Placement of Dental Implants Without Flap Surgery: A Clinical Report

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Traditionally, the procedure of implant placement requires a surgical periosteal flap to be raised. In a percentage of implant cases, there is no need for flap surgery for implant placement, or for a follow-up surgical procedure for abutment connection. In this clinical investigation, 20 maxillary and mandibular implants were placed in seven adult male patients. The sites for implant placement were prepared according to an alternative surgical technique without raising a surgical flap. Patients were recalled periodically for 2 years to evaluate healing and clinical integration of implants. The results showed normal clinical healing at the first week of reexamination in all implant sites; periodontal probing of less than 2 mm circumferentially around all healing caps at 3 months and later at subsequent recall periods; no radiolucency observed in the peri-implant zone; no sign of clinical mobility during recall examination; and no persistent or irreversible sign or symptoms of pain, infection, or necrosis. This alternative surgical technique can provide several advantages over the traditional 2-step procedure.
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Key words: alternative surgical technique, implant placement, surgical flap

Osseointegrated dental implant treatment generally involves surgical procedures for implant placement, abutment connection, and prosthodontic procedures.[1] The surgery is usually performed in 2 stages, implant placement and abutment connection. Both procedures are performed on an outpatient basis under local anesthesia. The first surgical procedure consists of the raising of a periosteal flap, use of low-speed drills with profuse saline cooling for preparation of the implant site, placement of the implant in the prepared site, and closure with readaptation of the flap and suturing.[2] The second surgical procedure involves the abutment connection.

Careful management of the bone during the surgical procedure is critical. Profuse amounts of saline are used during drilling to avoid overheating of the bone and to prevent future bony necrosis in the implant bed, thereby impeding future osseointegration.[3,4] Most of the literature describes the need initially to raise a flap for implant placement and then to perform a second surgical procedure that involves abutment connection and removal of the healing caps. Based on clinical experience, there would seem to be a percentage of implant cases that do not require flap surgery to place an implant or a second follow-up surgical procedure. This alternative procedure has been used for selected patients and has been clinically successful.

Traditional Surgical Procedure

Implant Placement. An incision is made on the buccal aspect of the alveolar crest, and a mucoperiosteal flap is raised lingually to expose the underlying bone. The position of the implant sites is then marked on the alveolar bone crest. Specially designed stainless-steel twist drills of successively increasing dimensions are used under profuse saline irrigation for gradual widening of the opening for the implant in the crest of the alveolar bone.[4,5] The drilling procedure is performed at a maximum rotational speed of 2,000 rpm.

Upon completion of the preparation, a titanium screw is placed, over which cover screws are placed to prevent bone from growing over the implant. Using mattress sutures, the periosteal flap is re-

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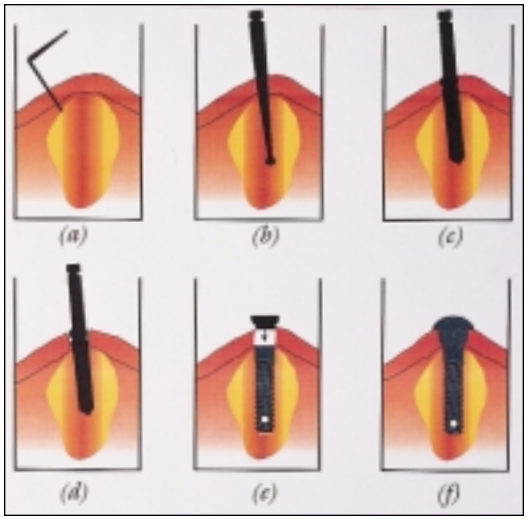

Fig 1 The surgical stages of implant placement: *(a)* sounding and determining the anatomy and depth of the underlying bone; *(b)* preparing the implant site and removing mucosal tissue using low-speed round bur of the same diameter as that of the implant to be used; *(c)* performing primary preparation of the implant site with a pilot drill; *(d)* successively enlarging the site with a twist drill; *(e)* measuring the prepared site with graduated probe and threading it with a titanium screw if necessary; *(f)* placing the implant and the healing cap.

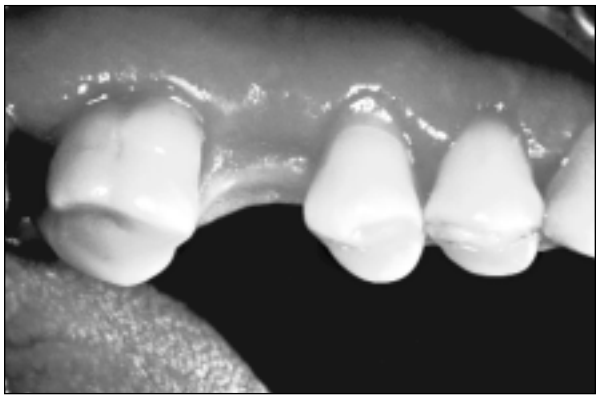

Fig 2 Clinical lateral view of the site to be prepared under local anesthesia.

adapted to cover the implant site. Postoperative instructions and antibiotic coverage for 10 days are provided. Patients are advised to avoid wearing a prosthesis for 2 weeks. Any existing prosthesis can later be relined with a soft material to avoid premature loading of the implant. Sutures are removed after 7 days. The healing period for the maxilla is usually 5 to 6 months, and for the mandible 3 to 4 months. The abutment connection stage would be initiated within 3 to 6 months.

Abutment Connection. After the cover screws are located, a longitudinal incision is made to expose them. All hard and soft tissues are cleaned by means of a punch excision. The abutment cylinders are placed into the titanium screw. The mucosa is readapted, and its thickness around the abutment is reduced. For oral hygiene accessibility, the abutment should be placed about 1 to 2 mm above the surrounding mucosa. Two weeks later, the final prosthodontic treatment may begin.

Alternative Surgical Procedure

The alternative surgical procedure is performed in one stage under local anesthesia for both implant placement and abutment connection. The thickness of the mucosa can be determined by graduated probing in 3 directions—crestally, bucally, and lingually—to approximate the alveolar anatomy of the bone (Fig 1). The positions of the implant sites are marked on the alveolar bone mucosa under profuse saline irrigation. The drilling procedure is performed at a maximum rotational speed of 2,000 rpm using specially designed stainless steel round burs of a size or diameter similar to that of the implant to be placed, or by using low-speed twist drills in graduated millimeter sizes to expose the underlying alveolar bone (Fig 2). The steel twist drills of successively increasing dimensions gradually widen and adjust the sites to the appropriate implant size (Figs 3 and 4).

The implants are immediately placed into the prepared sites, with the top of the implant at the level of or 1 mm below the bone. An abutment cylinder of a predetermined length is attached to the implant. The top of the abutment should be at least 2 mm above the surrounding mucosa for proper oral hygiene (Figs 5 to 7). Postoperative instructions, including restriction of the use of a prosthesis for 2 weeks, and antibiotic coverage are provided. Any existing prosthesis can later be relined with soft material to prevent premature loading of the implant. The entire healing period is generally 3 months for the mandibular implant and 5 months for the maxillary implant, after which final prosthodontic care can begin.

Methods and Materials

At a private clinic in Kuwait, Core-Vent implants (Paragon, Encino, CA) have been used for single and multiple tooth replacement since 1993. The alternative surgical procedure was performed on 7 Kuwaiti male adult patients, aged from 35 to 45 years, using a total of 20 implants in both the maxilla and mandible.

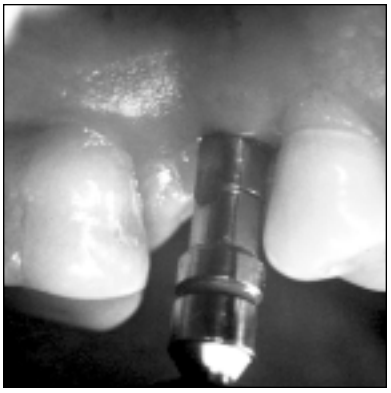

Fig 3 Successive enlargement of the implant site with a twist drill under profuse saline irrigation.

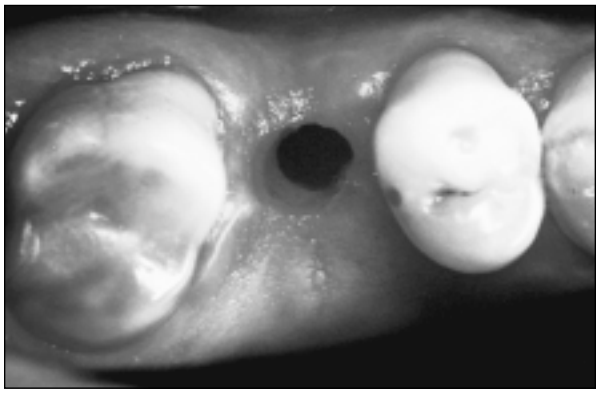

Fig 4 The site is ready for implant placement.

Fig 5 Clinical lateral view showing implant placement.

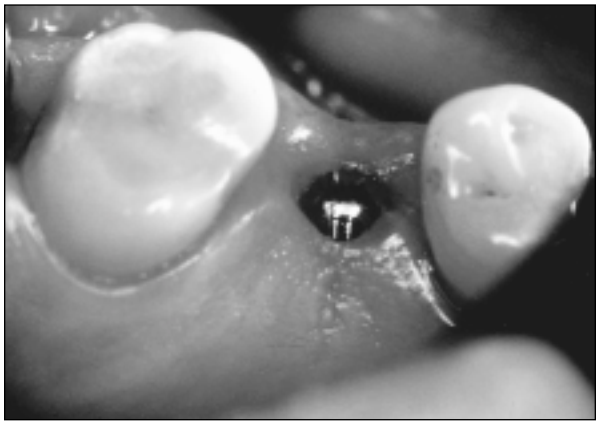

Fig 6 The head of the implant is at the same level as the bone.

The sites for implant placement were prepared under local anesthesia according to the method described previously (Fig 1).

The initial healing period was evaluated continuously for 3 months. The abutment connection and final prosthesis placement were performed by the traditional method. Patients were recalled after 1 week, 2 weeks, 1 month, and 3 months, and then every 3 months for at least 2 years. Healing and clinical integration of implants were clinically evaluated by assessing clinical tissue healing and color; probing around each healing collar and abutment 3 months later; examining radiographically the peri-implant zone; testing the clinical mobility of the implant in horizontal and occlusal directions; and assessing any persistent or irreversible sign or symptoms of pain, infection, or necrosis.

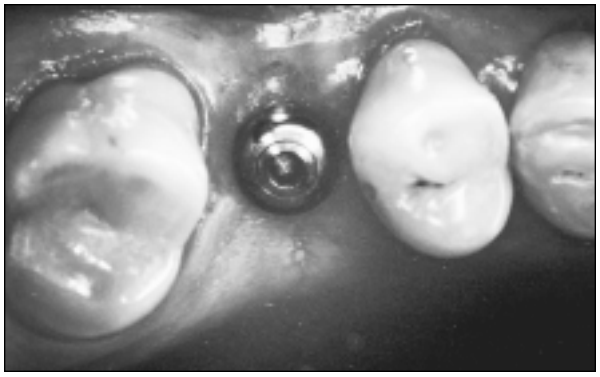

Fig 7 Placement of the healing cap.

Table 1 Results of 20 Implants Placed with a One-Step Method

				Criteria for clinical evaluation			
Implant no.	Time since placement (mo)	Time since loading (mo)	Healing tissue color	Periodontal probing (mm)	Radiolucency (+/–)	Mobility (+/–)	Presistent pain, infection, necrosis (+/–)
1	36	31	Normal	1	+	+	+
2	36	31	Normal	1	+	+	+
3	34	31	Normal	0.5	+	+	+
4	34	29	Normal	1	+	+	+
5	34	29	Normal	1	+	+	+
6	34	29	Normal	1	+	+	+
7	34	29	Normal	1	+	+	+
8	32	27	Normal	1.5	+	+	+
9	31	26	Normal	1	+	+	+
10	31	26	Normal	0.5	+	+	+
11	31	26	Normal	1	+	+	+
12	31	26	Normal	1	+	+	+
13	31	26	Normal	1	+	+	+
14	31	26	Normal	0.5	+	+	+
15	28	24	Normal	1.5	+	+	+
16	28	24	Normal	1	+	+	+
17	28	24	Normal	1	+	+	+
18	28	24	Normal	1	+	+	+
19	28	24	Normal	1	+	+	+
20	28	24	Normal	1	+	+	+

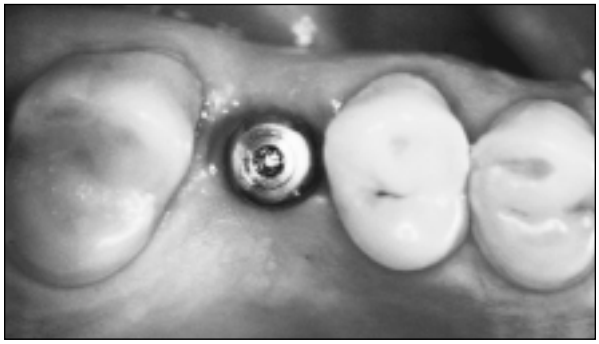

Fig 8 Occlusal view at 1 week shows good soft tissue healing color.

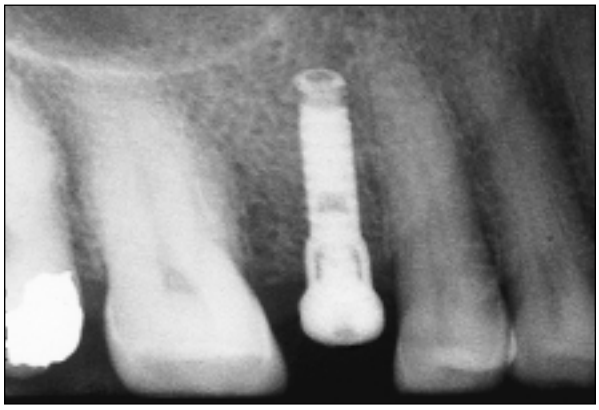

Fig 9 Radiograph 2 months later shows the implant with no abnormalities.

Results

The results for all implant sites are given in Table 1. The clinical healing of mucosal tissue was normal pink in color. Complete soft tissue healing was observed during the first week, second week, and 1 month after surgery at all sites (Fig 8). Periodontal probing was less than 2 mm circumferentially around all healing caps 3 months later and at subsequent recall periods. No radiolucencies were observed in the peri-implant zone (Fig 9). The implants had no signs of clinical mobility during recall examinations. There were no persistent or irreversible signs or symptoms of pain, infection, or necrosis.

Discussion

In a reasonable percentage of implant cases, bone topography can be predicted, eliminating the need for flap surgery. In this clinical investigation, 20 implant sites in 7 patients were prepared according to the method described and then clinically evaluated for more than 2 years. This surgical technique has both advantages and disadvantages. Among its advantages are the avoidance of flap surgery when placing the implant; elimination of the need for a second surgical procedure to place the abutment cylinder and of the need for adjusting the mucosal tissue to accommodate the abutment cylinder; minimal postoperative discomfort; immediate, visible results; a

possibility of using a cylinder abutment as a temporary component to aid in holding the prosthesis for a short period of time during the healing period; and reduction in time and in the number of visits and materials required. Among the disadvantages of this method are that accurate details or potential variation in bone anatomy or topography cannot be known; 4 mm of keratinized tissue might possibly be lost; and the implant surface might be contaminated as the implant is being placed. This technique cannot be used in all situations, especially in the case of anatomic limitations. The experience of the clinician should also be a consideration.

Conclusion

The preparation of surgical flaps for the placement of endosseous implants has been used for several years. In some implant situations, a simple surgical technique without the need to raise a flap can be used. This surgical technique has been described and the clinical healing at 20 sites has been evaluated. Several advantages can be seen in using this technique in selected patients.

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