

## BACKGROUND

- Following a sports-related concussion, patients often exhibit deficits in postural stability and reaction time (RT).
- The Sway Balance™ System (SWAY) is an FDA-approved mobile application that has proven to reliably and objectively assess both balance and RT.
- The post-concussion symptom scale (PCSS) asks patients to self-report their symptoms following a concussive injury.
- The relationship between self-reported symptoms of concussion and the SWAY protocol has not been examined.

## PURPOSE

- To examine the relationship between balance and RT deficits as measured by an objective (SWAY) tool and subjective (PCSS) tool following a sports-related concussion.

## METHODS

- 67 pediatric athletes who sustained a sports-related concussion were included in the study.
- All participants completed the PCSS and SWAY within 14 days of injury during their first visit to a pediatric sports-concussion clinic.
- The SWAY system calculates balance scores from 0 to 100 (0 = completely unstable, 100 = completely stable) for each of the following: bipedal stance (feet together), tandem stance (R foot forward), tandem stance (L foot forward), single leg stance (R), single leg stance (L). RT scores include: motion reaction time (MRT) score, and MRT (milliseconds).
- The self-reported PCSS symptoms of *balance difficulties* and *feeling slowed down*, were used to determine whether or not the perception of symptoms associated with poor balance and decreased reaction time were related to SWAY scores.

## RESULTS

- Pearson product-moment correlations were utilized to examine the relationship between SWAY scores and the PCSS *balance difficulties* and *feeling slowed down* scores.

**Table 1**

		PCSS - Balance	PCSS - Feeling Slowed Down
<b>Sway – Combined Score</b>	r	.081	.019
	P	.509	.879
	n	68	69
<b>Sway – Balance Only</b>	r	-.010	-.058
	P	.938	.635
	n	68	69
<b>Bipedal (Feet together)</b>	r	.024	-.153
	P	.847	.209
	n	68	69
<b>Tandem Stance (R foot forward)</b>	r	.020	-.117
	P	.873	.338
	n	68	69
<b>Tandem Stance (L foot forward)</b>	r	.037	.007
	P	.767	.953
	n	68	69
<b>Single-leg Stance (R)</b>	r	<b>.246</b>	.015
	P	<b>.043*</b>	.901
	n	<b>68</b>	69
<b>Single-leg Stance (L)</b>	r	-.028	.690
	P	.822	.69
	n	68	.063
<b>Motion Reaction Time</b>	r	-.072	.063
	P	.560	.609
	n	68	69
<b>Motion Reaction Time (ms)</b>	r	-.008	-.080
	P	.950	.512
	n	68	69

- The self-reported *feeling slowed down* score was not related to any of the SWAY scores, but the self-reported *balance* score was positively correlated to single leg (R) score ( $r = 0.246$ ;  $p = 0.043$ ).

## DISCUSSION

- These data suggest that subjective assessments of balance and RT via the PCSS may not be linked to SWAY scores.
- Patients may not be able to sensitively detect or perceive difficulties (or lack thereof) with postural stability or RT following a sports-related concussion.
- Further study is warranted using additional objective measures of balance and RT to determine if patients suffering from sports-related concussion are consistently inaccurate in perceiving such deficits.
- Baseline balance and RT scores may be more useful for detection of postural instability or RT deficits following a concussion than reliance on subjective measures of balance and RT as patients likely cannot accurately discern whether or not balance or RT deficits are present following injury.

## REFERENCES

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