



Gender Representation in Orthodontic Scientific Events: Analysis of Turkish Orthodontic Society Congresses and Symposia

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Abstract

Objectives: To assess gender representation in Turkish Orthodontic Society (TOD) congresses and symposia by analyzing the proportion of female and male invited speakers and oral presenters from 2013 to 2024.

Methods: Twelve TOD events (6 congresses, 6 symposia) held between 2013 and 2024 were reviewed. For each event, data on invited speakers and oral presenters were extracted from program booklets. Speaker gender was determined by names and photographs, with unclear cases excluded. The proportions of female and male speakers in each category were calculated. Chi-square tests were applied to compare gender distributions and evaluate trends over time.

Results: A total of 752 speakers were analyzed. Overall, women accounted for 68.8% of oral presenters and men accounted for 66.5% of invited speakers, a significant gender disparity ($p < 0.01$). This pattern was consistent in both congresses and symposia. In congresses, female representation among oral presenters increased significantly over the years ($p < 0.05$), whereas invited speaker gender proportions did not change significantly. Symposia showed no significant changes in gender distribution over time.

Conclusion: Despite women's high participation as oral presenters, they remain underrepresented among invited speakers at TOD events. These findings indicate a persistent gender gap in high-profile speaking roles and underscore the need for proactive measures to achieve gender balance in scientific leadership positions.

Keywords: Congresses as Topic; Orthodontics; Gender Equity

Introduction

Gender equality refers to the idea that individuals are equal in terms of human dignity and rights, and that women and men should have equal rights, opportunities, and access to resources [1]. Gender equality is recognized as one of the essential elements for social welfare and sustainable development. In this context, the representation of women in all areas of society is of great importance. Especially in leadership positions and scientific events, equal representation is critical for building a fair society and ensuring both economic and social progress [2]. Women's access to employment and representation not only contributes to their personal development but also positively affects the welfare and progress of their families and society at large [3]. Investing in women's education and skills, and ensuring they can make their choices freely, is one of the most effective ways to promote economic growth and support overall development and societal welfare. The underrepresentation of women in leadership and decision-making positions may result in a lack of perspective in decision-making processes. This can potentially lead to the creation of less inclusive policies.

In Turkey, women's roles and representation in social life have undergone significant changes throughout history. Especially since the Second Constitutional Era, important steps were taken to increase women's participation in education and work life. Various women's associations and organizations were established. During this period, women engaged in various activities to gain their rights, secure representation, and improve themselves [4]. With the declaration of the Republic, significant legal reforms were made, including granting Turkish women the right to vote and be elected, thanks to the leadership of Atatürk. These reforms enabled women to participate more actively in political and social life. During this entire process, women's inclusion in the workforce, changes in lifestyle and clothing, participation in vocational and higher education, their roles within the family, responsibilities, and political rights have become important discussion topics [5]. The equality of women's witness and inheritance rights with those of men also strengthened their position in public life.

However, despite all these advancements, women's representation in leadership positions and scientific events remains insufficient [6-8].

Academic events serve as crucial platforms for the production, sharing, and discussion of scientific knowledge. The underrepresentation of women in such events may lead to a gender-biased trend in the production of scientific knowledge and may negatively impact the career development of female researchers. It is important for scientific program committees to adopt strategies that prioritize inclusivity [9]. Increasing the presence of women as speakers, panelists, or session chairs at scientific events can provide role models for young female researchers and encourage them. Mentoring programs can support women's advancement in scientific careers and help them develop leadership skills [10]. Organizing gender equality awareness trainings and making them mandatory for all participants may help prevent discriminatory behaviors and gender-biased attitudes during events.

In conclusion, gender equality and the representation of women in leadership and scientific events are vital for the future of nations. The steps taken in this area will contribute to building a more just, inclusive, and prosperous society. The underrepresentation of women in scientific events may lead to a gender-biased trend in the production of scientific knowledge and negatively affect the career development of female researchers [9].

Despite the significant increase in the number of women in the fields of medicine and dentistry, inequality persists in leadership positions and speaker roles [11,12].

Evaluating gender representation in scientific and professional organizations is also essential for achieving gender equality. Assessing the gender distribution in Symposia and conferences within the field of orthodontics can offer informative insights into the existing gender disparities in the field [13].

The underrepresentation of women in leadership positions, particularly in academia, is a documented phenomenon across various disciplines [14,15]. Previous studies have found that the proportion of women in leadership positions remains insufficient. For example, an analysis of speaker representation at European Orthodontic Society conferences revealed that while women accounted for 67% of oral presenters, their representation among invited

speakers was unfortunately much lower—only 17.9% [16]. This imbalance does not only impact the visibility of successful women; it may also hinder the overall advancement of women in the field [13]. Furthermore, it may influence the field's capacity for innovative thinking [17].

An analysis of the symposia and congresses organized by the Turkish Orthodontic Society, one of Turkey's leading professional organizations, can serve as a valuable approach to assess these dynamics.

The aim of this study is to evaluate female representation in the field of orthodontics by examining the gender ratio of invited speakers and oral presenters in the congresses and symposia organized by the Turkish Orthodontic Society.

Methods

Inclusion criteria

In this study, all congress and symposium booklets available on the official website of the Turkish Orthodontic Society were reviewed. However, due to the lack of sufficient data in the booklets prior to 2013, those congresses and symposia were excluded from the study. The included congresses and symposia featured various national and international speakers in the field of orthodontics.

Data collection

A total of 12 events organized by the Turkish Orthodontic Society between 2013 and 2024—6 congresses and 6 symposia—were examined in this study. These events were held alternately, with a congress one year and a symposia the next. However, the congress that was originally planned for 2020 was held online in 2021 due to the COVID-19 pandemic. The symposium for that same year was also conducted online.

The study focused on two main categories: invited speakers and oral presentation speakers. Moderators, panelists, country representatives, poster presenters, award acceptance speakers, opening/closing ceremony speakers, and competition participants were excluded from the analysis.

Gender identification

The gender of the speakers was determined based on their names and surnames as listed in the event booklets, and, where available, their photographs. For speakers whose gender could not be identified from the booklet, additional internet research was conducted. Speakers whose gender could not be determined even through online searches were excluded from the study. In the symposium held in 2023, one oral presentation speaker was excluded due to unidentified gender.

Statistical analysis

All statistical analyses were performed using IBM SPSS Statistics (version 23). Chi-square tests were applied to compare gender distribution between speaker roles (invited speakers vs. oral presenters) in the overall sample, as well as between invited and oral presentation categories within congresses and within symposia. Chi-square tests were also used to evaluate differences across years among oral presenters in congresses and in symposia. Because some expected cell counts were low in the year-wise analysis of symposium invited speakers, that comparison was conducted using Fisher's exact test with a Monte Carlo simulation. All tests were two-tailed, and a p-value less than 0.05 was considered statistically significant.

Results

In this study, a total of 12 events organized by the Turkish Orthodontic Society between 2013 and 2024—6 congresses and 6 symposia—were analyzed. A total of 752 speakers who met the inclusion criteria were included in the study. During this 11-year period, a statistically significant gender disparity was observed: women were in the majority in oral presentations (68.8%), while men predominated among invited speakers (66.5%) ($p < 0.01$) (Table 1) (Figure 1).

When congresses and symposia were evaluated separately, a significant dependency was again observed. In congresses, the proportion of male invited speakers was 66.06%, whereas the proportion of female oral presenters was higher at 70.08% (Table 2). In symposia, the proportion of male invited speakers was 67.01%, while female oral presenters accounted for 66.3%, both statistically significant (Table 3).

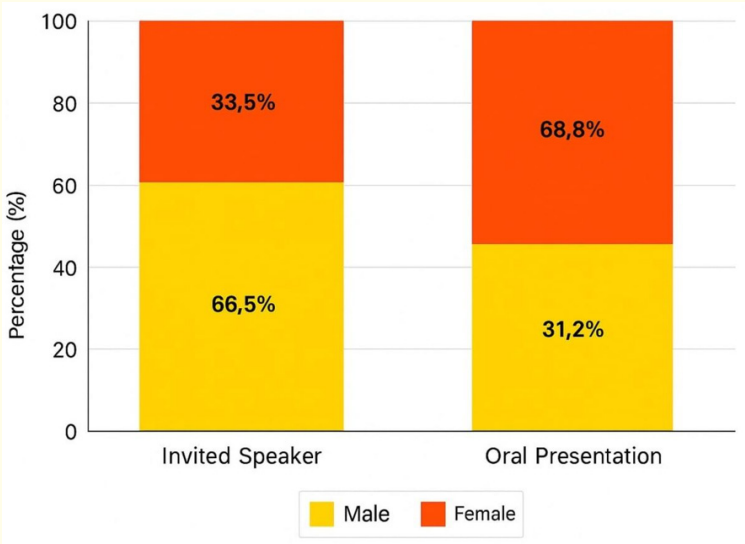


Figure 1: Gender distribution by presentation type.

Table 1: Contingency analysis of the relationship between type of invitation and gender (Overall).

Gender	Invitation Type	n	%	Total n	%	Chi-Square	p
Male	Invited Speaker	123	66.5 ^a	300	39.9 ^b		
	Oral Presenter	177	31.2 ^b				
Female	Invited Speaker	62	33.5 ^b	452	60.1 ^a	72.3	0.0001
	Oral Presenter	390	68.8 ^a				
Total	Invited Speaker	185	100.0	752	100.0		
	Oral Presenter	567	100.0				

Note: Different superscript letters (a, b) in the same row indicate significant differences (p < 0.05).

Table 2: Contingency Analysis of Gender and Presentation Type in Congresses.

Gender	Invited Speaker	Oral Presentation	Total	χ² (Chi-square)	p-value
Male	72 (66.06%) ^a	111 (29.92%) ^b	183 (38.13%) ^b	46.6	0.0001
Female	37 (33.95%) ^b	260 (70.08%) ^a	297 (61.87%) ^a		
Total	109 (100.0%)	371 (100.0%)	480 (100.0%)		

Note: Superscript letters (^a, ^b) denote statistical significance between groups; a > b indicates a statistically significant difference.

Table 3: Contingency Analysis of Gender and Presentation Type in Symposia.

Gender	Invited Speaker	Oral Presentation	Total	χ ² (Chi-square)	p-value
Male	51 (67.1%) ^a	66 (33.7%) ^b	117 (43.0%) ^b	24.9	0.0001
Female	25 (32.9%) ^b	130 (66.3%) ^a	155 (57.0%) ^a		
Total	76 (100.0%)	196 (100.0%)	272 (100.0%)		

Note: Superscript letters (^a, ^b) denote statistical significance between groups; a > b indicates a statistically significant difference.

When the relationship between invited speakers and years was examined in congresses, no statistically significant association was found (Table 4) (Figure 2). However, for oral presenters in congresses, a significant relationship between gender and years was observed ($p < 0.05$) (Table 5) (Figure 3). Representation of women

among oral presenters in congresses showed a significant increase over the years. Notably, since 2016, the proportion of women has remained consistently high. This finding indicates that female academics actively participated in oral presentations and were more strongly represented compared to their male counterparts.

Table 4: Distribution of Invited Speakers in Congresses by Gender and Year.

Year	Male (n/%)	Female (n/%)	Total (n/%)	Chi-Square	p-value
2014	15 (75.0%)	5 (25.0%)	20 (100.0%)		
2016	7 (70.0%)	3 (30.0%)	10 (100.0%)		
2018	11 (73.3%)	4 (26.7%)	15 (100.0%)		
2021	12 (70.6%)	5 (29.4%)	17 (100.0%)		
2022	12 (48.0%)	13 (52.0%)	25 (100.0%)		
2024	15 (68.2%)	7 (31.8%)	22 (100.0%)		
Total	72 (66.1%)	37 (33.9%)	109 (100.0%)	4.9	0.419

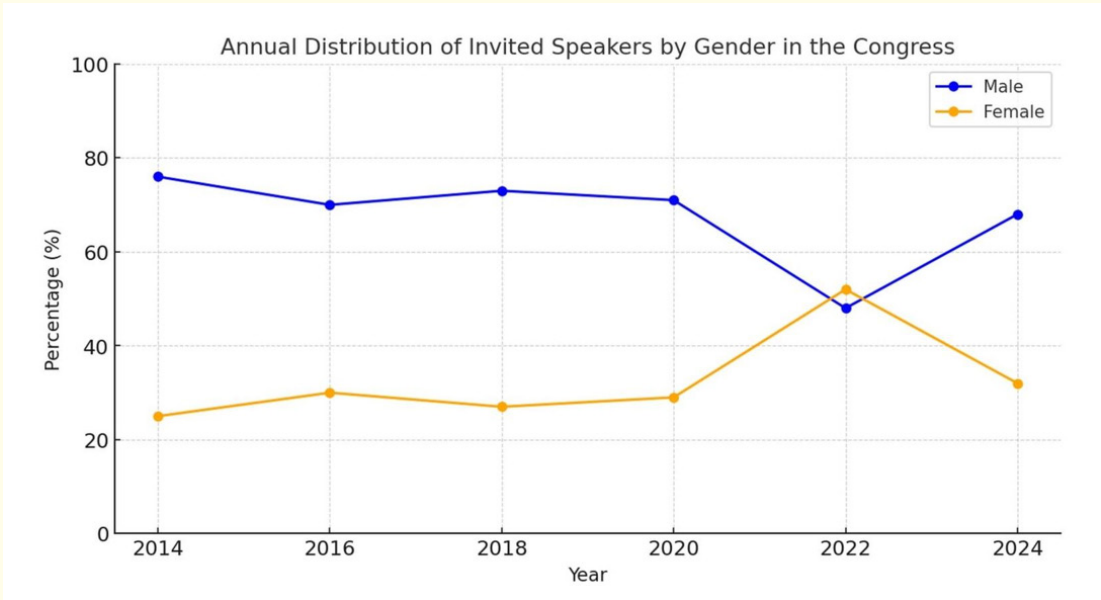
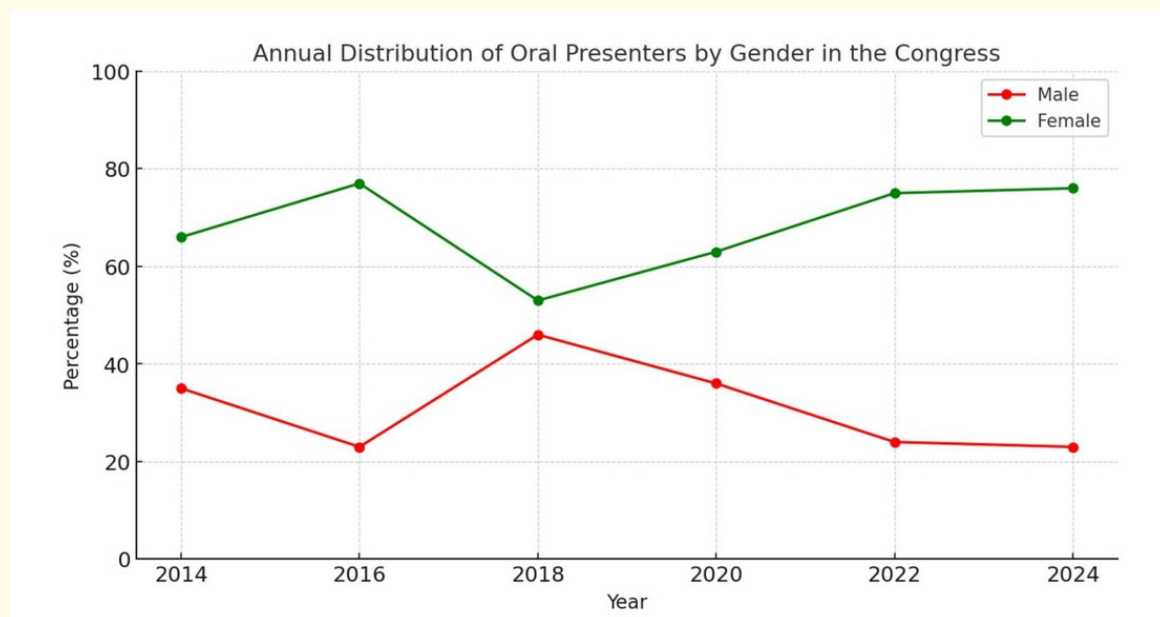


Figure 2: Annual Distribution of Invited Speakers in Congresses by Gender.

Table 5: Distribution of Oral Presenters in Congresses by Gender and Year.

Year	Male (n/%)	Female (n/%)	Total (n/%)	Chi-Square	p-value
2014	9 (34.6%)	17 (65.4%)	26 (100.0%)		
2016	9 (23.1%)	30 (76.9%)	39 (100.0%)		
2018	27 (46.6%)	31 (53.4%)	58 (100.0%)		
2021	21 (35.6%)	38 (64.4%)	59 (100.0%)		
2022	17 (24.3%)	53 (75.7%)	70 (100.0%)		
2024	28 (23.5%)	91 (76.5%)	119 (100.0%)		
Total	111 (29.9%)	260 (70.1%)	371 (100.0%)	13.07	0.023

**Figure 3:** Annual Distribution of Oral Presenters by Gender in the Congress.

In symposia, the relationship between invited speakers and years showed no statistically significant association ($p > 0.05$) (Table 6) (Figure 4). Similarly, the analysis of oral presenters in

symposia revealed no significant relationship between gender and years ($p > 0.05$) (Table 7) (Figure 5).

Table 6: Distribution of Invited Speakers in Symposia by Gender and Year.

Year	Male (n/%)	Female (n/%)	Total (n/%)	Chi-Square	p-value
2013	8 (80.0%)	2 (20.0%)	10 (100.0%)		
2015	4 (50.0%)	4 (50.0%)	8 (100.0%)		
2017	6 (75.0%)	2 (25.0%)	8 (100.0%)		
2019	6 (54.5%)	5 (45.5%)	11 (100.0%)		
2021	9 (81.8%)	2 (18.2%)	11 (100.0%)		
2023	18 (64.3%)	10 (35.7%)	28 (100.0%)		
Total	51 (67.1%)	25 (32.9%)	76 (100.0%)	*	0.582

* Analyzed using Monte Carlo simulation technique.

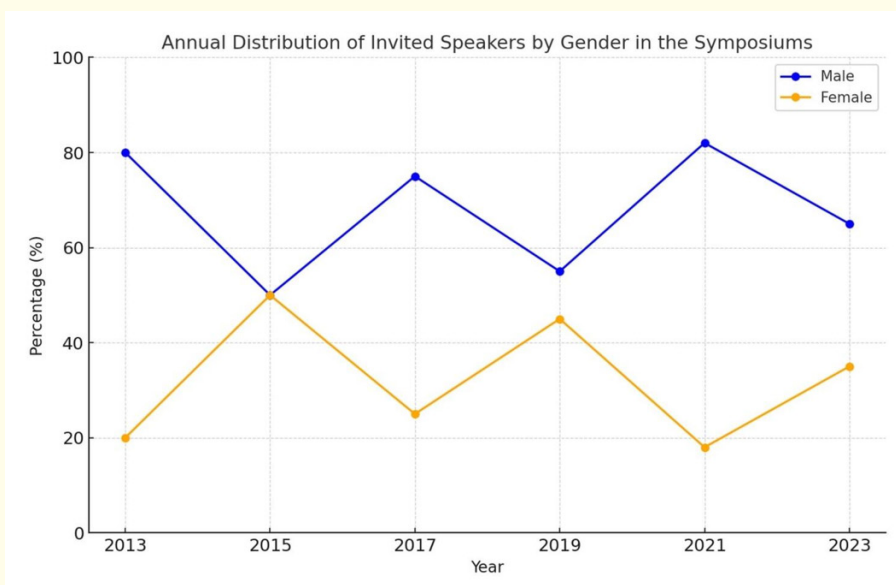


Figure 4: Annual Distribution of Invited Speakers by Gender in the Symposia.

Table 7: Distribution of Oral Presenters in Symposia by Gender and Year.

Year	Male (n/%)	Female (n/%)	Total (n/%)	Chi-Square	p-value
2013	6 (37.5%)	10 (62.5%)	16 (100.0%)		
2015	9 (39.1%)	14 (60.9%)	23 (100.0%)		
2017	7 (26.9%)	19 (73.1%)	26 (100.0%)		
2019	15 (37.5%)	25 (62.5%)	40 (100.0%)		
2021	11 (34.4%)	21 (65.6%)	32 (100.0%)		
2023	18 (30.5%)	41 (69.5%)	59 (100.0%)		
Total	66 (33.7%)	130 (66.3%)	196 (100.0%)	1.4	0.916

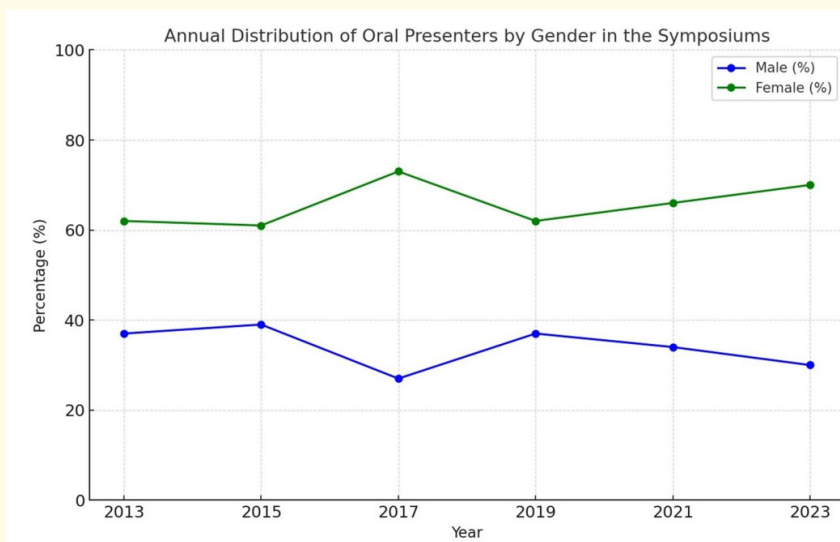


Figure 5: Annual Distribution of Oral Presenters by Gender in the Symposia.

Discussion

It is known that gender diversity in leadership positions and visible roles fosters innovation, increases quality, and strengthens decision-making processes [18-20]. This study is the first to examine the gender distribution among invited speakers and oral presenters at congresses and symposia organized by the Turkish Orthodontic Society. Since congresses and symposia are important events of the society, they were evaluated both together and separately. The findings point to the need for action to promote gender equality across scientific activities [21].

In our research, a statistically significant difference was found between the representation of female and male speakers at the events studied ($p < 0.05$). While men were significantly predominant in the invited speaker category, the opposite distribution was observed in the oral presentations (with women in the majority). One possible reason for this inequality could be that invited speakers are selected by the organizing committees. In other words, although female orthodontists value their academic development and are eager to give oral presentations, it appears that they do not find sufficient representation on the main stage as invited speakers.

These results identified in orthodontics are similar to trends reported in other fields of dentistry. For example, a study by Karadayı and Baştürk [9] in the field of endodontics revealed that among the invited speakers at the scientific congresses of three major endodontics organizations between 2013 and 2023, 84% were male and only 16% were female, and that there was no notable change in this ratio in the last decade. Similarly, a study in the field of prosthodontics found that in certain prosthodontics associations over the past 20 years, the proportion of female presidents remained only around 10% on average, and in some associations there were none at all [22]. This is an important indicator illustrating how underrepresented women are in leadership positions.

A similar situation exists in the field of academic publishing as well. In a study conducted in the field of prosthodontics, it was reported that only 12.5% of the editors-in-chief of the relevant

scientific journals were women [23]. This low proportion indicates that female researchers are not adequately represented in leadership positions in academic publications. Additionally, it has been noted that the vast majority of dental school deans worldwide are male. For example, 76% of dental school deans in the USA, 90% in the UK, 100% in Japan, and 97% in Germany are male [24]. These data reveal that gender imbalance in senior leadership positions continues in many health disciplines, including dentistry.

The imbalances observed in dentistry and in the scientific community in general are not unique to a single field but part of a broader systemic issue. The phenomenon that women's achievements are recognized less compared to men's is termed the "Matilda effect" in the literature [25]. This concept is defined as the lack of recognition for women scientists' discoveries and achievements to the extent they deserve, with these accomplishments often being credited to their male colleagues. en.wikipedia.org The Matilda effect highlights the systematic biases women face in science and health disciplines with regard to receiving awards and recognition.

In the specific case of orthodontics, the issue of women's work and achievements not being sufficiently visible continues. Indeed, when looking at the awards in orthodontic associations, it has been reported that the number of awards named after women is extremely low [10]. The fact that female orthodontists' successes receive fewer citations and less recognition indicates that the inequality in this field persists. These findings suggest that we can see traces of the Matilda effect in the orthodontic community as well.

The underrepresentation of women in leadership positions and as speakers at professional conferences is an ongoing problem in many disciplines of the medical and scientific world, not just in dentistry [26,27]. The elimination of this imbalance is critically important for creating a more equitable academic and professional environment. With increased diversity, different perspectives will be included in decision-making processes, innovative ideas will be encouraged, and equal opportunities will be provided for women's professional advancement. Understanding and addressing gender dynamics in academic environments is vitally important for creating a supportive and equitable learning environment, especially for young colleagues and students.

The data presented by this research can pave the way for taking concrete steps to promote gender equality within the Turkish Orthodontic Society and the orthodontic community in general. Increasing women's visibility in leadership roles and scientific events will provide strong role models for young women who aspire to pursue careers in orthodontics. Indeed, greater visibility of women in the field may encourage them to follow their professional goals with determination and contribute to the advancement of the orthodontic discipline.

Awareness and initiatives at the international level on this issue are also increasing. The American Dental Education Association (ADEA) appreciates the significant progress made by women in dental education in recent years and emphasizes the importance of increasing opportunities for women in global health, education, and research [28]. Similarly, researchers have called for urgent institutional changes to eliminate the systematic gender biases that hinder the advancement of women in science, medicine, and global health [21]. It has also been shown that increasing female representation on committees that organize scientific events can improve the gender balance among invited speakers. For example, it has been reported that for every 10% increase in the proportion of women on organizing committees of medical conferences, the proportion of invited speakers who are women increases by approximately 2.9% [29]. Findings like these demonstrate that achieving a more inclusive and balanced gender distribution in conference organization is both possible and an attainable goal.

One of the limitations of this study is the method of determining the gender of the speakers. Determining gender based on names and photographs can involve a margin of error, albeit a small one. For future similar research to be conducted more accurately, it would be beneficial for the society to include more detailed information in congress and symposium booklets, including participants' gender information.

Additionally, this research examined only the congresses and symposia organized by the Turkish Orthodontic Society. In the future, conducting more comprehensive studies that include dif-

ferent associations and a larger number of events could provide a more general and comparative perspective on gender representation in orthodontics. Similarly, examining the gender distribution of congress/symposium chairs or association presidents in the field of orthodontics would help in evaluating the male-female balance in leadership positions. Such large-scale studies would offer data-driven guidance for steps to be taken toward achieving gender equality in professional organizations and scientific events.

Conclusion

This study has demonstrated that female academics take on active and qualified roles in academic production; however, their achievements often fail to translate into visibility. In scientific meetings, equality must be ensured not only in participation but also in representation and decision-making positions. Otherwise, the imbalance in gender representation may adversely affect scientific diversity and inclusivity. Improving transparency in speaker selection processes and encouraging gender-balanced organizing committees may contribute to reducing this disparity. Furthermore, continuous monitoring of gender representation in professional events can guide institutions in developing more equitable and inclusive policies over time.

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