Should the Teaching of Full Denture Prosthetics Be Maintained in Schools of Dentistry?


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Consider the following quotations regarding edentulism in the United States and the training required to meet the needs of edentulous patients: “The 10 percent decline in edentulism experienced each decade for the past 30 years will be more than offset by the 79 percent increase in the adult population older than 55 years. . . . if training in complete denture prostheses is eliminated from the dental education curriculum, millions of patients will be forced to seek denture services from alternative providers.”1 “Although there will be a need for full dentures for the foreseeable future except in certain areas of the country, full denture construction will likely become so rare that the dentures required by the public could be handled by specialists. . . . We’re doing what is necessary to keep the [dental] curriculum relevant.”2

The American Dental Association’s 2002 Future of Dentistry Report pointed out that “expansion of oral and craniofacial science, changes in disease patterns, advances in dental materials, coupled with technological advances, are competing with the traditional elements of dental education for curriculum time.”3 Concerns regarding population, decreasing edentulous rates, and modifications of dental school curricula and clinical components of licensing examinations have appeared in the literature for more than two decades. Reporting on dental school patient records between the late 1970s and early 1980s, Colman et al. commented on the decreasing number of edentulous patients, saying, “the findings present a potentially serious problem . . . that may lead to a decline in the availability of sufficient experiences for the clinical training of dentists.”4 By 1990, “73 percent of dental schools report[ed] inadequate or marginal numbers of complete denture patients.”5

Some of the determining issues in considering the need for a continued commitment to the future teaching of full denture prosthetics in the predoctoral programs of schools of dentistry include the following:

• The extent to which there will be sufficient numbers of individuals with one or two edentulous arches to warrant the efforts and time commitments necessary in already overloaded dental school curricula (burdened with the advances of the past and the innovations of the twenty-first century).

• The potential to convert the “need” for denture services to a “demand” for care. A critical barrier to increasing the demand for dental services is associated with the fact that dental costs are “felt” to a greater extent than other health services as a consequence of extremely limited government support for dental care. The proportion of expenditures for dental services by federal, state, and local government programs represents approximately 6 percent of total costs, compared to 58 percent for hospital services, 27 percent for physician care, 61 percent for nursing home services, and 43 percent for overall personal health services.6

• If the first two issues support the continued teaching programs, should the service be transferred into the domain of specialists, rather than being carried out by general practitioners with referrals (as needed) to specialists? Under this changed approach, the educational process could be carried out in postdoctoral specialty programs, particularly...
in those cases that are too complex for undergraduate students.

- The ability to reduce dramatically total edentulism with innovative technology, including implants and further advances in preventive and restorative procedures. While it may be difficult to quantify the impact of these developments, future human resources and educational program planning efforts will require attention to these matters.

**Numbers and Proportions**

The National Center for Chronic Disease Prevention and Health Promotion reported for 1999-2002 that less than 1 percent of the twenty to thirty-nine age group was edentulous compared to less than 5 percent of residents forty to fifty-nine years of age and 25 percent of individuals more than sixty years of age. Almost 15 percent of individuals below the federal poverty level were without teeth, compared to less than 5 percent of individuals with incomes at more than twice the poverty level. In addition, 13.5 percent of individuals with less than a high school education were edentulous, compared to 3.5 percent of persons with more than a high school education.7

In 2002, Douglass et al. provided an extensive set of age-specific projections for future expectations of full denture “needs” and “demands.” Their analysis was based upon age-specific population data, percent of edentulism, and denture utilization patterns. They projected “an increase in the overall need for complete dentures, from 53.8 million in 1991 to 61.0 million dentures in 2020”1 (see Table 1). These authors commented that “these estimates may be significantly conservative because the need or demand for new dentures to replace broken, lost, or worn-out dentures was not taken into account.”

The findings from a 2004 National Survey on Behavioral Risk Factors provide a more detailed localized view of the estimated prevalence of edentulism among adults aged sixty-five years and over.8 Prevalence rates ranged by:

- **States**: From 12.4 percent in Connecticut to almost 43 percent in West Virginia. The median among the states was 21.2 percent.
- **150 metropolitan and micropolitan statistical areas**: From 5.2 percent in Bethesda-Frederick-Gaithersburg, MD, to 45.1 percent in Charleston, WV. The median among these areas was almost 19 percent.
- **200 counties**: From 6.1 percent in Monmouth County, NJ, to 34.6 percent in Kanawha County, WV. The median among the counties was 17.6 percent8 (see Table 2).

The need to present potential utilization data on a more local basis (rather than overall national information) is reinforced with the results from the study on behavioral risks. The estimated prevalence of adults who visited a dental health professional within the preceding year varied greatly by:

- **States**: From 59.4 percent in Mississippi to 80.6 percent in Connecticut. The median among the states was 70.2 percent.
- **150 metropolitan and micropolitan statistical areas**: From almost 59 percent in El Paso, TX, to 84.2 percent in Concord, NH. The median among these areas was 72.6 percent.
- **200 counties**: From almost 59 percent in El Paso County, TX, to 88.1 percent in Dakota County, MN. The median among the counties was 73.6 percent8 (see Table 3).

The variations in edentulous rates in different geographic areas were emphasized further in the National Rural Health Association’s 2005 report. Residents in rural areas are significantly more likely to have lost all their teeth than their nonrural counterparts; in fact, adults aged eighteen to sixty-four are nearly twice as likely to be edentulous if they are rural residents.9

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**Table 1. Number of U.S. adults (in millions) who need one or two dentures**

<table>
<thead>
<tr>
<th>Age Group (yrs)</th>
<th>1991</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>.9</td>
<td>.7</td>
<td>.6</td>
<td>.6</td>
</tr>
<tr>
<td>35-44</td>
<td>3.8</td>
<td>3.8</td>
<td>2.9</td>
<td>2.6</td>
</tr>
<tr>
<td>45-54</td>
<td>5.6</td>
<td>7.3</td>
<td>7.7</td>
<td>5.9</td>
</tr>
<tr>
<td>55-64</td>
<td>7.7</td>
<td>7.8</td>
<td>10.2</td>
<td>10.6</td>
</tr>
<tr>
<td>65-74</td>
<td>7.7</td>
<td>6.8</td>
<td>7.0</td>
<td>9.1</td>
</tr>
<tr>
<td>75-84</td>
<td>6.2</td>
<td>6.6</td>
<td>5.9</td>
<td>6.4</td>
</tr>
<tr>
<td>85+</td>
<td>1.9</td>
<td>2.3</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Total number of adults</td>
<td>33.6</td>
<td>35.4</td>
<td>37.1</td>
<td>37.9</td>
</tr>
<tr>
<td>Demand at 90% utilization</td>
<td>30.3</td>
<td>31.9</td>
<td>33.4</td>
<td>34.1</td>
</tr>
<tr>
<td>Total number of edentulous arches</td>
<td>53.8</td>
<td>56.5</td>
<td>59.3</td>
<td>61.0</td>
</tr>
</tbody>
</table>

Note: Numbers have been rounded.
Providers and Services

In 2004, there were 3,235 professionally active prosthodontics specialists reported by the American Dental Association.\(^\text{10}\) (The number of professionally active prosthodontists includes educators, administrators, etc., some of whom may not be in full-time practice.) Less than half (48 percent) of the 652 graduates from prosthodontics specialty programs in the five graduating classes between 2000 and 2004 (an annual average of sixty-two postgraduate residents) were U.S. citizens. To some extent, a number of the noncitizens may remain in this country.\(^\text{11}\)

In line with the view that “full denture construction will likely become so rare that the dentures required by the public could be handled by specialists,”\(^\text{12}\) consider the extent of the responsibility of prosthodontists in the following set: assume (conservatively) that dentures would be demanded in 2020 for only one-quarter of the projected estimated 61 million edentulous arches (i.e., 15 million dentures)\(^\text{1}\) (see Table 1); assume that the number of professionally active prosthodontists were to remain a) relatively constant at 3,250 prosthodontists in 2020, and b) increased to 4,000 prosthodontists, then each professionally active prosthodontics specialist would need to assume the responsibility in 2020 for between approximately 4,600 dentures (15,000,000 dentures ÷ 3,250 prosthodontists = 4,600) and 3,750 dentures (15,000,000 dentures ÷ 4,000 prosthodontists = 3,750); then, will professionally active prosthodontists distribute themselves to those states with greater edentulism rates? And what of the poor (with their higher rates of edentulism); will they be able to afford the fees of specialists? (In most states, Medicaid dentistry for adults, if it exists, does not include denture services.) What of the rural residents with their higher rates of edentulism; will specialists practice in sparsely inhabited areas? And what of the thought that “millions of patients will be forced to seek denture services from alternative providers.”\(^\text{11}\) Are we now to consider once again establishing cadres of denturists throughout the country? Has it been so long since 1978 that we have forgotten when 78 percent of the electorate of the State of Oregon voted to legalize independent denturists, because adequate denture services were unavailable from dentists for lower income populations?\(^\text{12,13}\)

Challenge

Dental education has come a long way since students would personally process their patients’ dentures (one of us even remembers fifty years ago having to cast his patients’ gold partial denture framework) and perform denture wax set-ups for licensing examinations. Surely it would be advantageous to eliminate “unnecessary” course and curriculum hours, given the ever-increasing complexity of providing adequate preparation for young men and women to deliver health services in an era of seeming exponential growth of knowledge in the basic and clinical sciences (made even more complex in our evolving diverse communities). One state (New York) has established a mandatory additional residency

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Table 2. Estimated prevalence of adults ages ≥65 years who have had all their natural teeth extracted, 2004

<table>
<thead>
<tr>
<th>Range</th>
<th>State</th>
<th>Metropolitan/Micropolitan Area</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>West Virginia</td>
<td>Charleston, WV</td>
<td>Kanawha, WV</td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td>Cincinnati, OH</td>
<td>Dayton, OH</td>
</tr>
<tr>
<td>Low</td>
<td>Connecticut</td>
<td>West Palm Beach, FL</td>
<td>Miami-Dade, FL</td>
</tr>
</tbody>
</table>

Table 3. Estimated prevalence of adults who visited a dental health professional within the preceding year, 2004

<table>
<thead>
<tr>
<th>Range</th>
<th>State</th>
<th>Metropolitan/Micropolitan Area</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Connecticut</td>
<td>Concord, NH</td>
<td>Dakota, MN</td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td>Madison, WI</td>
<td>St Paul, MN</td>
</tr>
<tr>
<td>Low</td>
<td>Mississippi</td>
<td>El Paso, TX</td>
<td>El Paso, TX</td>
</tr>
</tbody>
</table>
year in an effort to provide an additional period for preparation before licensure.

It seems inappropriate to classify the preparation of the next generation of dentists to provide full denture services as “unnecessary,” given the projected numbers of individuals who, for the foreseeable future, will need and demand the service. In addition, the experience gained in providing full denture services will reinforce an appreciation of the basic complexities of occlusion and the potential for adverse consequences. We do not advocate re-establishment of licensing board requirements for denture service. We do suggest the expansion of denture services beyond the traditional walls of dental schools to provide care in community centers, which provide for many of the underserved populations, in assisted living facilities, and even in nursing homes. Any planning for the future of dentistry must consider the reality that during the professional career years of most younger practitioners, one in five residents of our nation will be sixty-five years or older and, in some states, one in four.14

The reality is that only general practitioners, in concert with prosthodontists, can meet the full denture requirements in 2020. The need will be to provide denture services for the proportion of the 34 million U.S. adults with an estimated 61 million edentulous arches who will demand services. Do we have any other choice but to prepare the next generation of practitioners with the needed didactic prosthetic courses and clinical experiences in their predoctoral training years?

REFERENCES