Predoctoral Fixed Implant Patient Satisfaction Outcome and Challenges of a Clinical Implant Competency


Abstract: Treatment with fixed and removable partial dentures has been the traditional method of addressing the replacement of teeth competencies in dental education. However, by 2013 the Commission on Dental Accreditation (CODA) standards will mandate a competency in “replacement of teeth including fixed, removable, and dental implants.” In 2005, New York University College of Dentistry implemented a comprehensive implant program for predoctoral dental students. One of the outcome assessments of this program was to determine the level of patient satisfaction. Therefore, a patient satisfaction survey (n=103) assessed the use of implant treatment for the restoration of partially edentulous patients, measuring such dimensions of satisfaction as function, comfort, and esthetics. The results revealed that 96 percent of the patients surveyed were satisfied with their ability to chew, 91 percent were satisfied with the comfort of their restoration, and 86 percent were satisfied with the appearance of their restoration. Additionally, 90 percent of the surveyed patients who received implant-retained crowns as part of their routine care were satisfied with the overall treatment experience, and 97 percent of them would recommend this treatment to a friend. The survey results validate implant-supported crown treatment in predoctoral education. Although implant-supported restorations are a valid treatment option that must be presented to patients during treatment planning, creating a clinical competency in implant therapy requires greater consideration. Therefore, the benefits and challenges of such a clinical competency are discussed.

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As the quality of health care improves, an increase in demand for maintenance and replacement of teeth is anticipated. The number of lost teeth continues to increase with an aging population, leading to a growing number of partially edentulous patients who require increasingly complex restorative care. According to the Third National Health and Nutrition Examination Survey (NHANES III), only about 30 percent of the U.S. population eighteen years and older have a full complement of natural dentition (not including third molars). Among the twenty years and older population, 71.7 percent are reported to have twenty-one or more natural teeth. This percentage decreases to 42.4 percent for individuals aged fifty years and older. Patients today demand more comfort, better function, and increased esthetics.

Treatment with fixed and removable partial dentures has been the traditional method of addressing the replacement of teeth competencies in dental education. However, by 2013, the Commission on Dental Accreditation (CODA) standards will mandate a competency in “replacement of teeth including fixed, removable, and dental implants.” This new addition of dental implant therapy was expected because the success of implant therapy and its outcomes are well documented in the literature. This evidence has necessitated the inclusion of dental implants as another treatment choice for patients.

In the United States, as early as the 1970s, 20 percent of predoctoral dental education programs included lectures on implant dentistry in the curriculum. By the 1990s, curriculum guidelines were published by the American Association of Dental
Schools suggesting that graduates should be able to compare dental implants with other treatment modalities and provide a basic description of the surgical and prosthetic procedures involved. In 1993, Weintraub et al. reported that 86 percent of U.S. dental schools provided predoctoral students with instruction in implant dentistry. However, most of the programs offered lectures but limited clinically related components such as laboratory or preclinical or clinical experience. The report of a survey of North American dental deans published in 2006 noted that although 97 percent of dental schools in the United States and Canada had a didactic course related to dental implants and 86 percent provided some clinical implant experience for their students, only 13 percent had a requirement for a clinical experience in implant dentistry.

It is generally accepted that, upon graduation, a dentist should be able to manage a partially edentulous area using the most appropriate treatment option, which may include the use of implant restorations. New CODA competency guidelines mandate that by 2013 a predoctoral competency standard for implant prosthodontics must be in place at every accredited dental school. Maalhagh-Fard and Nimmo and Maalhagh-Fard et al. reported that recent graduates are more inclined to offer implant therapy as a treatment option when implant dentistry has been part of their predoctoral dental curriculum.

Debate on the desirable extent of implant education at the predoctoral level also occurs globally. The Association for Dental Education in Europe assessed the need for consensus on the predoctoral teaching of implant therapy to reduce the disparities in time and instructional methods among schools and agreed that predoctoral students should be competent in designing and delivering simple implant-retained/ supported fixed restorations. However, recent surveys of dental implant education in the United Kingdom and Ireland found that very few dental schools include dental implant treatment in their predoctoral curricula. A survey of European dental schools found that 75 percent of responding schools had established implant dentistry programs, but only 37 percent reported that their predoctoral students gained clinical experience in the restoration of implants. Others have reported the establishment of didactic and simulation components but, again, with a lesser involvement in direct patient care.

In 2005, New York University College of Dentistry (NYUCD) implemented didactic, simulation, and clinical components of a comprehensive implant program for predoctoral dental students. By 2007, approximately 70 percent of the NYUCD students had completed a clinical implant restoration on patients; since 2009, that number increased to and remains at 100 percent. One of the objectives of the program is to ensure a continuous improvement based on patient-related outcomes. The goals of this program are to diversify treatment offerings, to improve the dental education, and to optimize patient care.

In recent years, interest in assessing patient-based parameters, such as the outcomes of oral health and dental therapy, has increased. Such information offers new opportunities for the improvement of general health and dental care. Lang and De Bruyn reported that only 2 percent of the available literature focuses on evaluation of patient-related outcomes. The purpose of this study was, in part, to evaluate patient satisfaction of single-unit implant therapy in a predoctoral program. Since the CODA standards will soon mandate a competency in dental implants, we also discuss the benefits and challenges of having a clinical competency in implant therapy.

Methods

A patient satisfaction survey was developed, and the conduct of research was approved by New York University’s Institutional Review Board. A total of 871 subjects treated at NYUCD general dentistry clinics from 2006 to 2009 were identified using American Dental Association Procedure Code identifiers in the college’s internal clinical tracking system. A subject’s inclusion criteria required a minimum age of eighteen years and having received at least one single-unit fixed implant-retained crown in the predoctoral clinics.

The subjects’ ages ranged from twenty-six to eighty-one years. Calls to them were attempted in the months of June to December 2009 using the telephone numbers listed in their dental records. All telephone calls were made by two study personnel, who were calibrated and timed for delivery of a scripted consent form, conduct of survey, and recording of the data electronically. From a predetermined script, each subject who was successfully reached was asked if he or she would be willing to participate in a survey regarding satisfaction with the specific implant treatment they received at NYUCD. Once the subject agreed to participate in the survey, a scripted oral consent was obtained and recorded on the survey form (available from the corresponding author). To
confirm that the correct person was successfully reached on the telephone, the subject was then asked to verify the day and month of his or her birth.

An attempt was made to contact all 871 identified subjects, some of whom were unreachable or unavailable. Fifty-three subjects had changed or disconnected their telephone numbers or did not answer after three call attempts were made. Of the remaining 818 subjects, 715 were unavailable. These included those with answering machine recordings (379), who declined immediately (209), who did not speak English (44), who were reported to be working at the time of call (41), who were traveling (28), who were hospitalized (11), or who were reported to be deceased (3). The remaining 103 subjects agreed to participate in the telephone survey, 100 of whom completed the survey (97.1 percent). Answers were collected and electronically recorded and stored. The data were deidentified with the recording of only the subject's agreement to consent, date of birth, and responses.

Results

A total of 356 subjects (survey participants, those declining, or who did not speak English) who were originally deemed eligible (871) were reached (41 percent). The yield to participate was 29 percent (103 out of 356). Although a higher yield was anticipated, it was determined that this participating group provided a representative sample of the demographic type of patients treated at NYUCD.

In the survey results (Table 1), positive satisfaction with appearance and speech accounted for 86 percent and 95 percent, respectively. A total of 54 percent of the respondents reported an increase in self-confidence as a result of the implant restoration therapy, and 96 percent were satisfied with their ability to chew. In addition, 97 percent reported no pain during the restorative phase or after receiving the implant-retained crown. The subjects reported a 91 percent satisfaction rate (satisfied or very satisfied) with overall comfort after the new prosthesis was placed. Regarding oral hygiene maintenance,

<table>
<thead>
<tr>
<th>Survey Questions</th>
<th>Recorded Responses</th>
<th>Minimum and Maximum Values for Specific Survey Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Subjects = 103</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Are you satisfied with the appearance of your implant restoration?</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Are you satisfied with how well you can speak with your implant restoration?</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Are you satisfied with how well you can chew with your implant crown?</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Are you satisfied with the comfort of your implant crown?</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Have you experienced any pain with your new implant crown?</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Did your self-confidence increase since receiving the implant crown?</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>Do you pay more attention to your oral hygiene since the implant treatment?</td>
<td>79</td>
<td>79%</td>
</tr>
<tr>
<td>How easy is it easy to keep your crown clean?</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Would you recommend implants to a friend based on your experience?</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>How would you rate your overall experience of receiving an implant crown?</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Overall, how happy are you with your decision to get implant crowns?</td>
<td>1</td>
<td>1%</td>
</tr>
</tbody>
</table>
86 percent of the respondents rated their ability to keep the implant-supported crown as “easy” or “very easy,” and 92 percent reported that they were more aware (very often or often) of their oral hygiene related to the implant restoration. Additionally, 5 percent complained about food impaction with the implant-retained crowns that necessitated extra care in hygiene practice.

When the subjects were questioned about the amount of time they were partially edentulous prior to receiving their implant-supported crown, 54 percent said they were partially edentulous for over a year prior receiving the implant treatment. There were thirteen patients who had experienced treatment with a fixed partial denture prior to or concurrently with their experience of a single-unit, implant-retained crown. When questioned about their satisfaction with the single-unit, implant-retained crown as compared to treatment with a fixed partial denture, 92 percent (twelve of the thirteen) of this limited group were more satisfied with the implant crown treatment. No significant differences were found regarding the ability to keep the implant restoration clean as compared to a fixed partial denture.

Regarding the treatment decision, 98 percent of the total respondents were very satisfied or satisfied with their decision to receive implant-supported crowns after the treatment was completed. Ninety percent were very satisfied or satisfied with the experience of receiving an implant crown. In the telephone survey, six subjects reported complaints regarding their treatment. The complaints were loosening of prosthetic screws (n=3), loss of crown retention (n=2), and problems with occlusion (n=1). These problems necessitated additional follow-up appointments that the subjects found to be bothersome. As an overall observation, 97 percent of the respondents said they would very likely or likely recommend the implant-supported crown treatment to a friend or family member.

**Discussion**

All the cases in the survey database were taken from patients seen in the predoctoral program. Clinical acceptability of delivered restorations followed NYUCD core curriculum guidelines and were deemed acceptable by the clinical instructors at the time of prosthetic delivery for implant integration and adequacy of the prosthesis. The purpose of the survey was to determine patient satisfaction regarding these approved restorations. The survey was designed to measure dimensions of patient satisfaction through a telephone survey, which has been found to be a valid method for gathering responses. The emphasis of the survey was on “humaneness” and “outcome” as these aspects of satisfaction are known to be most accurately reported by patients and frequently used as categories in patient satisfaction surveys. The survey questionnaire was designed with five possible answers, many in the range of “very satisfied” to “very dissatisfied,” allowing respondents greater opportunity to express precision in view by offering a number of alternative responses. In addition, survey questions included varying descriptive ranges related to satisfaction, significance, difficulty, etc. to avoid establishing a predictable answering pattern to the patient. This further ensured reliability of responses.

The results of this study are similar to that in a study by Vermylen et al., who found equally high patient satisfaction with implant-retained restorations delivered by novice providers. These collective findings are very encouraging for schools that may have apprehension about initiating clinical implant therapy as a routine treatment offering in the predoctoral clinics. However, our study has potential limitations on perceptions of esthetics, speech, and self-confidence because clinical care in the predoctoral program at NYUCD excludes implant restoration of maxillary anterior teeth, which is a highly critical esthetic zone.

Our findings indicate that patients reported greater satisfaction with the decision to receive an implant-supported crown (98 percent) as compared to the experience of receiving an implant crown (90 percent). This slight disparity can perhaps be related to surgical aspects of treatment or to anxiety of dental care during the procedures. The patients seemed to indicate that although their satisfaction during care was not as high, they remain overwhelmingly positive about the decision and outcome of care with single tooth replacement with implants. These results further validate this treatment option for patients in a predoctoral program.

**Implant Therapy as a Clinical Competency**

A number of challenges in the development of a comprehensive predoctoral implant program have been described. The implementation of an adequate...
clinical program will require sufficient patient availability, a commitment to faculty training, and a dedication of financial resources. However, to progress along the continuum of curriculum from exposure to a formative experience and on to competence, the challenges are far greater.

The available patients in the institution may become limited when spread across competing clinical interests in graduate programs or continuing education offerings. Irrespective of the competing programs, the demand on patient availability is high when clinical competencies are designed to be direct patient care procedures because the students must have practiced these procedures during their formative experiences prior to exhibiting summative competence. This requires that student exposure to a variety of opportunities for teaching and learning occur before a competency exam is attempted independently. Where only a limited number of patients are available, meeting this type of clinical competence may simply not be possible.

Apart from competing programs, the additional concern often expressed is that treatment options may compete, such as a fixed partial denture versus an implant restoration clinical competency. The presence of a required clinical competency in implant restorations could thus conflict with a patient-centered treatment concept as the students strive to meet these competencies. Therefore, as dental schools seek to determine the best way to address this new competency requirement, diligence is required to meet clinical competencies while keeping the needs and desires of the patient at the center of each decision.

This patient-centered approach may require diversifying the competencies to include supplemental assessment mechanisms such as simulation or objective structured clinical examinations (OSCEs).

Where a patient-centered competency is advocated, faculty training and calibration become highly critical factors for successful competency management. Faculty training is required to ensure a thorough understanding of various treatment modalities and procedural steps. Faculty calibration further involves embracing the patient-centered philosophy and the delivery of care unrelated to traditional procedures or numerical requirements. Calibration is a highly critical component for faculty members, so that they assess student competencies in a unified manner.

From a patient’s perspective, when faced with treatment options, the decision making is not always simple. Often, patients have limited financial resources, which affects their treatment choice. Lack of reimbursements from Medicaid and from most insurance companies for implant procedures can influence the patient’s decision. From the institution’s perspective, where the program ultimately benefits patients and the costs can be recovered by patient care, implementation will receive greater support.

The goal of creating clinical competencies in implant-supported crowns is recommended as it is apparent that these procedures are a predictable and a desirable treatment modality. Although patient treatment may be the best mechanism for assessment, creating such competencies can be challenging (Table 2).

| Table 2. Potential benefits and challenges of creating a clinical competency in implant therapy |
|-----------------------------------------------|-------------------------|
| Benefits | Challenges |
| Clinical competency is the most relevant and valid form of assessing students. | Competing clinical competencies may compromise treatment selection for the patient. |
| Providing diverse treatment options to patients benefits patient care. | Patient availability may be compromised because of competing programs such as graduate programs and continuing education course offerings. |
| Expansion of faculty expertise is an expected outcome of faculty training that can benefit faculty members outside of the academic environment. | A greater number of faculty members require training and calibration. This includes the embracing of these treatment modalities, as well as technical aspects of patient management. |
| Offering these procedures as “routine care” can provide opportunities for marketing to patients and future students. | Dedication of financial resources is necessary in faculty training and calibration. |
| Payments from patient care services can subsidize or sustain programs. | Medicaid and insurance reimbursements can influence a patient's treatment decision. |
Conclusions

The conclusions of this study are as follows. The results of the patient outcome survey revealed that patients who received implant-retained crowns as part of their routine care at New York University College of Dentistry were highly satisfied with their overall decision regarding implant therapy and would recommend this treatment to a friend. To address the new CODA standards’ competency in replacement of teeth with dental implants, dental schools may need to diversify this competency assessment to include multiple mechanisms such as simulations or OSCEs as well as patient-centered clinical evaluation.

REFERENCES


