

Patients', parents', and orthodontists' perceptions of the need for and costs of additional procedures to reduce treatment time

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Introduction: The purpose of this study was to evaluate patients', parents', and orthodontists' perspectives on orthodontic treatment duration and techniques for accelerating the rate of tooth movement. **Methods:** Adolescent patients (n = 200) and their parents (n = 200), and adult patients (n = 50) from a multidocor practice were personally surveyed regarding treatment duration and acceptance of appliances and techniques to enhance the speed of orthodontic treatment, and how much increase in fees they were willing to pay for these. Members of the American Association of Orthodontists were surveyed electronically regarding their willingness to use these techniques and appliances and the costs they were willing to pay for them. **Results:** A total of 683 orthodontists replied to the electronic survey (7.5%). Approximately 70% of the orthodontists who replied to the survey were interested in adopting additional clinical procedures to reduce treatment time. No significant association was found between practice characteristics and interest in adopting clinical procedures to reduce treatment time. The invasiveness of the procedure was inversely related to its acceptance in all groups surveyed. Most orthodontists are willing to pay only up to 20% of their treatment fee to companies for the use of technologies that reduce treatment time, and most patients and parents were willing to pay only up to a 20% increase in fees for these approaches. Orthodontists thought that increases in the rate of tooth movement could pose a problem for fee collection. **Conclusions:** Orthodontists and patients alike are interested in techniques that can accelerate tooth movement. Similarities between all groups were found regarding the acceptance of different approaches to accelerate tooth movement and the percentage of the orthodontic fee that would be paid for these techniques. Less-invasive techniques had greater acceptability in all groups. (*Am J Orthod Dentofacial Orthop* 2014;145:S65-73)

One of the most challenging aspects of orthodontic treatment is its often prolonged duration. Aside from the burden of prolonged treatment on patients and parents, it can also result in pathologic changes, including root resorption.¹⁻³ Shortening treatment duration might help to prevent undesired treatment

sequelae and increase patient satisfaction. Recently, a number of procedures and techniques with the potential to reduce treatment times have been developed.

Procedures aimed to reduce treatment duration fall into 3 major categories. The first is biologic, through local or systemic administration of drugs. The second category is mechanical or physical stimulation such as vibration and low-energy lasers. The final category is surgically facilitated orthodontic treatment, such as dentoalveolar distraction,⁴ alveolar surgeries to undermine interseptal bone,⁵ and alveolar corticotomies.^{6,7}

The application of biologic substances to accelerate the rate of tooth movement has been reported in a number of animal studies.⁸⁻¹⁰ Although the local delivery of these biologic compounds could become standard practice in clinical orthodontics in the future, more evidence is needed to evaluate their safety, efficacy, and specificity to the dentoalveolar tissues.¹¹

Physical stimulation is another approach to accelerate tooth movement with significant appeal because

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of its less-invasive nature. One such method of physical stimulation is the application of vibratory forces. Recent animal studies evaluated the effect of vibration in a tooth-movement model in rats and found a statistically significant increase in the displacement of molars subjected to vibration and an orthodontic force when compared with an orthodontic force alone.^{10,12}

Corticotomy-facilitated tooth movement has become the most popular surgical method, shown both clinically and in animal models to temporarily enhance the rate of tooth movement.^{6,13-15} A recent split-mouth clinical study in patients having first premolar extractions reported approximately double the rate of canine retraction during the first month on the corticotomy side.⁶ It appears that with an increased surgical insult, a more significant enhancement in the rate of tooth movement is obtained.¹⁶ Nonetheless, more extensive surgery would likely deter a patient from consenting to this type of procedure.

Recently, a form of corticotomy has been developed that might be more appealing to patients, involving a minimally invasive flapless procedure of localized bone injury. The technique, termed piezocision, consists of vertical interproximal incisions apical to the interdental papilla on the labial aspect using a microsurgical blade to penetrate the cortical plate. Based on initial evidence, this technique has been reported to enhance the rate of orthodontic tooth movement similarly to corticotomies with a significantly less-invasive approach.¹⁷

Another alternative to shorten treatment time is the precise delivery of mechanics using technologies that customize the orthodontic appliance to each patient. Recently, some evidence has shown that these precise customized appliances can reduce treatment time.^{18,19} Although this approach has the potential for high patient acceptance, it does add a significant cost to treatment and might ultimately limit its use.

Despite all of these promising approaches, patients', parents', and orthodontists' perceptions of these procedures are unknown. Furthermore, the acceptability of these procedures based on their efficiency and cost has not been explored. In this questionnaire-based study, we evaluated patients', parents', and orthodontists' knowledge and perceptions of each of these treatment procedures. The specific procedures investigated consisted of invasive (locally injected intraoral drugs, corticotomies, piezocision) and noninvasive (customized appliances, vibration devices) methods. The objective of this survey was to determine the perceptions of adolescent and adult patients, parents, and orthodontists on additional treatment procedures for reducing orthodontic treatment time.

MATERIAL AND METHODS

Approval from the institutional review board of the University of Connecticut was obtained before the study. Two questionnaires were used to evaluate (1) orthodontists' perceptions and (2) adult patients', adolescent patients', and their parents' perceptions regarding treatment duration, appliances, and techniques available to accelerate orthodontic tooth movement. The questionnaire for the orthodontists was approved and distributed via e-mail by the American Association of Orthodontists to all 9160 active members in the United States and Canada with a link through Survey Monkey (Portland, Ore). The e-mail was accompanied by an introductory cover letter and an information sheet ([Appendix A](#), online only) that contained a brief description of all clinical procedures that could accelerate the rate of tooth movement to ensure full understanding of the questions. Three weeks after the initial mailing, the American Association of Orthodontists sent a reminder e-mail. Completing and submitting the online survey implied consent. No identifiable information was collected.

The questionnaire for orthodontists consisted of close-ended items on demographics and addressed their willingness to adopt the procedures described in the survey and the fees they would be willing to charge and pay for the different techniques and procedures ([Appendix B](#), online only). The questionnaire for the adolescent patients included close-ended questions on demographics, length of orthodontic treatment, and willingness to undergo the different procedures. Rank-order questions for the procedures were also included ([Appendix C](#), online only). The questionnaire for the adult patients and parents was analogous to that of the adolescents but also contained questions regarding the percentage of the treatment fee they were willing to pay for these techniques and adjuvant procedures for reducing treatment times ([Appendices D and E](#), online only).

Adolescent patients (13-17 years of age), their parents, and adult patients (18 years and older) were recruited from 2 orthodontic offices from a multidisciplinary practice in 2 communities of middle-to-upper socioeconomic status. All patients and parents were approached by the office staff members and asked about their willingness and interest in participating in this voluntary and anonymous questionnaire-based survey. The following were the inclusion criteria for participation in the survey: currently in orthodontic treatment or initiating treatment soon, and ability to speak and read English. Exclusion criteria were active or prospective patient less than 13 years of age, and patients or parents of adolescents with craniofacial deformities or medically handicapping conditions.

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