

Oculomotor dysfunctions among Israeli Defense Force soldiers admitted to an inpatient rehabilitation unit for polytrauma: the impact of co-occurring traumatic brain injury



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Purpose

This prospective observational study of Israeli Defense Force (IDF) soldiers admitted to an inpatient rehabilitation unit for (mostly blast) polytrauma examined the prevalence and phenotype of oculomotor dysfunction and the impact of co-occurring traumatic brain injury (TBI).

Methods

Optometric Evaluation



Neurological Evaluation



<b>Convergence Insufficiency</b> First criterion and one other: -Exophoria at near: 4Δ greater exophoria than at distance - NPC break ≥ 6cm -Positive fusional convergence≤ 15Δ break -Vergence facility (D or N) (3ΔBI/12ΔBO) ≤ 9cpm with difficulty fusing BO	<b>Fusional Vergence Dysfunction</b> , Either criterion is met -Positive fusional vergence ≤ 15Δ break, and negative fusional vergence < 8Δ break -Vergence facility (D or N) ((3ΔBI/12ΔBO) ≤ 9cpm with difficulty fusing BO AND BI	<b>Accommodative Infacility</b> Met with OD: Accommodative facility≤ 6cpm (difficulty with both +2D and -2 D lenses)
<b>Convergence Deficit</b> First criterion and one other: -NPC break ≥ 6cm -Positive fusional verge -Vergence facility (D or N) (3ΔBI/12ΔBO) ≤ 9cpm with difficulty fusing BO nce≤ 15Δ break	<b>Accommodative Insufficiency</b> , First criterion or second criterion -Accommodative amplitude More than 2D less than <15-1/4 age -Accommodative facility≤ 6cpm (difficulty with minus lenses)	<b>Accommodative Excess</b> , Met with OD Accommodative facility≤ 6cpm (difficulty with +2D)
<b>Convergence Excess</b> , First criterion and one other must be met -Esophoria at near≥3Δ -Negative fusional vergence< 8Δ break -Vergence facility (D or N) (3ΔBI/12ΔBO) ≤ 9cpm; difficulty fusing BI prism		

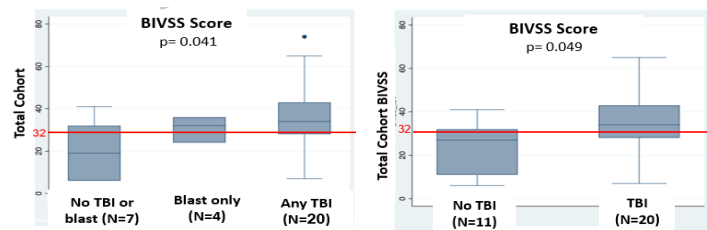
<sup>b</sup>Participants did not have exophoria greater at near than at far;  
Δ = prism diopter; BI = base-in; BO =base-out; cpm = cycles per minute; D = diopters

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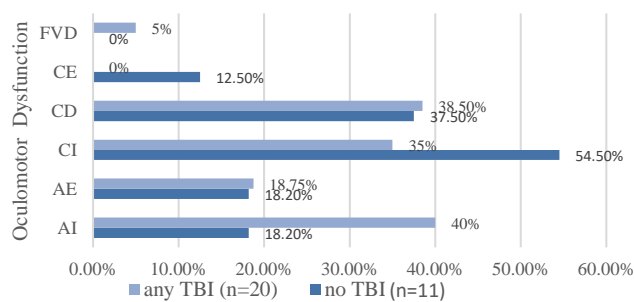
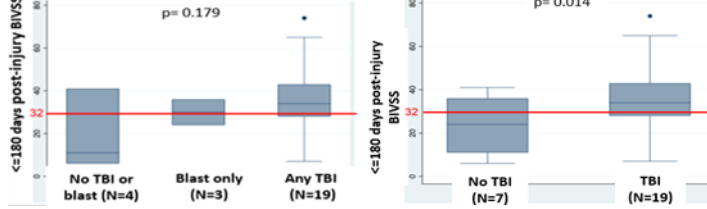
Results

Demographic outcomes	Total Cohort N=31	No blast or TBI N=7	Blast Only N=4	Any TBI N=20
Mean Age ± SD [Age Range]	25±7 [19-43]	22±3 [19-43]	22±3 [20-30]	26±8 [19-43]
Mean BIVSS Score ± SD [BIVSS Score Range]	33±16 [6-74]	24±13 [6-41]	31±6 [24-36]	37±16 [7-74]
Mean Days Since Injury ± SD [Range]	91±81 [17-300]	127±104 [25-300]	96.5±71 [25-191]	71±57 [17-212]
Mean Randot Stereopsis ± SD [Range]	97.6±189 [10-1000]	63±16 [40-100]	535±658 [70-1000]	24±13 [6-41]

Total Cohort BIVSS results (N=31)



Diagnosed ≤180 days (6 months) post injury (N=26)



Conclusions

- CI and CD common among entire cohort
- AI common among soldiers who were diagnosed with TBI
- Soldiers with TBI reported more symptoms compared with those who experienced blast without TBI
- Soldiers who experienced blast without TBI reported more symptoms compared to those who did not experience blast and without TBI