

BOTULINUM TOXIN TYPE A (BONT-A) FOR THE TREATMENT OF VISUAL PHOTOSENSITIVITY AFTER TRAUMATIC BRAIN INJURY

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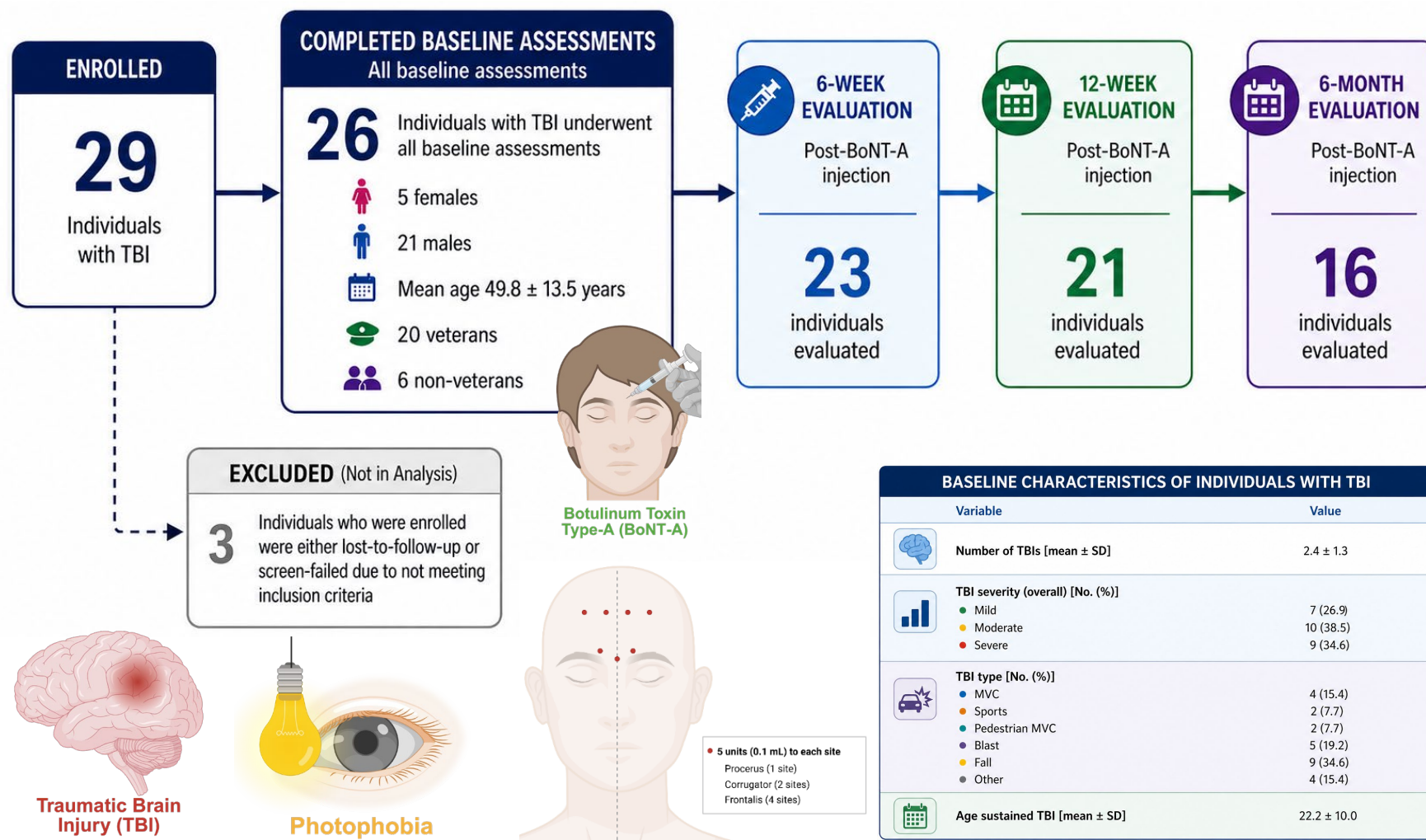
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INTRODUCTION

- Photophobia is a common and often debilitating symptom in individuals with traumatic brain injury (TBI), with limited effective treatment options currently available.
- This study aims to examine the therapeutic potential of Botulinum Toxin Type A (BoNT-A) for reducing photophobia by evaluating changes in symptom severity using a multimodal assessment approach integrating patient-reported outcomes with the Ocular Photosensitivity Analyzer (OPA).

METHODS

- Participants with a history of TBI completed two baseline assessments, followed by evaluations at 6 and 12 weeks after BoNT-A administration. Each participant received 35 units of BoNT-A, delivered as 5-unit injections across seven sites on the forehead.
- Photophobia was assessed using a Numerical Rating Scale (NRS; 0–10) capturing average and worst visual light sensitivity (VLS) over the prior week, as well as the Visual Light Sensitivity Questionnaire (VLSQ-8; range 8 – 40), with higher scores reflecting greater symptom severity. Visual photosensitivity thresholds (VPTs) were obtained using the OPA, where participants indicate at which light stimuli became uncomfortable; with lower values indicating greater visual photosensitivity.



RESULTS

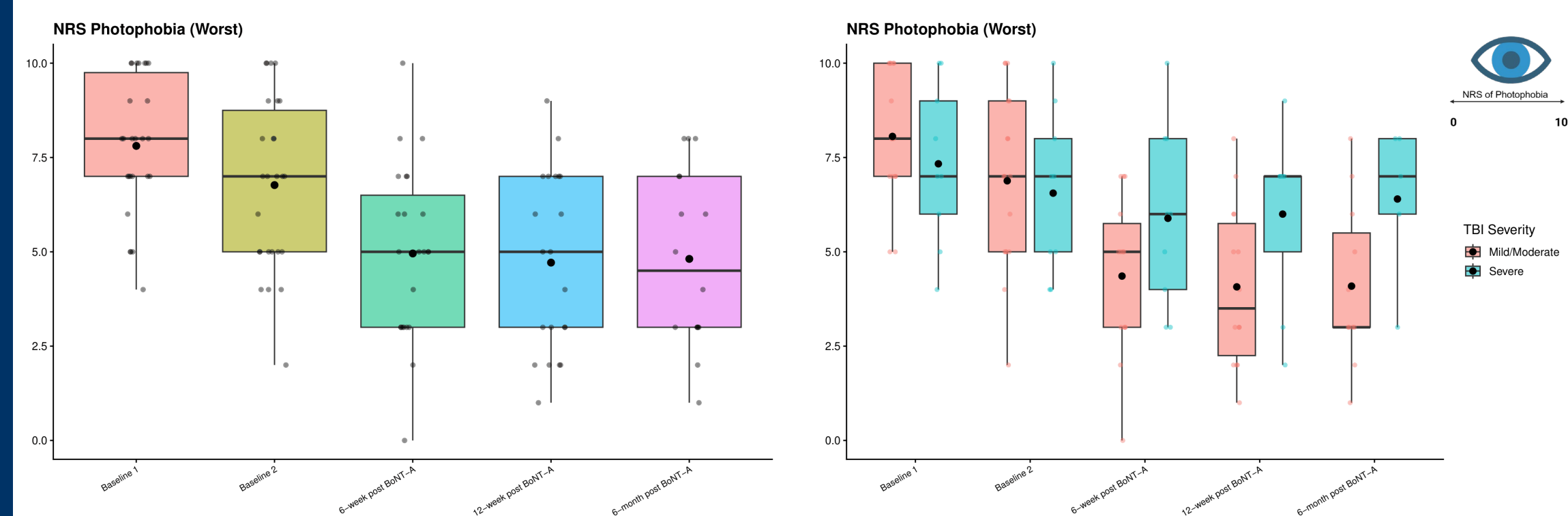


Figure 1. Numeric Rating Scale (NRS) Worst Photophobia score during the past week across study visits. Box-and-whisker plots show the distribution of NRS scores at baseline (Visit #1 and Visit #4), 6 weeks (Visit #6), 12 weeks (Visit #7), and 6 months (Visit #8) following BoNT-A treatment. Lower NRS scores indicate reduced symptoms, with scores decreasing over time after BoNT-A treatment.

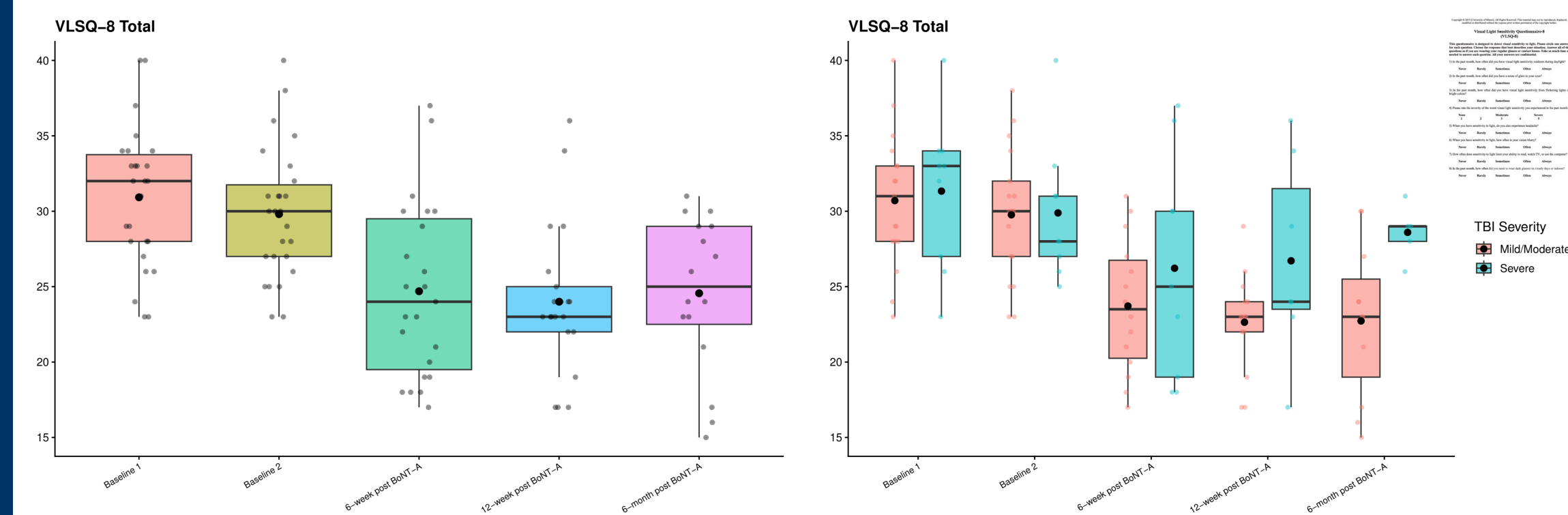


Figure 2. Visual Light Sensitivity Questionnaire (VLSQ-8) total score across study visits. Box-and-whisker plots show the distribution of VLSQ-8 total scores at baseline (Visit #1 and Visit #4), 6 weeks (Visit #6), 12 weeks (Visit #7), and 6 months (Visit #8) following BoNT-A treatment. Lower VLSQ-8 scores indicate reduced visual light sensitivity symptoms, with scores decreasing over time after BoNT-A treatment.

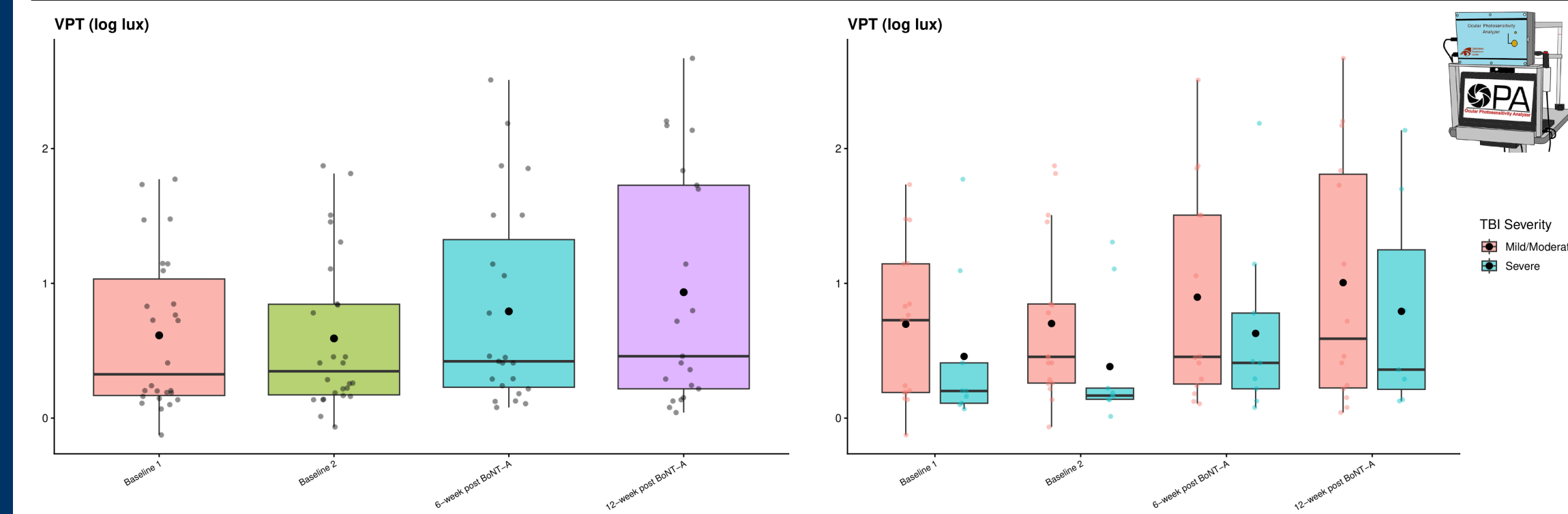


Figure 3. Visual Photosensitivity Threshold (VPT) across study visits. Box-and-whisker plots show the distribution of VPT (log lux) at baseline (Visit #1 and Visit #4), 6 weeks (Visit #6), 12 weeks (Visit #7), and 6 months (Visit #8) following BoNT-A treatment. Higher VPT values indicate reduced visual photosensitivity, with VPT increasing over time after BoNT-A treatment.

CONCLUSION

- BoNT-A treatment was associated with reductions in photophobia severity in individuals with TBI.
- Improvements were observed across patient-reported outcomes, including the NRS for worst photophobia and the VLSQ-8.
- Increased VPT values following treatment suggest reduced light-evoked discomfort.
- These findings suggest that BoNT-A may be a promising therapeutic option for individuals with persistent post-TBI photophobia.
- Larger, randomized controlled trials are warranted to further evaluate the safety, efficacy, and durability of BoNT-A for post-TBI photophobia.

ACKNOWLEDGEMENTS

Support: Department of Defense (DOD) Vision Research Program HT9425-23-1-0608 (Drs. Galor, Felix, Moulton).

Other Support: DOD Vision Research Program W81XWH-20-1-0820 (Drs. Galor, Felix), Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development, Clinical Sciences R&D (CSR) I01 CX002015 (Drs. Galor, Felix, Moulton), Biomedical Laboratory R&D (BLRD) Service I01 BX004893 (Dr. Galor), Rehabilitation R&D (RRD) I21 RX003883 (Drs. Felix, Galor), DOD Gulf War Illness Research Program (GWIRP) W81XWH-20-1-0579 (Dr. Galor), NIH NEI U01 EY034686 (Drs. Moulton, Galor, Felix), R01EY026174 (Dr. Galor), R61EY032468 (Dr. Galor); Research to Prevent Blindness Unrestricted Grant GR004596-1 (institutional), the Beauty of Sight Foundation, donation from: Dr. Harry W. Flynn Jr., and the Henri and Flore Lesieur Foundation.

This work is dedicated to our late mentor, Dr. Jean-Marie Parel, whose guidance and commitment to scientific rigor continues to influence our research efforts.

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DISCLOSURE

- Dr. Mariela C. Aguilar, Dr. Alex Gonzalez, and Mr. Cornelis Rowaan are co-inventors of intellectual property that is utilized in the study.
- The University of Miami also stands to gain royalties from the commercialization of the intellectual property.