

## Influence of Patient Financial Account Status on Orthodontic Appointment Attendance

Steven J. Lindauer<sup>a</sup>; Jacob A. Powell<sup>b</sup>; Brian C. Leybold<sup>b</sup>; Eser Tufekci<sup>c</sup>; Bhavna Shroff<sup>d</sup>

### ABSTRACT

**Objective:** To test the null hypothesis that the financial status of a patient's orthodontic contract and other patient and appointment characteristics have no influence on appointment attendance.

**Materials and Methods:** During a 6-week period, the last appointment of each active, non-Medicaid patient (n = 538) was recorded as either kept or missed. The financial status of the patient's contract, age, sex, method by which the appointment was made, and the type of appointment scheduled were recorded. Associations between each of these factors and appointment attendance were evaluated using  $\chi^2$  analysis. In the case of patients who missed their appointment, attendance at the subsequent reappointment was also evaluated.

**Results:** The overall appointment failure rate was 12.3%. Males (16.2%) were significantly more likely than females (9.5%) to miss appointments ( $P = .02$ ). Also, appointments made by postcard (28.2%) were more likely to be missed than those made in person (11.8%) or by phone (6.5%) ( $P = .003$ ). The most significant factor affecting appointment attendance was the patient's financial status ( $P = .0001$ ). Patients with accounts that were overdue (33.3%) or in collections (28.6%) were more likely to miss appointments than those whose accounts were current (10.5%). Of patients who missed their appointment (n = 66), 30% also missed the subsequent reappointment.

**Conclusions:** The null hypothesis was rejected. Patients with delinquent financial accounts were three times as likely to miss an orthodontic appointment as those whose contracts were current. Increased rates of missed orthodontic appointments were also found for males, patients scheduled by mailing a postcard, and patients who had missed their previous appointment. (*Angle Orthod.* 2009;79:755–758.)

**KEY WORDS:** Orthodontics; Appointment; Financial; Debt; Attendance

### INTRODUCTION

Patients who miss orthodontic appointments during active treatment are likely to remain in treatment longer.<sup>1–4</sup> Therefore, they have the potential to experience more detrimental side effects such as the development

of white spot lesions.<sup>5,6</sup> It has also been shown that missed appointments decrease the likelihood that orthodontic treatment will be completed successfully.<sup>7,8</sup> For practitioners, failed appointments disrupt the daily schedule and decrease productivity.<sup>1</sup>

Forgetfulness was the most commonly cited excuse given by patients for missing appointments both in general dentistry<sup>9</sup> and in orthodontics.<sup>10,11</sup> Other reasons for failing to show up for appointments included having other commitments,<sup>10</sup> inability to get time off,<sup>11</sup> and lack of transportation.<sup>11</sup> Illness, on the other hand, was more likely to result in a cancelled, rather than failed, appointment.<sup>11</sup>

Trenouth<sup>7</sup> observed that patients who were exempt from paying fees for dental services were more likely to miss appointments. Higher rates of appointment failure were found for pediatric dental<sup>12</sup> and orthodontic<sup>13,14</sup> patients in the United States covered by Medicaid. Having a history of medical debt may also be a predictor of poor appointment attendance. In a study

<sup>a</sup> Professor and Department Chair, Department of Orthodontics, School of Dentistry, Virginia Commonwealth University, Richmond, Va.

<sup>b</sup> Dental student, School of Dentistry, Virginia Commonwealth University, Richmond, Va.

<sup>c</sup> Associate Professor, Department of Orthodontics, School of Dentistry, Virginia Commonwealth University, Richmond, Va.

<sup>d</sup> Professor, Department of Orthodontics, School of Dentistry, Virginia Commonwealth University, Richmond, Va.

Corresponding author: Dr Steven J. Lindauer, Department of Orthodontics, School of Dentistry, Virginia Commonwealth University, 520 North 12th Street, Richmond, VA 23219 (e-mail: slindauer@vcu.edu)

Accepted: August 2008. Submitted: June 2008.

© 2009 by The EH Angle Education and Research Foundation, Inc.

of broken appointments at a pediatric outpatient clinic, Alpert<sup>15</sup> found that families of patients who missed appointments were almost twice as likely to have unpaid medical bills.

Unlike most other medical or dental care, orthodontic treatment requires that patients return for regular follow-up appointments over a prolonged period of time, lasting up to 2 years or more. Moreover, payment for orthodontic care is usually completed according to a contract of monthly installments that runs simultaneously with treatment but is not tied directly to patient visits. It is logical to believe that patients who get behind in their payments may skip appointments to avoid confrontations with the office staff. The purpose of this study was to determine whether the financial status of a patient's account, among other factors, influences whether a patient is more likely to miss orthodontic appointments.

## MATERIALS AND METHODS

Institutional review board approval was granted to conduct this retrospective study. All of the non-Medicaid, active patients scheduled to be seen during a 6-week period at the Virginia Commonwealth University orthodontic clinic were included. New patients who were scheduled for records, observation patients, and completed patients in retention were excluded.

Each patient's last appointment during the 6-week period was considered as either kept or missed. "Missed" meant that the patient either did not show for the appointment or cancelled the appointment on the same day. Appointments cancelled or rescheduled at least 1 day in advance were not included. If a patient was scheduled for more than one appointment during the 6-week period, only the last appointment was considered.

For each appointment, the patient's financial status relative to his or her orthodontic contract (current, overdue, or in collections), age group (adult or minor), sex (male or female), method by which the appointment was originally made (in person, by phone, or by postcard), and type of appointment scheduled (banding/bonding, adjustment, debonding, or retainer delivery) were recorded. Accounts were considered overdue if payment was more than 30 days late. Patients' accounts were sent to a collection agency when payments were more than 90 days late and the responsible party was nonresponsive to communications from the business office. In addition, for each missed appointment, the patient's subsequent reappointment was evaluated as kept or missed, and the method of scheduling for that appointment and the financial status were again recorded. Associations between each of these factors and appointment attendance for the

original, and subsequent reappointment if applicable, were evaluated using  $\chi^2$  analysis with a significance of  $P < .05$ .

## RESULTS

During the 6-week period, a total of 538 appointments were scheduled and evaluated. Overall, 472 (87.7%) appointments were recorded as kept, and 66 (12.3%) were missed. Of the 66 appointments that were missed, 44 were no-shows and 22 were rescheduled by the patient on the day of the appointment. Kept and missed appointments were compared by patient and appointment characteristics, and the results are shown in Table 1.

There were no significant differences in appointment attendance between adults (age  $\geq 18$  years) and minors ( $P = .34$ ). However, males (16.2%) were significantly more likely than females (9.5%) to miss appointments ( $P = .02$ ). The method by which the original appointment was made was significantly related to appointment attendance ( $P = .003$ ). Appointments made by postcard (28.2%) were more likely to be missed than appointments made in person (11.9%) or by phone (6.5%). The type of appointment scheduled was not associated with appointment attendance ( $P = .64$ ).

Of the patients with appointments evaluated during the study, 495 (92.0%) were current in their financial obligations relative to the orthodontic contract, 36 (7.2%) were overdue, and 7 (1.3%) were in collections. Patients who were overdue (33.3%) or in collections (28.6%) were significantly more likely to miss appointments than those who were current on their accounts (10.5%) ( $P = .0001$ ).

Appointments missed during the 6-week study period were rescheduled, and attendance at the subsequent reappointment was recorded. Of the 66 rescheduled appointments, 46 (70.0%) were kept and 20 (30.0%) were missed. There were no differences in attendance at the subsequent reappointment associated with how the appointment was scheduled ( $P = .30$ ) or with the financial status of the patient's account ( $P = .30$ ).

## DISCUSSION

Successful completion of orthodontic treatment requires that patients cooperate by attending scheduled appointments, wearing prescribed appliances as directed, and maintaining good oral hygiene. When a patient misses a regular visit, the appointment must either be rescheduled, thereby disrupting an already busy schedule, or postponed until the next appointment cycle, prolonging treatment duration. Understanding why patients miss appointments is the first

**Table 1.** Kept and Missed Appointments by Patient and Appointment Characteristics

Characteristic	Kept		Missed		P Value	Total	
	n	%	n	%		n	% of Total
Age					.34		
Adult	144	85.7	24	14.3		168	31.2
Minor	328	88.6	42	11.4		370	68.8
Sex					.02		
Female	286	90.5	30	9.5		316	58.7
Male	186	83.8	36	16.2		222	41.3
Appointment method					.003		
In person	372	88.2	50	11.8		422	78.4
Phone	72	93.5	5	6.5		77	14.3
Postcard	28	71.8	11	28.2		39	7.2
Appointment type					.64		
Bonding	36	92.3	3	7.7		39	7.2
Adjustment	393	86.9	59	13.1		452	84.0
Debonding	8	88.9	1	11.1		9	1.7
Retainer delivery	35	92.1	3	7.9		38	7.1
Financial status					.0001		
Current	443	89.5	52	10.5		495	92.0
Overdue	24	66.7	12	33.3		36	6.7
Collections	5	71.4	2	28.6		7	1.3
Total attendance	472	87.7	66	12.3		538	
Reappointment attendance	46	70.0	20	30.0		66	

step toward finding solutions to prevent future broken appointments.

Rates for missed orthodontic appointments reported in the literature are between 4%<sup>2,16</sup> and 14%.<sup>11</sup> While the 12% failure rate recorded in the current study is within this range, it is substantially higher than the 8.3% rate found by Horsley et al<sup>13</sup> for non-Medicaid patients in the same university orthodontic clinic during 2002–2003. The rate for missed appointments by Medicaid patients in that study was 15.4%. The criteria for defining missed appointments were the same as in the current study, but the previous study tracked a full year while this study evaluated a more limited 6-week period. It is possible that seasonal variations related to scheduled testing in schools or the local weather,<sup>17–20</sup> for example, were responsible for the higher rate of failed appointments by non-Medicaid patients in the current study.

Missed appointments were positively associated with being male, a postcard method of scheduling, and, most significantly, an overdue financial status of the patient relative to their orthodontic contract. Previous studies<sup>12,21</sup> have found a significantly higher rate of missed orthodontic appointments for female patients, while others<sup>16</sup> found no differences. Linthorst and de Metz,<sup>17</sup> who reported a significantly higher no-show rate for males than females at a medical outpatient clinic, also found that these missed appointments were more common when the weather was warm and sunny.

The postcard method of scheduling was most often used during this study as a way to notify those who

previously missed appointments of their newly rescheduled appointments. Therefore, it is not surprising that many of the patients scheduled in this way (28.2%) failed to show up for their appointments. A previous study<sup>11</sup> also showed that patients who miss one appointment are significantly more likely than other patients to miss additional appointments.

Patients whose orthodontic contracts were overdue or in collections were three times as likely to miss appointments as those whose contracts were current. Logically, it appears that these patients were trying to avoid personal confrontation regarding finances at the orthodontic office. In addition, however, skipping an appointment may have been viewed as a way to reduce accumulation of further debt if the patient assumed mistakenly that payments were somehow tied to the number of visits attended. It has been shown that individuals with high levels of debt will avoid going shopping, for example, as a money management technique.<sup>22</sup> Likewise, an appointment may have been missed intentionally to avoid the perceived need for a payment.

Behaviorally, individuals with problem debt have been shown to be less conscientious in general than those without debt,<sup>22</sup> suggesting that patients who are behind in their payments are also more likely to miss appointments for a variety of reasons. The association between financial account status and missed appointments may also be more complex, however. Webley and Nyhus<sup>22</sup> concluded that although several psychological variables were shown to be helpful in predicting problem debt, the strongest predictors were still eco-

conomic factors. Previous studies<sup>21,23</sup> found that there was a higher rate of missed orthodontic appointments for patients living in areas of lower socioeconomic status. Common reasons for failed appointments given by such patients included difficulty taking time off work and arranging transportation.<sup>21</sup> Lack of transportation was also identified by Paul and Hanna<sup>19</sup> as an important determinant of no-show behavior among low-income patients at an outpatient internal medicine clinic.

A recent review<sup>24</sup> concluded that appointment reminders were generally effective for improving attendance in outpatient health service settings. Both postal and telephone reminders significantly reduced appointment failures for general dental patients regardless of whether they were receiving public assistance to cover the cost of their care.<sup>25,26</sup> Providing appointment reminders, which was found to be significantly effective for increasing appointment attendance for orthodontic patients overall,<sup>21,27</sup> was not shown to be effective for orthodontic patients in low socioeconomic areas, however.<sup>21</sup> This suggests that improving orthodontic appointment attendance may be particularly difficult for patients who are behind in their payments.

## CONCLUSIONS

- Patients with delinquent financial accounts were three times as likely to miss appointments (32.6%) compared with patients whose accounts were current (10.5%).
- Higher rates of missed orthodontic appointments were also found for males, for patients scheduled by mailing a postcard, and for patients who had missed their previous appointment.
- Previous research suggests that appointment reminders, shown to be helpful for decreasing missed appointments in general, may not be effective for orthodontic patients having financial difficulties.

## REFERENCES

1. Haeger RS, Colberg RT. Effects of missed appointments and bracket failures on treatment efficiency and office productivity. *J Clin Orthod.* 2007;41:433–437.
2. Fink DF, Smith RJ. The duration of orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 1992;102:45–51.
3. Beckwith FR, Ackerman RJ, Cobb CM, Tira DE. An evaluation of factors affecting duration of orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 1999;115:439–447.
4. Jarvinen S, Widstrom E, Raitio M. Factors affecting the duration of orthodontic treatment in children. *Swed Dent J.* 2004;28:93–100.
5. Marcusson A, Norevall LI, Persson M. White spot reduction when using glass ionomer cement for bonding in orthodontics: a longitudinal and comparative study. *Eur J Orthod.* 1997;19:233–242.
6. Geiger AM, Gorelick L, Gwinnett AJ, Griswold PG. The effect of a fluoride program on white spot formation during orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 1988;93:29–37.
7. Trenouth MJ. Do failed appointments lead to discontinuation of orthodontic treatment? *Angle Orthod.* 2003;73:51–55.
8. Murray AM. Discontinuation of orthodontic treatment: a study of the contributing factors. *Br J Orthod.* 1989;16:1–7.
9. Skaret E, Raadal M, Kvale G, Berg E. Factors related to missed and cancelled dental appointments among adolescents in Norway. *Eur J Oral Sci.* 2000;108:175–183.
10. Richardson A. Failed appointments in an academic orthodontic clinic. *Br Dent J.* 1998;184:612–615.
11. Trenouth MJ, Hough A. Reasons for broken and cancelled appointments in a British orthodontic clinic. *J Clin Orthod.* 1991;25:115–120.
12. Iben B, Kanellis MJ, Warren J. Appointment-keeping behavior of Medicaid-enrolled pediatric dental patients in eastern Iowa. *Pediatr Dent.* 2000;22:325–329.
13. Horsley BP, Lindauer SJ, Shroff B, Tufekci E, Abubaker AO, Fowler CE, Maxfield BJ. Appointment keeping behavior of Medicaid vs non-Medicaid orthodontic patients. *Am J Orthod Dentofacial Orthop.* 2007;132:49–53.
14. Mirabelli JT, Huang GJ, Siu CH, King GJ, Omnell L. The effectiveness of phase I orthodontic treatment in a Medicaid population. *Am J Orthod Dentofacial Orthop.* 2005;127:592–598.
15. Alpert JJ. Broken appointments. *Pediatrics.* 1964;34:127–132.
16. Bos A, Hoogstraten J, Prah Anderson B. Failed appointments in an orthodontic clinic. *Am J Orthod Dentofacial Orthop.* 2005;127:355–357.
17. Linthorst GE, de Metz J. Global warming could affect outpatient attendance. *Lancet.* 2008;371:474.
18. Laken MP, Ager J. Using incentives to increase participation in prenatal care. *Obstet Gynecol.* 1995;85:326–329.
19. Paul J, Hanna JB. Applying the marketing concept in health care: the no-show problem. *Health Mark Q.* 1997;14:3–17.
20. Morse DL, Coulter MP, Napodano RJ, Hwang HL, Lawrence C. Broken appointments at a neighborhood health center. Emphasis on weather. *Med Care.* 1984;22:813–817.
21. Can S, Macfarlane T, O'Brien KD. The use of postal reminders to reduce non-attendance at an orthodontic clinic: a randomized controlled trial. *Br Dent J.* 2003;195:199–201.
22. Webley P, Nyhus EK. Life-cycle and dispositional routes into problem debt. *Br J Psych.* 2001;92:423–446.
23. O'Brien K, Mattick R, Mandall N, Wright J, Conboy F, Gosden T. Are specialist outreach clinics for orthodontic consultation effective? A randomized controlled trial. *Br Dent J.* 2001;191:203–207.
24. Henderson R. Encouraging attendance at outpatient appointments: can we do more? *Scott Med J.* 2008;53:9–12.
25. Reekie D, Devlin H, Worthington H. The prevention of failed appointments in general dental practice. *Br Dent J.* 1997;182:139–143.
26. Reekie D, Devlin H. Preventing failed appointments in general dental practice: a comparison of reminder methods. *Br Dent J.* 1998;185:472–474.
27. Lindauer SJ, Rubenstein LK, Wilkins C, Davidovitch M. Effect of telephone reminders on appointment failure rate. *J Clin Orthod.* 1993;27:427–431.