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Research paper

Clinical evaluation of Xive implants 3-year after placement

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Abstract

Objective: The main purpose of this retrospective study is to evaluate clinical outcomes of Xive implants 3-year after insertion. **Methods:** 219 Xive implants were placed in 139 patients and their clinical effects were evaluated using the Albrektsson Standard. **Results:**The 3-year survival rate of the Xive implants is 97.26%(213/219). Eleven cases of immediate implants and 15 cases of implant insertion after maxillary sinus lifting all succeeded. The failure ratio is 6/219(2.74%) with failures resulting from excess bone loss in the implant region, peri-implant mucosal inflammation or continuous pain caused by some unknown reasons. **Conclusion:** Xive implants are clinically effective for the restoration of missing teeth. Immediate implant and implant following maxillary sinus lifting were also successful.

Key words: Xive implant; dental implant; clinical evaluation

INTRODUCTION

Since the middle of last century when Professor Branemark first used titanium implants to restore missing teeth and proposed the theory of osseointegration, clinical applications of implant procedures, from the replacement of single missing teeth to extensive bone grafting for total jaw reconstruction, have become widespread. This method makes the puzzling case of conventional prostheses solvable. In addition, this method is also welcomed by the patient because implanted teeth are more esthetically appealing, convenient and efficient than conventional protheses. In the developed countries oral implants are used in more than 50% of the edentulous patients. This method is clearly replacing the conventional method and is becoming the major method for the replacement of missing teeth. There are more than 100 brands of implant systems now in use[1]. Our department of oral implant has been using Frialit-Xive implant systems since 2004. We have had satisfactory clinical results and there has been good social acceptance of these implants during the 3 years of their clinical use.

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MATERIALS AND METHODS

Subjects

A total of 219 Xive implants were placed in 139 patients from Feb 2004 to Aug 2007. The patient population included 67 males and 72 females with ages ranging from 19 to 81(***Table 1***). Among these implants there were 15 cases(6.85%) following maxillary sinus lift and sinus graft surgery and 21 cases(9.6%) following bone grafting because of bone defects. The other cases received conventional implant therapy. All patients had good oral health and normal occlusion, and were without severe systemic disease. Implant sites were free from infection.

Table 1 **Age and Gender Distribution Among Study Patients**

Age	Male	Female	Total
19-29	3	4	7
30-39	13	9	22
40-49	21	20	41
50-59	17	22	39
60-69	11	14	25
70-	2	3	5
Total	67	72	139

Preoperative planning

All patients received periapical film and panoramic

film to examine the height and width of alveolar bone. According to the examinations the position of implantation was determined and an operation template was manufactured, All patients were thoroughly informed about the procedure and asked to sign a consent form.

Implant system selection

We selected the Xive implant system produced by Dentsply Company, Germany. The Xive implant is a two-stage implant and allows submerged healing. It presents a grit-blasted and acid-etched implant surface. Its diameter ranges from 3.0 mm to 5.5 mm and its length ranges from 8 mm to 18 mm.

Implant therapy

For delayed implant placement the bone was exposed with a para-crestal incision. Mucosa and periosteum were mobilized and flapped. The surgical template was produced with Friadent select sleeves. It ensured the exact transfer of the preprosthetic planning to the clinical situation. The pilot drilling was performed with the twist drill D2.0. After the pilot drilling the implant site was prepared with the twist drill until the required diameter was reached. The implant was then brought into the final position either manually or with a handpiece. After placement, the implant was covered according to the treatment plan. After the healing time of 3 to 6 months, the implant was exposed again and restored with screw-retained or cement-retained fixed partial dentures. Careful adjustments of occlusion and articulation were performed to minimize lateral forces.

Post-operative evaluation

The Albrektsson Standard[2] was used to evalutate the outcome:① The individual unattached implant is immobile when tested clinically.② No evidence of periimplant radiolucency is present as assessed on an undistorted radiograph.③Mean vertical bone loss is less than 0.2mm annually after the first year of function or service. ④ There is no persistent pain, discomfort, or infection attributable to the implant.⑤ Implant design does not preclude placement of a crown or prosthesis with an appearance that is satisfactory to the patient and dentist.

RESULTS

The present prospective clinical study included 139 patients treated with a total of 219 Xive implants. Only 6 of 219 implants(2.74%) were lost, and the other patients received and maintained a fixed permanent prosthesis throughout the study period. The survival rate was 97.26%. Cases of immediate implant and those performed following maxillary sinus lift all succeeded. Failed cases included 4 maxillary teeth and 2 mandibular teeth. These failures were caused by bone defects, phlegmasia around the implant or persistent pain(***Table 2***).

Table 2 **Charactersitics of lost implants**

Position	Implant type (width/length)	Time(mo)	Probable cause
21	3.4mm/13mm	2	bone defects
23	3.4mm/13mm	1	bone defects
11	3.4mm/11mm	3	bone defects
36	4.5mm/11mm	27	phlegmasia around implant
26	3.8mm/11mm	19	phlegmasia around implant
31	3.4mm/11mm	6	Persistent pain

Twenty-one implant patients receiving bone grafts gained firm initial stability without inflammation. Titanium membranes exposed in 3 cases 3 months after operation and then were taken out. Grafted bone was absorbed slightly in 2 cases and there was serious absorption in 1 case in which granulation occurred around the implant. Grafted bone developed well without bone resorption in the remaining cases. The sites of donated bone healed well without malformation. Three patients felt pain and sensitivity in the region of the mandibular anterior teeth.

DISCUSSION

The Xive implant system has good clinical effectiveness in all types of edentulous patients. This is a new kind of endosseous implant that has good biocompatibility and osseointegration. It was designed initially for immediate implants and for single missing teeth. Its shape was designed to imitate the root of the natural tooth. The particular qualities of Xive implant includes:① The diameter ranges from 3.0 to 5.5mm to adapt to almost all types of missing teeth. ② The anatomic form of Xive implant is similar to the root of the natural tooth. This characteristic reduces the necessity for a bone graft when the Xive implant is used for immediate implantation. ③ A tight implant-bone interface which is protected from harmful intraoral influences by a soft tissue collar is a prerequisite for the long-term success of an implant[3]. ④ The largest diameter is seated at the level of the alveolar crest, which guarantees enough width of gingiva. Therefore the esthetic effect of the Xive implant is good.

The height of mandibular posterior alveolar bone may be insufficient for an implant. If the implant is used to break through the maxillary sinus it may lead to inflammation and cause failure. Maxillary sinus lifting has emerged as a new method that enlarges the indication for implant therapy. It was first proposed by Tatum in the 1980's[4]. Zhao verified that it was the effective method to enrich bone quantity in the area of the mandibular posterior alveolar[5]. As revealed in previous studies, a high success rate can be achieved and it was anticipated that predicatable outcomes could be obtained

with maxillary sinus lift and sinus graft surgery.

The placement of dental implants requires adequate bone volume at the desired locations for prosthetic support[6,7]. For reasons such as not restoring missing teeth in time, fracture of alveolar bone and periodontal disease, the quantity of bone is always insufficient. Local graft is an effective method for repairing alveolar atrophy and bone defects[8,9]. It has obvious advantages, such as there is no cutaneous scar associated with extraoral donor sites. In addition patients report minimal discomfort and these areas may offer decreased morbidity from graft harvest compared with extraoral locations.

A biomembrane or titanium membrane should be used to retain the grafting bone when the quantity of it is great. The failure rate of the titanium membrane is relatively high. When using the titanium membrane it is necessary that the particle bone is tightly compressed and the titanium membrane is close to particle bone without any spaces. It should also be covered by healthy and thick oral mucosa. At the same time the titanium membrane should have no reductus and be without any sharp margin.

An immediate implant is considered to be an effective method for some cases[10] . There are obvious advantages to the immediate implant for patients, and these have led to an increased focus on the development and evaluation of such protocols. Implanting at the time of tooth extraction may avoid resorption of alveolar bone. Another benefit is fewer postoperative complaints.

Firm initial stability is regarded as one determinant of success for dental implants in 2-stage protocols, and may be even more important in the immediate implant situation[11]. The Xive implant system has a form like the root of natural teeth. It is especially suitable for immediate implant. Notice should be taken to avoid bone resorption in the cervical part of implant and to achieve the best aesthetics of the gingiva.

Within the limitation of this study, it is conclued that Xive implants result in a positive predictable outcome.

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