BMC Ophthalmology

MATTERS ARISING

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Responding to comments on "Astigmatism in Duane Retraction syndrome"

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Abstract

This response addresses readers' comments on our study published in BMC Ophthalmology, which analyzed astigmatic variations among Duane Retraction Syndrome (DRS) subtypes. We clarified that our retrospective study relied on clinical data rather than advanced imaging due to practical limitations. Differences in DRS subtype prevalence were attributed to our focus on patients requiring surgical intervention rather than general epidemiological patterns. Age-related refractive variations across different DRS subtypes were found to be statistically insignificant, confirming that age differences did not influence the observed refractive patterns. The potential paradoxical effects of co-contraction and palpebral fissure narrowing on corneal curvature are notable, as both factors can simultaneously influence corneal changes. However, co-contraction may have a more prominent effect on corneal curvature than palpebral fissure narrowing, leading to a tendency toward against-the-rule astigmatism. Data inconsistencies in Table 3 were corrected, and the omission of key symbols in formulas was acknowledged. The insights provided by readers underscore the need for future studies incorporating advanced diagnostics and corneal topographic data to achieve a deeper understanding of astigmatism in DRS.

Dear editor

We sincerely appreciate the insightful comments provided by the readers regarding our article, *"Astigmatism in Duane Retraction Syndrome,"* recently published in *BMC Ophthalmology* [1]. The feedback highlights several critical aspects of our study, and we are grateful for the opportunity to clarify our findings further and discuss the points raised.

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The readers have correctly pointed out that the classical Huber classification does not always correspond directly with EMG findings. We acknowledge that, although Huber's classification offers a practical clinical framework, modern imaging studies have uncovered more complex neural pathways [2, 3]. However, it is important to note that imaging and EMG are not routinely used in clinical practice to manage DRS cases, as their application is typically limited to research settings or highly specialized cases. As our study was retrospective in nature, we relied on the routine clinical methods and data available in patient records, which primarily included clinical evaluations and Huber's classification. Our study aimed to assess astigmatic variations among different DRS subtypes based on this classification. While this approach provides valuable insights, we recognize that incorporating advanced imaging techniques and EMG findings in future prospective studies could enhance the understanding of neural innervation patterns and their potential role in the development of astigmatism.

We appreciate the concern regarding the higher prevalence of type II DRS observed in our research compared to previous epidemiological studies. It is important to clarify that our study specifically focused on hospital records of patients diagnosed with various types of DRS who were candidates for surgical intervention. This represents a distinct subset of DRS cases and does not reflect the general population of individuals with DRS in the broader community. Therefore, while previous reports have suggested that type II DRS is the least common subtype among all DRS cases, these findings pertain to the overall epidemiological distribution of DRS in the general population and do not necessarily reflect the distribution of cases requiring surgical treatment [4–6]. Our study is limited to patients with DRS severe enough to warrant surgical intervention, which likely accounts for the higher prevalence of type II DRS observed in our study compared to the proportions reported in population-based studies. Similarly, a previous study by the authors, which included 691 patients with DRS who underwent surgery, also reported that type IV and type III were the least common subtypes among those requiring surgical intervention [7]. It is also important to note that the purpose of our study was not to report the prevalence of different DRS subtypes. As such, the observed distribution of DRS subtypes in our study should be interpreted with this specific context in mind rather than as a representation of the general epidemiological patterns of DRS.

The readers have pointed out that the observed myopic shift in different DRS subtypes could be influenced by age distribution within each group. In our study, the mean age of DRS patients in types I, II, and III was 17.5 ± 13.9, 20.2 ± 13.6, and 21.0 ± 12.1, respectively ($P = 0.162$). This lack of statistical significance confirms that the mean age of patients across the different groups did not vary significantly. Therefore, age differences cannot account for the observed refractive pattern.

We appreciate the discussion regarding the potential paradoxical effects of co-contraction and palpebral fissure narrowing on corneal curvature. As suggested, eyelid pressure has been shown to influence corneal topography in conditions such as congenital ptosis [8]. However, it should be noted that in patients with congenital ptosis or blepharophimosis, eyelid pressure is the only facor affecting corneal topography, but in DRS cases, co-contraction and palpebral fissure narrowing can affect at the same time corneal curvature. In DRS cases, co-contraction may affect corneal curvature more prominent than palpebral fissure narrowing, leading to a tendency toward ATR astigmatism. While our study primarily focused on refractive astigmatism, we acknowledge that corneal topographic data would provide a more comprehensive understanding of the tomographic changes involved.

We acknowledge the readers' observation regarding unexplained variations in the non-DRS eyes' refractive components. These variations could be due to inherent interocular differences, but we agree that further analysis is warranted to determine whether systemic factors or shared biomechanical influences contribute to these findings.

We appreciate the identification of data inconsistency in Table 3 regarding the minimum cylindrical power in the right eye of bilateral DRS cases. The correct minimum cylinder and spherical equivalent in the right eye were -3.00 and -1.50 diopters, with mean values of -0.94 ± 0.70 and 0.80 ± 1.28 diopters, respectively. Also, we sincerely appreciate the correction regarding the omission of the meridian symbol (α) in the J0 and J45 formulas.

We are grateful for the thoughtful critique and valuable insights provided by the readers. Their comments contribute to refining the understanding of astigmatism in DRS and highlight more areas for future research. We hope our response clarifies the points raised and encourages further discussion.

Abbreviations

DRS	Duane Retraction Syndrome
ATR	Against-the-rule
EMG	Electromyography

Acknowledgements
Not applicable.

Author contributions
MK conceived the study, collected and analyzed the data, and drafted the manuscript. MA and BM contributed to the study design and data collection, and provided critical reviews and revisions of the manuscript. HM also collected and analyzed the data and contributed to the manuscript drafting. KD offered critical reviews and revisions, as well as assistance in data analysis. AM provided additional critical reviews and revisions of the manuscript.

Funding
This research did not receive any specific funding from public, commercial, or not-for-profit agencies.

Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The original study was conducted in compliance with the Declaration of Helsinki. The study protocol was rigorously reviewed and approved by the Institutional Review Board of Tehran University of Medical Sciences, ensuring conformity with ethical standards and guidelines.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Disclosure

There is no financial interest for the authors in any methods or materials mentioned in this article.

Received: 20 February 2025 / Accepted: 27 February 2025
Published online: 12 March 2025

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