

# Study on the perception of orthodontic treatment according to age: A questionnaire survey

Yoonji Kim

Department of Orthodontics, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea

**Objective:** This questionnaire study aimed to estimate the overall frequencies of positive perception towards orthodontic treatment among adults categorized according to age, sex, and area of living, and to identify barriers or negative perceptions preventing them from receiving orthodontic treatment. **Methods:** The participants included 598 adults aged over 20 years (230 men and 368 women) who visited the Dental Hospital of Seoul St. Mary's Hospital. The participants' opinions regarding their consideration of receiving orthodontic treatment were recorded using a specially designed questionnaire. **Results:** The overall rate of positive perception towards orthodontic treatment was 48.5%. Compared to adults in their 20s (63.2%), those in their 40s and 50s had a lower percentage of interest in orthodontic treatment (46.2% and 45.1%, respectively;  $p < 0.05$ ). Overall, women (52.2%) had a higher rate of interest than did men (42.6%;  $p < 0.05$ ). The area of living had no effect on the percentage of interest. The order of priority of chief complaints differed according to age: protrusion for those in the 20s and 30s, and spacing for those in the 40s to 60s. Overall, the main reason for not seeking treatment was the treatment fee. Respondents aged over 40 considered themselves "too old" for orthodontic treatment. **Conclusions:** The middle-aged had a relatively high percentage of interest (above 45%) in orthodontic treatment. However, demographic characteristics were not significantly associated with the positive interest. These results highlight the need for educating the middle-aged about the limitations and possibilities of orthodontic treatment to increase its acceptance. [Korean J Orthod 2017;47(4):215-221]

**Key words:** Perception, Orthodontic treatment, Age, Questionnaire

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**Corresponding author:** Yoonji Kim.

Associate Professor, Department of Orthodontics, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, 222 Banpo-daero, Seoul 16591, Korea.

Tel +82-2-2258-1776 e-mail [juice@catholic.ac.kr](mailto:juice@catholic.ac.kr)

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## INTRODUCTION

The increase in average life expectancy and national income has led to an increase in the number of middle-aged or old adult patients receiving orthodontic treatment.<sup>1</sup> Traditionally, the “so-called” adult orthodontic treatment has implied the treatment of adult patients in their 20s and early 30s, rather than adolescents. This notion of “adult patients” has been gradually changing to include middle-aged or old adult patients.<sup>2,3</sup> These changes have been reported worldwide.<sup>4-6</sup> The main reasons behind this change in perception are the improved capacity of the profession to treat problems and the patients’ desire to maintain their natural teeth and improve their function as well as appearance.<sup>7</sup>

Middle-aged and old adult patients are more likely to have periodontal problems, as well as bone turnover rates and psychological profiles that differ from younger patients.<sup>8-12</sup> Information about the limitations and possibilities of orthodontic treatment, which may differ from those of younger patients, should be provided to these patients. This, in turn, requires accurate estimation of the patients’ perceptions toward treatment. Therefore, it is necessary to investigate the motivation of patients for seeking orthodontic treatment and to analyze the barriers preventing them from starting orthodontic treatment according to different age groups. However, few studies have investigated the perceptions toward and demand for orthodontic treatment among middle-aged adult patients in Korea.<sup>13-15</sup>

The rate of starting orthodontic treatment may be decided not only by the severity or prevalence of malocclusion, but also by other background factors, such as age, sex, and socioeconomic status.<sup>16-19</sup> It would be intriguing to analyze the influence of background factors, such as age, sex, and area of living, on the perceptions toward orthodontic treatment. Therefore, this questionnaire study aimed to assess the overall frequencies of positive perception towards orthodontic treatment among adults categorized according to age, sex, and area of living, and to identify barriers or negative perceptions preventing them from receiving orthodontic treatment.

## MATERIALS AND METHODS

### Participants

The participants of this questionnaire-based study were 598 adults aged over 20 years (230 men and 368 women) who visited the Dental Hospital of Seoul St. Mary’s Hospital, The Catholic University of Korea, Seoul, Korea. They included patients, or those accompanying them, with no prior history of orthodontic treatment. Participants who visited the Department of Orthodontics

and Department of Oral and Maxillofacial Surgery were excluded because their perception towards orthodontic treatment would be affected by direct or indirect experiences of orthodontic treatment they have already undergone, which may bias their perception. The experimental protocols were approved by the Institutional Review Board of The Catholic University of Korea (KC12QISI0854).

### Data collection

The participants’ opinions regarding their consideration of receiving orthodontic treatment were recorded using a specially designed questionnaire. The questionnaires were completed by 653 participants, of whom 598 were selected after screening the responses for inaccuracies. Among the participants who had considered receiving orthodontic treatment, the chief complaints were inquired and their reasons for not receiving orthodontic treatment yet were surveyed. The final section of the questionnaire collected demographic data regarding the participants’ age, sex, and area of living. The contents of the questionnaire are briefly summarized in Supplement 1.

### Statistical analyses

Statistical analyses, including the Mantel-Haenszel chi-square test and Cochran-Mantel-Haenszel chi-square test, were performed using a standard statistical software package (SAS version 9.3, Cary, NC, USA). The  $p < 0.05$  level of significance was chosen for all tests.

## RESULTS

Among the 598 participants, 368 (61.5%) were women and 230 (38.5%) were men. The percentage of participants in their 20s, 30s, 40s, and 50s was 22.7%, 16.1%, 22.1%, and 23.7%, respectively. Table 1 summarizes the age and sex of the respondents.

**Table 1.** Sample distribution by age

Age group (yr)	Total	Male	Female
	598 (100)	230 (38.5)	368 (61.5)
20s (19–29)	136 (22.7)	57 (41.9)	79 (58.1)
30s (30–39)	96 (16.1)	46 (47.9)	50 (52.1)
40s (40–49)	132 (22.1)	51 (38.6)	81 (61.4)
50s (50–59)	142 (23.7)	40 (28.2)	102 (71.8)
60s (60–69)	71 (11.9)	25 (35.2)	46 (64.8)
70s (70–79)	21 (3.5)	11 (52.4)	10 (47.6)

Values are presented as number (%).

The participants were screened and selected from among 653 respondents.

**Percentage of interest in orthodontic treatment compared by age**

The rate of positive perception towards orthodontic treatment was 48.5% within the total sampled population (Figure 1). Compared to participants in their 20s (63.2%), those in their 40s and 50s had a significantly lower percentage of interest (46.2% and 45.1%, respectively;  $p < 0.05$ ).

**Percentage of interest in orthodontic treatment compared by sex**

In the total sampled population adjusted according to age, women (52.2%) had a higher rate of interest than did men (42.6%;  $p < 0.05$ ) (Table 2 and Figure 2). No statistically significant differences were observed between the sexes in any of the age groups.

**Percentage of interest in orthodontic treatment compared by area of living**

The respondents were also categorized according to the area of living. First, percentage of interest between Seoul and Gyeonggi Province was compared and no significant difference was observed between the two areas. The percentage was 48.4% in Seoul and 48.7% in Gyeonggi.

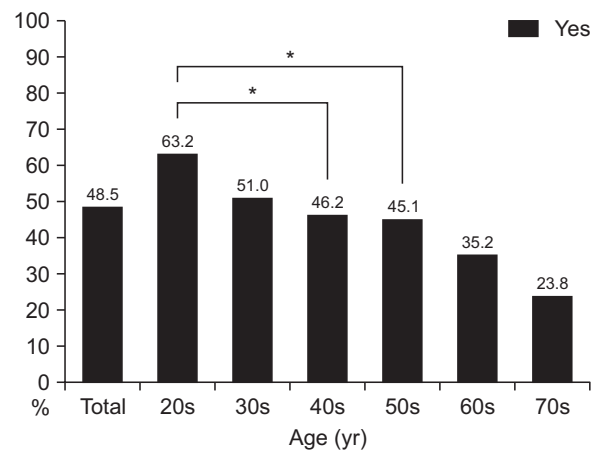
Seoul and Gyeonggi areas were then subdivided. Seoul was subdivided into three areas. The first one was Seocho-gu, wherein the hospital where this survey was conducted is located. The second area included the districts surrounding Seocho-gu: Gangnam-gu, Yongsan-gu, Dongjak-gu, and Gwanak-gu. The third area included the rest of Seoul. No significant difference was observed in the percentage of interest in orthodontic treatment among the three areas. The percentages were 51.6%, 42.9%, and 51.1% in the first, second, and third areas, respectively. Gyeonggi was subdivided into major cities with a population over 50

**Table 2.** Percentage of interest in orthodontic treatment compared by sex

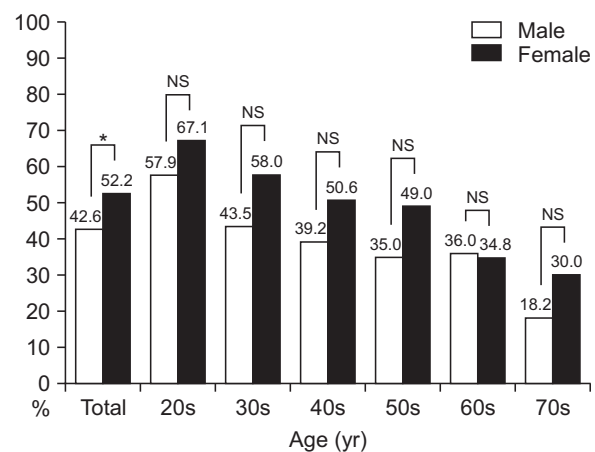
Age group (yr)	Male, yes (% within male age group)	Female, yes (% within female age group)	p-value
Total	42.6	52.2	0.015*
20s	57.9	67.1	NS
30s	43.5	58.0	NS
40s	39.2	50.6	NS
50s	35.0	49.0	NS
60s	36.0	34.8	NS
70s	18.2	30.0	NS

NS, No statistical significance between the groups. Cochran-Mantel-Haenszel chi-square test; \* $p = 0.05$ .

million (Suwon, Seoungnam, Goyang, Bucheon, and Anyang) and other areas. No significant difference was observed in the percentage of interest in orthodontic treatment among the major cities (50.7%) and other areas (45.6%).



**Figure 1.** Percentage of interest in orthodontic treatment compared by age. The rate of positive perception towards orthodontic treatment is 48.5% within the sampled population. Compared to participants in their 20s (63.2%), those in their 40s and 50s have a significantly lower percentage of interest in treatment (46.2% and 45.1%, respectively; \* $p = 0.05$ ). Mantel-Haenszel chi-square test.



**Figure 2.** Percentage of interest in orthodontic treatment compared by sex. Women (52.2%) have a higher rate of interest than do men (42.6%) in the total sampled population adjusted for age ( $p < 0.05$ ). No statistically significant differences are observed between the sexes in each age group (\* $p = 0.05$ ). Cochran-Mantel-Haenszel chi-square test.

**Order of priority of chief complaints according to age**

The order of priority of chief complaints showed definite differences according to age. Protrusion was the first chief complaint for those in their 20s and 30s, and spacing was the one for those in their 40s to 60s (Table 3). Secondary crowding indicated the aggravation of existing crowding due to periodontitis and/or missing tooth.<sup>3</sup> The frequency of spacing and secondary crowding as chief complaints increased steadily with advancing age.

**Main reasons for not receiving orthodontic treatment according to age**

The main reasons for not receiving orthodontic treatment were primarily the treatment fee and long treatment time in all age groups. Respondents aged over 40 years thought they were “too old” for orthodontic treatment (Table 4).

**DISCUSSION**

Korea is faced with a large aging population and declining birth rate. In this “aging society,” orthodontists are witnessing a recent increase in the number of middle-aged or older patients visiting their practices.<sup>15,20</sup> These patient groups may have different subjective needs for orthodontic treatment than do

younger patients, because they are concerned not only about their dental esthetics but also functional ability to maintain their teeth longer. They may also have a different status of the so-called “mature” dentition,<sup>2</sup> with signs of aging, periodontal disease, multiple old dental restorations, and other medical problems.

The vast majority of studies on the need for orthodontic treatment have been conducted on children and adolescents.<sup>21</sup> In questionnaire-centered studies, children self-perceived a higher treatment need than was professionally assessed on esthetic grounds. The demand for orthodontic treatment, however, is difficult to assess in children,<sup>22</sup> and it will considerably change with increasing age. Moreover, the self-perception of treatment need in older adults may be different from the treatment need evaluated by orthodontic experts.<sup>21,23</sup> Livas and Delli<sup>21</sup> have indicated that adults persistently underestimated the definitive treatment need as determined in terms of dental health.

In a practice survey conducted in 2010 by Lim,<sup>1</sup> 56.2% of respondents considered that less than 5% of total patients was accounted for orthodontic patients aged over 40 years, followed by 5–10% in 26.5% of respondents. This meant that in most orthodontic clinics, patients aged over 40 years accounted for less than 10% of the total number of patients. However, surprisingly, the result of this study demonstrated

**Table 3.** The order of priority of chief complaints according to age

Age group (yr)	Order of priority in chief complaint		
	1st	2nd	3rd
20s	Protrusion	Crowding	Asymmetry
30s	Protrusion	Asymmetry	Crowding
40s	Spacing	Protrusion	Secondary crowding*
50s	Spacing	Protrusion	Secondary crowding*
60s	Spacing	Secondary crowding	Protrusion
70s	Hard to chew	Tipped tooth due to missing teeth	Unesthetic

\*Aggravation of existing crowding due to periodontitis and/or missing tooth.<sup>3</sup>

**Table 4.** Main reasons for not receiving orthodontic treatment according to age

Age group (yr)	Reasons for no treatment		
	1st	2nd	3rd
20s	Fee	Long treatment time	Unesthetic
30s	Fee	Long treatment time	Pain
40s	Fee	Long treatment time	Might be more harm than good
50s	Fee	Long treatment time	Too old
60s	Long treatment time	Fee	Too old
70s	Fee	Long treatment time	Too old

that even respondents in their 40s and 50s showed considerably high interest towards orthodontic treatment (46.2% and 45.1%, respectively). Among the younger patients in their 20s, over half of the respondents (63.2%) had a positive interest (Figure 1). Although the need for and interest towards orthodontic treatment may be different among adults, this finding indicated that older adults have a high interest towards and subjective need for orthodontic treatment.

It is generally known that women have a higher interest towards orthodontic treatment than do men.<sup>17,24-26</sup> This study showed similar results in that women (52.2%) had a significantly higher rate of interest than did men (42.6%) in the total sampled population (Figure 2 and Table 2). However, no statistically significant differences were observed between the sexes in any of the age groups, indicating that participants of both sexes even over the age of 40 years had the same level of interest towards orthodontic treatment. This result may explain the recent increase in the number of middle-aged male patients visiting orthodontic clinics.

When the respondents were divided by the area of living, no significant difference was observed in the percentage of interest between Seoul and Gyeonggi areas, as well as between the subdivided areas. For this reason, the percentage of positive interest in orthodontic treatment was compared by the area of living. These results may imply that the socioeconomic level and health awareness among the participants are equally high regardless of their area of living in the capital area in Korea.

The chief complaint is a patient's self-reported primary reason for presenting for medical care. Chief complaints may be used to quantify, analyze, and plan for emergency care and provide valuable information on acute care needs where there are crucial data gaps. The need for standardization of chief complaint data in orthodontics has not yet been raised. The results of this study indicated that the order of priority of chief complaints had a definite trend in the different age groups. In younger adult patients in their 20s and 30s, protrusion, crowding, and asymmetry had higher priorities (Table 3). However, in older patients, spacing and secondary crowding had higher priorities. Spacing and secondary crowding may be the consequence of the reduced support provided by the affected periodontium.<sup>27,28</sup> This may also indicate that older patients are more concerned about malocclusion due to oral diseases. The important point is that they may be aware of the malalignment of their teeth, but are unaware of the status of the periodontium and their treatment need in terms of periodontal and other diseases. In the Korea National Health and Nutrition Examination Survey of 2015, the prevalence rate of

periodontitis among participants in their 50s was approximately 54% in males and 31% in females, and the percentage increased with age. These results may emphasize the importance of disease control during orthodontic treatment in middle-aged patients.

Among the barriers that prevent the middle-aged patients from starting orthodontic treatment, treatment fee and long treatment time had high priorities (Table 4). In addition, the result of this study demonstrated that patients aged over 40 years tend to think that they are too old for orthodontic treatment and that treatment may do more harm than good. These results certainly indicate that more information should be provided to the public that proper orthodontic treatment accompanied with oral and systemic disease control do more good than harm.

Despite its interesting findings, the study has some limitations. It would have been better if this study had been conducted with a larger number of participants with more equal sex distribution. In addition, it would have been better if this study had been conducted outside the dental hospital. However, this study aimed to maintain a common background of the respondents (i.e., patients and accompanying guests) to form a group that was aware of the importance of dental health. Moreover, the study center is located in one of busiest areas of Seoul and in an affluent neighborhood, which will help minimize the effects of economic factors of the respondents. A future study combining multicenter surveys would be helpful in understanding the demands of older adults and their misunderstandings regarding orthodontic treatment. Data from such larger surveys would be required in the future to ensure orthodontists remain updated about adult orthodontic treatment and the use of interdisciplinary treatment approaches.

## CONCLUSION

- The rate of positive perception towards orthodontic treatment was 48.5% within the total sampled population. Compared to participants in their 20s (63.2%), those in their 40s and 50s had a lower percentage of interest in treatment (46.2% and 45.1%, respectively;  $p < 0.05$ ).
- No statistically significant differences were observed between the sexes in any of the age groups.
- Demographic characteristics were not significantly associated with the positive interests.
- The order of priority of chief complaints showed distinct differences according to age: protrusion was the first chief complaint for the participants in their 20s and 30s, and spacing was the one for those in their 40s to 60s.
- These results may highlight the need for providing

more scientific information to the middle-aged about the limitations and possibilities of orthodontic treatment in order to increase its acceptance.

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**Supplement 1.** Summary of the questionnaire

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 Have you ever thought of receiving orthodontic treatment?

Yes (    ), No (    )

If YES, please answer the two questions below.

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 Question 1: Reasons why you have thought of receiving orthodontic treatment

(Select all that apply, in order of importance)

1 (    ) → 2 (    ) → 3 (    )

- 
- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| ① Lip protrusion                  | ② Tooth tipping after extraction     |
| ③ Malaligned tooth                | ④ Unesthetic                         |
| ⑤ Prognathism                     | ⑥ Dentist's recommendation           |
| ⑦ Asymmetry                       | ⑧ Friends/family receiving treatment |
| ⑨ More crowding than when younger | ⑩ TMJ disorder                       |
| ⑪ Tooth longer than when younger  | ⑫ Hard to chew                       |
| ⑬ Spacing between teeth           | ⑭ Others                             |
- 

Question 2: Reasons why you have not received orthodontic treatment yet

(Select all that apply, in order of importance)

1 (    ) → 2 (    ) → 3 (    )

- 
- |                             |   |
|-----------------------------|---|
| ① Treatment fee             | ② Time  |
| ③ Pain                      | ④ Draws attention                               |
| ⑤ Appliance too conspicuous | ⑥ Underlying medical history                    |
| ⑦ Age (too old)             | ⑧ Periodontal complications                     |
| ⑨ More loss than gain       | ⑩ Peer advice (Family, friends, dentists, etc.) |
-