

# Predoctoral Dental Students' Perceptions and Experiences with Prosthodontics

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## Keywords

Prosthodontics; predoctoral dental students; advanced standing dental students; survey; perceptions; mentoring; specialty training.

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## Abstract

**Purpose:** The aims of this study were to: (1) investigate the perceptions and experiences of predoctoral dental students and advanced standing students on mentorship, exposure to prosthodontics, and future need for the specialty, and (2) establish a baseline of students' perceptions of the impact of prosthodontics on salary, personal and patient quality of life, and the profession of dentistry.

**Materials and Methods:** A survey was distributed to 494 predoctoral and advanced standing students at the University of Pennsylvania School of Dental Medicine. Questions focused on the perceptions and experiences with the specialty of prosthodontics. A total of 410 surveys were analyzed using Chi Square tests and univariate and multivariate analysis with statistical software.

**Results:** Response rate was 83%. A positive initial introduction to prosthodontics was reported by 57% of students. Most students had positive experiences with prosthodontic faculty and enjoyed laboratory work and challenging/complex dentistry. A greater need for prosthodontists in the future was perceived by 82% of respondents, with 63% reporting that the future of prosthodontics had been emphasized. Students reported (1) a preclinical course directed by prosthodontists and (2) working in the clinic with prosthodontic faculty ( $p < 0.006$ ) as having the biggest impact on their introduction to prosthodontics. A desire to pursue training or a career in prosthodontics was reported by 3.4% of the respondents, with 1.7% of them pursuing prosthodontics. Enjoyment of providing care in prosthodontics was the most important factor for those who decided to pursue prosthodontic postgraduate training. When compared to other specialties, prosthodontics ranked low with regards to its impact on salary (7<sup>th</sup>), personal quality of life (5<sup>th</sup>), patient quality of life (4<sup>th</sup>), and strengthening of the dental field (7<sup>th</sup>).

**Conclusion:** Reasons few students are interested in prosthodontics as a career, despite a positive first introduction and high perceived future need for prosthodontists may be attributed to a number of factors. These include insufficient prosthodontically trained faculty, lack of a mentorship program, lack of an advanced graduate program, a perception of feeling unprepared upon graduation, and misconception of potential income in prosthodontics.

With the human lifespan increasing, there are more partially edentulous and edentulous patients, with recent studies predicting that by the year 2020, 30 million patients will be edentulous.<sup>1</sup> A large need for prosthodontic care is predicted

to exceed available specialty care in the years 2005, 2010, and 2020.<sup>2</sup> After decades of declining applicant pools and low enrollment numbers in prosthodontic training programs for US graduates, it was reported that advanced prosthodontic

programs have witnessed at least a 23% increase in the applicant pool since 2000.<sup>3</sup>

A survey of deans and program directors reported at least a 23% increase in the applicant pool for advanced education prosthodontic programs since 2000, with US-trained graduates making up 64% of the applicants.<sup>4</sup> More foreign-trained graduates than US-trained graduates were enrolled in prosthodontic programs from 1994 to 2002.<sup>5,6</sup> A significant increase in US-trained applicants to prosthodontic programs creates a more competitive applicant pool for the specialty, especially when compared to a 40.2% decline in applications and a 31.7% decline in enrollment just a decade earlier (between 1991 to 1999).<sup>7</sup> It has been reported that a 40.2% decline in prosthodontic enrollment from 1991 to 1999 was in contrast to the increased enrollments in specialties such as pediatric dentistry, orthodontics, oral and maxillofacial surgery, and endodontics.<sup>8,9</sup> As noted by Munoz *et al*,<sup>7</sup> the decline in enrollment and recruitment in prosthodontics occurred after the ADA changed the standards for specialty training to include clinical and didactic education in fixed and removable prosthodontics. Prior to this, specialty training in prosthodontics was in either removable or fixed prosthodontics.

Douglass and Watson<sup>2</sup> reported that the needs for removable and fixed prosthodontics will rise in the next 20 years, with total unmet need to increase from 488 million hours in 2005 to 517 million hours in 2010, and to 560 million hours in 2020. A survey of prosthodontic program directors and deans showed a positive statistically significant correlation with an increase in the number of US dental graduates applying to prosthodontic programs and factors such as mentoring by prosthodontists at the predoctoral level, interest in prosthodontics among US dental students, data depicting current and projected income for dental specialists, and number of prosthodontically trained full- or part-time faculty at the predoctoral level.<sup>4,5</sup>

A recent report revealed that mentors who serve as role models have a positive impact on students' specialty choices.<sup>10</sup> Several other studies also reveal that the influence of mentors/instructors as role models has a positive impact on a student's specialty choice.<sup>10,11</sup> The mentor/student relationship is considered a positive factor among educators and prospective students in prosthodontics. As an effort to raise awareness and interest in the specialty of prosthodontics among predoctoral dental students, student mentoring has been a major focus of several dental specialty training programs and prosthodontic organizations. The Greater New York Academy of Prosthodontics (GNYAP) started such a mentorship program in 2000. This program has allowed some of the authors to establish and further their mentor relationships through participation in the organization's meetings and activities while creating opportunities for the mentor and the student to engage in scholarly and research experience.

Establishment of mentorship was shown to significantly improve the perception of dental students on the specialty of periodontics.<sup>12</sup> An educational survey of faculty and residents in the specialty of endodontics recognized a negative impact of the deficient number of full-time specialty educators and researchers on predoctoral students' perceptions of the specialty of endodontics.<sup>13</sup> The literature supports the effectiveness of dental specialty mentorship in enhancing motivation, production, job

satisfaction, and enjoyment of practicing in the specialty for the mentor and the mentee.<sup>14</sup>

Nash and Pfeiffer reported that prosthodontic training is a financially attractive investment, as the internal rate of return for the expenses associated with prosthodontic training was a positive finding.<sup>15</sup> Income associated with a specialty has been shown to be an important factor predoctoral dental students consider when choosing specialty training or a career.<sup>16</sup>

Regarding the presence of prosthodontically trained faculty in predoctoral training programs, Haden *et al* reported that the shortage of prosthodontic faculty ranked fourth out of all dental specialties.<sup>17</sup> Several other studies have reported on the significant shortage of specialty-trained faculty in the specialties of orthodontics, endodontics, and periodontics.<sup>9,12,13</sup> In a review of factors that impact recruitment and retention of periodontic-trained faculty, creation of a culture of mentoring among faculty, residents, and predoctoral dental students was shown to encourage predoctoral students to train in periodontics.<sup>12</sup>

The literature is scarce on the perceptions of dental students for each of the American Dental Association recognized dental specialties. There is, however, a yearly nationwide survey of graduating dental students conducted by the American Dental Education Association. The most recent survey showed that only 18.7% of students felt well prepared in prosthodontics, with the majority of them also feeling unprepared in other dental specialties.<sup>18</sup> Specifically, more than 25% of the respondents felt less than prepared for implant dentistry, orthodontics, and oral health care for disabled patients. Dental specialties such as prosthodontics, periodontics, orthodontics, and endodontics provide care for the patient population in need of treatments where more than one-fourth of the US graduating classes felt less prepared. In addition to this, ample literature suggests that the above-mentioned dental specialties are also experiencing challenges with recruitment and maintenance of specialty-trained faculty.<sup>7,12,13,16</sup> Furthermore, a survey of 632 United Kingdom dental students of their perceptions of oral and maxillofacial surgery found that only 6% of the respondents planned to pursue training in oral and maxillofacial surgery, while most students felt well prepared for key oral surgery procedures in a private practice setting.<sup>19</sup>

Predoctoral and postgraduate advanced standing students at the University of Pennsylvania School of Dental Medicine (UPennSDM) were surveyed to better understand prosthodontic mentoring at the predoctoral level, interest in prosthodontics, income perception, and role of prosthodontics-trained faculty. This assessment was based on the students' perceptions and experiences with prosthodontics at an institution with large class sizes, foreign-trained dentists joining during the last 2 years of undergraduate training, and lack of a graduate prosthodontic program. There is, however, a periodontics/prosthesis graduate training program, which integrates a 4-year periodontic training curriculum appropriate for periodontic board certification and treatment of advanced restorative implant dentistry. In 2010, an advanced clinic in restorative dentistry was established where multidisciplinary restorative treatment is provided by undergraduate students.

The aims of this study were: (1) to investigate the perceptions and experiences of predoctoral dental students and advanced standing students on mentorship, exposure to prosthodontics,

and future needs of the specialty, and (2) to establish a baseline of students' perceptions of the impact of prosthodontics on salary, personal and patient quality of life, and the profession of dentistry.

## Materials and methods

In 2008, a survey was created and hand distributed during randomly selected classes to the 494 current/enrolled students and mailed in paper format with return postage enclosed to the most recently graduated class of 2007. The UPennSDM classes surveyed included: graduated class of 2007, 2008, 2009, 2010, 2011, advanced standing students 2009, and advanced standing students 2010. The survey format allowed only one response per respondent. The respondents completed the survey anonymously and voluntarily. After the surveys were collected, the data were manually entered, stored, and deidentified in an electronic format as a Microsoft Excel 2003 file (Microsoft, Redmond, WA). A total of 410 completed surveys were analyzed (Appendix).

A cover letter, which communicated the purpose of the survey, including a statement of confidentiality to safeguard data and identity of respondents, accompanied all surveys. The letter to all respondents contained a notice of IRB approval.

The survey validity was accomplished through a literature review as part of a broader survey,<sup>11</sup> which revealed no specific reports on the 4-year predoctoral and advanced standing dental students' perceptions, experience, and exposure to prosthodontics during training. After a review of the literature, the authors created the following questions *de novo* in conjunction with a review from statisticians to ensure question validity, appropriateness, and quantification:

1. When were you first introduced to prosthodontics?
2. Who/how were you first introduced to prosthodontics?
3. Which introductory experience to prosthodontics had the biggest impact on you?
4. How was your first introduction to prosthodontics?
5. During your time in dental school, has a faculty member suggested that you should pursue prosthodontics?
6. Was your experience with the prosthodontic faculty positive?
7. Do you enjoy laboratory work?
8. Do you enjoy complicated/challenging restorative dentistry?
9. What is your overall perception of prosthodontics?
10. Do you think there is a greater or a lesser need for prosthodontics in the future?
11. Has the future need for prosthodontics been stressed at your school?
12. How do students perceive the impact of prosthodontics as compared to other specialties with regards to salary, personal quality of life, patient quality of life, and strengthening dentistry?

Since the students could select more than one factor for the question "What introductory experience had the biggest impact on you?," the choices were collapsed into three factors: (1) lecture (survey response choices: faculty member teaching lecture, a preclinical course directed by prosthodontists, clinical

course taught by prosthodontists), (2) faculty/mentoring (survey response choices: faculty member in clinic, faculty member outside of lecture), and (3) other (survey response choices: working in commercial or school laboratory, as a patient, textbook/dental journal/online dental website, and other). The Pearson Chi Square analysis was then used to assess whether there was a correlation between: student class year and the factors overall perception of the specialty and enjoyment of challenging/complex dentistry, enjoyment of laboratory work, and experience with prosthodontic faculty. Furthermore, a baseline was established for the students' perceptions of the future of prosthodontics with regards to salary, their personal quality of life, the patients' quality of life, and the profession of dentistry.

## Statistical methods

Data were entered and stored anonymously in an electronic format as a Microsoft Excel 2003 file. Of the 494 distributed surveys, 410 were completed and analyzed using Chi Square tests and univariate and multivariate analysis with statistical software (SAS, Version 8.1, SAS Institute, Cary, NC).

## Results

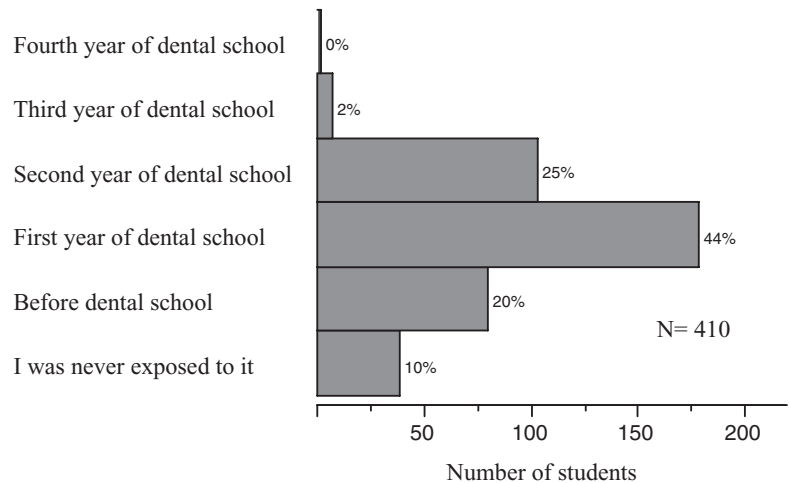
The response rate was 83% (410 completed surveys/494 distributed surveys). Of the respondents, 56% were women and 44% were men, with the majority of the students (88%) in the 20- to 29-year-old age range.<sup>20</sup> Responses of the graduated class of 2007 were not included in the analysis due to small sample size ( $n = 11$ ). Faulty mailing addresses and geographic relocation upon graduation were attributed to the small sample size for the graduated class of 2007.

More students (44%) were first introduced to the specialty of prosthodontics during their first year of dental school than any other year. By the fourth year of dental school, all students were exposed to the specialty of prosthodontics (Fig 1). A positive initial introduction to prosthodontics was reported by 57% of students.

The most commonly reported first introduction to prosthodontics was academic. Specifically, through faculty in lecture and a preclinical course directed by prosthodontists. Other experiences reported by the students were: observing a prosthodontist before entering dental school, a dentist or prosthodontist family member, working as a dental office assistant, working as a dental assistant, dental office photographs about what prosthodontists do, and upperclassmen (Table 1).

Lecture and faculty/mentoring were highly significant factors for the introduction to prosthodontics. Overall, lecture had the biggest impact on students in preclinical years (2010 and 2011), whereas faculty/mentoring had a bigger impact on students exposed to clinic (2008 and 2009;  $p < 0.006$ ). Overall, there was a statistically significant difference among the four classes in terms of the introductory experience to prosthodontics with the biggest impact. Students reported two statistically significant factors: (1) a preclinical course directed by a prosthodontist and (2) working in the clinic ( $p < 0.006$ ) as having the biggest impact on their introduction to prosthodontics (Fig 2).

The future of prosthodontics was reported to have been emphasized by 63% of the students. One-fourth of the students



**Figure 1** Students' response to the first exposure to prosthodontics. More students (44%) were first exposed to prosthodontics during their first year of dental school than any other year. All students were exposed to prosthodontics by their third year in dental school.

were indifferent to the experience with the prosthodontic faculty (Table 2). A positive experience with prosthodontic faculty was reported by 63% of the respondents. Complex/challenging restorative dentistry was enjoyed by 76% of students, and 59% reported enjoying doing laboratory work.

Many students (40%) perceived prosthodontics to be a known or very well known specialty. Of the respondents, 29% thought that the specialty of prosthodontics had the same awareness as other dental specialties (Fig 3). Of the 410 UPennSDM students, 82% recognized a greater need for prosthodontists in the future.

**Table 1** Students' perceptions of the most common introductory experiences to prosthodontics

Group	Factors	% Responses
Lecture	<ul style="list-style-type: none"> <li>• Faculty member teaching lecture</li> <li>• A preclinical course directed by prosthodontists</li> <li>• A clinical course taught by prosthodontists</li> </ul>	40.5%
Faculty/Mentoring	<ul style="list-style-type: none"> <li>• Faculty member outside of lecture</li> <li>• Faculty member in clinic</li> </ul>	40.5%
Other	<ul style="list-style-type: none"> <li>• Textbook/ Dental journals/ Online dental website</li> <li>• As a patient</li> <li>• Working in a commercial or school laboratory</li> <li>• Other*</li> </ul>	19%

The responses were collapsed into three categories: lecture, faculty/mentoring, and other. Students had the opportunity to select multiple responses. Lectures in prosthodontics and faculty/mentoring were reported by the students as the most common introductory experiences to prosthodontics.

\*Students had the opportunity to write the other introductory experiences to prosthodontics: prosthodontist or dentist family members, working in a dental office before dental school.

There was a statistically significant and positive correlation between enjoyment of laboratory work and the overall perception that prosthodontics is a known or well-known specialty ( $p < 0.0001$ ). Of the 165 students who perceived prosthodontics to be a known or well-known specialty, 136 (82%) of them enjoyed laboratory work. A statistically significant and positive correlation was found between enjoyment of complex/challenging dentistry and overall perception of prosthodontics ( $p < 0.0001$ ). A total of 35 (97%) of the 36 students who perceived prosthodontics to be a well-known specialty enjoyed complex/challenging dentistry.

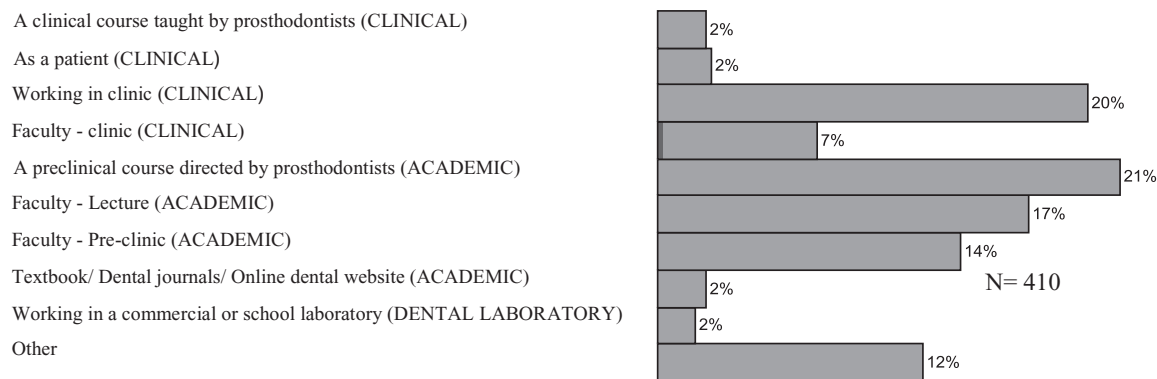
A statistically significant correlation ( $p < 0.0001$ ) was found between overall perception of prosthodontics and experiences with prosthodontically trained faculty. No statistically significant correlation could be established between overall perception of prosthodontics and whether the future of the specialty was stressed at the school.

The specialty of prosthodontics was reported to be the desired career by 3.4% of the respondents, while 1.7% of the respondents actually decided to pursue specialty training in prosthodontics at the time the survey was conducted. The five students who reported that they planned to pursue a career in prosthodontics indicated that enjoyment of providing service in this specialty was the single most important factor in their choice. Prosthodontics ranked fourth (out of nine ADA accredited specialties) with regards to patient quality of life and seventh with regards to salary and its impact on the profession of dentistry (Table 3).

## Discussion

Prosthodontics has been reported to be an increasingly competitive specialty choice.<sup>3</sup> Therefore, it is necessary to understand dental students' perceptions of the specialty at the predoctoral level.

The 4-year curriculum developed at UPennSDM at the time of this survey provided the students with hands-on experience and training in the computerized simulation laboratory starting on the first day of dental school. Based on the findings of



**Figure 2** Students’ responses to the single introductory experience to prosthodontics with the biggest impact. The students could choose the single most important introductory experience to prosthodontics from three categories: clinical, academic, dental laboratory, and other. A pre-clinical course directed by prosthodontists (21 % of the respondents) was

the single introductory experience to prosthodontics with the biggest impact. This was closely followed by working in the clinic (20%). Among the other introductory experiences were prosthodontist family members, observing a prosthodontist before dental school, and working in a dental office.

this study, the great emphasis placed in preclinical training during the first 2 years of dental school seems to positively impact the students’ exposure to prosthodontics. The majority of them (44%) expressed that they were exposed to the specialty during their first year of dental school. A preclinical course directed by prosthodontically trained faculty was the single most favorable introductory experience to prosthodontics. Almost all students (98%) were exposed to prosthodontics by their third year when they started clinical patient care.

Full-time dedication to patient care is the focus of the last 2 years of training. During this time, students have the opportunity to work closely and under the supervision of several faculty members who were trained from ADA accredited prosthodontic programs; however, the majority of the faculty are general dentists. Even though working in the clinic was the second most favorable introductory experience to prosthodontics, only 2% of the students reported that a clinical course taught by a

prosthodontically trained faculty was an important introductory experience.

This finding points to several factors that can influence the students’ limited introductory experience to the specialty by prosthodontically trained faculty. Since the study is limited to one institution, the authors can only hypothesize that the small number of faculty trained in an ADA-accredited prosthodontic graduate program and the lack of a prosthodontic graduate training program do not offer students the opportunity to familiarize themselves with the entire scope of the specialty. The limited introduction to prosthodontics through a course taught by an ADA-accredited prosthodontist is consistent with the reported shortage, challenges in recruitment, and retention of prosthodontic faculty in dental schools.<sup>3,4,7</sup>

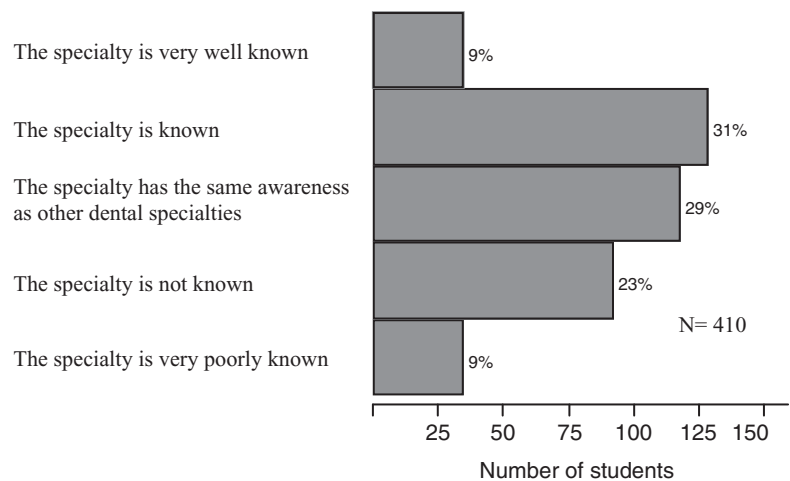
Another factor to be considered is the lack of an established mentorship program. A positive statistically significant correlation with an increase in prosthodontic specialty applicant pools and mentoring by prosthodontists at the predoctoral level has

**Table 2** Summary of students’ experiences with prosthodontics during dental school training

Survey questions	Mostly yes% (N)	Sometimes yes% (N)	Indifferent % (N)	Sometimes no % (N)	Mostly no % (N)
Was your experience with the prosthodontic faculty positive?	32% (130)	31% (128)	26% (108)	7% (27)	4% (17)
Do you enjoy doing dental laboratory work?	23% (95)	36% (148)	8% (32)	15% (63)	18% (72)
Do you enjoy complicated/challenging restorative dentistry?*	35% (145)	41% (169)	8% (33)	7% (30)	8% (33)
Has the future of prosthodontics been stressed at your school?*	31% (127)	32% (133)	23% (94)	5% (22)	8% (34)

The majority of the respondents (63%) had a positive experience with prosthodontic faculty and enjoyed doing laboratory work (59%) and complicated restorative dentistry (76%). Even though the future of prosthodontics was reported to have been stressed at the school by 63% of the students, one-fourth of them were indifferent to the experience with the prosthodontic faculty.

\*Percentages have been rounded off to the nearest whole number.



**Figure 3** Students' overall perception of awareness of prosthodontics. The most popular response (31%) was that students perceived prosthodontics to be known; 29% of them perceived it to have the same awareness as other dental specialties.

been shown in the literature.<sup>4,17</sup> Based on this survey's findings, in 2010, a prosthodontic mentorship program and prosthodontic club were established at UPennSDM. In addition to this, students interested in prosthodontics now have the opportunity to attend the GNYAP annual session under the mentorship of a prosthodontically trained faculty member. Redistribution of the survey instrument to the students exposed to established mentorship can help assess its effectiveness in attracting more students to prosthodontics.

Regarding the presence of an advanced graduate program in prosthodontics, the Harvard School of Dental Medicine (HSDM) report<sup>16</sup> showed that the presence of students in the advanced graduate program in prosthodontics served as a positive role model for dental students. It is encouraging to see that 63% of the students had a positive first exposure to prosthodontics. Despite the lack of an advanced graduate training program in prosthodontics at UPennSDM and the small number of prosthodontically trained or board-certified faculty, working closely with prosthodontically trained faculty may

have a positive influence on the students' exposure to this field, as 63% of the students had a positive first exposure to prosthodontics.

Conversely, the periodontics/prosthesis graduate training program integrates a 4-year curriculum in periodontic training and advanced restorative dentistry appropriate for periodontic board certification. In addition to this, the program incorporates management and treatment planning of cases comprising surgical, implant, and prosthetic rehabilitation. The dental students are exposed to the periodontics/prosthesis program during their clinical rotations in periodontics where they work beside residents and periodontics-trained faculty. This experience may also add to the students' positive exposure to the specialty of prosthodontics.

A greater future need for prosthodontists was recognized by 83% of the students, which is consistent with the expected increased need for the specialty in the next 20 years.<sup>2</sup> Despite this, the specialty of prosthodontics was reported to be the desired career by 3.4% of the respondents, with only five students (1.7%) actually pursuing specialty training in prosthodontics at the time the survey was conducted. It would be expected that with such a large awareness of the future need for prosthodontics, more students would be interested in and actually pursuing training in the specialty of prosthodontics. Several factors may contribute to such disparity. These include the ADEA finding that only 18.7% of graduating dental students feel well prepared in prosthodontics,<sup>18</sup> the small number of accredited prosthodontic faculty, lack of an established mentorship program, lack of an advanced graduate program, misconception of the potential specialty income, and lastly, a strong correlation between the perception of the specialty and enjoyment of challenging/complex dentistry and laboratory work (which are some of the fundamental components of the practice of prosthodontics).

Some additional student responses in this survey may help identify why such a small number of students is interested in prosthodontics. More specifically, although 76% of the respondents enjoyed complicated dentistry, and 59% liked laboratory work, one-fourth of them were indifferent to the experiences they had with prosthodontics-trained faculty. Additionally, only

**Table 3** Students' perceptions of the future impact of dental specialty careers on salary, personal quality of life, patient quality of life, and dentistry

Students' perceptions of future impact	Career	Prosthodontics rank
Salary		
Greatest/Least	OMFS/Oral Pathology	7 <sup>th</sup>
Personal Quality of Life		
Greatest/Least	Orthodontics/OMFS	5 <sup>th</sup>
Patient Quality of Life		
Greatest/Least	General Dentistry/OMFS	4 <sup>th</sup>
Strengthening Dentistry		
Greatest/Least	General Dentistry/OMFS	7 <sup>th</sup>

Students ranked oral maxillofacial surgery as the dental specialty career with the best future impact on salary, while ranking it as the career with the least future impact on personal quality of life, patient quality of life, and strengthening dentistry. Prosthodontics ranked fourth (out of nine) with regards to patient quality of life, and seventh with regards to strength of dentistry and salary.

9% of the respondents perceived the details of the specialty of prosthodontics to be very well known.

A strong positive correlation was found between the perception of the specialty and enjoyment of laboratory work, challenging/complex dentistry, and experiences with prosthodontics-trained faculty. This suggests that students relate their enjoyment of performing procedures common to a specialty and exposure to the actual practice of the specialty with their perception of the specialty. This is consistent with a survey of faculty and residents in endodontics, which recognized a negative impact of the deficient number of accredited endodontic faculty and residents on the predoctoral dental students' perception of the specialty of endodontics.<sup>13</sup>

There appears to be a negative misconception between predoctoral students' perceptions on current and projected income in prosthodontics. This is an interesting finding, not only because the students' perceptions do not reflect the peer-reviewed literature on the income factor, but also because income associated with a specialty was also one of the important factors predoctoral students at HSDM considered when choosing specialty training.<sup>16</sup> The five students who decided to pursue specialty training in prosthodontics reported that enjoyment of providing care in that specialty and not income was the most important factor on which they based their decision to specialize in this field.

Students did not rank prosthodontics as the top or bottom choice in terms of anticipated salary, professional quality of life, or patient care. According to a report of the US Bureau of Labor statistics at the time of the survey as well as recent reports, prosthodontists have higher earnings than most other dental specialists.<sup>21</sup>

The limitations of the study are data collected from a single institution, despite a large sample size ( $n = 410$ ) and no follow-up survey of the lower classes as they progressed through training.

In these exciting times of the specialty of prosthodontics, more board-eligible prosthodontically trained faculty, creation of an accredited prosthodontic residency program, and establishment of a mentorship program can attract more students to the specialty of prosthodontics. Their talent and innovative views are vital, as the functional and esthetic needs of the patient population challenge advances in technology, materials, and multidisciplinary care.

## Conclusion

From this survey, few dental students at UPennSDM desired (3.4%) or planned (1.7%) to pursue training or a career in prosthodontics. This is despite the predoctoral dental students' positive experiences with prosthodontics, positive influence and encouragement of prosthodontics-trained faculty, and a perceived greater future need for the specialty. Based on the findings of this study, the following factors may be limiting efforts to meet the greater need for prosthodontists at the educator and graduate training level:

- (1) Insufficient prosthodontics-trained faculty in predoctoral training,
- (2) Lack of an established mentorship program,
- (3) Lack of an advanced graduate program in prosthodontics,
- (4) A perception of feeling unprepared in the specialty upon graduation,
- (5) Misconception of potential income in prosthodontics.

## References

1. Douglass CW, Shih A, Ostry L: Will there be a need for complete dentures in the United States in 2020? *J Prosthet Dent* 2002;87:5-8
2. Douglass CW, Watson AJ: Future needs for fixed and removable partial dentures in the United States. *J Prosthet Dent* 2002;87:9-14
3. Wright RF, Dunlop RA, Kim FM, et al: A survey of program directors: trends, challenges, and mentoring in prosthodontics. Part 1. *J Prosthodont* 2008;17:69-75
4. Wright RF, Dunlop RA, Kim FM, et al: A survey of deans: trends, challenges, and mentoring in prosthodontics. Part 2. *J Prosthodont* 2008;17:149-155
5. American Dental Association: Trends in Advanced Dental Education Programs 1991/92 to 2000/02. Chicago, ADA, 2002, pp. 16-17
6. American Dental Association: 2002/03 Survey of Advanced Dental Education, Chicago, ADA, 2004, p. 34
7. Munoz DM, Kinnunen T, Chang BM, et al: Ten-year survey of program directors: trends, challenges, and mentoring in prosthodontics. Part 1. *J Prosthodont* 2011;20:587-592
8. Felton DA, Goldstein G, Cooper L: Postgraduate Resident Recruitment in Prosthodontics: Cause for Alarm or Window of Opportunity? *ACP Messenger*, Chicago, ACP, Winter 2001, p. 32
9. American Dental Association: 2002/03 Survey of Advanced Dental Education, Chicago, ADA, 2004, p. 34
10. Blissett R, Lee MC, Jimenez M, et al: Differential factors that influence applicant selection of a prosthodontic residency program. *J Prosthodont* 2009;18:283-288
11. Ambrozy DM, Irby DM, Bowen JL, et al: Role models' perceptions of themselves and their influence on students' specialty choices. *Acad Medicine* 1997;72:1119-1121
12. Hempton TJ, Drakos D, Likhari V, et al: Strategies for developing a culture of mentoring in postdoctoral periodontology. *J Dent Educ* 2008;72:577-584
13. Glickman GN, Gluskin AH, Johnson WT, et al: The crisis in endodontic education: current perspectives and strategies for change. *J Endod* 2005;31:255-261
14. Schrubbe KF: Mentorship: a critical component for professional growth and academic success. *J Dent Educ* 2004;68:324-328
15. Nash KD, Pfeifer DL: Prosthodontics as a specialty private practice: net income of private practitioners. *J Prosthodont* 2006;15:37-46
16. Zarchy M, Kinnunen T, Chang BM, et al: Increasing predoctoral dental students' motivations to specialize in prosthodontics. *J Dent Educ* 2011;75:1236-1243
17. Haden NK, Weaver RG, Valachovic RW: Meeting the demand for future dental school faculty: trends, challenges, and responses. *J Dent Educ* 2002;66:1102-1113
18. Okwuje I, Anderson E, Valachovic RW: Annual ADEA survey of dental school seniors: 2008 graduating class. *J Dent Educ* 2009;73:1009-1032
19. Maccluskey M, Durham J, Bell A, et al: A national survey of UK final year students' opinion of undergraduate oral surgery teaching. *Eur J Dent Educ* 2012;16:e205-e212

20. Dhima M, Han R, Petropoulos VC, et al: Students' perceptions of dental specialties and factors influencing specialties and career choices. *J Dent Educ* 2012;76:562-573

21. United States Department of Labor, Bureau of Labor Statistics. November 2004 National Occupational Employment and Wage Estimates: Healthcare and Technical Occupations. Washington, US Department of Labor, 2004. [http://www.bls.gov/oes/2004/november/oes\\_29He.htm](http://www.bls.gov/oes/2004/november/oes_29He.htm) Accessed May 17, 2012

**Appendix: Survey**

When were you first introduced to Prosthodontics?

- Before dental school
- First year of dental school
- Second year of dental school
- Third year of dental school
- Fourth year of dental school
- I was never exposed to it

Who/how were you first introduced to Prosthodontics? (Choose All That Apply)

Academic:

- Faculty-lecture
- a preclinical course directed by prosthodontists
- Faculty-preclinic
- Textbook/Dental Journals/Online dental website

Clinical:

- Faculty-clinic
- As a patient
- Working with patients
- A clinical course taught by prosthodontists

Dental Laboratory:

- Working in a commercial or school laboratory

Other:

- Other (Please specify) \_\_\_\_\_

Which introductory experience to Prosthodontics had the biggest impact on you?

(Choose only one)

Academic:

- Faculty-lecture
- a preclinical course directed by prosthodontists
- Faculty-preclinic lab
- Textbook/Dental Journals/Online dental website

Clinical:

- Faculty clinic
- As a patient
- Working in the clinic
- A clinical course taught by prosthodontists

Dental Laboratory:

- Working in a school or commercial laboratory

Other:

- Other (Please specify) \_\_\_\_\_

Was your first introduction to Prosthodontics positive or negative?

- mostly positive
- sometimes positive
- indifferent
- sometimes negative
- mostly negative

During your time in dental school, has a faculty member suggested that you should pursue Prosthodontics?

- yes
- no

Was your experience with the Prosthodontic /restorative faculty positive?

- mostly yes
- sometimes yes
- indifferent
- sometimes no
- mostly no

Do you enjoy doing dental laboratory work?

- mostly yes
- sometimes yes
- indifferent
- sometimes no
- mostly no

Do you enjoy complicated/challenging restorative dentistry?

- mostly yes
- sometimes yes
- indifferent
- sometimes no
- mostly no

What is your overall perception of Prosthodontics?

- the specialty is very well known
- the specialty is known
- the specialty has about the same awareness as other specialties in dentistry
- the specialty is not known
- the specialty is very poorly known

Do you think there is a greater or lesser need for Prosthodontists in the future?

- greater
- lesser

Has the future need for prosthodontics been stressed at your school?

- mostly yes
- sometimes yes
- indifferent
- sometimes no
- mostly no



In dentistry which specialty or nonspecialty do you believe has the best future in terms of the following:

Salary:

- Academics (straight into teaching)
- Dental Public Health
- Endodontics
- General Dentistry
- Oral and Maxillofacial Surgery
- Oral and Maxillofacial Radiology
- Orthodontics
- Oral Pathology
- Periodontics
- Pediatric Dentistry
- Prosthodontics

Personal quality of life:

- Academics (straight into teaching)
- Dental Public Health
- Endodontics
- General Dentistry
- Oral and Maxillofacial Surgery
- Oral and Maxillofacial Radiology
- Orthodontics
- Oral Pathology
- Periodontics
- Pediatric Dentistry
- Prosthodontics

Patient quality of life:

- Academics (straight into teaching)
- Dental Public Health
- Endodontics
- General Dentistry
- Oral and Maxillofacial Surgery
- Oral and Maxillofacial Radiology
- Orthodontics
- Oral Pathology
- Periodontics
- Pediatric Dentistry
- Prosthodontics

Overall impact on the profession of dentistry:

- Academics (straight into teaching)
- Dental Public Health
- Endodontics
- General Dentistry
- Oral and Maxillofacial Surgery
- Oral and Maxillofacial Radiology
- Orthodontics
- Oral Pathology
- Periodontics
- Pediatric Dentistry
- Prosthodontics

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