction combining both immediate loading with computer-aided design/computer-aided manufacturing (CAD/CAM) planning to facilitate fabrication of a definitive prosthesis. A very strong case is made as to the benefits both to the patient and the clinician in planning for this type of protocol as well as the execution of both the surgical procedure and the prosthetic rehabilitation.

Although all parameters for this type of reconstruction were correctly addressed, there are some questions not raised both as to the benefits of this technique as it relates to traditional prosthetic surgical rehabilitation as well as to the limiting factors created by this technology.

There is no question that the surgical procedure is significantly shortened and soft tissue trauma minimized with the closed flap technique. However, unless the patient has only a mild resorption of the underlying ridge and the appropriate positioning of the attached gingiva in the edentulous case, there are many disadvantages in utilizing this type of treatment plan. For example, an open flap allows one at the same time as placing the implants to evaluate the critical bone to implant interface at the crestal region and peri-implant zone. It is often noted that, regardless of the scan, the actual bone quality at the crest at the point of implant placement is less than optimal and one therefore needs to make an intraoperative decision as to the best position to relocate the fixture. Additionally localized alveoplasty or conversely alloplastic bone augmentation may be utilized to enhance local ridge morphology to improve long term implant success.

Most edentulous cases that require the implants to be placed close to the crest of the ridge, if done in a blind closed-flap fashion, do not provide for these modifications.

Clinical observations have reported varying unfavourable long-term crestal bone stability when using flapless protocols as compared with open flap surgery. This might be caused by many of the limitations outlined earlier.

Open flaps allow one to appropriately position and suture the flap to gain an immediate zone of attached gingiva around the necks of the implants at the time of surgery, using techniques such as “Palacci” flaps or buccally positioned flaps.

Specially formed provisional abutments can be utilized to further mould the soft tissue and can be incorporated into the interim prosthesis. This is rather difficult to incorporate in the authors’ methodology.

Peri-implant soft tissue augmentation, healing, and development of the soft tissue emergence profile around implants is as important in terms of long term success as is the benefit of the outlined techniques of this article.

There is no question that, from a surgical standpoint however, the protocol recommended in this article provided both efficiency and also increased patient comfort with a less invasive procedure. The initial advantages may have to be questioned with current protocols.

It is noted in the article that many studies showing flapless surgery as it relates to an individual implant site do not address some of these critical issues when dealing with complete edentulous cases. Many cases using open flap surgery other than the initial trauma to the patient have shown rapid healing with minimal disadvantage for the patient. This has also allowed for prefabricated templates using similar techniques to transfer the fixture position either by

DOI 10.1111/j.1708-8240.2010.00344.x

a direct pickup or fixture level impressions and with the appropriate planning can deliver an immediate interim prosthesis immediately.

We have found that, with careful communication, a fixture level impression using an open-tray technique at the time of implant placement has provided for an extremely accurate master model, which can then be utilized to not only fabricate the immediate interim prosthesis but also as a cross-reference for accuracy for the final framework, if planned appropriately.

In spite of using CAD/CAM technology and flapless surgery, the authors not only had to take a standard fixture level impression, but this also had to be verified with a second transfer record and did not eliminate some of the basic issues typically addressed in normal implant prosthetics.

The prosthetic fabrication of the definitive prosthesis, however, did not simplify the procedure regardless of the benefit of the CAD/CAM approach. First, because of the limitations of zirconium, a fixture level impression needed double verification as one could not section and solder the sub frame. Second, the authors mention the benefit strength-wise and color-wise of the zirconium prosthesis. However, with appropriate management of current dental materials in a long-span totally edentulous prosthesis, one has to consider the limitations of this approach because of the need to support the feldspathic porcelain and for total passivity of the sub frame. Limitations to adjusting framework become a factor when choosing certain materials like zirconium. Once again, a careful analysis needs to be made as how best to combine this developing technology to be simplistic, accurate, and cost effective as it pertains to this type of rehabilitation.

Without question, there are definite advantages to this emerging technology but, until some of the nuances to control accuracy in a more simplistic and cost-effective way have been worked out, the advantages and disadvantages on a case by case basis need to be critically evaluated, which in time will definitely improve on the current technology.

One might even go as far as to look to the future and "rearrange" the protocol of this article or reverse some of this applied technology.

CAD/CAM plan for implant placement using an open technique foregoing some patient comfort for better long term peri-implant biological control and response.

Then robotically transfer implant position, eliminating traditional impression transfer techniques and their inaccuracies. After soft tissue maturation, scan emergence soft tissue peri-implant form indirectly from the provisional prosthesis and position of customized soft tissue abutments, which can be retroscanned and positioned with CAD/CAM to fabricate the final prosthesis.

The surgical clinician plans for and optimizes implant placement. Special soft tissue abutments are placed. Then implant position is robotically transferred. The restorative member then optimizes the form of the interim prosthesis to allow for the soft tissue form and response. The "technology" fabricates the prosthesis using the most appropriate and cost effective methods and materials. Depending on the level of artistry required, the technician layers the finished framework. The restorative clinician finalizes the occlusion.

Computerized planning and execution has definitely become a part of dentistry!

*Oral and Maxillofacial Surgeon, Private Practice, Boca Raton, FL 33486, USA

This commentary is accompanied by article, "Immediate Loading of the Maxilla with Prefabricated Interim Prosthesis Using Interactive Planning Software, and CAD/CAM Rehabilitation with Definitive Zirconia Prosthesis: 2-Year Clinical Follow-up," Panos Papaspyridakos, DDS, MS Kunal Lal, DDS, MS, DOI 10.1111/j.1708-8240.2010.00343.x