

*A Professional Courtesy of:*



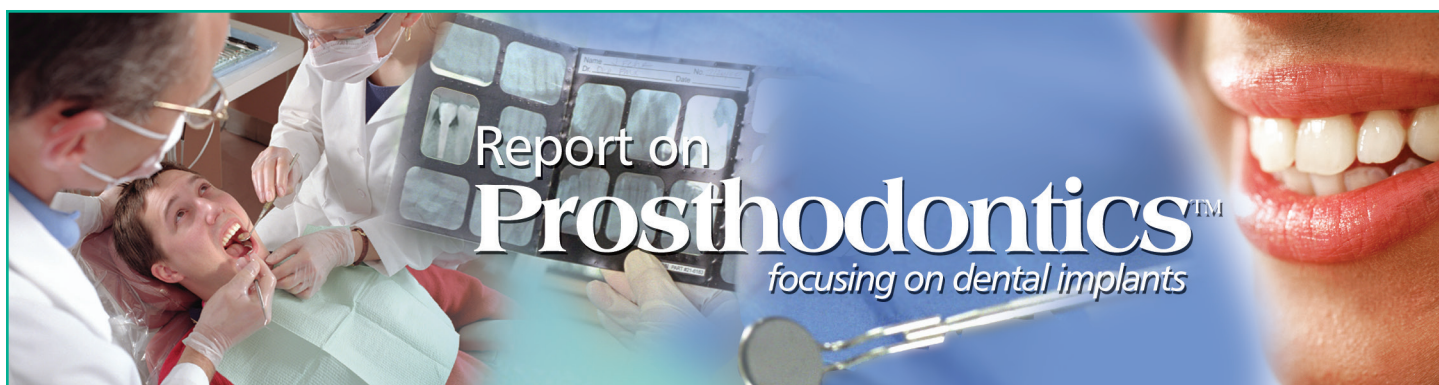
**James A. Oshetski, D.D.S.**  
*Diplomate, American Board of Oral Implantology/Implant Dentistry*

14 Maine Street, Brunswick ME 04011

207-729-1159 • Fax: 207-721-0792

Email: droshetski@gmail.com

www.droshetski.com



## Flapless Surgical Approach for Implant Placement

*Although the use of the flapless surgical approach for implant placement in the edentulous patient has gained popularity, little information has been published about this approach for partially edentulous patients. This issue of Report on Prosthodontics reviews the current literature regarding surgical and prosthetic outcomes in partially edentulous patients when a flapless surgical approach is used.*

### Rehabilitations in Partially Edentulous Patients After 3 Years

Immediate loading of implants placed in soft bone of partially edentulous patients may pose a risk to the outcome of these restorations. Maló et al, private practitioners from Portugal, evaluated the 3-year outcomes of fixed partial prostheses supported by implants with immediate provisionalization without occlusal contacts inserted in soft bone with flap and flapless protocols.

A total of 41 patients (22 women, 19 men) with partial edentulism were treated with implants and immediately provisionalized with an interim prosthesis without occlusal contacts. Patients were assigned to either a flapless or flap protocol. The 72 implants placed (51 maxillary, 1 mandibular) supported 54 fixed prostheses: 47 single-tooth restorations and 7 fixed partial prostheses. Implants were at least 4 mm in diameter and 10 mm in length.

Eight patients with 8 implants dropped out of the study. One implant from the flapless surgical procedure group failed to integrate. The overall cumulative survival rate at 3 years was 98.6% (Table 1). Bone resorption relative to the implant platform after 3 years was 1.14 mm for the flap surgical technique group and 1.60 mm for the flapless surgical technique group.

In the flapless group, 5 patients presented with prosthetic complications;

3 of these were heavy bruxers. Three patients fractured their definitive prosthesis, 1 had a provisional crown decementation and 1 had a fractured screw. In the group with the flap, 4 patients presented with prosthetic complications; 3 of

#### Inside this issue:

- Immediate vs Early Loading of Dental Implants Placed Flapless
- Flapless vs Open Flap Implant Placement in Partially Edentulous Patients
- Implant Outcomes of Flapless Procedures

*Spring 2017*

**Table 1.** Implant survival distribution by study group

Flap surgery technique group				
Time period	Total number of implants	Number of implants lost	Withdrawn	Cumulative survival rate
0–6 months	40	0	1	100%
6 months–1 year	39	0	1	100%
1–2 years	38	0	1	100%
2–3 years	37	0	2	100%
Flapless surgery technique group				
Time period	Total number of implants	Number of implants lost	Withdrawn	Cumulative survival rate
0–6 months	32	1	2	96.9%
6 months–1 year	29	0	0	96.9%
1–2 years	28	0	1	96.9%
2–3 years	28	0	0	96.9%

these patients fractured their definitive prosthesis. Three patients who showed signs of poor oral hygiene developed peri-implant pathology.

The limitations of this study included the small number of patients in the sample size, the lack of randomization and the existence of different variables that may have had an impact on the complications, such as occlusion, bruxism and oral hygiene. Further research with partially edentulous patients is needed.

Maló P, de Araújo Nobre M, Lopes A. Three-year outcomes of fixed partial rehabilitations supported by implants inserted with flap or flapless surgical techniques. *J Prosthodont* 2016;25:357-363.

## Immediate vs Early Loading of Dental Implants Placed Flapless

While reports in the literature support the use of immediate loading of dental implants placed with a flapless surgical approach in edentulous patients, the question arises as to whether the literature supports immediate loading in partially edentulous patients after a flapless surgery. Many clinicians have expanded the use of this protocol for the partially edentulous patient.

In a 3-year randomized clinical trial, Merli, a private practitioner from Italy, et al compared immediate vs early loading of dental implants placed in partially edentulous patients using a flapless surgery. Sixty patients were consecutively enrolled and randomly assigned to 1 of the 2 groups. Patients aged  $\geq 18$  years who were partially edentulous with space for at least one 9.5-mm-long dental implant having a bone thickness of  $\geq 5.5$  mm met the inclusion criteria. Exclusion criteria included general contraindications to implant surgery.

An experienced surgeon placed threaded cylindrical titanium implants using a flapless procedure. Insertion torque was required to reach  $\geq 40$  Ncm; if that torque could not be achieved, the implant was replaced with one having a larger diameter. After the implant was placed, an envelope was opened to reveal whether the procedure would involve the immediate- or early-loading protocol. In the immediate-loading protocol, all provisional prostheses were placed within 72 hours. For patients in the early-loading group, the prostheses were placed approximately 6 weeks after implant placement. Intraoral radiographs were made at implant placement and at the 3-year follow-up. The outcome measures evaluated were

- prosthesis failure
- implant failure
- complications (biological and prosthetic)
- radiographic peri-implant marginal bone level

There were no prosthesis or implant failures. Two complications occurred in the early-loading group and 1 in the immediate-loading group during the first year; no complications occurred between 1 year and 3 years. There were no statistically significant differences between the 2 groups at 3 years. The early-loading group had a better bone level than did the immediate-loading group, but this difference was not statistically significant.

Merli M, Moscatelli M, Mariotti G, et al. Immediate versus early non-occlusal loading of dental implants placed flapless in partially edentulous patients: a 3-year randomized clinical trial. *J Clin Periodontol* 2012;39:196-202.

## Flapless vs Open Flap Implant Placement in Partially Edentulous Patients

**R**etrospective and prospective studies have shown immediate loading with flapless surgery to be a viable treatment option. Through a systematic review using CENTRAL, Cannizzaro et al from the University of Bologna, Italy, concluded that flapless implant placement is feasible and reduces postoperative discomfort.

To determine the efficacy of flapless vs open flap implant placement for immediately loaded prostheses in partially edentulous patients, the authors conducted a randomized split-mouth study. Patients were included in this study if they had 2 edentulous areas with bone width of at least 5 mm and bone height of at least 10 mm. Patients were

excluded from the study if they had general contraindications to implant surgery. Of the 40 patients in the study, 20 were smokers.

After the patient received anesthesia, the surgeon was informed whether or not to raise a flap at the first site. The second site was treated 2 weeks later. The diameter and length of the tapered implants were selected according to available bone. For the implants to be immediately loaded, insertion torque had to reach 48 Ncm. Implants not reaching this insertion torque were replaced with larger diameter implants. Provisional full-occluding restorations were cemented using the prepared mount abutments within 4 hours of implant placement; baseline intraoral radiographs were taken after placement.

Approximately 8 weeks after implant placement, the definitive restorations were placed. Patients were recalled every 3 months for oral hygiene and prosthetic checkups.

**Table 2.** Main comparisons of the 2 interventions (40 patients)

	Flapless	Flap	<i>p</i> value
Number of inserted implants	76	67	NA
Number of post-extractive implants	25	24	NA
Number of elevated flaps	4	40	NA
Number of implants immediately replaced by larger diameter ones	3	1	NA
Number of prostheses that could not be placed/remade (patients)	2 (2)	2 (2)	>.99
Number of failed implants (patients)	2 (2)	2 (2)	>.99
Number of failed post-extractive implants	1	1	>.99
Number of complications (patients)	1 (1)	6 (5)	.22
Duration of implant placement in minutes	11.9 ± 6.0	28.8 ± 9.3	<.001 <sup>a</sup>
Number of sites requiring sutures	12	40	NA
Self-reported pain 3 days postoperatively	0.33 ± 0.62	0.70 ± 0.79	.017 <sup>a</sup>
Number of patients who felt no pain	30	19	NA
Number of patients who felt mild pain	7	15	NA
Number of patients who felt moderate pain	3	4	NA
Number of patients who felt severe pain	0	1	NA
Self-reported swelling 3 days postoperatively	0.45 ± 0.64	1.08 ± 0.86	<.001 <sup>a</sup>
Number of patients who felt no swelling	25	11	NA
Number of patients who felt mild swelling	12	17	NA
Number of patients who felt moderate swelling	3	10	NA
Number of patients who felt severe swelling	0	2	NA
Mean number of analgesic tablets consumed 3 days postoperatively	2.05 ± 1.52	5.73 ± 1.43	<.001 <sup>a</sup>
Number of patients who preferred the procedure <sup>b</sup>	31	3	<.001 <sup>a</sup>

NA, not applicable.

<sup>a</sup>Statistically significant difference; <sup>b</sup>6 patients had no preference.



At the 1-year recall, radiographs were taken. Prosthesis failure, implant failure, complications, implant placement time, patient self-reported postsurgical pain and swelling, consumption of analgesics, peri-implant bone level and patient preference were evaluated.

Four implants failed, all in different patients. Two definitive crowns, 1 in each group, had to be remade. There was no statistically significant difference in the occurrence of complications between the 2 groups. Flapless implants required significantly less time than did implants placed using an open flap procedure. Patients reported significantly less postsurgical pain and swelling and consumed fewer analgesics postoperatively following a flapless surgery. At 1 year, the peri-implant marginal bone level was not statistically different between the 2 groups. Patients significantly preferred the flapless surgery to the open flap surgery (Table 2). Both techniques achieved good success, although the flapless procedure produced less discomfort and was preferable to the patient.

*Cannizzaro G, Felice P, Leone M, et al. Flapless versus open flap implant surgery in partially edentulous patients subjected to immediate loading: 1-year results from a split-mouth randomised controlled trial. Eur J Oral Implantol 2011;4:177-188.*

## Implant Outcomes of Flapless Procedures

**T**he concept of flapless implant surgery has been advocated as a means to decrease treatment time and patient discomfort. Computer-guided implant treatment planning has been used to improve implant placement and restoration. In a 2014 systematic review, Voulgarakis et al from University Hospital Freiburg, Germany, examined the outcomes of flapless surgery for implants placed with freehand or guided surgical methods.

An electronic literature search of PubMed from 1970 to 2013 was undertaken. The patient intervention comparison outcome question was, "What is the outcome of implants placed by means of flapless surgery using freehand or guided surgery with or without [3-dimensional (3D)] navigation?"

After full-text evaluation, 23 studies were included in this review. The flapless-surgery technique showed higher

implant survival rates. In the majority of these studies, the implant was placed with 3D-guided flapless surgery. In the 23 studies evaluated, crestal bone levels were assessed using a variety of techniques. Due to the heterogeneity of the studies, no comparisons could be made.

The complications observed with the flapless surgery could be categorized into 2 types:

- intraoperative
- postoperative

During implant placement, none of the studies using freehand placement reported complications. Fenestration (2.73%) and bone dehiscence (1.95%) occurred in flapless guided surgeries (not using 3D navigation). The rate of complication (fractured surgical guide) with 3D navigation systems ranged from 6.66% to 9.67%. Postoperative complications were reported in 12 studies. Of these, 10 used 3D navigation, of which 4 reported pain as a postoperative complication. The other 2 studies reported on freehand implant placement; 1 reported pain as a complication. Seven studies reported implant mobility, absence of keratinized mucosa, ulceration and peri-implant pathology, including bleeding on probing, mucosa inflammation and local bony defects.

The authors concluded that the use of 3D navigational systems with flapless surgeries could not be confirmed as being superior to conventional techniques. Further studies are needed.

*Voulgarakis A, Strub JR, Att W. Outcomes of implants placed with three different flapless surgical procedures: a systematic review. Int J Oral Maxillofac Surg 2014;43:476-486.*

### In the Next Issue:

- Patient outcomes with implant-supported mandibular removable partial dentures
- A retrospective study of implant-supported removable partial dentures
- Implant-assisted removable partial dentures as an alternative treatment

Do you or your staff have any questions or comments about **Report on Prosthodontics**? Please call or write our office. We would be happy to hear from you.  
©2017