

Characterizing Balance Impairment Following Acute Concussion In The General Population: A Cross-sectional Analysis

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Background

- Balance deficits and dizziness are common symptoms following concussion [1]
- Concussion literature has identified deficits using clinical, center-of-pressure (COP) and self-report measures of balance in **athletes**
- Poor agreement between self-reported and quantitative measures of balance in the athletic population [2]
- Little evidence exists on balance-related deficits following concussion in adults from the **general population**

COP allows for assessment of:

- Visual, vestibular and somatosensory contributions to balance [3]
- Quantification of reactive balance control, as represented by the high-frequency band [4]
- Dual-task trade off during cognitive and motor tasks [3]

Objectives

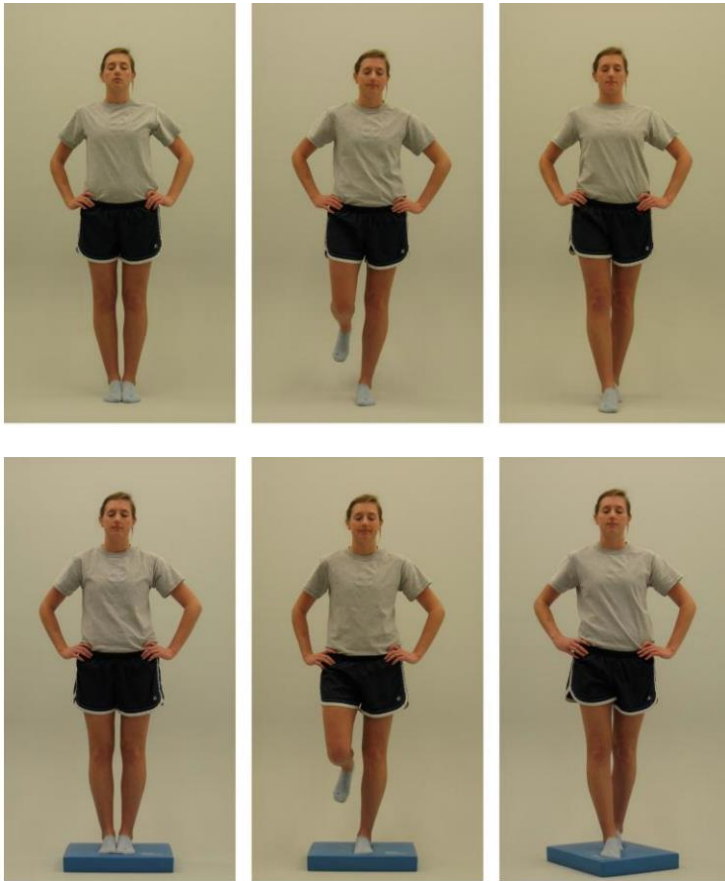
1. To characterize balance deficits following concussion in **adults from the general population** using self-reported, clinical and COP measures of balance within 1 week of concussion

2. To identify potential mechanisms that contribute to balance deficits following concussion including:

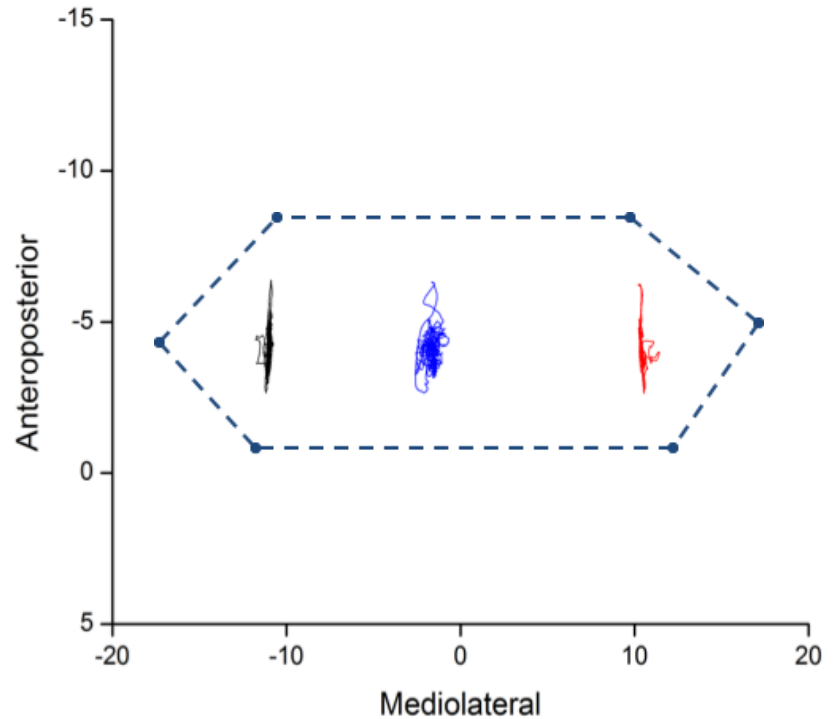


Study Design

Clinical [5]:



Center-Of-Pressure:



Variable		CONC	HC
		N=104	N=20
Sex (%)	Men	45%	40%
	Women	55%	60%
Age [Mean (SD)]		32.7 (11.8)	31.9 (10.1)
Years of Education		15 (2.4)	18 (1.4)
Dual Task [Mean (SD)]	Responses	12 (6.1)	16 (5.2)
	Errors	1 (1.3)	0.5 (0.7)
Days post-injury [Mean (SD)]		5.0 (1.7)	
SCAT3 [Median (Range)]	Total	37 (0-128)	
	Balance	1 (0-6)	
	Dizziness	1 (0-6)	

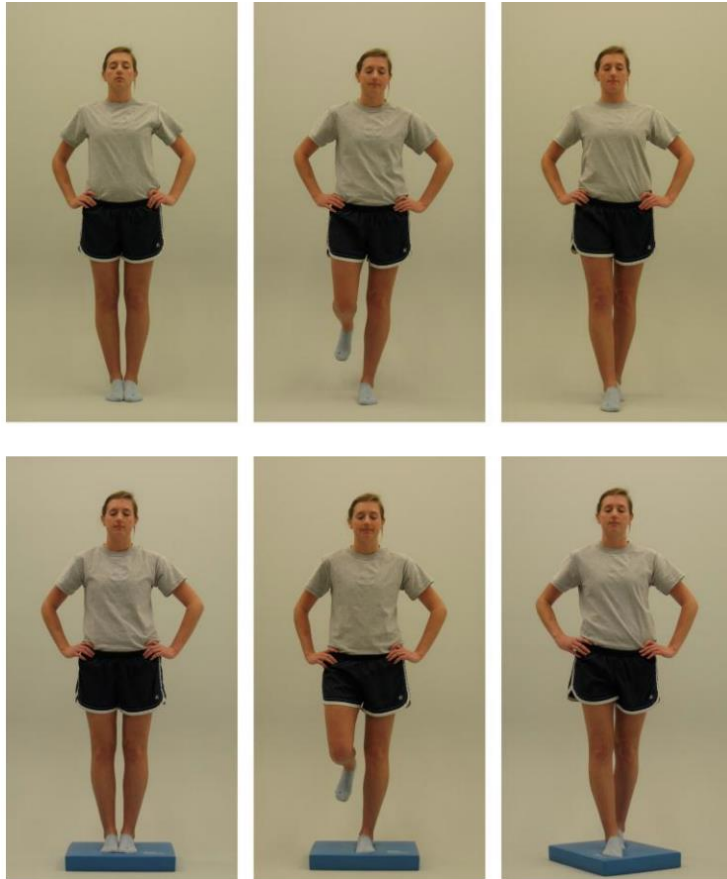
Results: Self-Reported Symptoms

Symptom	None	Mild	Moderate		Severe		
Balance Problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6

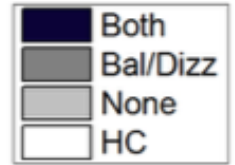
[6]

Variable	Both	Bal/Dizz	None	HC
	N=45	N=30	N=29	N=20
Sex (number (%))				
Men	19 (42%)	15 (50%)	13 (45%)	8 (40%)
Women	26 (58%)	15 (50%)	16 (55%)	12 (60%)
Age (years (SD))	32.0 (10.7)	31.3 (10.1)	36.0 (14.9)	31.9 (10.1)

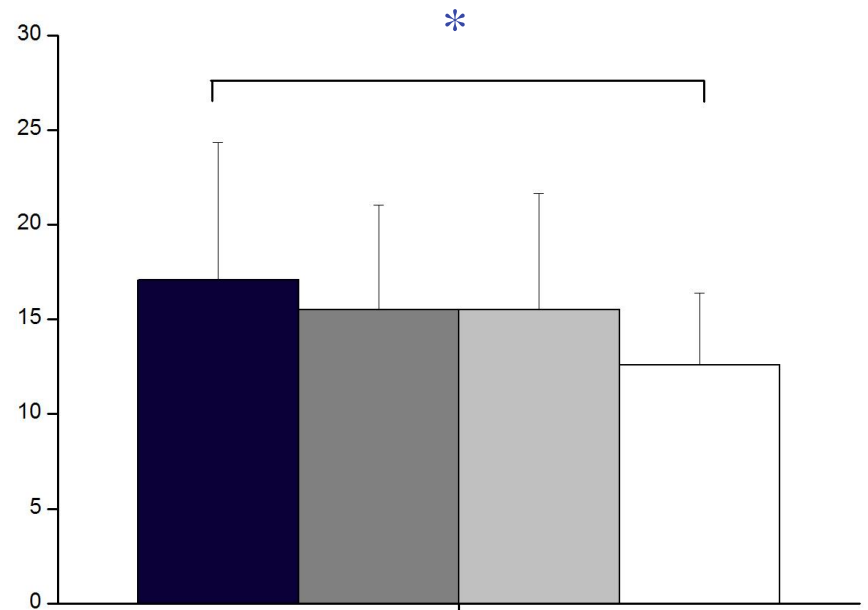
Results: Clinical Measures



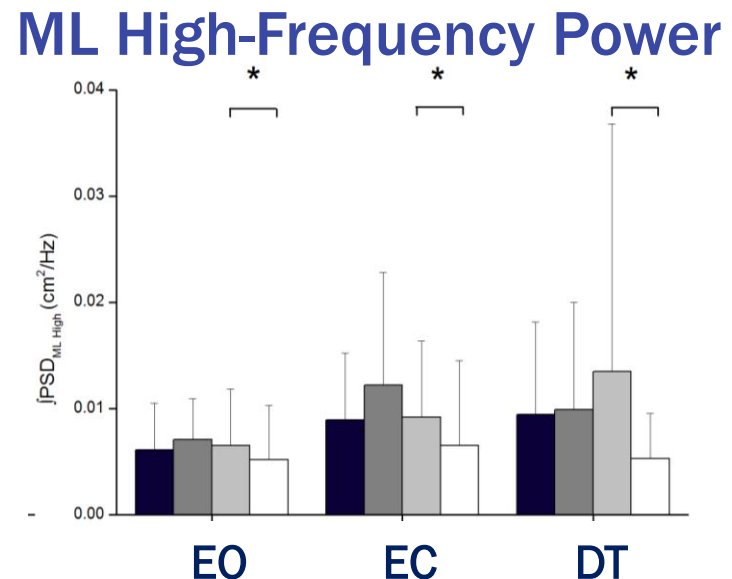
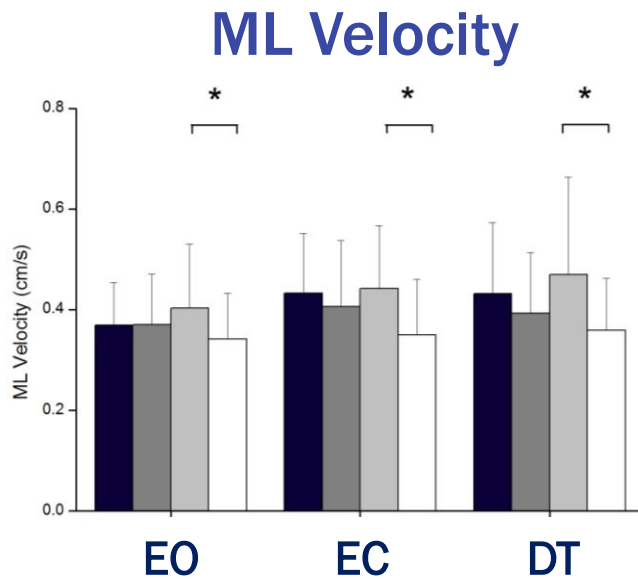
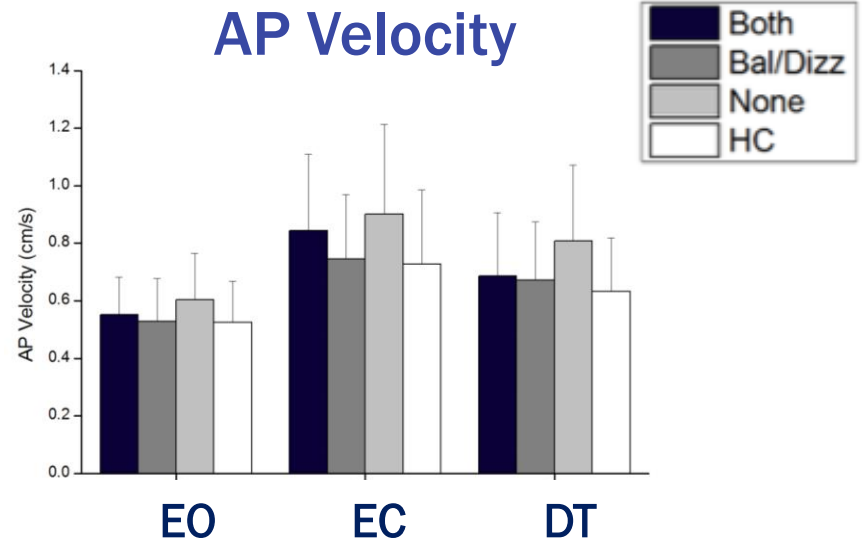
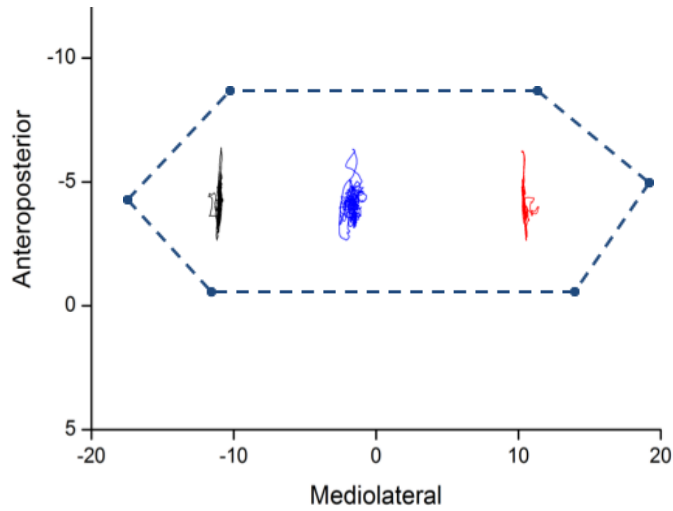
[5]



BESS Score



Results: COP Measures



Discussion: Primary Objective

*“To characterize balance deficits following concussion in **adults from the general population** using self-reported, clinical and COP measures of balance within 1 week of concussion”*

Self-Reported Symptoms:

- Self-reported symptoms are not a reliable method of identifying balance-related deficits following concussion

Clinical Measures:

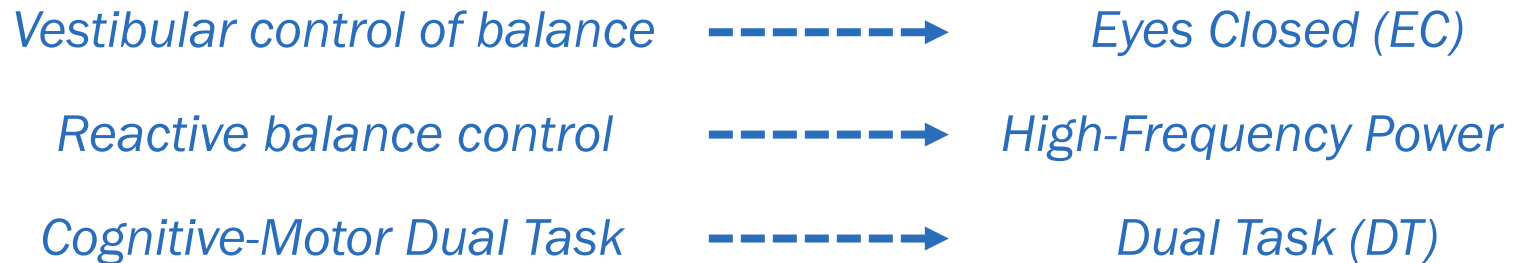
- All groups were at least 1 clinically important difference above controls

COP Measures:

- Those who reported no symptoms had significantly larger velocity and high-frequency power

Discussion: Secondary Objective

To identify potential mechanisms that contribute to balance deficits:



Task Difficulty:

- Quiet standing tasks were completed within a standardized base-of-support that may be too wide to reveal deficits in this population
- Previous work has identified deficits in the feet together position in concussed athletes [7]

Conclusions

- Balance deficits are present 5 days post-concussion in adults from the **general population**
- These are best reflected when looking at a combination of measures (clinical, COP) and not accurately depicted using self-reported symptoms alone

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