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Short-term Success of Osseointegrated Dental Implants in HIV-positive Individuals: A Prospective Study

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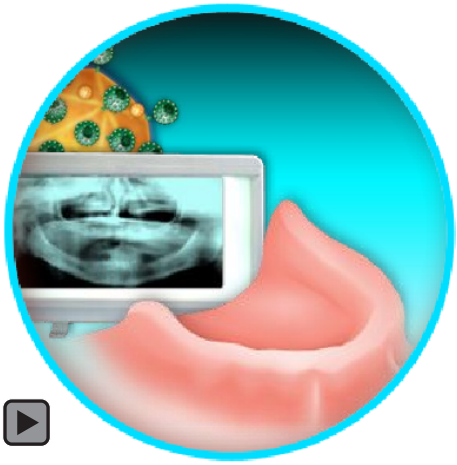

Abstract

Purpose: Except for the occasional case report, there are no studies evaluating the success rate of osseointegrated dental implants in individuals infected with the human immunodeficiency virus (HIV). This study investigated the short-term clinical outcome of implant placement in a group of HIV-positive and HIV-negative individuals who required complete dentures.

Methods and Materials: Edentulous subjects were recruited from an HIV-dedicated clinic and a dental school clinic. Two BioHorizons® dental implants were placed in the anterior mandible to support an overdenture opposing a maxillary denture. Outcome measurements obtained six months after activation of implants were presence of pain, mobility, soft tissue status, and radiographic bone level. Descriptive statistics were used.

Results: Twenty-nine edentulous adults, including 20 HIV-positive subjects (test) and nine HIV-negative subjects (control), participated. The test group had six females, 14 males; 13 Whites, four African-Americans, and three Hispanics with a mean age of 48.9 years (range: 35-59). The mean CD4 count was 467 cells/mm^3 (range: 132-948). The control group had six females, three males; seven Whites, and two Hispanics with a mean age of 65.3 years (range: 50-82). Short-term success rate was 100% for both groups. No difference in clinical outcome was found between the groups.

Conclusion: This study demonstrated dental implants are well tolerated and have predictable outcomes for HIV-infected individuals for the duration of the study and probably over an even longer term.

Keywords: HIV, dental implant, osseointegration, complete denture, overdenture

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Introduction

Individuals infected with the human immunodeficiency virus (HIV) can be affected by a wide variety of oral health problems.[1-4] Many of these problems can progress to the point where the ravages of disease and, sometimes neglect, result in partial or complete loss of the natural dentition.[5-7] Severely compromised oral health has serious implications for the general health of patients with an HIV infection. Long-term maintenance of oral health becomes an important goal as significant advances in the management of this infectious disease become a reality. In particular, with the widespread use of potent antiretroviral regimens, referred to as highly active antiretroviral therapy (HAART), this treatment combination has increased the life expectancy for these individuals.[8-11] Today, with the sustained reduction in AIDS-related morbidity and mortality, the prospect of living with HIV as a chronic, rather than, a terminal disease has never been greater.

Irrespective of HIV status, some patients who wear conventional mandibular complete dentures experience considerable difficulty adapting to their prostheses. There is increasing awareness two-implant, mandibular overdentures are superior to conventional dentures because this combined treatment offers better retention and support.[12,13] Improved comfort, stability, function, and chewing efficiency with implant-supported overdentures have been documented.[13] Patients who receive two-implant, mandibular overdentures with opposing complete maxillary dentures report their quality of life is significantly higher than with conventional dentures.[12] With an increased survival rate, some HIV-infected edentulous patients who wear dentures are becoming informed consumers of oral healthcare and are requesting a variety of procedures, including dental implants.

There are a number of articles relating systemic factors as an important variable influencing the outcome of osseointegrated dental implants. Most of these articles arrive at this conclusion based on retrospective clinical studies or case reports.[14,15] At present, it is unclear to the extent systemic factors interfere with the achievement of osseointegration and its maintenance over time.[16,17] For this reason, there is considerable controversy as to whether such an oral surgical procedure should be performed on HIV-infected patients.[18]

Except for occasional published case reports,[19-22] there are no prospective studies in the English literature on the clinical outcome of endosseous dental implant procedures in HIV-positive patients. In 1998 Rajnay and Hochstetter[19] were the first to document the successful placement of an endosseous, root-form, single implant without complications in an HIV-infected adult. In a second case Baron and associates[20] described the complete rehabilitation of a 27-year-old HIV-positive female who was concurrently infected with

both Hepatitis B virus and Hepatitis C virus. Oral rehabilitation included prostheses supported by twelve implants; six in the maxilla and six in the mandible. Shetty and Achong[21] reported the successful placement in an HIV-positive patient who was managed with eight dental implants; six in the maxilla and two in the mandible. Recently, Achong and associates[22] published the successful outcome, during a 24-month follow-up period, of dental implant placement in three HIV-infected patients. The first patient was a 56-year-old black male who received two implants and crowns. The second, a 45-year-old white male with a history of Hepatitis B infection, received two implants and crowns. The third was an edentulous 46-year-old male with a history of Hepatitis C who received two implants and a mandibular overdenture.


Two-Implant Mandibular Overdentures

The results from these case reports are encouraging, but it is important to verify these isolated patient findings used prospective, controlled studies to determine the clinical success rate of dental implants in this group of immunocompromised patients. The purpose of this study was to evaluate and compare the short-term outcome of osseointegrated dental implants, placed in the anterior mandible of edentulous HIV-positive and HIV-negative individuals, who required complete dentures.

Methods and Materials

This prospective, non-randomized, clinical trial evaluated the short-term success of osseointegrated implants in both HIV-positive and HIV-negative individuals. This study was conducted at Bering-Omega Dental Clinic (BODC) in Houston, TX, USA, a community-based HIV-dedicated clinic for indigent adults and The University of Texas Dental Branch at Houston (UTDB). A standardized protocol was used for the preoperative evaluation, treatment planning, surgical placement, assessment of healing and osseointegration, as well as the prosthetic rehabilitation of implant-supported complete overdentures.

This research protocol was approved by The University of Texas Health Science Center at Houston Committee for the Protection of Human Subjects (Protocol HSC-DB-99-005). Informed consent was obtained from each subject enrolled.

Subject Selection

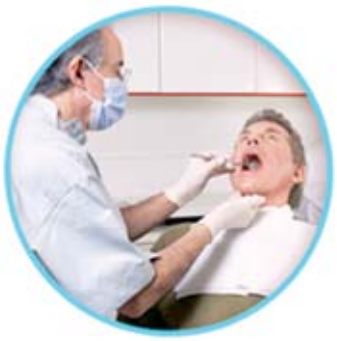
Subjects selected to receive two osseointegrated dental implants were older than 18 years of age, completely edentulous, and with adequate mandibular bone availability (Misch Available Bone Classification Divisions A, B, or C[23]) and adequate mandibular bone density (Misch Bone Density Classification D1, D2, or D3[24]).

In addition, for the HIV-positive individuals, laboratory findings were expected to be as follows:

- Hemoglobin > 8g/dl
- Absolute neutrophil count >750 cells/mm^3
- Platelet count > 75,000/mm^3
- AST <5 times the upper limit of normal (ULN)
- Bilirubin <2.5 times ULN
- Alkaline phosphatase < 5 times ULN
- Creatinine <2.5 mg/ml

Baseline data including the CD4 T-lymphocyte counts, HIV viral load, and other routine hematology studies were obtained.

Subjects were not accepted into this study if they were severely immunocompromised with a high recurrence of opportunistic infections, wasting disease, or disseminated malignancy. Also excluded were those individuals with uncontrolled diabetes mellitus, severe class II type malocclusion (retrognathia), and those with parafunctional habits such as severe bruxism. Subjects who had inadequate mandibular bone availability (Misch Available Bone Classification Division D[23]) or inadequate mandibular bone density (Misch Bone Density Classification D4[24]) were not accepted.



Lastly, any condition placing subjects at unacceptable health risk or if the individual was judged to be unlikely to comply with the study requirements disqualified them from participating in the study.

Examination Procedures

Besides an intraoral clinical examination, panoramic radiographs were obtained to screen for bony pathoses and to determine the amount of anterior mandibular bone present to facilitate the selection of the implant size to be used.

Treatment Procedures

Every participant received two endosseous dental implants (BioHorizons Implant System, Inc., Birmingham, AL, USA) to retain their mandibular overdentures, using appropriate attachments such as the standard O-ring attachment. After both dentures were fabricated, the mandibular denture was duplicated with clear acrylic (Vitacrylic® Fricke International, Inc., Villa Park, IL, USA) to create the surgical drill guide.

For consistency, only two surgeons who followed the Brånemark surgical protocol[25,26] placed all the implants in this study. All subjects were medicated with a broad-spectrum systemic antibiotic, primarily amoxicillin, one-hour prior to the surgery and up to seven days , postoperatively.[27] In addition, subjects rinsed with 0.12% chlorhexidine gluconate solution before surgery and twice a day for 15 days after surgery. Pain medication was prescribed, as needed.

Follow-up Care and Assessment

Subjects returned to the clinic for follow-up care and clinical assessment at regular intervals. When soft tissue healing was considered to be adequate, new dentures were inserted. The mandibular denture was relined in the anterior region, where the implants had been placed,

with a soft relining material (CoeSoft, Dentsply International, Inc., York, PA, USA). On average, three months after the stage I surgery, the stage II surgery was performed. Two to three weeks following stage II surgery the implants were activated with the mandibular denture retained by O-ring attachments (BioHorizons Implant System, Inc., Birmingham, AL, USA).

Periapical radiographs were taken at the time of the loading to determine the alveolar bone level and to evaluate for any radiolucency surrounding the implants. Six months after the implants were loaded, periapical radiographs were taken to document changes in bone height and quality of surrounding bone. In addition, each implant was clinically evaluated for evidence of infection, pain, and mobility at the loading appointment and on the six-month follow-up visit.

The primary variable evaluated was the treatment outcome measured according to the guidelines for successful implants as established by Albrektsson and Zarb[14] with a single modification. Both clinical and radiographic parameters were used to evaluate the success rate of the implants in both groups of subjects, and the criteria for success are briefly described as follows:

Clinically, an integrated implant should be immobile with absence of persistent infection, pain, paresthesia, neuropathies, or violation of the mandibular canal. The condition of the peri-implant bone, the degree of marginal bone loss, and the mechanical components are determined radiographically. A radiograph should not demonstrate any evidence of peri-implant radiolucency.

Since this was a six-month study, the vertical bone loss criterion was modified to be less than 0.5 mm loss six months after implant loading, as opposed to less than 1.0 mm in the first year and less than 0.2 mm annually, following the implant's first year of service.

A lighted viewing table, a millimeter ruler, and 3-power magnifying glass were used to measure the vertical bone loss around each implant. On periapical radiographs taken at the time of implant loading, baseline bone measurements were made by a single examiner on the distal and mesial of each implant using the implant-abutment junction as a reference to the point where the bone contacts the body of the implant.[28] Each patient had two implants, and a total of four measurements were made. This procedure was repeated on radiographs of implants taken six months after implant loading. The differences in measurements between baseline and six months after loading, which represent marginal bone loss, were recorded.

Descriptive analysis of all the parameters measured in this study was conducted six months after activation to evaluate the osseointegration of the dental implants in each patient. Descriptive statistics including the mean, range, and percent success rate were used in this study for comparison between the control and test groups.

Results

A total of 29 subjects (17 males and 12 females) were enrolled in this study. A convenience sample of 20 subjects comprised the test group (HIV-positive), all of whom were treated at BODC. Of the 20 subjects in the test group, 15 (75%) completed the six-month protocol and five (25%) did not. Two subjects (10%) died from complications associated with their HIV infection and three (15%) dropped out of the study. A convenience sample of nine individuals comprised the control group (HIV-negative) and all subjects (100%) completed the protocol at UTDB. A summary of the demographic information of all the subjects enrolled in the test and control groups is presented in Table 1. In general, the HIV-positive group was ethnically more diverse; had proportionally more male participants; and averaged 16 years younger than the test group. Besides HIV and antiretroviral treatment, the test

Table 1. Demographic summary of subjects in study.

Characteristics	Test Group (n = 20)	Control Group (n = 9)
Ethnicity		
African-American	4 = 20%	0 = 0%
Hispanic	3 = 15%	2 = 22%
White	13 = 65%	7 = 78%
Sex		
Male	14 = 70%	3 = 33%
Female	6 = 30%	6 = 67%
Age		
Range	35 – 59 yrs	52 – 82 yrs
Mean	48.9 yrs	65.3 yrs
Cigarette Smoker		
Yes	13 = 65%	1 = 11%
No	7 = 35%	8 = 89%
Diabetes – Type II		
Yes	4 = 20%	0 = 0%
No	16 = 80%	9 = 100%
HIV Medications		
Yes	15 = 75%	0 = 0%
No	5 = 25%	9 = 100%

group had a higher percentage of risk factors including an increased number of patients who were cigarette smokers and were diagnosed with diabetes.

Specific demographic information regarding the 20 subjects in the test group including the subjects' age, ethnicity, sex, use of tobacco products, history of diabetes, CD4 count, viral load, the use of HAART medications, and the treatment outcomes of the dental implants six months after loading is presented in Table 2. Demographic information concerning the nine subjects in the control group is listed in Table 3.

The treatment outcomes were assessed for each implant six months after loading. In this study all implants placed in subjects, who completed the six-month protocol, irrespective of their HIV status, had osseointegrated successfully (Tables 2 and 3). There was no evidence of infection, pain, bleeding, implant mobility, nor peri-implant radiolucency. All measurements of marginal bone loss for the test and the control groups were less than 0.5 mm. For both groups, the range was from 0.0 mm to 0.4 mm. The mean for the test group was 0.06 mm with a standard deviation of 0.09. For the control group, the mean was 0.18 with a standard deviation of 0.17.

Table 2. Subject data and treatment outcomes. (Test Group, n=20)

Subject No.	Age	Ethnicity	Sex	Cigarette Smoker	Diabetes	HIV Status			Treatment Outcomes		Notes
						HIV Medication	CD4	Viral Load	Clinical Findings	Radiographic Findings	
T1	42	A	M	<1 pack/ day	-	-	1247	2986	+	+	
T2	56	W	M	1 pack/day	-	HAART	948	24,000	+	+	
T3	50	H	F	-	-	HAART	797	UD			Discontinued
T4	48	A	F	-	Type II	HAART	771	UD			Discontinued
T5	53	W	M	<1 pack/ day	-	-	751	3320	+	+	
T6	45	W	M	1 pack/day	-	HAART	731	1534	+	+	
T7	54	W	M	2 packs/ day	-	HAART	569	UD	+	+	
T8	49	W	M	1 pack/day	-	-	534	19,621	+	+	
T9	35	W	F	1 pack/day	Type II	-	526	7449	+	+	
T10	39	W	M	2 packs/ day	-	HAART	525	113,576			Deceased
T11	59	H	F	-	-	HAART	490	2000	+	+	
T12	56	W	M	2 packs/ day	-	HAART	418	UD	+	+	
T13	44	W	M	1 pack/day	-	HAART	369	UD	+	+	
T14	54	W	M	-	-	HAART	335	UD			Deceased
T15	56	A	F	-	Type II	HAART	327	UD	+	+	
T16	36	W	M	1 pack/day	-	-	209	UD			Discontinued
T17	55	W	M	1 pack/day	-	HAART	209	UD	+	+	
T18	45	W	M	1 pack/day	Type II	HAART	192	UD	+	+	
T19	56	A	F	-	-	HAART	91	56,533	+	+	
T20	45	H	M	-	-	HAART	67	2633	+	+	

LEGEND:

Ethnicity	Sex	HIV status	Treatment Outcomes
A African-American	M Male	HAART Highly Active Anti-Retroviral Therapy	**Clinical Findings**
H Hispanic	F Female	CD4 cells/mm^3	+ Absence of infection, pain, bleeding, implant mobility
W White		Viral Load copies/mm^3	**Radiographic Findings**
		UD Undetectable	+ No peri-implant radiolucency, < 0.5 mm bone loss at 6 months

Table 3. Subject data and treatment outcomes. (Control Group, n=9)

Subject No.	Age	Ethnicity	Sex	Cigarette Smoker	Diabetes	Treatment Outcomes	
						Clinical Findings	Radiographic Findings
C1	73	W	M	-	-	+	+
C2	60	H	F	-	-	+	+
C3	73	H	F	-	-	+	+
C4	82	W	F	-	-	+	+
C5	67	W	M	1 pack/day	-	+	+
C6	74	W	F	-	-	+	+
C7	52	W	F	-	-	+	+
C8	50	W	F	-	-	+	+
C9	57	W	M	-	-	+	+

LEGEND:

Ethnicity	Sex	Treatment Outcomes
A African-American	M Male	**Clinical Findings**
H Hispanic	F Female	+ Absence of infection, pain, bleeding, implant mobility
W White		**Radiographic Findings**
		+ No peri-implant radiolucency, < 0.5 mm bone loss at 6 months

Both groups demonstrated a 100% short-term success rate. Figures 1-9 illustrate a clinical case of an HIV-positive patient, the corresponding radiographs at baseline (implant activation), and at the six-month follow-up appointment.

Various healing responses, following stage I and after stage II surgery, requiring minor corrective measures were encountered during the course of this study. These are presented in Table 4 for the test group and in Table 5 for the control group. Also, summarized in these tables are the corrective measures taken when indicated.

In the test group six subjects (30%) experienced at least one healing response which required corrective intervention. The most frequently encountered healing response requiring intervention was soft tissue overgrowth around the implants in three (15%) of the subjects (T1, T3, and T7). Four subjects (20%) experienced other noteworthy considerations including the activation of recurrent intraoral herpes simplex infection on the hard palate (T1), porous Misch Bone Density Classification D4[24] (T5), compromised alignment of the implants due to the anatomy of the anterior mandible (T12), and the lack of keratinized tissue around the implants (T20). In the control group two subjects (22.2%) had corrective measures taken; one (11.1%) required removal of soft tissue overgrowth around an implant (C9), the other (11.1%) had excess bone growth over the implant which required osseous recontouring (C4).

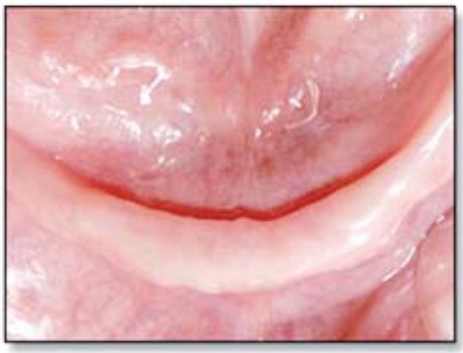


Figure 1. Mandibular edentulous ridge prior to the placement of two implants in a HIV-infected subject.

Figure 2. Stage I surgery (implant placement) in the same subject.

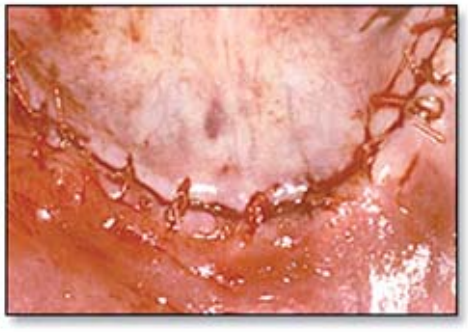


Figure 3. Stage I surgery with primary closure in the same subject.

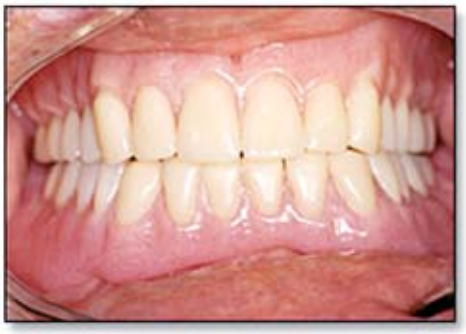


Figure 7. Subject wearing maxillary complete denture and implant-supported mandibular overdenture.

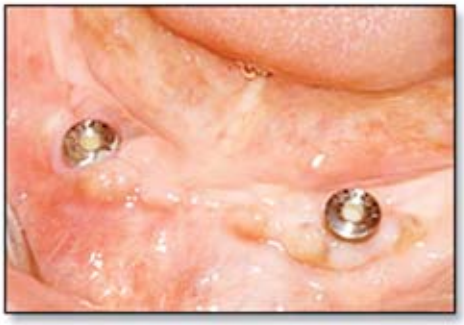


Figure 4. After stage II surgery with implant healing caps placed in the same subject.

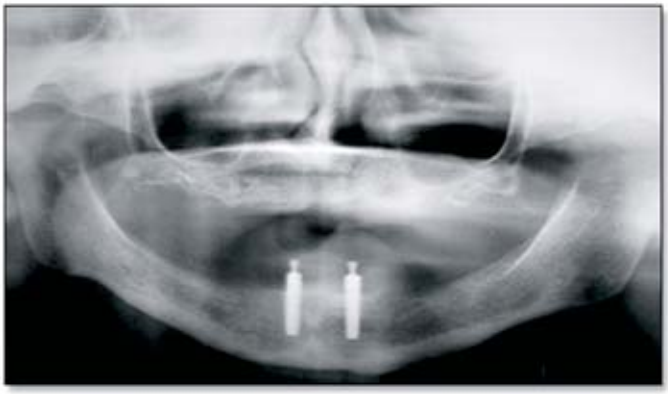


Figure 8. Panoramic radiograph taken when the implant-supported mandibular overdenture was activated with o-rings (implant loading).

Figure 5. O-ring abutments placed (implant loading) in the same subject.

Figure 9. Periapical radiograph of an implant taken six months after implant loading.

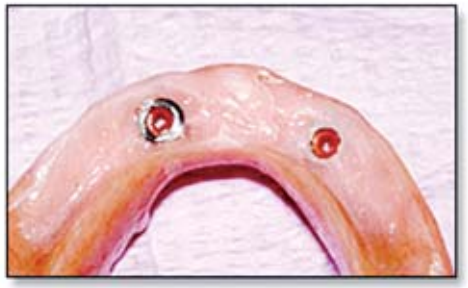


Figure 6. Implant-supported mandibular overdenture activated (implant loading).

Table 4. Occurrence of post-surgical corrective measures. (Test Group, n=20)

Subject No.	Post-Surgical Healing Responses Requiring Corrective Modifications	Notes
T1	A - Dx: R soft tissue overgrowth; Tx: CO_2 laser ablation A - Dx: Recurrent herpes under maxillary denture; Tx: Acyclovir 800 mg	
T2		
T3	2 - Dx: L soft tissue overgrowth; Tx: CO_2 laser ablation 2 - Dx: L soft tissue overgrowth; Tx: CO_2 laser ablation	Discontinued after 2
T4		Discontinued after 2
T5	I - Dx: very porous bone; Tx: Extra implant placed in site #20, "sleeper"	
T6		
T7	A - Dx: L soft tissue overgrowth; Tx: CO_2 laser ablation	
T8		
T9		
T10		Died after I
T11		
T12	A - Dx: R out of alignment with L; Tx: Angled abutment used	
T13		
T14		Died after I
T15		
T16		Discontinued after 2
T17		
T18		
T19		
T20	2 - Dx: L & R lack of keratinized tissue; Tx: Dermal graft placed	

LEGEND:
I = Implant Placement
2 = 2nd Stage Surgery
A = Implant Activation
L = Left Implant
R = Right Implant
Dx = Diagnosis
Tx = Treatment

Table 5. Occurrence of post-surgical corrective measures. (Control Group, n=9)

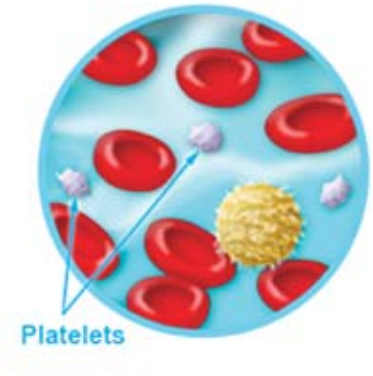
Subject No.	Post-Surgical Healing Responses Requiring Corrective Modifications
C1	
C2	
C3	
C4	2 - Dx: R excess bone over cover screw; Tx: osseous recontouring
C5	
C6	
C7	
C8	
C9	2 - Dx: R soft tissue overgrowth; Tx: soft tissue excision

LEGEND:
I = Implant Placement
2 = 2nd Stage Surgery
A = Implant Activation
L = Left Implant
R = Right Implant
Dx = Diagnosis
Tx = Treatment

Discussion

Based on the short-term results, both HIV-positive and HIV-negative individuals demonstrated clinical and radiographic success following placement of dental implants for the retention of a mandibular denture. Irrespective of the HIV status, the high success rate could be explained in part by the site of placement of the dental implants. Mandibular anterior dental implants are known to have the most favorable outcome due to the ideal anatomical structure and bone type found in that region.[25,29,30]

All post-surgical corrective measures following stage I and after stage II surgery were resolved successfully and the implants functioned well. The most common corrective treatment was the removal of the soft tissue overgrowth adjacent to the implants. This tissue response was found in both the test group (15%) and in the control group (11%). The corrective treatment for these cases included either CO_2 laser ablation or removal of the excess tissues with a scalpel. The soft tissues were allowed to heal completely before the implants were activated. Healing was uneventful after the redundant alveolar mucosa was excised for both groups.



It should be pointed out five subjects in the test group (25%), T16, T17, T18, T19, and T20, had CD4 counts slightly above or less than 200 cell/mm^3 and were classified as having AIDS. In addition, one of these five, T18, was also a controlled type II diabetic and smoked at least one pack of cigarettes a day. A total of four subjects in the test group (20%), T4, T9, T15, and T18, had controlled type II diabetes. Three of these subjects who completed the study had successful osseointegration of their dental implants. In this study HIV-infected individuals who have AIDS and/or have well-controlled type II diabetes underwent successful dental implant therapy despite these significant risk factors.

Little information has been published concerning post-insertion complications encountered with complete dentures in patients who are HIV-positive.[5,31] With regard to oral complications during prosthetic treatment for edentulous non-HIV-infected patients, there are reports describing problems associated with xerostomia[32-34] and candidiasis.[35-37] It should be noted these are two complications frequently associated with HIV infection, but in the present study these conditions did not affect the short-term prognosis of dental implants.

Some clinicians do not recommend the placement of dental implants in HIV-positive patients because of a perceived risk of developing complications from invasive dental treatment. While it is generally accepted a disturbance of the immune function in a patient may lead to poor wound healing and infection, there is considerable controversy regarding the incidence of delayed wound healing and other post-extraction complications in HIV-infected patients. Of clinical importance, studies evaluating the extraction of teeth in HIV-infected patients have demonstrated there is not a statistically significant increased risk for post-extraction complications when compared with non-HIV-infected patients.[38-40] A recent systematic review of the literature by Patton and associates[41] concluded the evidence is insufficient to determine if there is a higher risk for developing complications following invasive oral surgical procedures in this immunocompromised group of patients. Although the number of patients in this study is limited, the findings illustrated the surgical procedure of placing dental implants is also well tolerated in HIV-infected individuals.

Cigarette smoking is generally considered to be a significant risk factor in the prognosis of dental implants. After studying the association between the failure of dental implants and cigarette smoking, Bain and Moy[42] suggested the patient cease smoking at least one week prior to surgery to allow reversal of higher levels of platelet adhesion and blood viscosity as well as the shorter-term effects associated with nicotine.

These authors recommended patients should avoid tobacco for at least two months after implant placement. By that time bony healing should have progressed to the osteoblastic phase and early osseointegration should be established.[43,44] Lambert and associates[45] reported smoking does not contribute to early implant failures between the time of implant placement and its uncovering. However, greater failures seem to appear between the time following uncovering and before the insertion of the prosthesis. Their results suggest implant failures in smokers are not the result of poor healing or osseointegration but rather of exposure of peri-implant tissues to the insult from tobacco smoke. They also suggest the detrimental effects may be reduced by cessation of smoking, use of preoperative antibiotics, and use of hydroxyapatite-coated implants.

It is very interesting to note of the 15 subjects in the test group who completed the study, 11 subjects (73%) smoked at least a pack of cigarettes a day. Only one subject in the control group (11%) was a smoker. Despite the high incidence of tobacco use in the HIV-infected group, all of the cigarette smokers who completed the study achieved successful osseointegration of their dental implants. In this study patients who smoked were asked to discontinue the habit for at least three weeks after the surgery. All of these patients claimed to have been compliant with the smoking cessation instructions which probably reduced the deleterious effects of smoking on dental implant health and increased the probability for a favorable, short-term outcome.[42-46]

When a patient has a chronic disease, such as HIV infection, hospitalizations, increased risk for opportunistic infections, and rigorous medication dosing schedules may affect patient compliance and motivation. Clinicians need to be aware of the various complications that may occur during treatment. Patients may become ill and require hospitalization which may interrupt the ideal timing and sequence of dental treatment. In this study two subjects, T10 and T14, died from complications of the HIV disease, despite adhering to a well defined list of exclusion criteria. Typically, patients must be able to tolerate several long appointments, endure oral discomfort and surgical procedures, and demonstrate a willingness to adhere to home care instructions and a maintenance schedule. For a variety of medical, socioeconomic, and psychological reasons, HIV-infected individuals may not be able to adhere to the treatment protocol and may not complete their dental care. In this study three subjects (T3, T4, and T16) dropped out of the study prematurely, and their reasons for discontinuing ranged from hospitalizations, relocations to another state, and incarceration.

When properly prescribed and performed, endosseous implant therapy can greatly improve the masticatory and phonetic function of the prosthesis. Regardless of HIV status, dental implant therapy can restore appearance and function, improve nutrition, and enhance the quality of life. Clinicians need scientific evidence to justify the provision of implant dentistry to patients who are HIV-infected. In addition, if invasive surgical procedures are performed on this special group of patients, it is important for the clinician to understand the common manifestations and complications of this disease, including any systemic therapies that may impact treatment outcome. As the number of immunocompromised patients who could benefit from osseointegrated implants continues to increase, the dental profession will need to address all the treatment options available to this group of medically complex patients.

Conclusion

This is the first prospective study of the placement of dental implants in HIV-positive individuals. After a six-month evaluation, all dental implants were defined as being successfully integrated regardless of the HIV status of the individual. No differences were found between the HIV-infected and uninfected groups regarding the clinical response and integration of endosseous dental implants, as measured by standardized parameters.

This short-term study demonstrated osseointegrated dental implants are well tolerated and are a predictable treatment option for the immunocompromised patient. Extended follow-up of the subjects who participated in this study is desirable in order to determine the long-term prognosis of dental implants in the HIV-infected individual.

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