

Evidence for the Need for a Pediatric Concussion Quality of Life Measure in Addition to the PCSS

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Introduction

The experience of concussion goes beyond the physical symptoms and recovery progression (Limond, Dorris, & McMillan, 2009; Novak et al., 2016; Scherwath et al., 2011; Zemek et al., 2013). For example, Cognitive and emotional symptoms are often a significant aspect of mild TBI (Ellis et al., 2016; Limond et al., 2009; Scherwath et al., 2011). Memory problems and difficulty concentrating and sustaining focus also often emerge during the recovery process (Grubenhoff et al., 2014; Scherwath et al., 2011). The impact of a concussion on daily functioning can last well beyond recovery from the physical symptoms (Limond et al., 2009).

The purpose of the current evaluation was to examine whether a quality of life measure can provide important information not readily measured by a symptom scale.

Methods

- Rating scales were included in packets completed by pediatric patients at their doctor's visit at a regional concussion clinic.
- Participants were told to complete the packets themselves and provide them to medical staff during the appointment
- 280 packets were collected

Measures

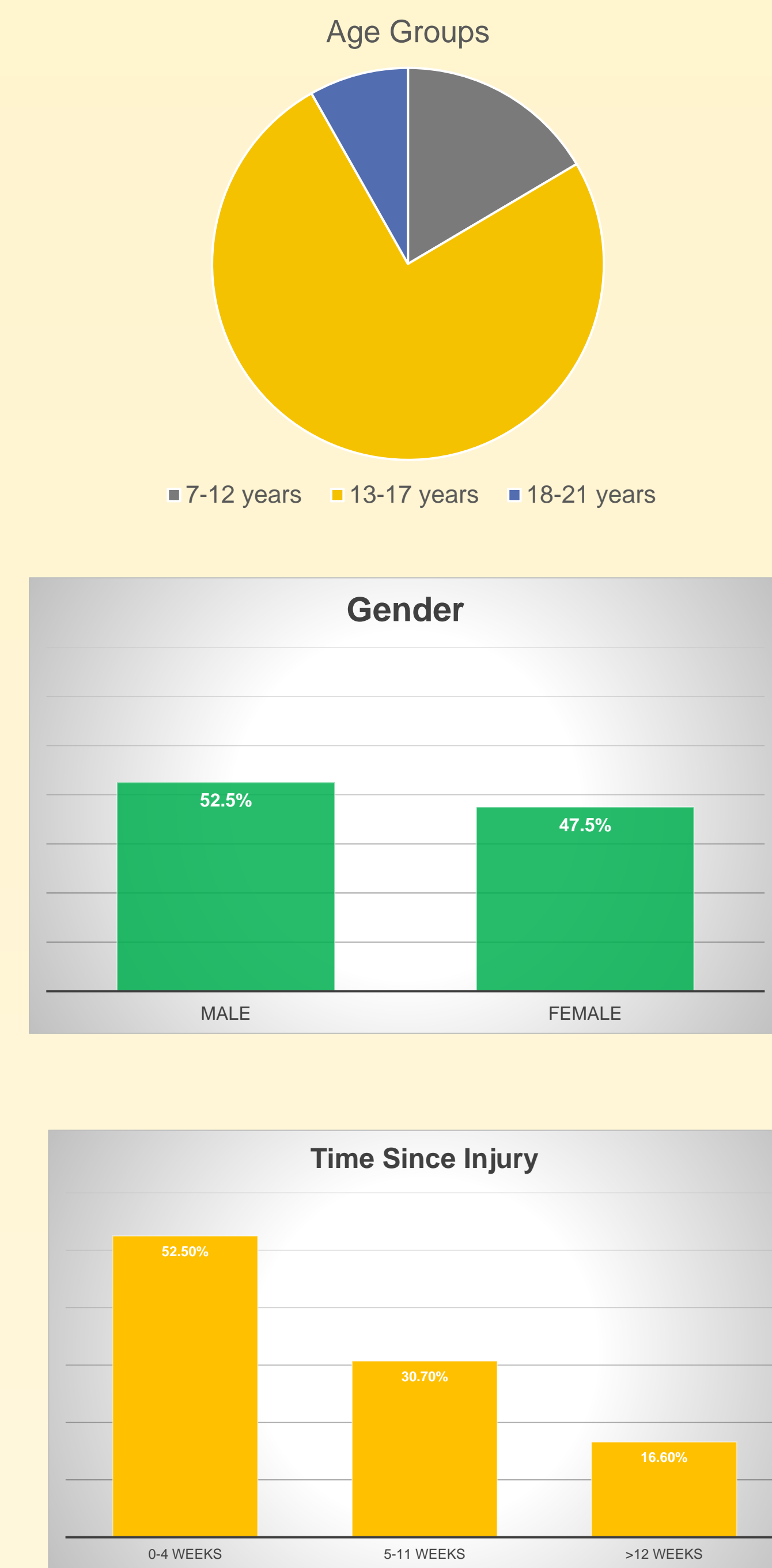
Pediatric Life After Concussion Evaluation Scale

- Instrument developed to examine pediatric perspectives on quality of life after concussion
- Demographic section (Age, gender, weeks since injury, school attendance)
- Perception of overall recovery as percent recovered rating
- 20 questions in 4 sections: Cognition, School, Emotions, Social/Activities
- 4 point Likert scale

Post Concussion Symptom Scale:

- 22 symptoms
- 7 point Likert scale
- Rating of symptom intensity on that day

Participants



Results

Correlations Among Domains on PLACES and Symptom Domains on PCSS

	Cognition	Social	Emotion	School	PLACES Total	PCSS Total	PCSS Physical	PCSS Cognition	PCSS Emotion
Cognition	1	.561**	.714**	.002	.870**	.733**	.692**	.776**	.525**
Social		1	.685**	.161*	.837**	.553**	.535**	.455**	.455**
Emotion			1	.029	.913**	.629**	.564**	.595**	.619**
School				1	.066	-.040	.005	-.065	-.069
PLACES Total					1	.732**	.701**	.704**	.594**
PCSS Total						1	.962**	.896**	.798**
PCSS Physical							1	.841**	.678**
PCSS Cognition								1	.695**
PCSS Emotion									1

- There is a strong correlation between post concussion symptoms (Total PCSS) and quality of life (Total PLACES)
- There are strong correlations among the PLACES Cognition, Social, and Emotion domains
- School support only has one small correlation with social concerns
- There are strong correlations between post concussion symptoms (PCSS) related to physical/somatic, cognition, and emotion domains
- There are moderate to strong correlations between domains on the PCSS and the PLACES.

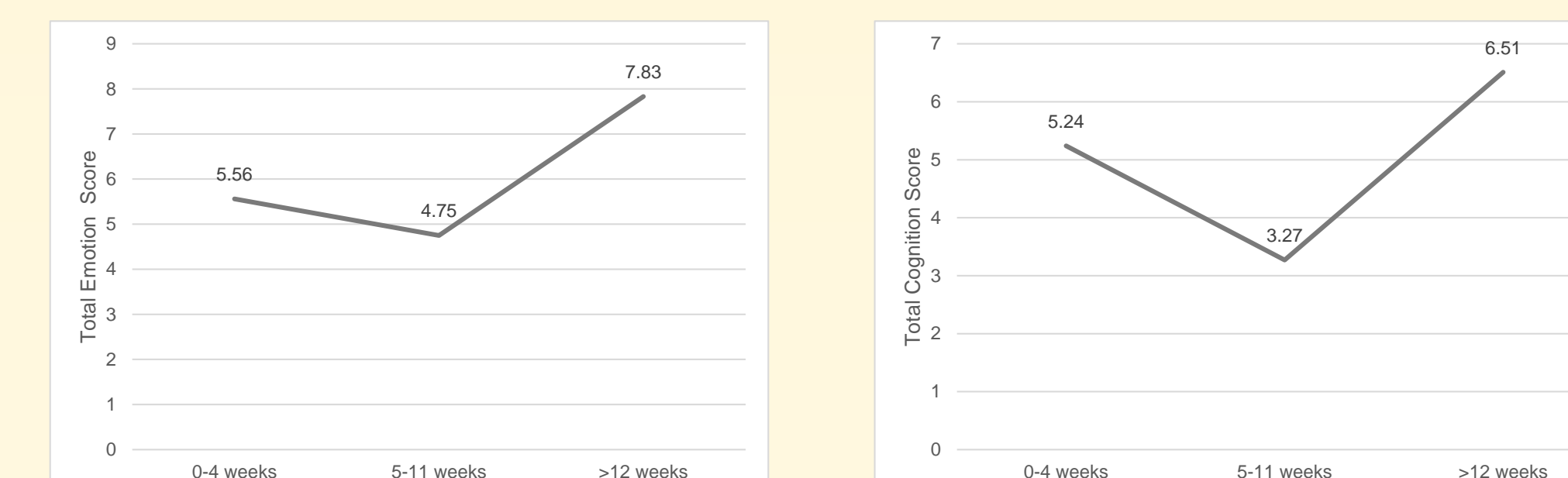
Results

ANOVA of Differences Between Time Since Injury Groups for Recovery Domains

Domain	Sum Squares	df	Mean Sq	F	p
PLACES Cognition	352.76	2	176.38	8.47	.00
PLACES Emotion	264.86	2	132.43	6.23	.00
PLACES Social	139.32	2	69.66	4.15	.02
PLACES School	24.94	2	12.47	1.34	.27
PLACES Total Symptoms	2402.99	2	1201.49	8.66	.00
PCSS Cognition	405.46	2	202.73	5.88	.00
PCSS Emotion	97.49	2	48.74	1.96	.14
PCSS Physical/Somatic	2321.76	2	1160.88	5.97	.00
PCSS Total Symptoms	4732.24	2	2366.12	4.82	.01

- Post concussion symptoms (PCSS Total) and quality of life (PLACES Total) show significant differences for time since injury
- There are significant effects for cognition on both the PCSS and PLACES
- There is a significant effect for emotion on the PLACES but *not* for emotion on PCSS
- Symptom load is elevated for the groups in the early phases of recovery and for those individuals with lingering symptoms. The drop in symptom load during 5-11 week period may reflect recovery patterns.

Mean Symptom Load for Domains Across Time Since Injury Groups



- Principal component analysis showed that, while many items load onto the first factor, there are other factors that address social concerns, and school experience. Emotion on the PCSS loads to a different factor than does emotion on the PLACES.

Rotated Component Factor Matrix for Cognition, Emotion, Social, and School

Item	1	2	3	4	5
PLACES Symptoms make it hard to think	.769			.317	
PLACES Symptoms make it hard to pay attn	.807		.311		
PLACES Trouble learning new information	.758		.300		
PLACES Trouble remembering information	.794			.338	
PLACES Symptoms impair me in school	.694		.468		
PCSS Feeling foggy	.674	.558			
PCSS Difficulty concentrating	.783	.424			
PCSS Difficulty remembering	.724	.373			
PCSS Feeling slowed down	.549	.574			
PLACES Concussion has disrupted my life			.467	.656	
PLACES I feel frustrated by symptoms	.342		.412	.664	
PLACES My symptoms effect how I feel	.318	.444		.648	
PLACES I feel overwhelmed	.384			.686	
PLACES Worrying more than before		.390		.629	
PCSS More emotional		.812			
PCSS Nervousness		.692			
PCSS Irritability	.337	.777			
PCSS Sadness		.815			
PLACES Prevented from time w/friends			.783		
PLACES Prevented participation activities			.517		
PLACES I feel left out because of symptoms			.685		
PLACES Less social since injury		.310	.746		
PLACES Symptoms effect way I interact		.338	.725		
PLACES School demands - recovery longer	.350		.423		
PLACES Teachers are understanding				.884	
PLACES School has been helpful				.873	
PLACES School provides accommodations				.903	
PLACES I use my accommodations				.725	

Conclusions

SUMMARY:

- There is a strong correlation between post concussion symptoms (PCSS) and quality of life concerns (PLACES)
- There are moderate to strong correlations between domains on the PCSS and PLACES suggesting that there is a relationship between physical/somatic, cognitive, emotion, and social domains after concussion
- ANOVA showed significant differences between time since injury groups for Total PCSS symptoms, Total PLACES symptoms, cognition on both measures, PLACES social domain, PCSS Physical/Somatic domain, and PLACES Emotion domain.
- The emotion measure for the PCSS was not significant across groups
- Symptom load for significant domains on ANOVA showed the same pattern of elevated symptom load in the first 4 weeks and for those individuals with lingering symptoms. The 5-11 week period shows the fewest symptoms
- Principal component analysis showed that the emotion social, and school domains load onto different factors than the PCSS emotion and cognition domains.
- The emotion items on the PLACES and the PCSS loaded onto different factors suggesting that they measure different symptom complexes

CLINICAL IMPLICATIONS:

- Concussion recovery is a complex process that involves physical, cognitive, emotional, and quality of life domains
- The PLACES provides information about concussion symptoms and quality of life that is not available on the PCSS concussion symptom scale
- In the emotion domain, the items on the PCSS do not fully capture the experience of concussion for pediatric patients
- A pattern of elevated symptom load during the first 4 weeks with a drop during the 5-11 week period suggests that pediatric patients are recovering during this period. Those individuals with lingering symptoms experience symptom loads similar to the high levels of the first 4 weeks after injury

LIMITATIONS:

- Although the directions indicated that the pediatric patient complete the scale, it was noticed that parents and patients sometimes had conversations while the patient completed the forms.
- Information on premorbid conditions was not included.
- Most of the participants were referred for treatment to the clinic by athletic trainers and primary care physicians. The sample may not be consistent with the broad range of concussion injuries seen by pediatricians and other primary care providers.

References

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