



## Evaluation of Otolaryngology Authorship Trends in the Laryngoscope Journal from 1995-2015

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### Abstract

**Objective:** To identify recent authorship trends in The Laryngoscope Journal since 1995.

**Materials and Methods:** A database was formed after analyzing articles published in The Laryngoscope in 1995, 2005, and 2015. The gender of first and last author, the origin of the corresponding author (North America, Europe, Far East, and Other), and the degree(s) of the first and last author were recorded. T-tests and ANOVA analysis were used to establish statistical significance.

**Results:** The 1,103 articles were evaluated from 1995, 2005, and 2015. The average number of authors per article increased by 47.8% ( $p < 0.01$ ). Female first authors increased from 31 of 202 (15%) to 125 of 460 (27%) from 1995 to 2015 ( $p < 0.01$ ), while senior author gender remained unchanged. For North America, Far East, and Other, there was a significant relative change in the number of papers published over time ( $p < 0.01$ ). With respect to first author, publications by physicians relatively decreased, while other degree combinations increased ( $p < 0.01$ ).

**Discussion:** In the past twenty years, The Laryngoscope has demonstrated an increase in the diversity of gender, country of origin, and degree of first authors. Not only are more females publishing, but a greater number of students, post-doctoral and other graduate students, are contributing to literature in Otolaryngology. The first author gender shift may parallel the ten-fold increase in female Otolaryngologists reported from 1981 to 2009.

**Conclusion:** The Laryngoscope's authorship is increasingly diversifying with a larger number of first female authors and non-physician contributors. Regardless, there is an insignificant change in senior female authorship.

**Keywords:** Authorship; The Laryngoscope; Female; Otolaryngology; Research

### Introduction

Research is a highly regarded element of medical school, residency, and fellowship applications [1]. This factor is particularly true for competitive residencies like Otolaryngology, Dermatology, Plastic Surgery, Orthopedic Surgery, and Ophthalmology. Inclusion as an author in any position is favorable, however first and last author positions hold the highest value and greatest prestige in medical literature [1]. The first and last authors often contribute the most to the paper. The last author, usually the senior author, is credited with overseeing the project and typically with generating the project idea.

The U.S remains the largest contributor of research to Otolaryngology literature; however, studies show an increase in publications from Europe, and in particular, the United Kingdom (U.K) [2]. Gender discrepancies in publishing are global issues that have been focused on recently. A study in 2008 compared four journals in Otolaryngology and found a substantial rise in female first authors from 1978 to 2008 (12.9% to 21.3%) [3]. This study did not comment on the gender of senior authors. Regardless, gender and country of origin are two variables that can be examined to achieve a larger consensus in Otolaryngology authorship.

The Laryngoscope was started in 1896 by Dr. Max Aaron Goldstein and was purchased in 1984 by the Triological Society. The Laryngoscope is a world renowned Otolaryngology Journal publishing nearly 500 manuscripts annually on a wide array of topics in Otolaryngology from North American

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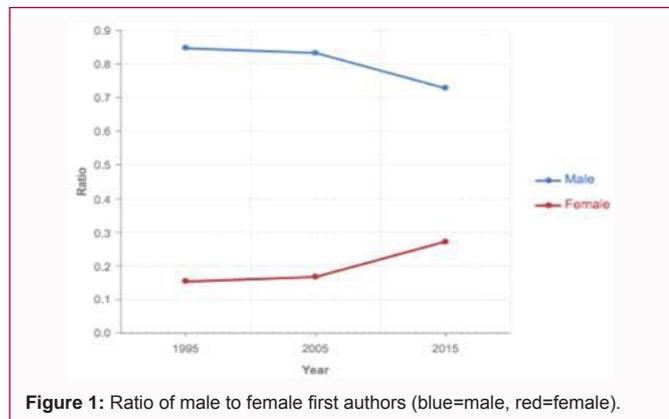
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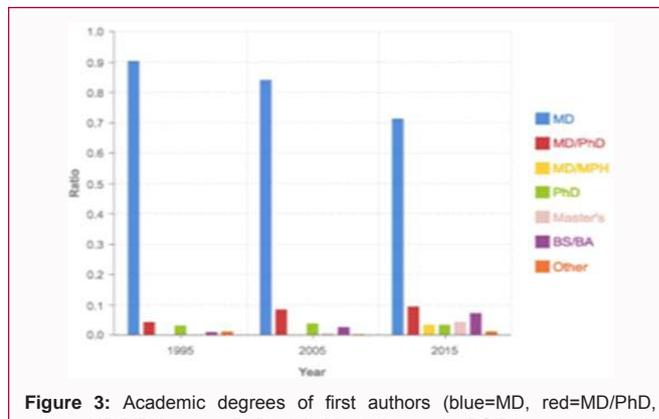
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**Table 1:** Changes in authorship from 1995 to 2015.

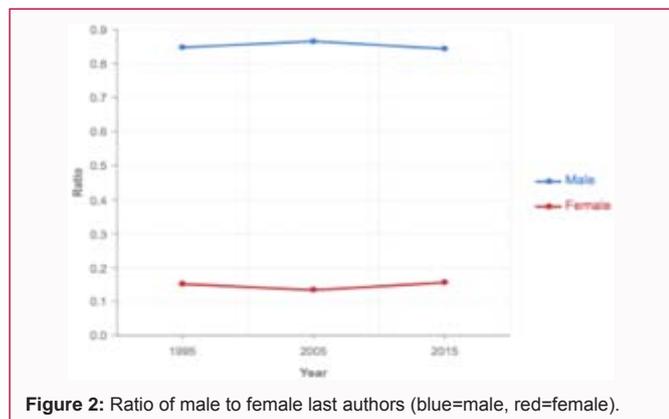
Year	# of Authors for manuscript	# of Female first authors	# of Male first authors	# of Female last authors	# of Male last authors
1995	3.7	31	171	27	151
2005	4.5	64	320	48	311
2015	5.4	125	335	70	378



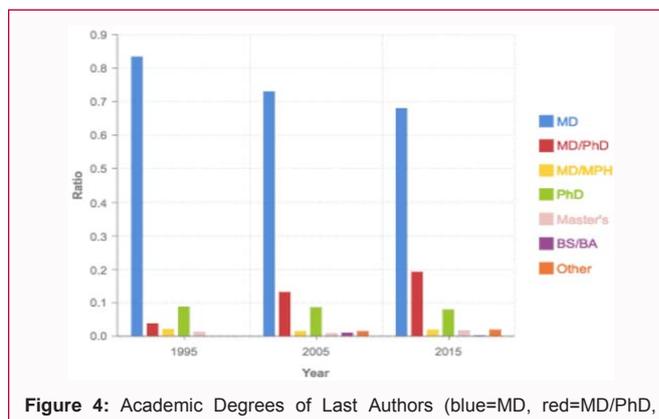
**Figure 1:** Ratio of male to female first authors (blue=male, red=female).



**Figure 3:** Academic degrees of first authors (blue=MD, red=MD/PhD, yellow=MD/MPH, green=PhD, pink=Master's, purple=BS/BA, orange=other).



**Figure 2:** Ratio of male to female last authors (blue=male, red=female).



**Figure 4:** Academic Degrees of Last Authors (blue=MD, red=MD/PhD, yellow=MD/MPH, green=PhD, pink=Master's, purple=BS/BA, orange=other).

and International investigators. Because an array of geographical areas is well represented, this Journal serves as an example of trends in Otolaryngology authorship [4]. We hypothesized that there would be an increase in first female authorship as seen in other studies [3] and that there would be an insignificant change in senior female authorship because fields like Plastic Surgery and Ophthalmology did not witness an increase [5,6]. We also believed that there would be a significant increase in global research output in countries other than the United States [2]. As for degree type of first and last authors, we anticipated a rise in non-physician first authors and an insignificant change in last authors' degree type. The main objective of this study was to analyze authorship trends in *The Laryngoscope*, over the course of twenty years in areas concerning gender, degree type, and country of origin.

### Materials and Methods

The authorship of Original Reports and Case Reports published in *The Laryngoscope* in 1995, 2005, and 2015 were recorded. These were included because of similar manuscripts that were also studying authorship trends [7]. Authorship of historical Classic Editorials, Best Practice Articles, How I Do It, Systematic Reviews, Letters to the Editor, and unpublished articles were not included in this analysis. The number of authors per article, gender, highest degree and geographic location at time of publication for the first and last

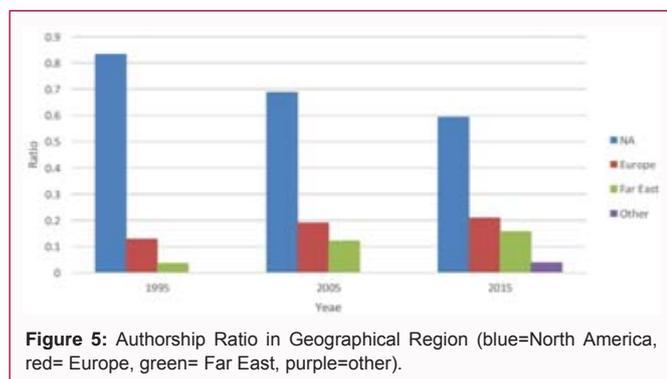
authors were collected. Potential gender disparity was resolved with a Google-based search engine. The database uses name-sex patterns to determine gender [8]. This program has been used in previous manuscripts that analyze authorship trends in Ophthalmology [6]. Degrees were classified as MD, MD/PhD, PhD, Masters, BS or BA, MD/MPH, and Other. Non-US degrees were changed to U.S equivalents. Geographic designations were categorized as: North America, Europe, the Far East, and Other.

The data was analyzed using SPSS 23 software (IBM SPSS Inc., Chicago, IL. USA). Chi square tests were performed to determine significance in authorship trends. A one-way ANOVA was performed to find the difference in the number of authors.

### Results

There were significant authorship changes between 1995 and 2015 (Table 1) that were not evident between 1995 and 2005 or between 2005 and 2015. Authorship of 862 articles in the 1995 and 2015 volumes was analyzed. The mean number of authors per article increased from 3.7 in 1995 to 5.4 in 2015 ( $p < 0.01$ ). The number of manuscripts published per Journal doubled from 222 in 1995 to 460 in 2015.

The increase in the number of manuscripts per volume resulted in



**Figure 5:** Authorship Ratio in Geographical Region (blue=North America, red= Europe, green= Far East, purple=other).

an increase in both male and female first authors from 1995 to 2005 (Figure 1). However, there was a four-fold increase in female first authors compared to a two-fold increase in male first authors (31 to 125 vs. 171 to 335 respectively,  $p < 0.01$ ). When looking at percentages, female first authorship increased from 1995 to 2015 by 11.9% (15.3% vs. 27.2%,  $p < 0.01$ ). The ratio of last authorship position for female and male authors remained relatively unchanged in the selected twenty years (27 to 70 vs. 151 to 378 respectively,  $p > 0.05$ ) (Figure 2).

There was a relative increase in degrees for first authors with a MD/PhD, PhD, Master's, or MD/MPH (Figure 3). First authors who had a degree that was considered "Other" did not change significantly. Within the data, 97% of first authors in 1995 had a MD degree, and by 2015, this decreased to 84% of first authors ( $p < 0.01$ ). 90.3% of first authors had an isolated MD degree, and 4.4% had an MD with another degree (PhD or MPH) in 1995. In 2015, 71.4% of first authors had an isolated MD degree, and 12.7% of first author physicians had either a MPH or PhD ( $p < 0.01$ ). For the last authorship position, the categories were largely unchanged with the exception of the last authorship for authors with both their MD and PhD (4% on 1995 vs. 19.3% in 2015,  $p < 0.01$ ) (Figure 4).

There were significant changes in the geographic origin of the publishing institutions. A relative decline of North American contributors from 83.3% in 1995 to 59.3% was observed ( $p < 0.01$ ) (Figure 5). While in the Far East, there was a significant increase from 3.6% in 1995 to 15.7% in 2015 ( $p < 0.01$ ). The Other category also increased from no contributions in 1995, to representing 4.1% of publications in 2015 ( $p < 0.01$ ). Unfortunately, the countries in the other category were not noted.

## Discussion

Many studies have noted the gap in gender authorship in Surgical Specialty Journals. Other specialties, such as Internal Medicine, are demonstrating a marked rise in female authorship for first and senior authors [5]. Otolaryngology follows a similar trend when compared to other Surgical Specialties. In recent decades, there has been a rise in female Otolaryngology residents, which can explain the increase in female first authorship from 1995 to 2015. In 2005, only 21% of Otolaryngology residents in North America identified as being female, but in 2017, this rose to 34.3% [9-12]. An analysis in Otolaryngology literature found that in general, Plastics, Otolaryngology, Pediatric, and Head and Neck areas there was a paralleled rise in female non-physician first authors [3]. Despite the increase in female first authors, an increase in female senior authors was not observed. This is similar to other specialty Surgery fields such as Plastic Surgery [5]. This may reflect that these female first authors have not yet reached senior

author status or perhaps that they did not remain in the academic environment from which most literature arises [13]. Ophthalmology also has had more female first authors from 2002 to 2014, but an insignificant change in senior authors [6]. This significant finding of a plateau of female senior authorship in Otolaryngology has not been noted in recent manuscripts.

One of the possible reasons for a lack of current senior female authorship is the "dropout" rate of female Otolaryngologists. Female residents are more likely to want to leave their residency programs, and this persists during training. A ten year analysis of attrition rates for general surgeon residents found that more women left surgical training [14]. Although, female and male Head and Neck Surgeons are both equally likely to be married and have children, female Otolaryngologists are more likely to spend more time on home care/evening care, and be responsible for their respective sick children [7]. Another study found that female surgeons in general were reported to have less job satisfaction than their male counterparts [15]. This reduced job satisfaction can lead to more job turnovers.

Another reason for this trend of stagnant senior female authors is the overall lack of women in academia. Some reasons behind this have been proposed and include child care, lack of role model in their field, and less administrative support [5]. This overarching population size in academia may be due to the same proportion of female senior authors from 1995 to 2015. Future analyses may clarify the lack of increase in female senior authors.

Regardless of this plateau of female senior authorship, The Laryngoscope had a rise in authors per article and a two-fold increase in Journals from 1995 to 2015. The increase in authorship can possibly be attributed to the competitiveness of residency programs or a push for research during residency. In 2016, Otolaryngology resident applicants on average had 8.4 publications, abstracts, and/or presentations [16]. The 2016 national average of Internal Medicine residency applicants in comparison had 4.4 abstracts, presentations, and publications [17]. The unexpected increase in residency publications was explored at Harvard Medical School and the number of publications per resident increased from 1.2 in 1996 to 5.1 in 2013 [18].

First authors are still the most likely to have an MD than any other degree, but more first authors have a PhD, Master's, or just a BS/BA degree. Some medical students have achieved a PhD or Master's degree to be accepted into medical school. In 2015, the national average of matriculating applicants was 39% [19]. The rise in non-physician authors can be medical students who are trying to be competitive for residency, or even graduate and undergraduate students who are trying to be admitted into medical school. The other substantial rises consisted of the first and last author physicians who are obtaining either a PhD or an MPH. These degrees may have been tools in order to gain admission into residency as previously mentioned, or they could have been achieved during or after medical school. AAMC indicates that over 59% of medical schools offered a dual MD/MPH program in 2016, as opposed to 25% in 1992 [20]. As for the physicians with a PhD, a Dermatology study indicated that physician scientists, MD/PhDs, were 1.6 times more likely to go into academic medicine than traditional physicians [21]. This finding may explain the rise in MD/PhDs who are becoming more prominent in academia.

North America was the only region that proportionally decreased

in publications over twenty years. In general, all of the geographic regions naturally produced more publications in 2015. This trend in global publication increase may be attributed to the growth of health initiatives in low-income and middle-income countries that can strengthen the health systems [22]. Other countries are starting to notice the importance that research in regards to educating and benefiting not only the general public, but also inspiring future students to enter healthcare. A previous 2017 study in Otolaryngology also noted an increase in Otolaryngology Publications from Europe and specifically the U.K, Spain, and the Netherlands [2].

The trends noted here are only for The Laryngoscope Journal and may not be mirrored for other Otolaryngology Journals. There were some minor limitations to the study. For the geographical location, the selections were based upon the biographies of the corresponding first authors, which may not have been where the study was conducted. The name program that deciphered if the authors were male or female may not be accurate for gender neutral names; although this same software has been used in other studies. Future manuscripts on authorship could note the number of pages per each article. Since there has been an increase in volume, there perhaps may be a subsequent decrease in length of each article.

Gender is a pressing issue in the 21<sup>st</sup> century because of misbehaviors in the work place and the wage gap that is still noted in a few of the surgical fields [5]. Although there has been a staggering shift in the number of female first authors, the insignificant change in last authors demonstrates how gradual the gender changes are and how there are potentially certain stereotypes that remain in healthcare. Otolaryngology is progressing nevertheless and its influx in female residents hopefully will influence the future of surgical academia.

## Conclusion

Authorship trends in The Laryngoscope provide insight into the changing field of Otolaryngology. Over the course of twenty years, there has been a significant increase in the number of female and non-physician authors. Although there were not significant changes in female senior authorship, this is still an important finding due to the lack of prior analysis in this area in recent years. Otolaryngology is trending like other Surgical subspecialties, so there should be a universal push for publishing senior female authors.

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