

# Orthodontic Care in Suburban Cuyahoga County, Ohio: Who Provides Treatment and Whom Do They Treat?

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**Abstract:** It has been reported that orthodontic services are being provided to a larger segment of the population by an increasing number of providers. The present study surveyed the dental and orthodontic experiences of 10th grade students attending 16 public and two parochial high schools in suburban Cuyahoga County, Ohio, as well as two schools from the city of Cleveland. Questionnaires were distributed in the classroom and data obtained for 2808 students. Approximately 50% of the sample were girls with an average age of  $15.5 \pm 0.8$  years. Results of the survey revealed that 84% (2371/2808) had seen a dentist within the past year, and 37% (1047/2808) of the students had received orthodontic treatment from 171 different providers. Of those treated, 87.2% (913/1047) were treated by a specialist in orthodontics, 10.8% (114/1047) by a general dentist, and 0.7% (7/1047) by a pediatric dentist, with 1.3% missing or unknown (13/1047). Patients who had seen a dentist within the past year were more likely to have had orthodontic treatment. Only 7% of the untreated students were told by a dental professional that they needed braces compared with 71% of the treated group. Therefore, we conclude that orthodontic specialists provide most of the orthodontic services in the suburbs of Cuyahoga County, and visiting a general dentist positively influences the utilization of orthodontic services. (*Angle Orthod* 2004;74:293–297.)

**Key Words:** Orthodontics; Treatment; Utilization

## INTRODUCTION

Most orthodontic specialists derive most of their income from clinical practice. Therefore, there is considerable interest in the orthodontic community regarding the demographics of clinical care. Clinicians are interested in knowing who is receiving orthodontic care and what factors might influence the orthodontic treatment decision. Other areas of interest include the percentage of teenagers receiving orthodontic treatment, as well as the socioeconomic concerns that affect the decision to seek care. In addition to questions pertaining to who is being treated, there is also some concern over who is providing orthodontic services.

For example, what is the role of the general dentist in recommending or providing orthodontic services? Because orthodontics is a specialty in the profession of dentistry, dental practice laws usually allow individuals with a dental degree and a variety of formal and informal training in orthodontics to provide orthodontic services to the dental public. In the state of Ohio, any licensed dentist may provide orthodontic care for his or her patients. However, general dentists are not allowed to limit their clinical practice to a single specialty area.

Because dentistry is most often practiced outside potential secondary regulatory bodies such as hospitals, it is both legal and possible for general dentists to provide comprehensive orthodontic treatment for their patients. Therefore, the question arises, what percentage of care is provided by specialists in orthodontics? The perception in the orthodontic community has been that general dentists treating a high percentage of the patients who receive orthodontic care.<sup>1</sup> This belief has been supported by reports in the orthodontic literature that indicate that from 20% to 50% of all orthodontic treatment is provided by general dentists with no advanced university training in orthodontics.<sup>2–4</sup> The present study examines the demographic characteristics of orthodontic practice by going directly to the patient. Specifically, this study surveyed 10th grade students attending public or parochial schools in Cuyahoga County, Ohio, on their dental and orthodontic experiences.

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## MATERIALS AND METHODS

### Sample selection

A cross-sectional sample of 2808 tenth graders from 18 public and two parochial schools in Cuyahoga County were enrolled in this study. Subjects were recruited by contacting their high-school principal. A letter explaining the study was sent to all high-school principals in the county. All the 16 schools in the city of Cleveland agreed to participate, along with 20 schools located in the suburbs surrounding Cleveland. The utilization rate for orthodontic services averaged 7% in the Cleveland city schools compared with more than 30% in the suburban schools. So, to maximize the yield of information on orthodontic treatment, only two of the 16 Cleveland city schools were included in the final sample. Therefore, the utilization reflects a sample bias toward suburban schools. Of the 20 suburban schools that originally agreed to participate, two later declined because they had school levies on the ballot that fall.

### Data collection and analysis

Data were collected during English class because this was a required subject for all students in the 10th grade. A questionnaire was passed out to all students to assess dental and orthodontic utilization rates and provide baseline information on orthodontic provider education level (Figure 1).

In addition to these standard survey questions, all students were asked to indicate how they felt about their teeth/smile by placing a mark on a 100-mm visual analog scale (VAS)<sup>5,6</sup> (Figure 1, question 4). Students who had received orthodontic treatment were also asked to make a mark on a similar 100-mm VAS scale to indicate how they felt about their teeth/smile before having braces (Figure 1, question 13). The descriptive term "Terrible" was used for the left-hand side of the 100-mm line and assigned a zero score, whereas the word "Great" anchored the right-hand side and was assigned a score of 100. Using a millimeter ruler, the distance from the left-hand side of the 100-mm line to the student's mark was measured, and this value was recorded as a continuous variable. Means and standard deviations were calculated. A two-tailed *t*-test was used to test independence of sample means for VAS scale scores, and a *P* value  $\leq .05$  was used to assign statistical significance.

To assess the socioeconomic impact on utilization of orthodontic services, Hollingshead's two-factor index of social position was used.<sup>7</sup> This index uses a combination of the parents' occupation and education level to estimate family income. The students were stratified into five groups, with class 1 being the highest and class 5 the lowest socioeconomic group. Because this was primarily a descriptive study, frequency data were tabulated for all categorical variables, whereas means and standard deviations were used for continuous variables.

**Case Western Reserve University  
School of Dentistry  
Dental Health Survey**

Name: \_\_\_\_\_ Male \_\_\_\_ Female \_\_\_\_ Date of Birth \_\_\_\_\_

Phone Number: \_\_\_\_\_ Age \_\_\_\_\_ How would you describe your ethnicity (i.e., African, Asian, Central American, Eastern European, European, North American, South American)? \_\_\_\_\_

Father's Occupation \_\_\_\_\_ Mother's Occupation \_\_\_\_\_

Last year of education completed by your parents:

|                                       |                                       |
|---------------------------------------|---------------------------------------|
| <b>Father:</b>                        | <b>Mother:</b>                        |
| ____ 6th Grade                        | ____ 6th Grade                        |
| ____ Junior High School               | ____ Junior High School               |
| ____ At least one year of High School | ____ At least one year of High School |
| ____ High School diploma              | ____ High School diploma              |
| ____ At least one year of College     | ____ At least one year of College     |
| ____ College diploma                  | ____ College diploma                  |
| ____ DDS, MD, JD, PhD, MBA            | ____ DDS, MD, JD, PhD, MBA            |
| ____ Other                            | ____ Other                            |

1. Have you visited a dentist in the last year? YES \_\_\_\_ NO \_\_\_\_  
If YES, why did you go to the dentist?

|                     |                       |                      |
|---------------------|-----------------------|----------------------|
| Check up ____       | Cleaning ____         | Trauma ____          |
| Cavity/filling ____ | Root canal ____       | Broken tooth ____    |
| Extraction ____     | Periodontal work ____ | Other (explain) ____ |

2. Where do you go for your dental care? \_\_\_\_\_

3. Do you have a family dentist? YES \_\_\_\_ NO \_\_\_\_

4. Place a mark on the line below that indicates how you feel about your teeth/smile now.

I feel awful \_\_\_\_\_ I feel great

5. Have you ever been told by a dental professional that you need braces? YES \_\_\_\_ NO \_\_\_\_

6. Have you ever worn braces? YES \_\_\_\_ NO \_\_\_\_

If your answer to this question is NO, stop here.

If your answer is YES, please answer the questions 7 thru 13 on reverse side of this page.

7. Where did you go for your braces? \_\_\_\_\_

8. What was the name of the dentist who put the braces on your teeth? \_\_\_\_\_

9. Was the dentist who put the braces on your teeth the same dentist who cleaned your teeth and did your fillings? YES \_\_\_\_ NO \_\_\_\_

10. When did you get your braces on? Month \_\_\_\_ Year \_\_\_\_

11. When did you get your braces off? Month \_\_\_\_ Year \_\_\_\_

12. Are you wearing a retainer now? YES \_\_\_\_ NO \_\_\_\_

If NO, when did you stop wearing your retainer? Month \_\_\_\_ Year \_\_\_\_

13. Place a mark on the line below that indicates how you felt about your teeth before braces.

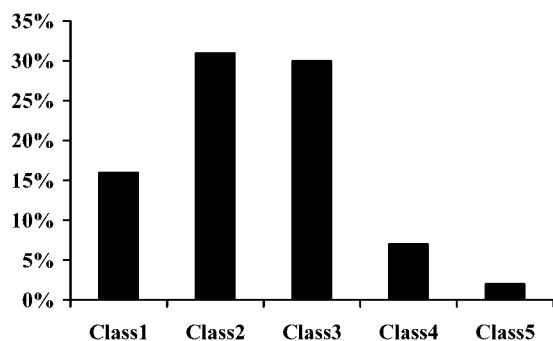
I feel awful \_\_\_\_\_ I feel great

Impression I.D. Number \_\_\_\_\_

FIGURE 1. Questionnaire used in this study.

## RESULTS

Of the 2808 students, 50% were girls with a mean age of  $15.5 \pm 0.8$  years. Most of the students were from upper and middle class families (Figure 2). Eighty-four percent (2371/2808) had visited a dentist within the past year. One thousand forty-seven (37%) had received or were presently undergoing orthodontic treatment. The percentage of students who had an orthodontic experience was associated with a number of factors. The most important factor was the dentist's recommendation. In the total sample of 2808, 42% ( $n = 1180$ ) were told by their dentist that they needed braces. Forty-five percent ( $n = 1264$ ) were not told that they needed braces. The remaining 13% ( $n = 365$ ) did not

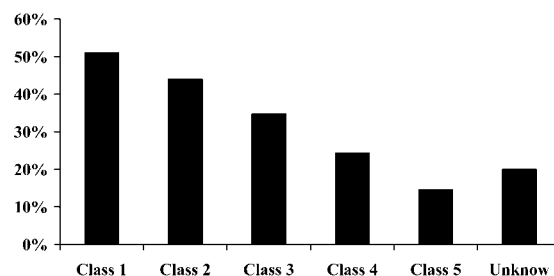


**FIGURE 2.** Total sample of 2808 by social class. (class 1 highest social group, class 5 lowest).

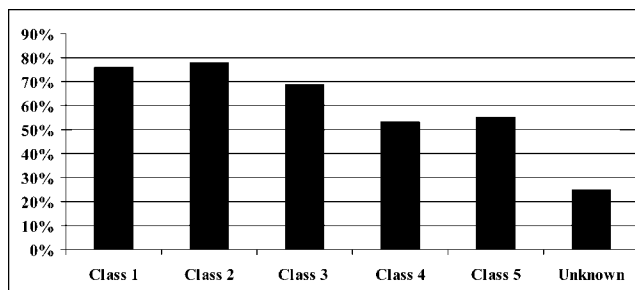
indicate whether they had or had not been told by their dentist that they needed braces. Of the 42% who were told they needed braces by the dentist, 71% apparently followed the dentist's advice and were treated. In contrast, only 7% of the 45% who were not told they needed braces by their dentist eventually had orthodontic treatment. The decision to seek treatment was also associated with social status, with more affluent students being more likely to have treatment (Figures 2 through 4).

The average rating for all students of their teeth/smile was  $69 \pm 22$  mm on the 100-mm VAS scale. Students who had braces rated their smile slightly higher ( $73 \pm 21$  mm) compared with students who did not have braces ( $67 \pm 22$  mm). This difference was statistically significant ( $P \leq .05$ ).

Of the 1047 students who had braces, the education level of the orthodontic service provider could be accurately determined for 1034. In this subsample, 121 students (12%) were treated by a nonorthodontist, and 913 (87%) were treated by a specialist in orthodontics. The percentage of students treated by nonorthodontists ranged from 10% in social class 1, 12% in classes 2 and 3, to 15% in social class 4. Correspondingly, orthodontists treated 85–90% of the students in each social class. A total of 171 different orthodontic care providers were listed for these 1034 stu-



**FIGURE 4.** Percentage of students in each social class who had orthodontic treatment ( $n = 1047$ ).

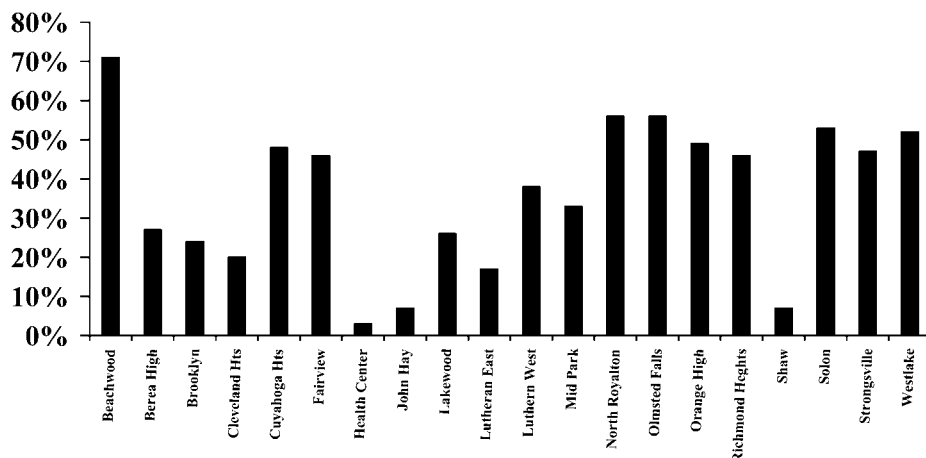


**FIGURE 5.** Percentage of students by social class who had orthodontic treatment after being told by their dentist that they needed braces ( $n = 1180$ ).

dents. Of these, 90 providers were orthodontists, 78 were general dentists, and three were pediatric dentists.

## DISCUSSION

The study provides some interesting results regarding who is being treated orthodontically and who is providing that care. However, the selection of the sample is biased toward suburban schools, so utilization rates reflect that population rather than all 10th grade students. In contrast to previous reports in the literature, the methods used in this study eliminated provider reporting bias by going directly to the consumers of orthodontic services, namely,



**FIGURE 3.** Percentage of students orthodontically treated at each school surveyed ( $n = 1047$ ).

10th grade high-school students. By going to the source, it was not necessary to rely on a third party to estimate utilization of orthodontic services.

The results are predictable in some aspects and surprising in others. We surveyed more suburban schools than inner city schools, and consequently, we oversampled upper middle class students. Even with this bias, the data support the popular contention that braces are a quality of life service with status symbol appeal. Two main factors affect teenagers' decision to have orthodontic treatment. First, if their dentist says that they need braces, then 71% of the time they will follow through and have treatment. This finding underscores the importance of the general dentist as the gatekeeper and source of orthodontic patients for the specialist. In the absence of a dental referral, patients in this study sought care only 7% of the time. Not surprisingly, the individuals who sought care came from the highest socioeconomic class. Therefore, it would be financially unwise for an orthodontic specialist to alienate his or her general dental colleagues and rely solely on patient referrals.

The second factor that influenced utilization of services was socioeconomic status. Here, the data support the position that orthodontics is an upscale dental service. Utilization steadily increased from the lowest social class (class 5) to the highest social class (class 1). Almost unbelievably, the utilization rates in some affluent suburban schools approached 70%! Because estimates of the percentage of teenagers with dental malocclusion in the United States range from 40% to 59%, the decision by orthodontists to treat some students at these more affluent schools must be based on criteria different from those used to estimate the prevalence of malocclusion.<sup>8-10</sup> Our data suggest that if a student's family can afford braces and if their dentist says he or she needs them, he or she will be treated. In fact, if the student wants braces and his or her family can afford them, he or she might be treated even without a dental referral.

These data refute the common belief that 50% of all orthodontic care is provided by nonorthodontists. However, we did find that close to 50% (81/171) of all providers of orthodontic services were nonorthodontists. Therefore, the number of patients treated by each of these nonorthodontists must be small. This finding makes sense if we assume that each nonorthodontist treats his or her own patients who need orthodontic services but does not receive referrals from other dentists. This is a logical assumption because a dentist would probably not refer patients to another dentist for a specialty service when a specialist is available.

As specialists, we also know that our best referring dentists send between 20 and 30 patients each year to our offices. If one of these referring dentists took a weekend course in orthodontics and decided to treat their own patients, they could start with about 25 patients each year. Surveys of orthodontic practice indicate that the average orthodontist in the Ohio region treats between 180 and 240 cases per year.<sup>11-13</sup> Using these numbers, we can estimate

the total number of patients treated per year. For example, if 100 general dentists treat 25 patients per year, at the end of the year, they will have treated 2500 patients. During the same year, 100 orthodontists treat 180 patients each, for a yearly total of 18,000 patients. At the end of the year, a total of 20,500 patients received orthodontic treatment. Of those 20,500 patients, 88% (18,000/20,500) were treated by orthodontists, and 12% (2500/20,500) were treated by general dentists.

These theoretical numbers are very close to the actual figures found in the present study and have implications for quality assurance in orthodontic care. A general dentist providing substandard orthodontic care could affect the oral health of 25 patients each year. In stark contrast, an orthodontist providing substandard care could affect 180 patients each year. Therefore, the best way to ensure that patients receive high-quality orthodontic services is to promote excellence within the specialty. Worrying about general dentists providing substandard orthodontic care at best wins a battle for 10% of the orthodontic patients. At worst, it promotes infighting between dental professionals, demeans the profession, and undermines the trust patients have in their health care providers.

## CONCLUSIONS

In summary, approximately 37% of 10th grade students enrolled in the 20 suburban Cuyahoga County high schools participating in this study received orthodontic treatment. Most of the care was provided by specialists in orthodontics. Two major factors influenced utilization of orthodontic services. The first was a determination of the need for care by the family dentist, and the second was the family's ability to pay for treatment. The impact of these findings on clinical orthodontic practice is discussed.

## ACKNOWLEDGMENT

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