

Gender diversity in endodontics: Women's representation at recent biennial meetings

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Abstract

Aim: Leadership opportunities within professional fields often include invitations to speak at major organizational meetings. However, the representation of speakers from underrepresented groups at annual scientific meetings of endodontic organizations has yet to be documented. This observational study aimed to evaluate the percentage of women invited to speak at selected endodontic organization meetings.

Methodology: The number of male and female keynote or invited speakers at the European Society of Endodontology (ESE), Asian Pacific Endodontic Confederation (APEC), and International Federation of Endodontic Associations (IFEA) conferences from 2013 to 2023 were recorded. A chi-square test was conducted to assess differences in the percentage of women speakers over time and among the three organizations.

Results: A total of 714 keynote and invited speakers from the scientific meetings of the three endodontic organizations between 2013 and 2023 met the inclusion criteria. Of these, 601 (84.17%) were men, and 113 (15.83%) were women, reflecting a significant gender disparity ($p < 0.001$). No significant differences were observed between the organizations, nor was there a significant change in the number of women speakers over time.

Conclusions: Regardless of the organization or the timeframe, the number of women speakers at scientific meetings remains consistently lower than that of men, with no significant change observed over the past decade.

KEYWORDS

conferences, endodontics, gender, representation, women

INTRODUCTION

Leaders who serve as role models for underrepresented minorities in science significantly impact their fields by occupying diverse leadership positions (Pololi et al., 2010; Toledo et al., 2017). Such roles include academic positions like department chair or dean, executive roles,

and key opinion leadership (KOL) activities (Phasuk et al., 2021). One of the most underrepresented groups in academia is women, who continue to face significant challenges in achieving gender equity across various disciplines and leadership roles. According to the World Health Organization (WHO), gender refers to the socially constructed roles, behaviours, norms, and relationships

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associated with women, men, girls, and boys, which vary across societies and can change over time (World Health Organization, 2021). Gangwani and Kolokythas (2019) identified key barriers to women's advancement in leadership, including a lack of role models and mentorship, limited peer support, and systemic inequalities in executive selection processes. These challenges are exacerbated by implicit biases and negative stereotypes that disproportionately affect women (Gangwani et al., 2024), mirroring the struggles of other underrepresented minorities.

In endodontics, as in other scientific disciplines, leadership often involves public engagement through professional organizations. This includes roles in committee work, positions of responsibility, and speaking engagements at scientific conferences (Hill & Vaughan, 2013). Major global professional organizations host biennial conferences that provide valuable opportunities for individuals to establish and strengthen their leadership roles. These events offer platforms to build professional reputations through roles such as keynote speakers, committee members, and organizational leaders. For underrepresented groups, including women, taking the stage holds added significance. Their presence highlights personal accomplishments and inspires others from similar backgrounds to pursue leadership (Sukotjo et al., 2016).

Public exposure through speaking engagements elevates a speaker's status as a leader and expert, enhancing professional reputation and credibility (Martin, 2014). Invited speakers gain recognition in clinical, academic, administrative, educational or research domains, which fosters collaboration and opens doors to further opportunities (Hill & Vaughan, 2013; Martin, 2014). For underrepresented groups, visibility at such events serves as a motivator and a powerful example of what can be achieved (Sukotjo et al., 2016).

Women's involvement in academic, professional and administrative leadership is crucial for driving organizational success and contributing to societal progress (Eagly & Carli, 2009; Pololi et al., 2010; Toledo et al., 2017). Within dentistry, women leaders bring significant innovation to the field while also acting as powerful role models through their inclusive and forward-looking leadership styles (Gangwani & Kolokythas, 2019). Their presence in senior roles—whether as department heads, deans, or presidents of professional associations—plays a pivotal role in fostering diversity and inclusion within the profession (Hill & Vaughan, 2013; Martin, 2014; Phasuk et al., 2021). Research has shown that women often adopt democratic, collaborative and inclusive leadership approaches, which enhance team motivation, engagement and overall performance (Eagly & Carli, 2009).

The gender gap in leadership within dental medicine remains a significant health issue. It creates substantial

barriers by preventing talented professionals from advancing to higher academic positions. This also results in a lack of role models to inspire future generations (Bernardi et al., 2023; Heggie et al., 2021). This disparity not only hinders the progression of the profession but also impacts oral care programmes for the general population (Bernardi et al., 2023; Hay et al., 2019).

In fields such as academic medicine, science and engineering, women face limited speaking opportunities. This restricts their ability to present research, build networks and advance their careers (Buell et al., 2018; Masur, 2015). Persistent gender imbalances in speaker lineups reinforce stereotypes of male leadership, diminishing women's confidence in achieving leadership roles and discouraging them from pursuing scientific careers (Handelsman et al., 2005; Hill & Vaughan, 2013; Pain, 2014).

Despite these challenges, women constitute a growing proportion of dental professionals worldwide. According to Women Dentists Worldwide, over 60% of dentists in Europe are women (Phasuk et al., 2021). In 2019, Spain reported that 65% of its dental graduates were female, with similar trends in Germany, the United States of America (USA) and Canada (Adams, 2005; Hernández-Ruiz et al., 2022; Li et al., 2019). However, this increasing representation does not reflect the distribution of genders in active dental workforces or leadership positions (Hernández-Ruiz et al., 2022).

Given the critical role of role models in advancing women and underrepresented minorities into leadership, this study aims to evaluate and compare the representation of women as speakers at major endodontic meetings and assess changes over the past decade. The null hypothesis posits no significant differences in the number of male and female speakers over time.

MATERIALS AND METHODS

Study design

This study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines to ensure the clarity and transparency of its methodology (Vandenbroucke et al., 2014; von Elm et al., 2014; Figure 1).

Selection criteria

This study analysed three prominent endodontic organizations: the International Federation of Endodontic Associations (IFEA), the European Society of Endodontology (ESE), and the Asian Pacific Endodontic

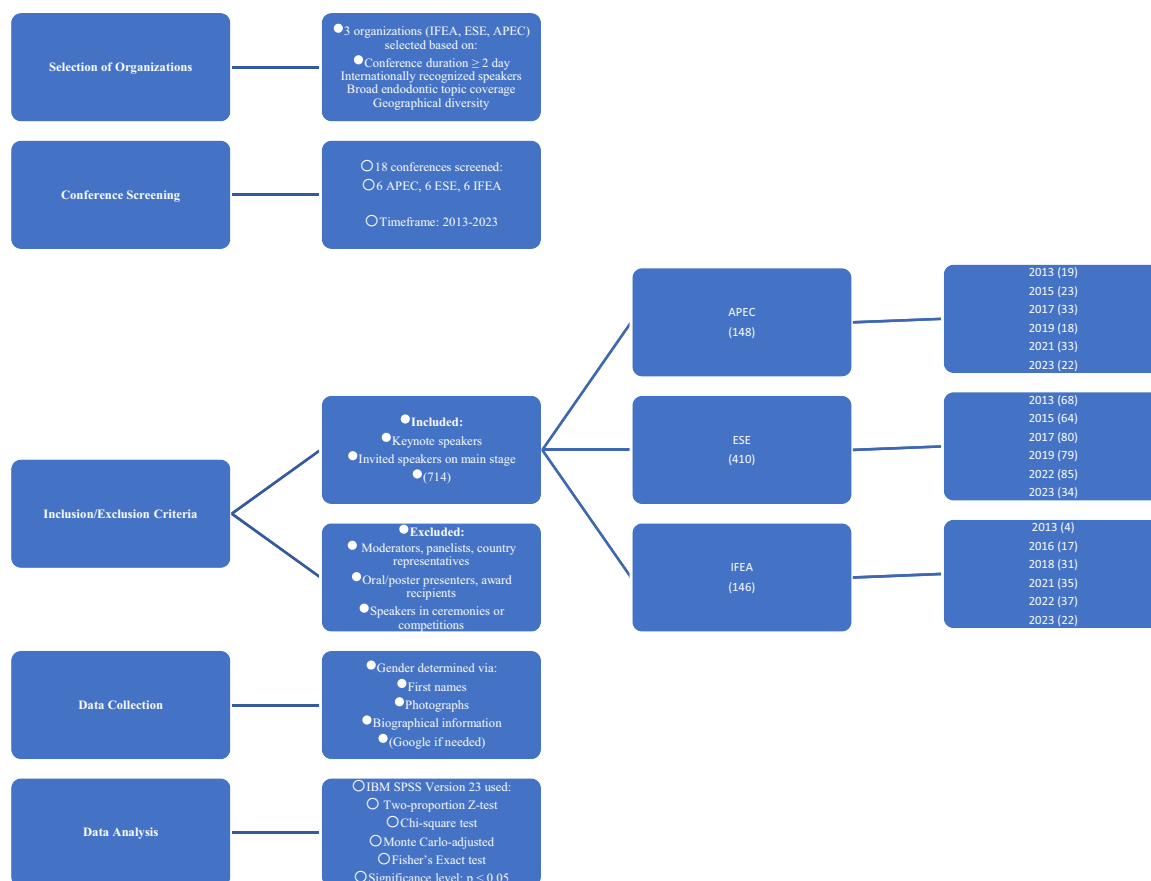


FIGURE 1 Study methodology flowchart.

Confederation (APEC). These organizations were selected due to their conferences meeting key criteria: spanning at least 2 days, featuring internationally recognized speakers, addressing a broad spectrum of endodontic topics, and representing diverse geographical regions.

Data collection

A total of 18 conferences were reviewed, comprising six hosted by the APEC, six by the ESE, and six by the IFEA. To examine recent trends in scientific meetings, the study focused on the ten-year period from 2013 to 2023. Only keynote and invited speakers who presented on the main stage were included in the analysis. Moderators and speakers who participated as panellists, country representatives, oral and poster presenters, or in award acceptance speeches, opening/closing ceremonies and competitions were excluded.

Gender identification

Gender identification was determined using speaker details from the scientific programs of each conference.

When a photograph of the speaker was available, their gender was recorded accordingly. In cases where no photograph was provided, gender identification was confirmed through biographical information obtained via Google searches.

Statistical analysis

Data analysis was performed using IBM SPSS version 23. A two-proportion Z-test was applied to compare the ratios of male to female speakers. Chi-square and Monte Carlo corrected Fisher's Exact tests were used to analyse gender distribution by year and across organizations. Statistical significance was set at $p < .05$.

RESULTS

Between 2013 and 2023, 714 speakers meeting the inclusion criteria were analysed from 18 scientific conferences organized by three major endodontic organizations: APEC, ESE, and IFEA. A significant gender disparity was observed over this 10-year period ($p < .001$). Of the 714

speakers, 601 (84.17%) were men, while 113 (15.83%) were women (Table 1).

The highest number of female speakers was recorded at the 2019 ESE Congress, with a total of 15 female speakers. However, the highest proportional representation of female speakers occurred at the 2023 ESE Congress, with women comprising 29% of the invited main-stage speakers. In contrast, the 2013 IFEA Congress did not feature any female main-stage invited speakers, marking the lowest proportional representation of women over the 10-year period.

No significant difference in gender distribution was observed across organizations ($p = 0.248$). The proportion of female speakers and male speakers is listed in Table 2.

No significant difference in gender distribution was observed across the years ($p = .052$). The proportion of female speakers varied over the decade (Table 3).

No significant difference in gender distribution by year was observed within the IFEA organization ($p = .085$). In 2013, the proportion of female speakers was 0%, which was the lowest of all organizations in all time frames (Table 4).

Similarly, no significant difference in gender distribution by year was found within the ESE organization ($p = .275$) and APEC ($p = .622$) organizations. The proportion of female speakers in ESE, APEC and IFEA organizations is listed in Table 4.

DISCUSSION

The null hypothesis, suggesting no significant difference in the number of male and female speakers at major endodontic conferences over time, was rejected. A notable

limitation of this study is the inability to accurately determine the global number of female endodontists, as not all are members of organizations like the European Society of Endodontology (ESE), the International Federation of Endodontic Associations (IFEA) or the Asian Pacific Endodontic Confederation (APEC). Moreover, due to the multinational composition of these organizations, specific data on the gender distribution of registered members was unavailable. If such data had been accessible, it would have allowed us to assess whether the number of female speakers at international conferences reflects equitable representation. In the absence of this data, we compared female representation over time and across organizations.

Another limitation of this study relates to the methods used for gender identification. The reliance on names and photos poses challenges, as names do not always clearly indicate gender, and images may be unclear or outdated. While biographical details were referenced to improve accuracy, they may also contain errors. These challenges underscore the need for more precise and standardized approaches in future studies to enhance both accuracy and inclusivity in professional settings.

This study examined the biennial conferences organized by APEC, ESE and IFEA from 2013 to 2023 to determine whether there has been a change in the trend of female representation over the past decade. The American Association of Endodontics' conferences were excluded from this study due to their annual schedule, unlike the biennial conferences of the organizations evaluated. Table 4 presents the years in which the congresses were held. Because the organizations held their conferences in different years, direct comparisons between the three organizations within the same year were not possible. Instead, trends for each organization were examined separately. The 2020 IFEA Congress was held online due to the COVID-19 pandemic, and the ESE Congress, originally scheduled for 2021, was held in 2022, making the ESE Congress annual instead of biennial. There was, however, no change in the schedule of the APEC congresses.

The average representation of female speakers across the evaluated years was only 15.8%. This result aligns with findings from other medical (Masur, 2015) and academic fields (Buell et al., 2018). A study revealed a

TABLE 1 Comparison of male and female speaker ratios over a 10-year period.

Gender	Frequency (n)	Percentage (%)	Test statistic	p^*
Male	601	85.4	37.55	<.001
Female	113	14.6		
Total	714			

*Two-proportion Z test.

TABLE 2 Gender distribution by organization.

Organization	IFEA	ESE	APEC	Total	Test statistic	p^*
Gender						
Male	126 (86.3%)	343 (83.7%)	132 (89.2%)	601 (85.4%)	2.791	.248
Female	20 (13.7%)	67 (16.3%)	16 (10.8%)	103 (14.6%)		

*Chi-square test, frequency (percentage).

significant gender imbalance among invited speakers at orthodontic events, with only 23% of speakers being female and 77% male. This pattern is consistent with findings from United Kingdom dental conferences, where just three events featured gender-balanced panels (Heggie et al., 2021). Furthermore, research by Piasecki et al. (2020) also found an underrepresentation of female speakers at major USA prosthodontic society meetings. Similarly, a study in Brazil by Martorell et al. (2021) showed gender balance varying across different dental specialties, with paediatric dentistry exhibiting no significant gender differences—aligning with our results. This study also noted that women are more commonly

found in paediatric specialties, whereas men tend to dominate fields like oral surgery and prosthodontics.

Our analysis showed no significant difference in gender distribution within each conference over the 10-year period ($p > .05$). Likewise, no significant difference was found when comparing the three organizations during the same period ($p > .05$). One possible reason for the underrepresentation of women at conferences is the limited diversity within editorial teams, which hampers women from joining editorial boards, particularly as editors-in-chief of dental journals (Lalloo, 2022). This dynamic perpetuates a cycle that obstructs the advancement of women's careers in academia. A similar cycle is evident in the speaker selection process for academic conferences, where gender imbalances within leadership positions exacerbate underrepresentation. Speaker selection typically falls to the scientific program committee, which identifies potential speakers based on the meeting's theme and evaluates their suitability. As Kongkiatkamon et al. (2010) note, leadership positions within these committees, especially the chair, are often occupied by men in the field of endodontics. After the committee compiles the list of proposed speakers, it is submitted to the governing body—such as an executive council or board of directors—for final review and approval (Piasecki et al., 2020). These recommendations are often accepted with minimal revisions (Piasecki et al., 2020). Thus, the speaker selection process involves two key stages: initial selection by the committee and final adjudication by the governing body.

TABLE 3 Gender distribution by year.

Year	Male	Female	Test statistic	p^*
2013	82 (90.1%)	9 (9.9%)	15.219	.052
2015	77 (88.5%)	10 (11.5%)		
2016	15 (88.2%)	2 (11.8%)		
2017	98 (86.7%)	15 (13.3%)		
2018	30 (96.8%)	1 (3.2%)		
2019	79 (81.4%)	18 (18.6%)		
2021	62 (91.2%)	6 (8.8%)		
2022	98 (80.3%)	24 (19.7%)		
2023	60 (76.9%)	18 (23.1%)		

*Monte Carlo corrected fisher's exact test, frequency (percentage).

TABLE 4 Gender distribution over time by organization.

Organization	Year	Male	Female	Test statistic	p
IFEA	2013	4 (100%)	0 (0%)	9.107	.085**
	2016	15 (88.2%)	2 (11.8%)		
	2018	30 (96.8%)	1 (3.2%)		
	2021	32 (91.4%)	3 (8.6%)		
	2022	27 (73%)	10 (27%)		
	2023	18 (81.8%)	4 (18.2%)		
ESE	2013	60 (88.2%)	8 (11.8%)	6.332	.275*
	2015	55 (85.9%)	9 (14.1%)		
	2017	69 (86.3%)	11 (13.8%)		
	2019	64 (81%)	15 (19%)		
	2022	71 (83.5%)	14 (16.5%)		
	2023	24 (70.6%)	10 (29.4%)		
APEC	2013	18 (94.7%)	1 (5.3%)	3.523	.622**
	2015	22 (95.7%)	1 (4.3%)		
	2017	29 (87.9%)	4 (12.1%)		
	2019	15 (83.3%)	3 (16.7%)		
	2021	30 (90.9%)	3 (9.1%)		
	2023	18 (81.8%)	4 (18.2%)		

*Chi-square test. **Monte Carlo corrected fisher's exact test, frequency (percentage).

Unfortunately, neither stage effectively addresses the underrepresentation of women, despite the moral imperative for action. Research indicates that leaders who prioritize equality are perceived as more prototypical and influential, regardless of their gender (Hardacre & Subašić, 2018).

Studies indicate that women in leadership roles within dentistry are less likely to be married or have children (Bompolaki et al., 2022; Cain et al., 2022; Fleming et al., 2022; Gangwani & Kolokythas, 2019; Garcia et al., 2022; Hernández-Ruiz et al., 2022; Li et al., 2019; Phasuk et al., 2021; Worthington et al., 2022). This situation creates apprehension among young women, who often feel they must choose between a career and family—a dilemma not similarly perceived by their male counterparts (Pallavi & Rajkumar, 2011). Moreover, existing family support policies and childcare assistance in the countries reviewed remain inadequate, making it challenging for women to balance professional responsibilities with home life. These factors collectively hinder the emergence of capable female leaders and contribute to the ongoing underrepresentation of women in the field (Bernardi et al., 2023).

The “meritocracy” argument, often used to justify this underrepresentation, claims that individuals are assigned positions based on abilities and achievements, suggesting fewer qualified women to invite (Scully, 2015). This reasoning perpetuates the false belief that women, if equally hardworking or productive, would naturally be included in speaker lineups. However, there is no scientific evidence to support the notion that men and women differ in intellectual abilities or work ethic (Meriac et al., 2009). This finding aligns with studies that observe gender balance in oral presentation panels but a significant imbalance among invited speakers, with a predominance of male speakers (Koletsis & Papadopoulou, 2022). These biases and stereotypes create multiple barriers for women, particularly when major endodontic organizations plan scientific conferences.

Several organizations have taken steps to support women's leadership in dental field. The Italian National Dental Association (ANDI) and the Italian Association of Dentistry (AIO) have addressed gender disparities (Bernardi et al., 2023), with the AIO hosting a 2022 conference focused on gender shifts in dentistry (FDI Aio International Congress, 2022). The American Association for Dental Research (AADR) and the International Association for Dental Research (IADR) have contributed through initiatives like the “Women in Science Network”, which emphasizes mentorship and recruitment (Ioannidou et al., 2014). Programs such as the American Dental Education Association (ADEA) Leadership Institute and Executive Leadership in Academic Medicine (ELAM) have provided women with the skills and opportunities needed to take

on leadership roles (ADA, 2013). The company Dentsply Sirona has supported women's empowerment in dentistry through (1) the introduction of an award (the Dentsply Sirona Smart Integration Award), (2) a program for female dentists to improve their skills as speakers and offer them the right opportunities (the Female Speaker Development Program), and (3) a forum where female dentists can network (the Dentsply Sirona Women) (Release Press, 2022). These initiatives share a common aim: to address gender inequities and create a more balanced academic environment. By focusing on mentorship, equitable policies and professional development, these organizations seek to enhance opportunities for women in dental field.

Change can be achieved through the implementation of either incentives or penalties (Phasuk et al., 2021). Incentives might include increased prestige, financial benefits, or growth in membership, encouraging organizations to prioritize gender diversity (Phasuk et al., 2021). On the other hand, penalties, such as fines for failing to meet diversity standards, reputational damage or the loss of members, could pressure organizations to take action (Phasuk et al., 2021). The absence of such mechanisms in the current system has contributed to the lack of substantial progress in addressing gender imbalances in leadership roles.

However, we believe that the lack of women in leadership positions and/or keynote speaker positions is not due to women's lacking skills as speakers, rather it is the lack of being offered the right opportunities. The available literature confirms, however, an extensive gender imbalance in the invited speakers at endodontic conferences. Our study also supports this perspective, highlighting a significant gender imbalance among invited speakers at endodontic conferences. Rather than resorting to palliative measures for addressing a fundamental and structural issue, organizations must propose more targeted and effective solutions. The first step is to clearly identify and address the problem. The second step is to develop and implement targeted solutions, such as policies promoting equal opportunities. Encouraging organizations to adopt inclusive policies and raising awareness of the benefits of diversity can enhance progress.

There is a growing need for greater awareness and proactive inclusion of underrepresented minorities, particularly women, as speakers at scientific conferences. It is essential that scientific program committees adopt strategies prioritizing inclusivity. Creating clear guidelines could equip committees to make meaningful progress, ensuring a more balanced representation of women and other underrepresented groups. A reasonable initial target would be to ensure the percentage of female speakers matches the proportion of women in the field, similar to a guideline recently suggested in mathematics (Martin, 2015). By implementing such steps, the profession can foster the

advancement of women into leadership roles and contribute to the broader goal of gender equity.

CONCLUSIONS

Based on the findings of this observational study, it was concluded that the number of female speakers at the selected scientific endodontic meetings is proportionally lower than that of male speakers, and there has been no significant change in the representation of female speakers over the past decade.

AUTHOR CONTRIBUTIONS

Concept: A.K., F.B.B.; Design: A.K., F.B.B.; Supervision: F.B.B.; Materials: A.K.; Data: A.K.; Analysis: A.K.; Literature search: A.K., F.B.B.; Writing: A.K.; Critical revision: F.B.B.

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest related to this research.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ETHICS STATEMENT

Ethical approval was not required for this study.

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