



Original Article

# 20-Year Change in the Perception of Orthodontic Treatment: A Cross-Sectional Study

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## Main Points

- The contributors' attitudes towards orthodontic treatment shifted from negative in the first decade to positive in the second decade.
- The frequency of entries containing procedure and motivation increased significantly and the frequency of entries containing complaint decreased significantly in the second decade.
- Pain was the most common complaint with a rate of almost 40% in both decades.
- The frequency of complaints regarding prolonged treatment increased in the second decade compared to the first decade.

## ABSTRACT

**Objective:** To compare the changes in the perception towards orthodontics between the first and second decades over the 20-year period based on a collaborative hypertext dictionary site.

**Methods:** The orthodontics-related entries were searched on the EksiSozluk website (<http://www.eksisozluk.com>). The keyword was determined as "diş teli" ("brace") and a total of 1,028 entries that were contributed between 2001 and 2021 were analyzed. Entries were divided into five general categories based on their content: definition, asking for advice, humor, advertising, and transfer of experience. The transfer of experience category was further divided into four subcategories: procedure, motivation, advice, and complaint. For each entry, the attitude of the contributor was also noted. Entries were compared between the two decades with regard to content and attitude towards orthodontics.

**Results:** The average number of entries contributed per year was  $13.40 \pm 10.58$  in the first decade and was  $89.40 \pm 44.67$  in the second decade, the increase was statistically significant ( $P < .05$ ). A significant difference was observed between the two decades in terms of content ( $P < .05$ ). There was a proportional decrease in the definition and an increase in the transfer of experience. Moreover, the rate of entries containing a complaint decreased and motivation increased in the second decade ( $P < .05$ ). On the other hand, there was also a significant change between the two decades with regard to the distribution of attitudes, whereby the rate of positive entries increased in the second decade ( $P < .05$ ).

**Conclusion:** The contributors' attitudes towards orthodontics shifted from negative in the first decade to positive in the second decade.

**Keywords:** Orthodontics, collaborative hypertext dictionary, perception, social media

## INTRODUCTION

Internet is the most widely used tool among today's information and communication technologies and it is known that the widespread use of the internet shapes life.<sup>1-3</sup> Today, people prefer the internet directly to access information, including health information, either by watching video sharing sites such as YouTube or reading the articles on the websites they access through search engines, or by reading the comments written by the contributors who share their knowledge and experience on a specific topic.<sup>4</sup> Due to the fact that websites are the primary source of information, the quality and reliability of information on websites has become more important

than ever. On the other hand, online healthcare studies have started to be made and these studies are generally in the form of index studies and YouTube studies conducted on the quality and reliability of websites.<sup>5-9</sup>

With the advent of User-Generated Content, information sharing and circulation has become easier and freer than before, which in turn allows internet users to actively share everything they own and also to act directly as the source and commentator of the news stories.<sup>10</sup> Collaborative hypertext dictionary sites are those where people can define an object, person, or situation or comment on entries, share their experiences, and exchange ideas with people experienced in that field. As such, these sites are constantly updated with the addition of new comments. Additionally, these sites have an effective function in reflecting the perceptions and attitudes in the society to the public and they are mostly used by young people with a certain level of education. Therefore, they are important in terms of reflecting the perceptions and thoughts of a significant portion of the society.<sup>10,11</sup> One of the best known of these sites is EksiSozluk, which has received the highest number of monthly and total online definitions since its establishment in Turkey in 1999.<sup>12</sup> Moreover, EksiSozluk has had more than 10 times higher number of entries than that of its closest rival.<sup>13</sup> As defined by a sociologist "it is like Wikipedia, a social network and Reddit rolled into one."<sup>14</sup>

To our knowledge, although there have been various cross-sectional studies in the literature using collaborative hypertext dictionary sites for the evaluation of various topics such as perception of aging,<sup>10</sup> views regarding coronavirus 2019 disease (COVID-19) vaccine,<sup>15</sup> and perceptions regarding healthcare professionals,<sup>16</sup> there has been no study using collaborative hypertext dictionary sites in the field of dentistry or orthodontics to date.

The first entry about orthodontics in EksiSozluk was contributed in 2001. The aim of this study was to compare the changes in the perception of society towards orthodontic treatment between the first and second decades over the 20-year period between 2001 and 2021 based on the entries contributed to EksiSozluk related to orthodontic treatment. In addition, it was also aimed to reveal the problems related to orthodontic treatment and to increase the awareness among orthodontists on this issue and to identify possible solutions.

## METHODS

The online comments written by EksiSozluk users on any topic, called entry, constituted the data of the present study. Since the data were collected from publicly available entries, no ethics committee approval was required.

The orthodontics-related entries were searched on the EksiSozluk website (<http://www.eksisozluk.com>) on August 1, 2021. The keyword to be used in the search was determined as "diş teli" (meaning "brace" in English) based on the statistics obtained from Google Trends (<https://trends.google.com/trends/?geo=TR>) regarding the searches performed in the field of orthodontics in

Turkey since 2004. Over the last 20 years, only 136 entries were found in EksiSozluk including the keyword "orthodontics," which is the most searched keyword following "braces" in Google Trends. Only the keyword "brace" was chosen for the standardization of the researched entries.

All the 1,032 entries that were contributed between September 13, 2001, and August 1, 2021, were transferred to Microsoft SQL Server (Microsoft, Redmond, Wash, USA) and a total of 1028 entries were analyzed.

Age and gender of the authors were mostly anonymous in EksiSozluk; therefore, demographic analysis of entry contributors could not be performed. Entries that were unrelated to orthodontics and those containing insults and/or inappropriate language were not included in the analysis.

Since the entries mostly reflected the subjective opinions of the contributors and varied in type and length, they were not only examined with numerical values but also evaluated in terms of content and attitude.<sup>15</sup>

For the content analysis, the orthodontic appliances mentioned in the entries were divided into five categories:

1. Metal buccal brackets
2. Clear buccal brackets
3. Lingual brackets
4. Clear aligners
5. Removable appliances

To achieve standardization, entries that did not mention any device type were not included in this category.

For the general content, Initially, 100 randomly chosen entries were reviewed and then divided into 5 general categories based on their content:

1. **Definition:** This category involved entries that included a definition regardless of its source (i.e., scientific fact or personal opinion) (e.g., *orthodontic treatment allows split, crooked, protruding teeth to move to their original places*).
2. **Asking for advice:** This category included entries asking for the knowledge and experience of other contributors, such as those asking whether to wear braces, asking for information about orthodontists working in a certain location, and those inquiring about the costs of orthodontic treatments (e.g., *Is there anybody here whose teeth deteriorated after orthodontic treatment; if yes, could you tell us how you solved the problem?*).
3. **Humor:** An interesting aspect about EksiSozluk is that it is also a well-known for the entries containing humor. Such entries were included in this category (e.g., *Bro, I just wonder if it [the appliance] was silver or white gold.*).
4. **Advertising:** Although it is forbidden to advertise or publicize a person/company/object on EksiSozluk, entries that

mentioned or recommended a specific physician, though extremely rarely, were included in this category (e.g., *I recommend the Orthodontic clinic.*)

5. **Transfer of experience:** This was the largest category and included entries in which contributors shared their own experiences (e.g., *This piece of metal caused unbearable pain in the week the brackets were changed, upsetting me the whole day, urging me to want to remove all my teeth. Moreover, it was a reason for not being able to sleep, but after the removal of the brackets, you become a person with an adorable smile.*).

Transfer of experience was further divided into four subcategories:

- I. **Procedure:** This category included the entries in which the contributors described their clinical condition and/or the procedure(s) they underwent without expressing their own personal opinions (e.g., *Process: The rubber bands installed after the second month started to hurt a lot. In the third month, thick wires were installed and the gaps between my teeth were closed completely.*).
- II. **Motivation:** This category included entries that were contributed with the aim of encouraging patients to undergo orthodontic treatment, attempting to motivate and convince them that although there could be some difficulties at the beginning of the treatment, beautiful smiles can be obtained at the end of the treatment. (e.g., *Although it was difficult at the beginning, the appearance of my teeth at the end of the treatment was worth all these difficulties.*).
- III. **Advice:** Entries containing detailed advice on oral hygiene, eating, drinking, and the use of retention device based on contributors' personal experience were included in this category (e.g., *There were minor irregularities after the treatment. It was my fault; 6-7 months after the wires came out, I stopped using the plate given to me. You shouldn't neglect it!*).
- IV. **Complaint:** Entries that only mentioned complaints and did not contain any statement of motivation regarding orthodontic treatment were included in this category. (e.g., *I can describe it with a single word: pain.*)

The entries included in the "Complaint" category were further divided into the following subcategories and they were included in several categories if they contained more than one type of complaints:

- IV-1. Pain
- IV-2. Wound
- IV-3. Eating and swallowing problems
- IV-4. Physical appearance
- IV-5. Speech problems
- IV-6. Elastics
- IV-7. Prolonged treatment
- IV-8. Retention devices
- IV-9. Relapse
- IV-10. Discoloration
- IV-11. Nonspecific (e.g., *That's a real torture!*)

Entries containing contributors' attitudes towards orthodontic treatment were divided into three groups:

1. Positive: Entries containing motivational phrases or those containing advice and satisfaction related to the post-treatment period.
2. Negative: Entries containing complaints regarding the procedure and post-treatment dissatisfaction.
3. Neutral: Entries that did not contain any subjective evaluation or emotional expressions.

### Statistical Analysis

Sample size was calculated using G\*Power statistical software (version 3.0.10; Heinrich Heine University Düsseldorf, Düsseldorf, Germany). A post hoc power analysis showed the power of the study to be 0.98 according to a 58% reduction in the rate of negative entries between decades, from 43% in the first decade to 25% in the second decade and a 2-tailed alpha level of 0.05.

Intra- and inter-rater reliability of the variables were calculated using Cohen's Kappa test. A total of 200 randomly selected entries were re-evaluated separately by two researchers (M.A.Y. and M.N.E.) 15 days after the initial evaluation.

Statistical analyses were performed using SPSS for Windows version 22.0 (IBM Corp., Armonk, NY, USA). Descriptives were expressed as mean, standard deviation (SD), and frequencies (n). The normal distribution of continuous variables was assessed using the Shapiro-Wilk test and all the variables showed normal distribution. The numbers of entries contributed during the two decades were compared using independent-samples t-test. Categorical variables were compared between the two decades using the Chi-square test. A *P* value of <.05 was considered significant.

### RESULTS

Inter- and intra-rater agreement rates were 0.930 and 1.00, respectively. Only 4 out of 1032 entries were excluded from the study since they contained insults and thus the remaining 1028 entries were included in the analysis.

Table 1 presents the descriptives and comparison of the entries contributed in both decades. The average number of entries contributed per year was  $13.40 \pm 10.58$  in the first decade and was  $89.40 \pm 44.67$  in the second decade and the increase was statistically significant ( $P < .05$ ) (Figure 1).

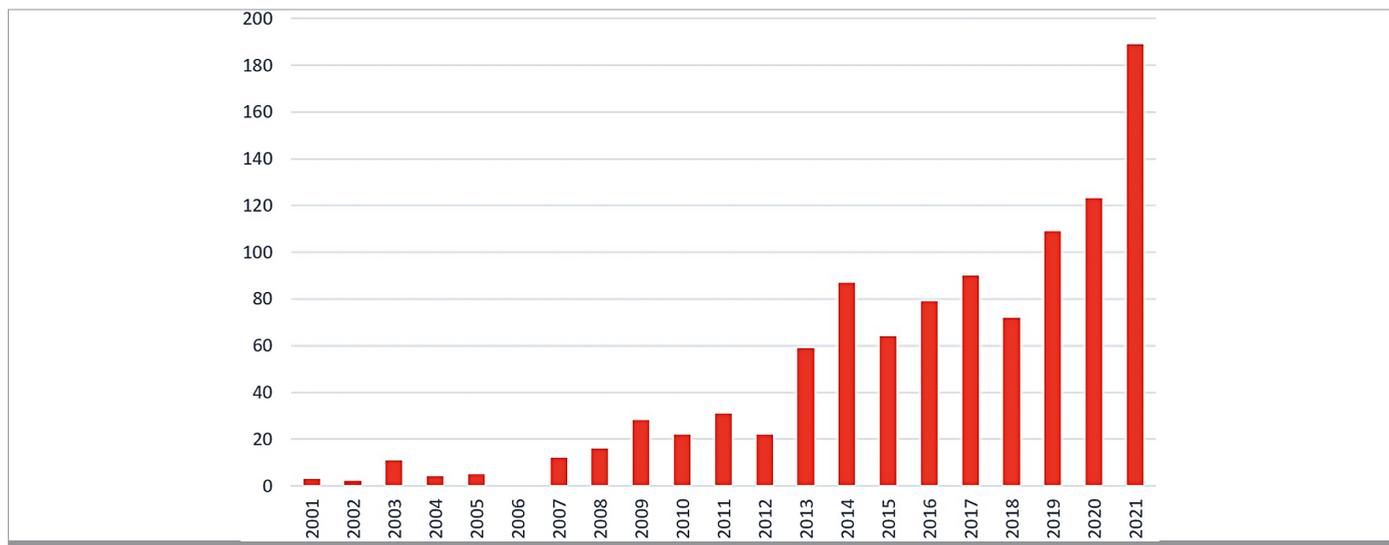
Although there was no significant difference between the two decades with regard to the distribution of device types ( $P > .05$ ), there was a significant difference in terms of content ( $P < .01$ ). Of note, 17.2% of the entries included a definition in the first decade and this rate decreased to 7.8% in the second decade. In contrast, 76.9% of the entries included transfer of experience in the first decade, and this rate was found to be 81.5% in the second decade.

Among the subcategories of the experience group, the entries containing comments regarding procedure (8.7% vs. 14.5%) and motivation (18.4% vs. 38.4%) showed an increasing trend, while

**Table 1. Descriptive statistics of the entries**

		First Decade (n = 134)	Second Decade (n = 894)	P
Number of entries contributed per year (Mean ± SD)		13.40 ± 10.58	89.40 ± 44.67	.000 *** α
Device type	Buccal metal (n, %)	93 (93%)	642 (92.6%)	.498 β
	Buccal ceramic (n, %)	4 (4%)	29 (4.2%)	
	Lingual (n, %)	0 (0%)	3 (0.4%)	
	Clear aligner (n, %)	1 (1%)	15 (2.2%)	
	Removable (n, %)	2 (2%)	4 (0.6%)	
Content	Definition (n, %)	23 (17.2%)	70 (7.8%)	.001 ** β
	Asking for advice (n, %)	0 (0%)	51 (5.7%)	
	Humor (n, %)	7 (5.2%)	39 (4.4%)	
	Advertising (n, %)	1 (0.7%)	5 (0.6%)	
	Transfer of experience (n, %)	103 (76.9%)	729 (81.5%)	
Content of transfer of experience	Procedure (n, %)	9 (8.7%)	106 (14.5%)	.000 ***β
	Motivation (n, %)	19 (18.4%)	280 (38.4%)	
	Advice (n, %)	16 (15.5%)	112 (15.4%)	
	Complaint (n, %)	59 (57.3%)	231 (31.7%)	

αIndependent samples t test, βχ<sup>2</sup> test, \*\*P < .01, \*\*\*P < .001, SD, standard deviation.



**Figure 1.** Distribution of entries by year

the entries containing comments regarding complaint (57.3% vs. 31.7%) showed a decreasing trend in the second decade compared to the first decade ( $P < .001$ ).

Table 2 shows the distribution of complaints in both decades. The frequencies of subcategories including wound (18.64% vs. 12.12%), physical appearance (23.72% vs. 9.09%) and speech problems (18.64% vs. 3.03%) showed a decrease, whereas no change was observed in the complaints related to pain, eating and swallowing problems, elastics, retention devices, retention, and relapse. By contrast, the complaints related to prolonged treatment showed an increase (11.86% vs. 25.54%).

Table 3 presents the distribution of attitudes (positive, negative, and neutral) towards orthodontic treatment (Figure 2) in the entries containing comments related to device types and

content. There was an overall significant difference between the two decades ( $P < .001$ ). Of note, negative attitudes were more dominant in the first decade (43.3%), while positive attitudes were more dominant in the second decade (49.6%). Additionally, approximately one-quarter of the entries were neutral in both decades (25.4% and 25.2%, respectively). In terms of device type, however, there was a significant change in the frequency of attitudes in the entries related to metal buccal brackets between the two decades ( $P < .01$ ), while no significant change was observed in the attitudes in the entries related to clear buccal brackets ( $P > .05$ ). As for the content of the entries, no significant difference was found between the two decades with regard to the distribution of attitudes in the entries containing definition and humor ( $P > .05$ ), while there was a significant increase in the positive attitudes in the entries containing transfer of experience in the second decade compared to the first decade ( $P < .01$ ).

**Table 2.** Complaints mentioned in the entries

Complaint	First Decade (2001-2011)	Second Decade (2012-2021)
Pain (n, %)	23 (38.98%)	85 (36.79%)
Eating and swallowing problems (n, %)	18 (30.50%)	76 (32.90%)
Physical appearance (n, %)	14 (23.72)	21 (9.09%)
Wound (n, %)	11 (18.64%)	28 (12.12%)
Speech problems (n, %)	11 (18.64)	7 (3.03%)
Retention device (n, %)	8 (13.55%)	25 (10.82%)
Elastics (n, %)	7 (11.86%)	27 (11.68%)
Prolonged treatment (n, %)	7 (11.86%)	59 (25.54%)
Relapse (n, %)	4 (6.77%)	20 (8.65%)
Discoloration (n, %)	1 (1.69%)	7 (3.03%)
Nonspecific (n, %)	9 (15.25%)	40 (17.31%)

**Table 3.** Comparison of attitudes in different decades

		First Decade (2001-2011)			Second Decade (2012-2021)			P <sup>β</sup>
		Positive (n, %)	Negative (n, %)	Neutral (n, %)	Positive (n, %)	Negative (n, %)	Neutral (n, %)	
Total		42 (31.3)	58 (43.3)	34 (25.4)	443 (49.6)	226 (25.3)	225 (25.2)	.000 ***
Device type	Buccal metal	33 (35.5%)	42 (45.2%)	18 (19.4%)	345 (53.7%)	189 (29.4%)	108 (16.8%)	.003 **
	Buccal ceramic	0 (0%)	3 (75%)	1 (25%)	16 (55.2%)	8 (22.6%)	5 (17.2%)	.110
Content	Definition	9 (39.1%)	2 (8.7%)	12 (52.2%)	34 (48.6%)	9 (12.9%)	27 (38.6%)	.509
	Humor	2 (28.6%)	3 (42.9%)	2 (28.6%)	10 (25.6%)	7 (17.9%)	22 (56.4%)	.313
	Experience	31 (30.1%)	53 (51.5%)	19 (18.4%)	397 (54.5%)	204 (28%)	128 (17.6%)	.000 ***

<sup>β</sup>χ<sup>2</sup> test, \*\*P < .01, \*\*\*P < .001.

280

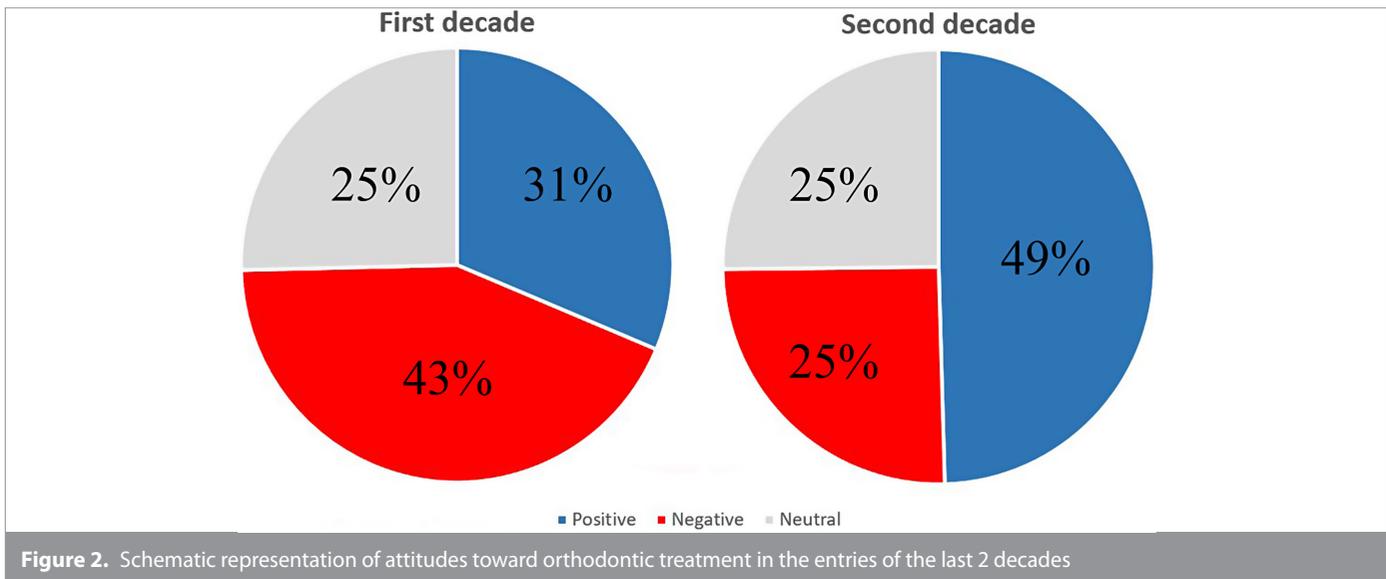


Table 4 presents the distribution of complaints about metal and clear buccal brackets. Among these complaints, pain (40%), eating and swallowing problems (34.50%), and prolonged treatment (24.31%) constituted the three most common complaints in buccal metal brackets, while pain (30.76%), discoloration (30.76%), and eating and swallowing problems (15.38%) constituted the three most common complaints in buccal clear brackets.

**DISCUSSION**

Social media provides an insight into current cultural and social trends of the society and into the modern understanding of beauty, particularly among patients undergoing orthodontic treatment.<sup>17</sup> The present study aimed to evaluate long-term attitudes based on the entries contributed to collaborative

**Table 4.** Complaints according to device type

Complaint	Buccal Metal	Buccal Ceramic
Pain (n, %)	102 (40%)	4 (30.76%)
Eating and swallowing problems (n, %)	37 (14.50%)	1 (7.69%)
Physical appearance (n, %)	88 (34.50%)	3 (23.07%)
Wound (n, %)	32 (12.54%)	1 (7.69%)
Speech problems (n, %)	14 (5.49%)	1 (7.69%)
Retention device (n, %)	34 (13.33%)	0 (0%)
Elastics (n, %)	62 (24.31%)	2 (15.38%)
Prolonged treatment (n, %)	31 (12.15%)	1 (7.69%)
Relapse (n, %)	21 (8.23%)	1 (7.69%)
Discoloration (n, %)	4 (1.56%)	4 (30.76%)
Nonspecific (n, %)	36 (14.11%)	2 (15.38%)

hypertext dictionary sites, which constitute an important branch of social media, regarding orthodontic treatment. In addition, by performing content analysis, it was aimed to determine the complaints of the contributors and to raise the awareness of orthodontists about these problems. Our research data consisted of the entries contributed to EksiSozluk, which is one of the most frequently visited collaborative hypertext dictionary sites with more than 700,000 active users who had a certain level of knowledge and ability to explain new communication technologies and the internet and who evaluated the phenomena from a different perspective.<sup>16,18,19</sup>

Our results indicated that the number of entries increased by almost 5 times in the second decade compared to the first decade. This finding could be explained by the rapid increase in the number of internet users and the growing interest in orthodontic treatment in the world within the last 20 years.<sup>20,21</sup>

Cross-sectional studies have shown that orthodontic patients are positively affected by the experiences shared by other patients on the internet.<sup>22,23</sup> This situation shows the importance of evaluating collaborative hypertext dictionary sites in terms of content. In our study, although there was no significant difference between the two decades with regard to device type, there was a significant increase in the number of entries about lingual brackets and clear aligners in the second decade, which implicates that the interest in these treatments will increase in the future. Jeremiah et al.<sup>24</sup> in line with our findings reported that the demand for lingual brackets and clear aligners have recently increased.

A significant difference was determined between the two decades with regard to the distribution of content types. Of note, entries containing a definition decreased while the entries containing transfer of experience increased in the second decade compared to the first decade. This finding indicates that the contributors did not need new definition entries and that they tended to share their experiences more frequently in the second decade. Moreover, this finding could be explained by the

increasing number of individuals undergoing orthodontic treatment. Studies presenting similar findings to those of our study have shown that patients frequently share their experiences on social media platforms such as forums and blogs with people who receive orthodontic treatment like themselves and that it is easier for them to share their feelings in these environments rather than to communicate with their orthodontists.<sup>23,25,26</sup>

Evaluating social media content is essential for understanding the experiences, expectations, and motivational factors associated with orthodontic treatment.<sup>17</sup> Our findings showed a significant change in the subcategories of transfer of experience between the two decades, whereby the frequency of entries containing procedure and motivation increased significantly and the frequency of entries containing complaint decreased significantly in the second decade. These changes could be explained by the advancements in orthodontic technology, such as reduced bracket size, increased use of clear aligners, and increasing accessibility of lingual brackets and clear aligners.<sup>27</sup> Additionally, the increased frequency of entries regarding motivation could be attributed to the increase in the number of individuals receiving orthodontic treatment and in the number of people sharing their experiences on this topic in social life and on the internet and also could be associated with the reduction in the frequency of entries containing a complaint in the second decade.

In the entries analyzed, it was revealed that the attitudes towards orthodontic treatment shifted from negative in the first decade to positive in the second decade. In a similar way to our findings, Kim<sup>28</sup> reported that orthodontic treatment has gained increasing popularity in society and that the rate of positive perception among adults in their 20s had reached 63.2%. Similarly, Noll et al.<sup>29</sup> also reported that the attitude towards orthodontic treatment was mostly positive in their Twitter analysis. These findings could be associated with the increased acceptability of orthodontic appliances in line with the increase in aesthetic perception in society. Additionally, it could also be related to the increase in treatment options in line with the development of orthodontic appliances and the numerical increase in the number of patients undergoing orthodontic treatment.<sup>24</sup> Similarly, studies in the literature have shown that the cooperation of patients with orthodontic treatment increases and that they develop more positive attitudes towards the treatment in line with their increasing knowledge and experience regarding the treatment.<sup>26</sup> However, despite this positive change, approximately 30% of the entries analyzed in our study contained a complaint, which implicates that orthodontists should be more concerned about patients' complaints.

Patients are in active communication with other internet users, mainly to provide and receive support from each other and to share information.<sup>17</sup> Literature indicates that the experiences shared among patients often include problems such as poor oral hygiene, chewing problems, orthodontic pain, use of elastics, and difficulties in the use of retainers, while their posts related

to motivation indicate that patients obtain excellent aesthetic outcomes and better occlusion at the end of the treatment.<sup>23,25,26</sup> In a Twitter study by Noll et al.<sup>29</sup> it was determined that the most common complaints of the patients were related to pain. Similarly, in our study, the pain was the most common complaint with a rate of almost 40% in both decades. Taken together, these findings implicate that orthodontist should inform their patients that pain is an expected outcome, which in turn could lead to beneficial outcomes in terms of long-term motivation since such preparation will increase patients' trust in the treatment and in the physician.

Common problems reported in the social media studies include eating and swallowing problems, difficult cleaning of brackets and archwires, soft tissue wounds, and the use of elastics.<sup>17</sup> Similarly, our findings indicated that one-third of the complaints reported by the contributors included eating and swallowing problems. Taken together, these findings suggest that orthodontists should inform patients regarding the likelihood of eating difficulties in treatments that involve appliances other than clear aligners and removable appliances, particularly in buccal brackets, and should prepare patients for this situation prior to the treatment.

Our findings showed that the frequency of complaints regarding prolonged treatment increased in the second decade compared to the first decade. Literature indicates that the duration of orthodontic treatment varies according to the type of malocclusion, treatment options, knowledge and experience of the orthodontist, patient's compliance with the treatment and follow-up sessions.<sup>30</sup> In addition, it is a common fact that if the duration of the treatment exceeds the time stated by the physician at the beginning of the treatment, this may cause dissatisfaction among the patients and thereby may lead to a complaint as a result of the perception of prolonged treatment.

In the second decade, a decrease was observed in the frequency of the complaints of intraoral wounds. The decrease observed in our study could be due to the advancements in bracket technology, such as reduction in bracket size, development of smoother bracket surfaces, elimination of traumas caused by ligature wires with the development of self-ligating brackets, and the reduction in the use of twisted wires.<sup>31</sup>

In our study, most of the complaints mentioned in the first decade were related to the physical appearance of brackets and braces. This finding could be due to the false impression of ugliness reflected by the main characters in TV series such as "Ugly Betty" and video clips such as Ketty Perry's "Last Friday Night," which were being screened on TV channels during the first decade and in which these characters were ugly individuals receiving orthodontic treatment.<sup>32</sup> Studies in the literature have shown that the acceptability of orthodontic appliances has increased due to the increase in dental and orthodontic awareness.<sup>24</sup> Similarly, in our study, the frequency of visual complaints showed a reduction in the second decade compared to the first decade. This finding could be associated with the aesthetic

innovations in orthodontic appliances (e.g. mini brackets, clear brackets, custom brackets).<sup>24</sup>

Our findings, in a similar way to those of Twitter studies, indicated that one out of every 10 contributors complained about the use of elastics in both decades.<sup>17</sup> This finding suggests that patients should be informed about the difficulties of using elastics prior to the study.

Negative experiences with orthodontic retainers are frequently shared on Twitter, most of which include pain, speech problems, aesthetic anxiety, odor, and discoloration problems as well as difficulties experienced during the insertion and removal of these appliances during meals and their risk of loss.<sup>17,29,33,34</sup> Similarly, most of the entries analyzed in our study included complaints regarding retention devices. In addition, some contributors also complained of relapse caused by inadequate attention to the retention protocol. Accordingly, orthodontists should inform their patients about the risk of relapse after treatment and should also instruct them regarding the retention protocol.

In our study, the contents of complaints regarding metal buccal and clear buccal brackets were analyzed and the most interesting finding was the complaint of discoloration of teeth caused by devices or discoloration of clear elastic ligatures or brackets. Literature indicates that the color stability of aesthetic brackets can be affected by numerous factors such as their content, morphology, and surface properties.<sup>35</sup> Additionally, it has been shown that all plastic and ceramic aesthetic brackets can show discoloration due to endogenous and exogenous factors.<sup>35</sup> On the other hand, in order to obtain the desired aesthetic outcome, the bracket to be selected should be compatible with the patient's own tooth color and/or tooth translucency.<sup>36</sup> In our study, the increase in the number of discoloration complaints in the second decade could be associated with the patients' increased interest in aesthetic brackets in the second decade compared to the first decade. Accordingly, it is highly important to select the most appropriate brackets according to patients' aesthetic expectations and individual characteristics and to inform the patients about the risk of discoloration.

Our study was limited in several ways. First and foremost, the language used was not English. Nevertheless, EksiSozluk is used more interactively than many international English-language collaborative hypertext dictionary sites and has an important role in setting the agenda and influencing people's preferences in Turkey.<sup>10,15,19</sup> The second limitation was that the entries were not graded with regard to their accuracy and quality. In the literature, there are various indexes used for rating websites and videos.<sup>6-8</sup> However, it is not possible to adapt these indexes since the contents of the entries (objective information showing scientific sources as well as news, humor, or personal experiences) and their lengths show remarkable variation. Finally, it is a common fact that collaborative hypertext dictionary sites allow their contributors to delete their titles and entries in later periods. Accordingly, the statistical findings obtained in our study, though confirmed at the end of the study, may show time-related differences due to this dynamic process.

## CONCLUSION

The results indicated that the contributors' attitudes towards orthodontic treatment shifted from negative in the first decade to positive in the second decade. Nonetheless, it should be noted that the contributors expressed serious negative attitudes and complaints regarding orthodontic treatment, which need to be addressed appropriately. On the other hand, in the second decade, pain and eating/swallowing problems were the most common complaints while the complaints regarding physical appearance decreased and the complaints regarding prolonged treatment increased. Moreover, the increased number of entries in the second decade compared to the first decade indicate the increased awareness regarding collaborative hypertext dictionary sites.

**Ethics Committee Approval:** Since the data were collected from publicly available entries, no ethics committee approval was required.

**Informed Consent:** N/A.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – M.A.Y., M.N.E.; Design – M.A.Y., M.N.E.; Supervision – M.A.Y., M.N.E.; Materials – M.A.Y., M.N.E.; Data Collection and/or Processing – M.A.Y., M.N.E.; Analysis and/or Interpretation – M.A.Y., M.N.E.; Literature Review – M.A.Y., M.N.E.; Writing – M.A.Y., M.N.E.; Critical Review – M.A.Y., M.N.E.

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