Psychosocial Influences and Mental Health Outcomes in Sport-Related Concussion

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<td>Illustrate Ways the Psychosocial Components of Athletics and the Culture of Sport Participation Influences the Response and Recovery from Concussion</td>
<td>Highlight Potential Emotional and Mental Health Outcomes that Can Influence Athletes Compliance Practices and Their Rehabilitation Results</td>
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Physical / Psychological Readiness to Return to Sport Don’t Always Coincide!

Mental Factors Can Influence Response to Injury as Well as Physical Outcome!!

The Impact of Psychological Factors Post-Concussion is Not Well Understood!!

Concussion in A Health Psychology Context

Pain Intensity is One of the Most Powerful Predictors of Activity Tolerance, Particularly within Rehabilitation

However, **CATASTROPHIZING** is Associated with Higher Levels of Subjective Pain Intensity, Disability, and Emotional Distress

**CATASTROPHIZING** is a Way of Thinking about an Injury Where People:

- **Ruminate about Painful Sensations:**
  “I Can’t Stop Thinking About How Much It Hurts”

- **Magnify Values of Pain Sensations:**
  “I Worry Something Serious May Be Wrong”

- **Feel Helpless To Cope Effectively:**
  “There’s Nothing I Can Do About It”

The Development of any **CHRONIC PAIN CONDITION** Involves Psychological Factors:

- Perception of Pain is the Result of Interpretation of the Injury and Its Sensations
- Believing a Stimulus is Harmful or Attributing Greater Meaning to Painful Sensations Cause People to Experience More Pain
- People Who are Worried, Anxious, Depressed, or Have a Negative Outlook Have a Higher Sensitivity to Pain
- Operant Conditioning, Social Reinforcement, and Secondary Gain Issues All Contribute to the Persistence of Pain Behaviors

Factors Associated with Faster Recovery from Injury Include:

1. **Maintaining a Positive Attitude and Outlook**
2. **Being Self-Motivated / Having Desire to Heal**
3. **Having Social Support in Primary Social Network and Rehabilitation Facility**
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Injury is a significant stressor that athletes are sometimes ill-prepared (or unwilling) to face.

Injured athletes are more likely to experience depression, anxiety, and reduced self-esteem when compared to non-injured peers.

Athletes with lower self-esteem and greater emotional reactions after injury were:

- Generally more invested in playing professional sports
- Had a greater identification with being an athlete
- Rarely had other interests, activities, or motivations outside of sports

Athletes say that frustration, confusion, anger, and fear are common early reactions to injury. However, negative emotions generally decrease as rehabilitation progresses.

Emotional reactions are not as fixed or orderly as has been suggested by “grief” models.

A reluctance to discuss emotions related to being injured with peers or coaches was associated with:

- Persistent feelings of isolation and alienation
- Reduced long-term psychological rehabilitation

Persistent post-injury emotional disturbance is associated with:

- Poor adherence to rehabilitation regimen
- Poor rehabilitation outcome

Emotional distress after injury was also associated with decreased confidence in:

- A full recovery
- Success in sport
- Ability to adhere to rehab

Athletes also have heightened fears during the transition back to sport. Commonly reported fears include:

- Fear of re-injury
- Fear of falling behind others
- Fear of underperforming
- Fear of missing out

Injured athletes are more likely to experience depression, anxiety, and reduced self-esteem when compared to non-injured peers.
General Criteria Used for Return to Play Following Sport-Related Concussion Has Been Established for Almost Two Decades

- **Symptom-Free At Rest**
- **Symptom-Free with Cognitive / Physical Exertion**
- **“Normal” Neuro-cognitive Data / Objective Evaluations**

Being “Asymptomatic” is at the Core of Proper Concussion Management, But it is Not an Easily Defined State
3-Year Prospective Study of 17 HS American Football Teams: N=2,141; Total Concussions: N=134

Recovery From HS Football-Related Concussion: How Long Does it Take?

Week 1: 40% recovered
Week 2: 60% recovered
Week 3: 80% recovered


Graph showing recovery rates over weeks with specific percentages for each week.
Five Items Failed to Clearly Load on Any Factor, But Were Strongly Associated:

- Nausea
- Balance Problems
- Sleeping More Than Usual
- Irritability
- Vision Problems

Strong C-M-F Factor (40.0% of Variance) Suggests a “Global” Symptom Pattern within First Week of Injury

Concentration Problems and Mental Sluggishness Contributed to C-M-F Factor More Than Headache!!

Females Athletes Tended to Score Higher on the Affective Cluster
FACTORS THAT INFLUENCE RECOVERY

Previous Concussions

Migraine History (Family / Personal)

Age

LD / ADHD History

Sex

Ocular History

Motion Sensitivity

Litigation

Prior Functioning: Physical

Prior Functioning: Psychological
Anxiety / Mood Clinical Profile is Characterized By Emotional Disturbance (e.g., Anxiety, Dysphoria), Hypervigilance of Somatic Complaints, and Sleep Dysregulation

Mental Health History:
Several Studies Found That A Diagnosed Mental Health History or Previous Mental Health Tx Predicts Greater Symptom Endorsement and A Protracted Recovery from A Concussion

BIOLOGICAL SEX:
Females Tend To Report More Emotional Symptoms than Males Before and After Injury (Iverson et al., 2015; Kontos, Elbin, et al., 2012)

General Indicators of Emotional Disturbance after Injury Include:
- Inconsistencies in Subjective Sx Reporting vs. Objective Deficits
- Worsening of Symptoms and Deficits Over Time, as These Patterns Are Not Consistent With Typical SRC Recovery

Sex Differences Have Been Attributed to Biological Factors and Cultural Phenomena, but No Consensus Explanation for Differences in SRC-Symptom Reporting Exists at This Time (Covassin et al, 2007, 2012)

Social Support:
Perceived Stress Post-Concussion Has Been Positively Associated with Levels of Anxiety and Depressive Symptoms

High Levels of Parental Pre-injury Anxiety and Child Reported Stress after Concussion Was Predictive of Greater Symptoms at 18 months

Covassin et al. (2014) Reported That Concussed Athletes Who Endorsed High Levels of Social Support Reported Low Levels Post-Injury Anxiety

Brain Alterations:
The Overlap of SRC-Symptoms and Mental Health Disorders are Partially Due To Physiological Changes That Occur in The Emotional Centers of The Brain after Concussion
Sports No Longer A Prize Unto Itself

• Educational Component Diminished
• Greater Focus on “Destinations” Such as College and Professional Sports, Particularly for Parents w/o H.S. Degrees
• Prevailing Mindset for Success in College Admissions has Become Sport Specialization
  ▪ Other Pursuits (e.g., Music, Art) Have Also Adopted Specialization Approach

Kids Are Not Just Picking One Sport at The Expense of Other Sports ... They’re Picking One Sport at The Expense of Any Other Extracurricular Interests!

Early Specialization Actually Narrows Development and Increases Risk of Injury

Specialized Athletes More Susceptible To Injury Because They Are “Exposed” To Their Sport More Often and Put More Stress on The Concentrated Group of Muscles, Ligaments and Bones Related To Their Sport (i.e., “Overtrained”)
Familial Expectations for NCAA Football Players

Since I was young, my family expected I would be a...
(% of NCAA football players responding ‘Agree’ or ‘Strongly Agree’)

Note: Endorsement of top two scale points on 6-point scale. NCAA 2015 GOALS study (4,724 NCAA football student-athletes surveyed).
Injury Rates in High School Athletes Have A Direct Relationship to Exposure by Hours Per Week and Higher Training Intensity / Volumes Have Consistently Been Shown To Increase The Risk of Overuse Injuries

**Weekly Volume**
Training More than 16 Hours A Week Was Associated with A Significantly Increased Risk of Overuse Injury

**Yearly Volume**
Kids (9-14) Who Pitched More Than 100 Innings A Year Were 3.5 Times More Likely To Suffer An Overuse Injury

**Yearly Volume**
There Was 42% Increase in Overuse Injuries in High School Athletes Who Participated All Year Versus 3 Seasons or Less Per Year

**Yearly Volume**
There Is an Increased Risk for Shoulder and Elbow Injuries in Youth Pitchers Who Pitch More than 8 Months A Year

**Scheduling**
Multiple Events on Same Day or Several Events over Consecutive Days is Considered A Risk Factor for an Overuse Injury
Today’s Adolescents: Post-9/11 Generation, Raised in Era of Insecurity

- Never Known a Time when Terrorism and School Shootings Weren’t the Norm
- Grew Up Watching Their Parents Weather a Severe Recession
- Hit Puberty when Technology and Social Media Were Transforming Society
- Significantly More Standardized Testing Protocols Implemented in the Past Decade

For Today’s Adolescents, “No Firm Line” between Real and Online Worlds

- Technology and Online Bullying Are Affecting Kids as Early as Fifth Grade
- Every Fight / Slight is Documented Online for Hours or Days after the Incident
- Managing a Social-Media Identity Plus Fretting about Unique Cultural and Societal Pressures

Anxiety and Depression in High School Has Been on the Rise Since 2012

- Statistic Cuts Across All Demographics - Suburban, Urban and Rural
- Mental Illness Impacts Those Who Are College Bound And Those Who Aren’t
- Family Financial Stress Can Exacerbate These Issues
- Studies Show That Girls Are More At Risk Than Boys

Susanna Schrobsdorff – Time Magazine; Oct., 2016 “Teen Depression and Anxiety: Why the Kids Are Not Alright”
In 2015, HHS reported that about 3 million teens (Ages 12-17) experienced at least one major depressive episode in the preceding year.

According to the NIMH, about 30% of girls and 20% of boys (almost 6.3 million teens) have had an anxiety disorder.

Student Athletes and Stress

College Student-Athletes Experience More Psychological Pressure and Stress than their Non-Athletic peers, But are Significantly Less Likely to Seek Mental Health Services

When Student-Athletes Seek Counseling, They Have More Stress-Related Physical Illnesses and Higher Rates of Depression and Anxiety

Examination of Student-Athlete Sleep Patterns Show they Experience, on Average, Four Nights of Insufficient Sleep per Week
Questions To Ask Patient

Concussion Has No Observable Signs or Physical Limitations, Athletes May Struggle with Perception of “ Appearing” Healthy while Injured

Concussion Is Also Brain Injury, Which May Directly Affect The Injured Athletes Cognitive Ability To Cope with Being Injured

(Covassin, Crutcher, Elbin, Burkhart & Kontos, 2013)

**MUSCULOSKELETAL (MSK)**

- A Defined and Causal Causal Mechanism That Precedes Diagnosis
- Observable Consequence or Visible Evidence of Injury
- More Certain Prognosis, with An Often Well-defined Treatment and Rehabilitation Schedule Injury

**CONCUSSION**

- Can Lack A Clear, Causal Mechanism or Blow To The Head
- No Observable Signs or Physical Limitations
- Presents Uniquely in Each Athlete, with More Global Impairments

“Anyone in Family Have A History of Anxiety or Stress-Related Health Conditions?”

“Do You Spend A Lot of Time Thinking about Your Symptoms?”

“How Often Do Your Parents Ask about Your Symptoms?”

“Have Your Social Activities Been Restricted?”

“Have You Avoided Participating in Activities, Even When Cleared To Do So?”

“Does Worry or Stress Cause Your Concussion Symptoms To Get Worse?”
Concussion Symptoms Typically Worst In First 7-10 Days, But Usually Resolve Within A Month Following The Injury


Conclude That Psychological Factors Play A Larger Role Than Physiological Response To Concussion

- Time Loss From Practice / Games
- Social Isolation
- Withdrawal From ADLs


Restoration Of Athletic Ability Return To Play

Athletes w/ High Athletic Identity, Amotivation, and Performance Anxiety Had Continued Symptoms Up To 28 Days Post-Concussion

Larger Social Network Size Predicted Greater Improvements In Symptoms

High Mastery / Low Ego Coach Environment And Low Mastery / High Ego Parent Environments Predicted Symptoms Reductions

Psychosocial Variables Accounted for 23 - 31% of Symptom Change Over Time
Several Studies Have Documented Increased Depression Symptoms In Athletes w/ SRC

Yang et al. (2015) Found:

- **20%** of Concussed College Athletes Had Increased Depression Sxs after SRC
- College Athletes w/ Baseline Depression Sxs Were 4.59 Times More Likely To Suffer Dysphoria After SRC

Depression Also Shown To Be A Long-Term Consequence of SRC

- Guskiewicz et al. (2007): Dose-Response Relationship Between Self-Reported SRCs and Clinical Depression Later in Life
- Retired NFL Players w/ 1-2 SRCs Had 1.5X Greater Depression Risk for Depression
- Retired NFL Players w/ 3+ SRCs Had 3X Greater Depression Risk

In One of The Few Studies To Examine Suicide Following SRC, Only 10% of Athletes with A Post-Injury Psychiatric Outcome Had Suicidal Ideation

Numerous Researchers And Experts Have Called For Clinicians To Incorporate Depression and Mood Screening Assessment Into Their Pre- and Post SRC Management
Anxiety Symptoms Associated with Concussion

Covassin et al. (2014) posit that high prevalence of anxiety in SRCs due to:
- Heightened perception of severity
- Lack of prognostic timeline for RTP
- Loss of athletic identity

In a pediatric population, concussed patients with no premorbid history of anxiety took ∼76 days to recover. Patients diagnosed with premorbid anxiety took ∼6 months to recover (Corwin et al., 2014).

Youth and collegiate athletes who exhibited early signs of anxiety should be targeted for interventions to decrease their chances of prolonged recovery from SRC (Collins, Kontos, Reynolds, Murawski & Fu, 2014).

Yang et al. (2015) reported over one-third of concussed college athletes experienced state anxiety following their SRCs.

Turner et al.’s (2017) comparison of CONC and MSK groups:
- 73.3% of participants exceeded threshold for state anxiety during acute phase of post-injury recovery, regardless of type of injury.
- Both groups demonstrated gradual improvement in mood state throughout the recovery process.
- Over half of participants in each group scored above cutoff during acute and return to play phase!!

Children with post-concussion SXS for longer than one month reported more anxiety than children whose symptoms resolved within one week (Grubenhaff et al., 2016).

Fear/anxiety in athletic injuries can be directed at:
- Uncertainty about clearance process
- Uncertainty about long-term career
- Thoughts of current/future health
- Concerns of death, disability, and reduced quality-of-life
- Concerns about maintaining elite level of performance or intensity
- Loss of control, pride, or identity by a forced alteration of playing style

Anxiety symptoms often difficult to disentangle from SRC symptomatology (Bloom et al., 2004).

SRC’s shared anxiety symptoms:
- Anxiousness
- Fatigue
- Nervousness
- Sleep difficulties

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Youth and collegiate athletes who exhibited early signs of anxiety should be targeted for interventions to decrease their chances of prolonged recovery from SRC (Collins, Kontos, Reynolds, Murawski & Fu, 2014).
Prescription of Prolonged, Strict Rest Has Been Associated w/ Development of Emotional Difficulties That, For Some, Require Formal Psychological Intervention

Behavioral Reregulation is Practice of Maintaining Healthy Lifestyle Factors To Prevent PCS Symptoms From Becoming Chronic Impairment:

- Sleep Schedule
- Adequate Nutrition and Hydration
- Daily Movements / Physical Activity
- Management of Stress

SLEEP:
Sleep Disturbance Common After Concussion, But is Also Associated w/ Reduced Cognitive Functioning, Anxiety, and Depression in General Population

PHYSICAL ACTIVITY AND DESSENSITIZATION:
Positive Influence of Physical Activity on Mood / Anxiety SXS is Multifactorial while Avoidance Behaviors Can Become “Conditioned” Quickly

Avoidance Results in Loss of Outlets for Coping w/ Stress as well as Limited Engagement In Meaningful, Social Interactions and Loss of Daily Routine

COPING STYLE:
Active, Problem-Focused Coping Style Shown To Be Beneficial In Reducing PCS Symptom Burden

Individuals w/ Higher Levels of Resiliency Demonstrated Less Emotionality as well as Better Quality-of-Life after Concussion

PSYCHOEDUCATION:
Reassurance; Provision of Support; and Appropriate Education Shown To Reduce PCS Symptoms in Several, Replicated RCT Studies

Discussion of SXS In Positive Context; Cognitive Reattribution of Symptoms; and Gradual Activation Associated w/ Better Psychological Outcomes

Education Has Included Informing Patients about Concussion SXS To Medication Management Issues and Expected Recovery Times
Cognitive Behavioral Psychotherapy

Treatment Typically Includes Graded Exposure, Activity Scheduling, Relaxation Exercises, Social Skills Training, and Cognitive Restructuring

Cognitive Training Focuses On:
- Altering Problematic Beliefs
- Helping Clients Improving Problem-Solving Skills
- Self-Monitoring Their Thoughts, Emotions, and Behaviors

Improving Coping Strategies Involve Teaching Patients:
- Mental Disengagement
- Positive Reinterpretation
- Emotional Venting And Re-processing
- Relaxation Training, Mindfulness, And Guided Imagery

Medications
- SSRI’s (e.g., Zoloft)
- Benzodiazepines (e.g., Klonopin)
- SNRI’s (e.g., Cymbalta)
- Tricyclic Antidepressants (e.g., Amitryptyline)
- Other Antidepressants (e.g., Trazodone for Sleep)
- The Influence of Psychological Factors on Concussion Recovery is Not Currently Understood, but Evidence Suggests a Similarity with Chronic Pain Literature
- Symptoms of Anxiety and Depression Appear to be Common Responses to Concussion as well as Risk Factors for Protracted Recovery
- Clinicians Must Balance Tenants of Concussion Management w/ the Risk of Fostering Emotional Difficulties That May Require Formal Treatment in the Future

| Psychosocial Components of Athletics and the Culture of Today’s Sports Environments Have a Direct Influence on Emotional and Psychological Reactions to Concussive and MSK Injuries | Concussion is a Heterogeneous Injury with Divergent Trajectories |
Thank you

FOR YOUR BRAIN
THE BEST MINDS

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REFERENCES / FURTHER EXPLORATION

Take a deeper dive into the world of sport psychology and injury by reviewing the following:


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Take a deeper dive into the world of sport concussion by reviewing the following:


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