Trends in Gender Representation over Five Decades of the Journal of Biomechanics

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Summary

The purpose of this study was to quantify the contribution of women to publications in the Journal of Biomechanics from 1970 to 2020. The number of papers published and number of authors of those papers increased over the 50 year assessment period. The contribution of women to these publications increased over the same period, but still falls short of equality. There are encouraging trends in the contributions of women to the biomechanics literature, but there is still room for improvement and opportunities to improve this should be explored.

Introduction

In STEM areas (science, technology, engineering and mathematics) the number of women in doctoral programs in the US has grown over the last few decades, but women are still in the minority [1]. Membership of biomechanics societies reflect this general trend, with for example in 2022 women comprised 39% of the ISB membership, compared with 19% in 1973 [2]. Engagement in science is reflected in many ways, one is the authorship of journal publications. Tracking the number of female authors contributing to publications in science is a useful measure of engagement.

It was the purpose of this study to quantify the contribution of women to publications in the Journal of Biomechanics from 1970 to 2020.

Methods

All research articles published in the Journal of Biomechanics for one year of each decade (1970, 1980, 1990, 2000, 2010, and 2020) were analyzed; the Journal of Biomechanics was first published in 1968. Two trained assessors determined the gender of the authors of the articles. Using a known dataset, the assessors were blind tested for their accuracy in assessing gender from first and last names, and did so with accuracy greater than 99%. In cases where the gender of an author was not apparent, or the two assessors differed the corresponding author was contacted. With this approach from a total of 1490 publications, the gender of authors was not identified in less than 2% of cases.

Results and Discussion

The number of research papers grew across the decades (Table 1). The number of authors per paper also grew. Similarly, this growth was observed in the number of women as authors of papers, but has not reached equality (Figure 1a). Women on papers as either first or last author has grown over the years analyzed (Figure 1b). In 2020, women as first or last author had higher percentages than women as authors (cf. Figure 1a with Figure 1b).

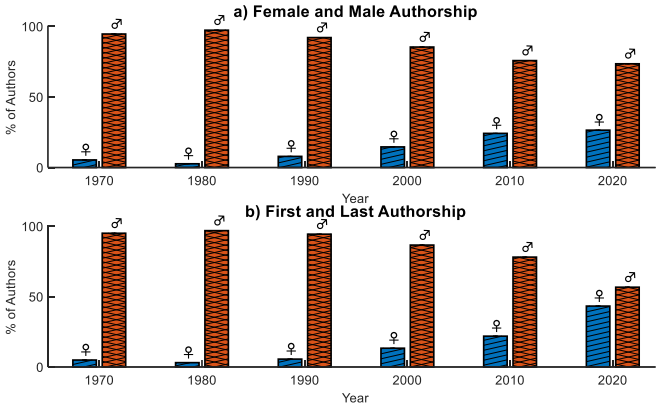

Figure 1: Authorship trends for the Journal of Biomechanics.

Diversity has many facets, of which the engagement of women is only one. Outside of equity, diversity of collaborators has the potential to enhance research [3]. The trends reported in this study are encouraging but indicate that there is still work to be done.

Conclusions

There are encouraging trends in the contributions of women to the biomechanics literature, but further efforts are still needed and opportunities to improve this should be explored.

References

[1] Okahana, H. and Zhou, E. (2019). *Graduate enrollment and degrees: 2008 to 2018*. Council of Graduate Schools.
[2] Steele, J.R. and Challis, J.H. (2023). *J. Biom.*, **152**: 111547.
[3] Freeman, R.B. and W. Huang (2014). *Nature*, **513**(7518): 305-305.

Table 1: Number of research papers and number of authors of those papers published in the Journal of Biomechanics over the last fifty years.

Year	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Number of Papers	49	113	133	215	479	501
Number of Authors per Paper	1.9 ± 1.0	2.3 ± 1.0	2.8 ± 1.3	3.3 ± 1.6	4.2 ± 1.9	4.6 ± 2.1