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INTRODUCTION

- In the United States approximately 3 million people suffer from TBI annually (McMahon et. al, 2014)
- Vision problems are self-reported in 75% of TBI patients across severity levels despite normal best corrected visual acuity (BCVA) and fundus exam (Goodrich et. al, 2013)
- We previously detected differences in retina thickness, ocular motor function, and visual evoked potential between controls and individuals who incurred a mTBI on average 7 years prior.(Rasdall et. al, 2024)

OBJECTIVE

The goal of this study is to validate a visual assessment battery for detection of mild traumatic brain injury (mTBI)

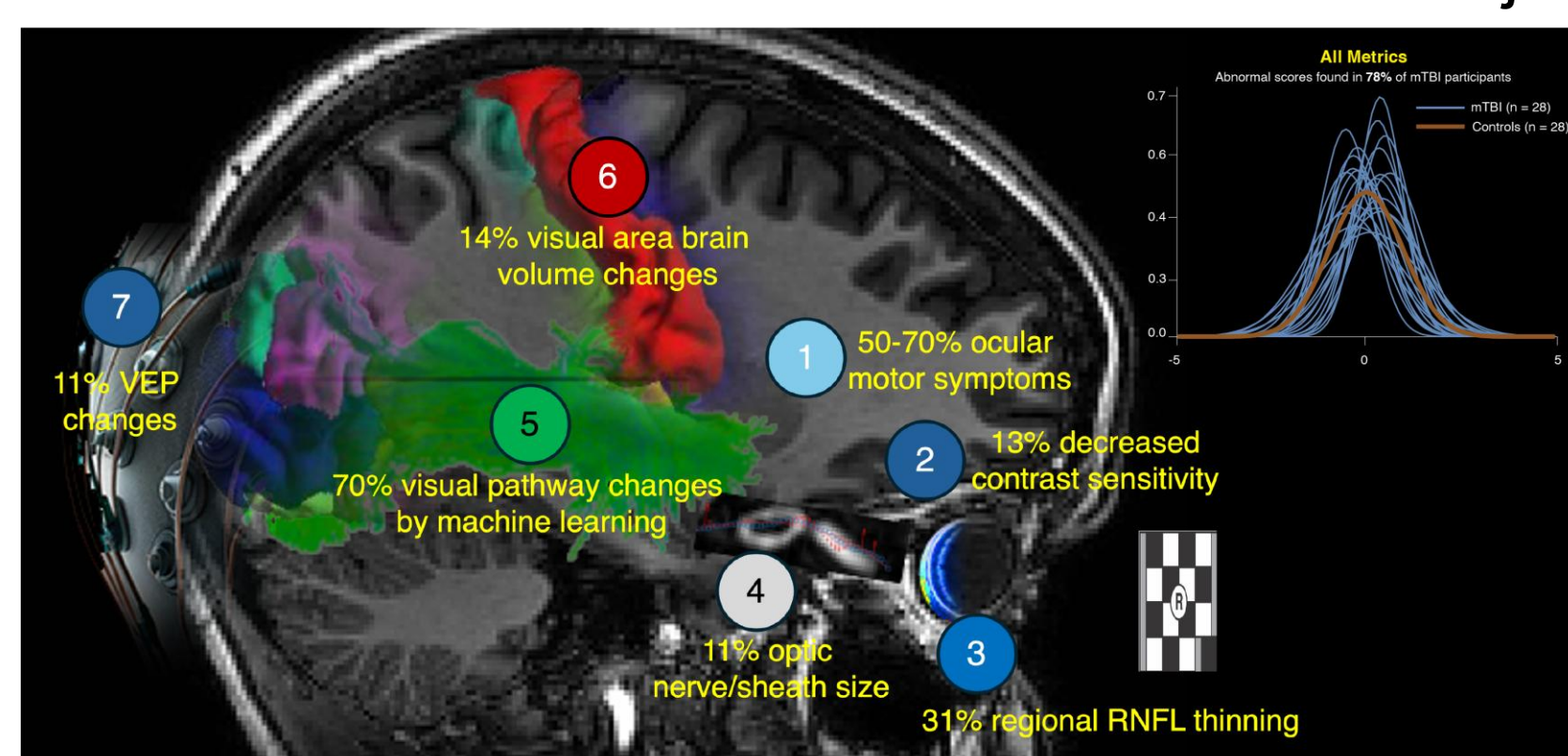


Figure 1. 78% of participants with mTBI were identified as having abnormal findings in our previous study (Rasdall et. al, 2024)

METHODS

- Participants underwent an assessment session during which multiple metrics were measured.

Demographics	Control	TBI
Participants	14	14
Female	6	9
Male	8	5
Mean age (years)	35	40
Median time since injury	N/A	12.7

- Inclusion criteria:** Males and females 18 years of age and older with a documented history of mild TBI (GCS 13-15). Controls have no history of TBI based on the BISQ.
- Exclusion criteria:** History of ocular, neurological, or psychiatric disease; severe TBI (GCS <13); recent head trauma (within 3 months); metallic implants; age younger than 18 years; and pregnancy.
- Screening involved BCVA, color vision testing, intraocular pressure measurement, and dilated fundus examination.
- Study metrics included:
 - Neurobehavioral symptom inventory
 - Humphrey Visual Field
 - Contrast Sensitivity
 - Visual Evoked Potentials
 - Oculomotor Assessment
 - Orthoptic Assessment
 - Optical Coherence Tomography
 - Magnetic Resonance Imaging of visual cortical brain areas and optic nerve

RESULTS

1. Self-Reported Symptom and Injury Questionnaires

Neurobiobank Brain Injury Screening Questionnaire			
Mechanism of Injury	Percentage	Longest Unconscious Duration	
		Duration	n
Sports- related Impacts	27%	<1 min	4
Falls	23%	1-10 min	2
Motor vehicle accidents	17%	11-20 min	1
Military blast exposure	10%	1 hr-23 hrs	1
Domestic violence	10%	Unknown	2
Other	13%	No LOC reported	4

# of Unconscious Episodes	
Episodes	n
0	3
1	6
2	3
3	1
Unknown	2

Longest Confusion Duration	
Duration	n
>1 min	3
11-20 min	1
30-45 min	1
1 hr-23 hrs	2
1 day- 1 week	3
Unknown	3

# of Confusion Episodes	
Episodes	n
0	1
1	5
2	4
3	1
4	1
>5	2
Unknown	1

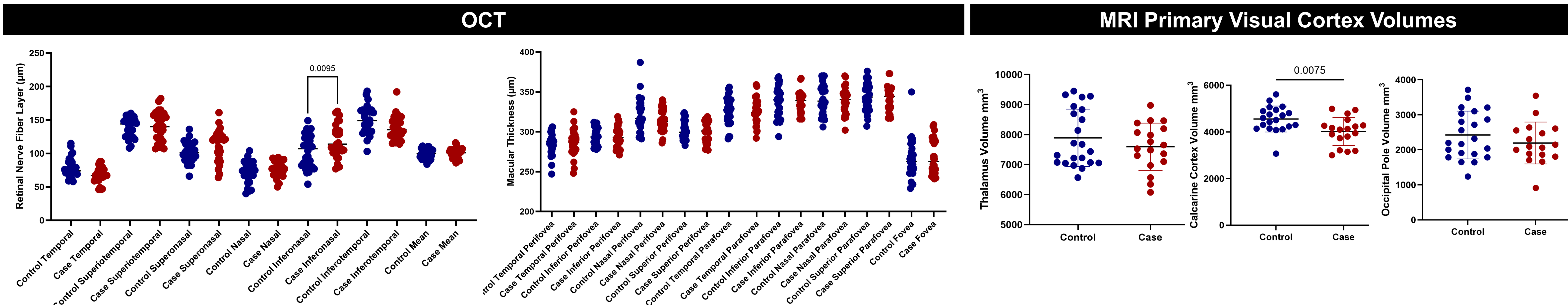
Mechanisms of injury include sports-related impacts (n=8), falls (n=7), motor vehicle accidents (n=5), military blast exposure (n=3), domestic violence (n=3) and other (n=4). 57% of participants report multiple injuries.

Neurobehavioral Symptom Inventory

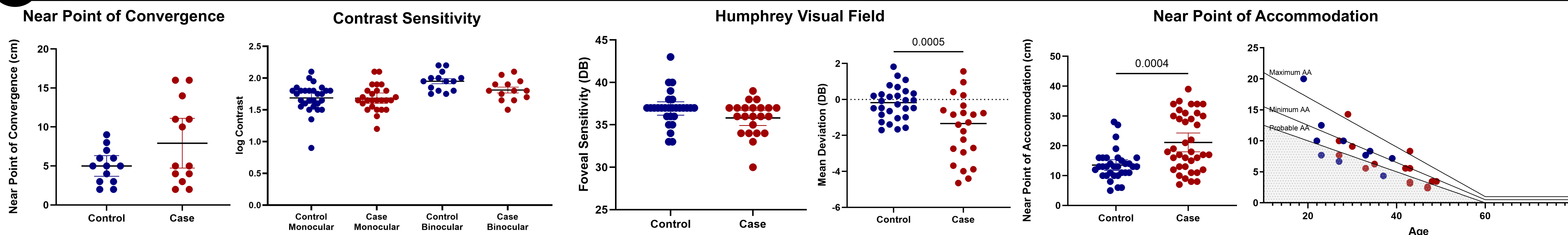
Domain	Mean Score (0-4)	SD
Cognitive	1.73	1.06
Somatic	1.37	0.91
Vestibular	1.13	0.86
Emotional	1.63	0.96

Symptom	Percent Severe/Very Severe
Sensitivity to Light	28.6%
Vision problems, blurring, trouble seeing	14.3%
Cognitive Difficulties (Poor concentration forgetfulness, difficulty making decisions etc.)	42.9%

2. Structural Differences



3. Functional Assessments



Summary

We are approximately halfway through our recruitment goals and expect that continued enrollment will further validate and refine the diagnostic utility of this approach.

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