One-year test-retest reliability of baseline neurocognitive scores in Canadian university athletes

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Abstract

Baseline neurocognitive tests have been widely used in concussion management despite limited research examining the test-retest reliability with Canadian samples. The proposed study aimed to establish one-year test-retest reliability of the ImPACT in a sample of Canadian varsity athletes. Findings will guide best practices for baseline assessments in concussion management. 205 university athletes (26% female) were administered the Immediate Post-concussion Assessment and Cognitive Testing (ImPACT) battery on two occasions (testing interval Mdays = 363.7) as part of their preseason evaluation with the University of Windsor's Sport-related Concussion Centre. Athletes who had sustained a concussion in between assessments were not included. Intraclass correlations for the Visual Motor Composite (R = .84) demonstrated strong agreement, while the Verbal Memory (R = .61), Visual Memory (R = .68), and Reaction Time (R = .59) Composites, and the Symptom Score (R = .68) demonstrated moderate agreement. Results demonstrated moderate to strong agreement for one-year test-retest reliability of the ImPACT neurocognitive and symptom scores in a sample of Canadian varsity athletes. Consistent with previous research with child and adult samples, the Visual Motor Composite demonstrated the most reliable score across the one-year retest interval. Given the moderate to strong one-year test-retest reliability of the ImPACT, in the absence of more recent baseline data (i.e. from the past year), data from up to two years may be reliable for baseline comparison to post-injury evaluations in sport concussion management settings.

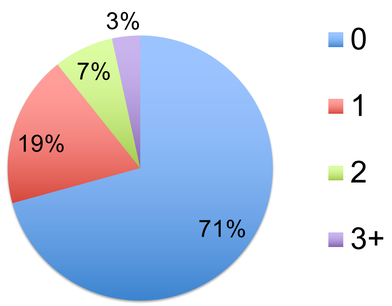
Introduction

- Baseline neurocognitive tests have been widely used in concussion management for varsity athletes[1] despite limited research examining the psychometric properties with Canadian samples.
- The present study aimed to establish one-year test-retest reliability of the ImPACT® in a sample of Canadian varsity athletes.

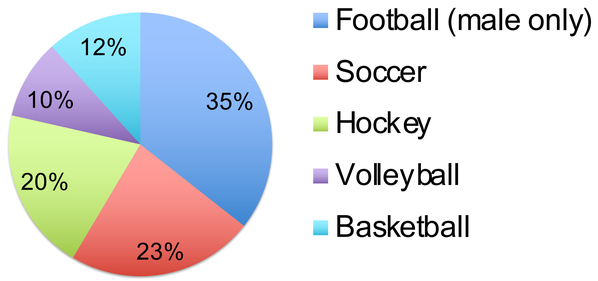
Method

- 205 university athletes (26% females) aged 17 to 25 years (*M*=19.5, *SD*=1.66) were administered the Immediate Post-concussion Assessment and Cognitive Testing (ImPACT®) battery[2] on two occasions (testing interval M_{days} = 363.7) as part of preseason evaluations.
- Athletes who sustained a concussion between assessments were excluded.

Prior Concussions



Sport Played



Results

- Visual Motor Speed demonstrated strong agreement and high precision based on the intra-class correlation coefficient and standard error of measurement.
- Verbal Memory, Visual Memory, and Reaction Time composites, as well as the Symptom Score demonstrated moderate agreement across one-year re-test interval.

ImPACT composites	*M(SD)*		Pearson's *r*	Intra-class Correlation		Paired t-test	
	Time 1	Time 2		*R*	*SEM*	*t*	*d*
Verbal Memory	85.1 (10.1)	87.9 (9.7)	**0.46****	**0.61**	4.7	-3.9**	0.28
Visual Memory	75.3 (12.7)	77.7 (13.1)	**0.52****	**0.68**	5.1	-2.7*	0.19
Visual Motor Speed	41.5 (6.5)	42.7 (6.4)	**0.74****	**0.84**	1.4	-3.6**	0.19
Reaction Time	0.58 (0.08)	0.57 (0.08)	**0.42****	**0.59**	0.04	0.66	0.13
Symptoms	5.7 (8.8)	5.2 (7.7)	**0.52****	**0.68**	3.3	0.93	0.06

*** $p < 0.01$ ** $p < 0.001$**

Conclusions

- Results demonstrated moderate to strong agreement for one-year test-retest reliability of the ImPACT neurocognitive and symptom scores in a sample of Canadian varsity athletes.
- Visual Motor Speed was demonstrated to be the most reliable score in this sample, which is consistent with previous reliability research of U.S. collegiate athletes[3] and youth[4] at the same re-test interval as well as with Canadian youth at a short interval[5].
- In the absence of more recent baseline assessments, data from up to two years may be acceptable for comparison to post-injury evaluations in sport concussion management given no other concussions have occurred since baseline data was collected.

References

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