

The Relationship Between Pediatric Quality of Life and Post Concussion Symptoms

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Introduction

Most pediatric concussion patients recover physically within a month (Blume & Hawash, 2012; Crowe et al., 2016; Zemek et al., 2013), but up to 50% of children and adolescents may continue to experience cognitive or emotional symptoms after the physical symptoms have resolved (Crowe et al., 2016). For a portion of injured children and adolescents, symptoms will linger beyond 30 days (Field et al., 2003; Harmon et al., 2013; Heyer et al., 2016; Makdissi et al., 2003; Novak et al., 2016; Purcell et al., 2016; Raikes & Smart, 2015). In turn, lingering symptoms affect quality of life of children and adolescents with concussion (McLeod et al., 2015; Novak et al., 2016). The tasks and activities that students are exposed to in school deplete cognitive reserves, which further has consequences for learning, emotional functioning, symptom expression, and general quality of life.

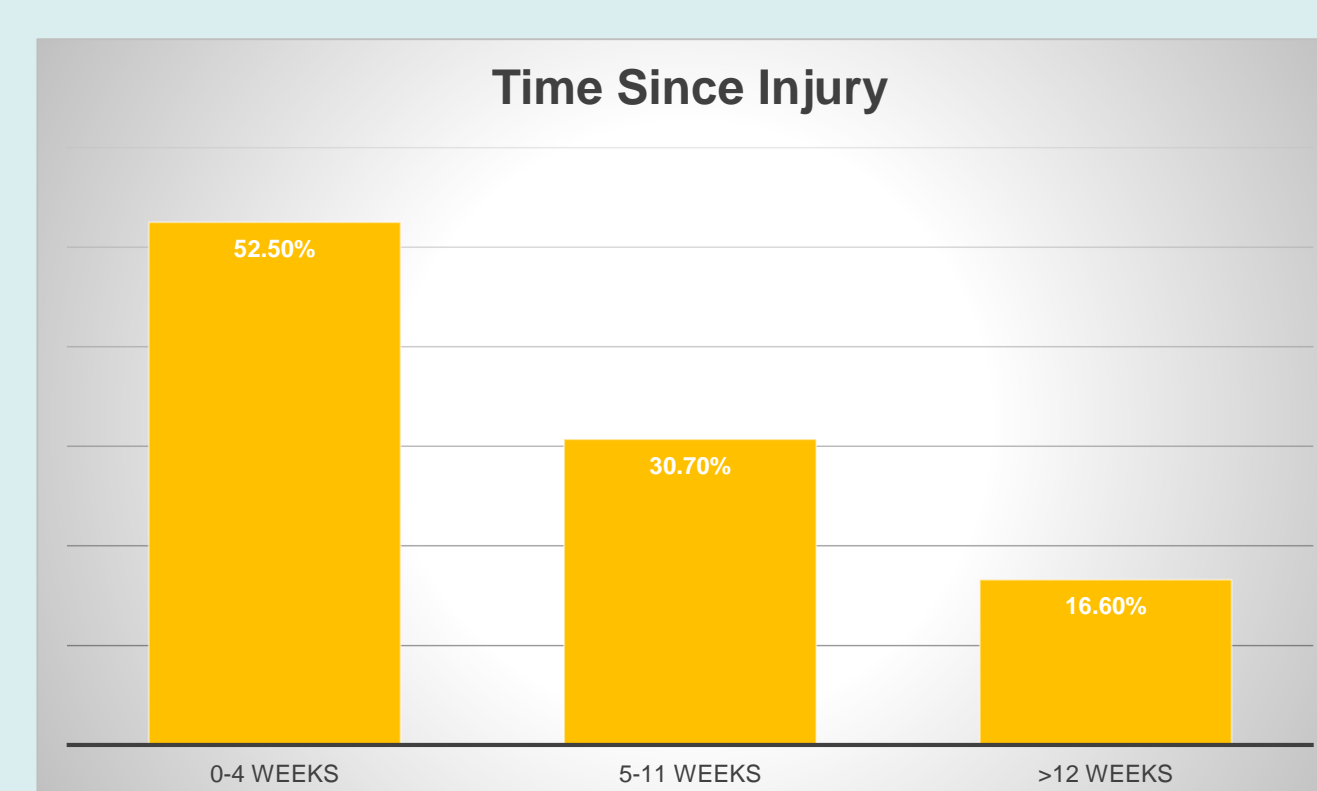
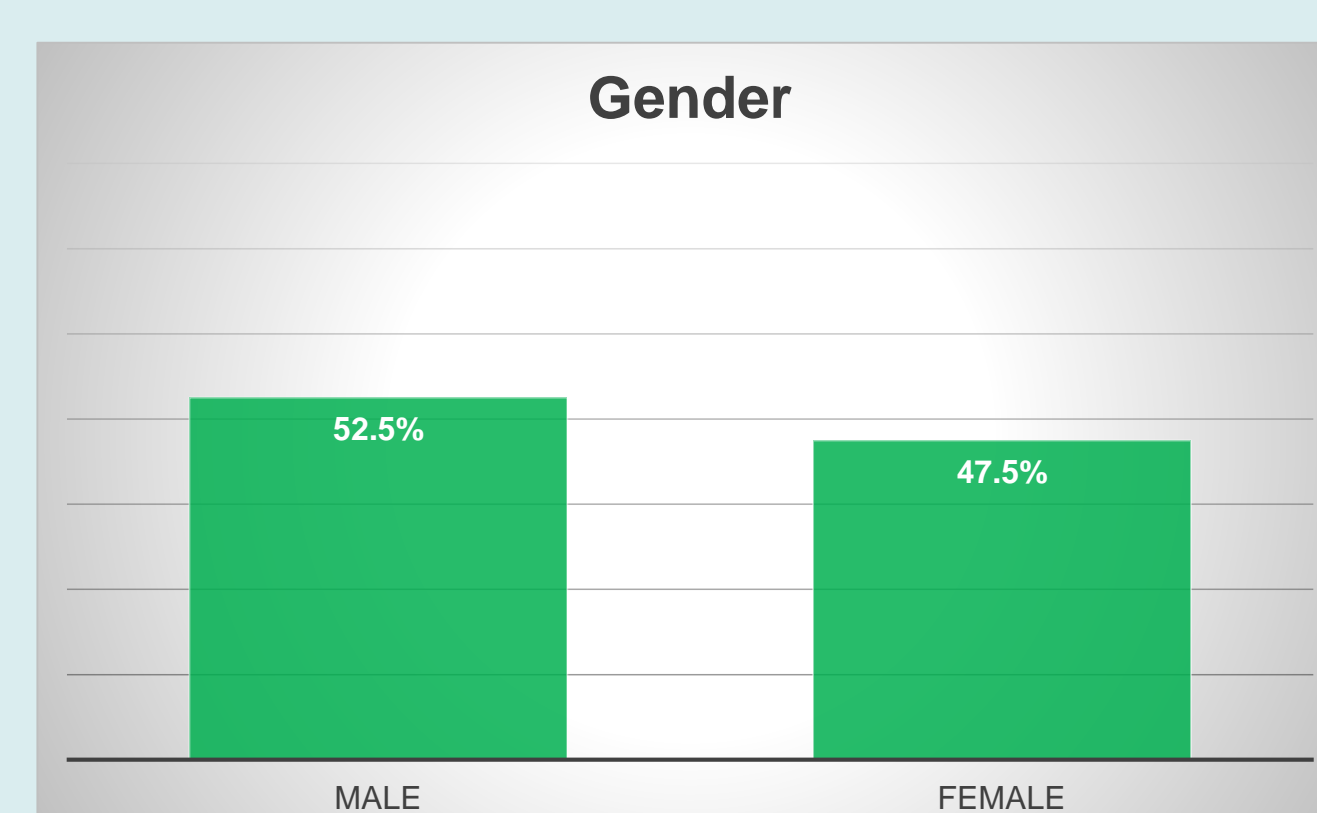
Objectives: To understand how concussion symptoms impact the pediatric patient's day to day functioning during recovery. This study explored pediatric patients' perspectives on their recovery and symptom expression.

Methods

Who: Pediatric patients at regional concussion program

Sample Size: 280 responses

Age: 7 to 21, with a mean age of 14.8 years



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
- The purpose is to capture the state of symptoms at the time of completion of the measure (Lovell et al., 2006; Kontos et al., 2012).

Results

Correlational Analysis

- Strong relationship between total quality of life concerns (PLACES) and post concussion symptom load (PCSS Total)
- Strong correlations between post concussion symptom load (PCSS) and cognition, social, and emotion domains
- Strong correlations between quality of life domains related to cognition, emotions, and social concerns
- Moderate to strong correlations between perception of recovery as percent recovered rating and symptom loads on PCSS, and cognition, emotion, and social domains

Correlations Among Quality of Life Symptoms, PCSS, and Injury Demographics

	Cognition	Social	Emotion	School	PLACES Total	PCSS Total	% Recovered
Cognition	1	.561**	.714**	.002	.870**	.733**	-.547**
Social		1	.685**	.161*	.837**	.553**	-.439**
Emotion			1	.029	.913**	.629**	-.404**
School				1	.066	-.040	-.017
PLACES Total					1	.732**	-.552**
PCSS Total						1	-.597**
% recovered							1

Multiple Regression Analysis

Predicting concussion symptom load from quality of life and demographics:

- Total quality of life symptom load (PLACES total) explained 54.9% of the variance on the total PCSS score (post concussion symptom load).

Multiple Regression: Post Concussion Symptom Scale

VARIABLE	B	SE _B	β	R ² CHANGE
INTERCEPT	15.21	5.88		
TOTAL PLACES	1.06	0.098	.59**	.549
TIME SINCE INJURY	-1.19	1.37	-.02	.006
% RECOVERED	-0.24	0.05	-.25**	.047
GENDER	4.11	2.03	.09*	.008

Predicting perceptions of cognitive difficulties from symptom load and quality of life:

- Total post concussion symptom load (Total PCSS) explained 51.8% of the variance
- Total quality of life load (Total PLACES) explained 20% of the variance

Multiple Regression: Predicting Cognition

VARIABLE	B	SE _B	β	R ² CHANGE
INTERCEPT	-4.16	0.25		
TIME SINCE INJURY	0.01	0.01	.05	.061
TOTAL PCSS	0.05	0.01	.25**	.518
TOTAL PLACES	0.25	0.18	.67**	.200

Predicting perceptions of emotional concerns from symptom load and quality of life:

- Total post concussion symptom load (Total PCSS) explained 36% of the variance
- Total quality of life load (Total PLACES) explained 42.8% of the variance

Multiple Regression: Predicting Emotion

VARIABLE	B	SE _B	β	R ² CHANGE
INTERCEPT	-0.35	0.23		
TIME SINCE INJURY	-0.03	0.01	-.02	.042
TOTAL PCSS	-0.18	0.01	-.09**	.360
TOTAL PLACES	0.38	0.02	0.98**	.428

Predicting perceptions of social concerns from symptom load and quality of life:

- Total post concussion symptom load (Total PCSS) explained 25.7% of the variance
- Total quality of life load (Total PLACES) explained 45.6% of the variance

Multiple Regression: Predicting Social Concerns

VARIABLE	B	SE _B	β	R ² CHANGE
INTERCEPT	0.47	0.24		
TIME SINCE INJURY	-0.01	0.01	-.05	.027
TOTAL PCSS	-0.04	0.01	-.020**	.257
TOTAL PLACES	0.33	0.02	1.01**	.456

Conclusions

Summary:

- There is a strong correlation between post concussion symptom load and worse quality of life.
- There is a strong correlation between post concussion symptom load and pediatric perceptions of difficulty with cognition, emotional expression, and social concerns.
- Cognition has strong relationships with elevated emotion symptoms and social concerns
- The more recovered an individual perceived herself/himself to be the lower the symptom load across domains
- Quality of life explained more than half of variance for post concussion symptoms
- Post concussion symptoms (Total PCSS) contributes the most variance to cognition, with quality of life (Total PLACES) contributing an additional 20%
- Quality of Life (Total PLACES) contributes the most variance to both the emotion and social domains with total post concussion symptom load adding to the model

Clinical Implications:

- This study showed that children provide important perspectives on their recovery from concussion.
- The experience of a concussion goes beyond the physical symptoms and impacts quality of life for many children and adolescents.
- There is an interaction between post-concussion symptoms and quality of life domains.
- Higher symptom load is related to worse perception of recovery and to perceptions of more difficulty with cognition, social life, and increased emotional symptoms.

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.

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