

CONCUSSION AND YOUTH SUICIDE RISK

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REACH Attending Psychiatrist

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**I HAVE NO FINANCIAL CONFLICTS
I HAVE NO RELEVANT DISCLOSURES**

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AGENDA

Case Vignette
 Clinical Observation Turned Inquiry
 Concussion and Mental Health Challenges- Adolescents
 Evidence for Associations Between Concussion and Youth Suicide
 Parallels- Concussion and Depression
 Psychosocial Interventions to Improve Outcomes
 Mitigate Risk for Youth Suicide- GO SECURE

3

PRE-TEST QUESTIONS

Which Post Concussive Syndrome Symptom is most strongly linked to negative mental health outcomes?

- 1- Cognitive Changes
- 2- Dizziness
- 3- Headache
- 4- Light Sensitivity

What youth sport has the greatest risk of incurring a concussion?

- 1- Soccer
- 2- Cheerleading
- 3- Tackle Football
- 4- Rugby

Which Risk Factor is the Greatest contributor to Suicide Risk Post Concussion?

- 1- Prior history of ADHD + Prior history of Depression
- 2- Prior history of Depression
- 3- Prior history of Depression+ Hx of Concussion
- 4- Prior history of Concussion

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INTRODUCTION



Child and Adolescent Psychiatrist
Adult Psychiatrist

Podcast Creator and Host

Parent, Educator, Speaker



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IMPULSIVITY

ADOLESCENT BRAIN

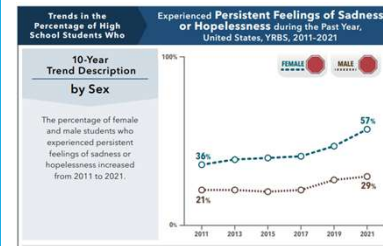
SUICIDE RISK



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YRBS AND DEPRESSION

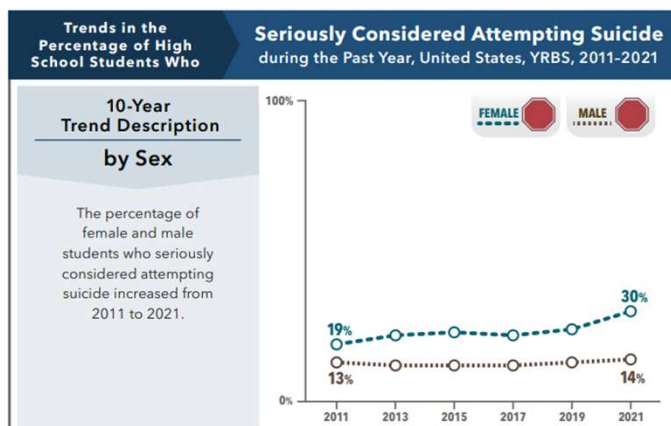
- 42% of HS students- experienced persistent feelings of sadness or hopelessness- in- 2021
 - 57% of female
 - 70% of LGBTQ+
- 29% of HS students POOR Mental Health in past 30 days
- 41% of female -POOR mental health in past 30 days.



YOUTH RISK BEHAVIOR SURVEY
DATA SUMMARY & TRENDS REPORT

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YRBS AND SUICIDE



- 22% of HS students seriously considering suicide in 2021
- 30% of female
- 10% of students ATTEMPTED
- 22% of LGBTQ+ ATTEMPTED

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JULISA

15 yo Cheerleader- on the Junior Varsity Team

Concussion x 4 over past 3 years

1 month ago sustained 4th concussion while in practice

Hx of Social Anxiety, Hx of Bullying, Hx of Sexual Abuse

Recent- Insomnia, Declining/Failing Grades

New Depressive Mood and Passive Suicidal Ideation

Last week Pediatrician advised – No Cheerleading

Patient felt frustrated, and isolated and made a suicide attempt-

Admitted to Inpatient Psychiatry – stepping down -Arrives in PHP program for treatment – sees Dr. Naidoo

Parent endorses depressive symptoms are s/p Concussion



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CLINICAL OBSERVATIONS TURNED INQUIRY

- TRENDS
- Patients with Depression often had hx of Multiple Concussions- Remote and Recent
- Patients with SI- had hx of Concussion within 6 months
- Patients who had Depression and Concussion:
 - Treatment Resistant Depression
 - Increased Frequency of Suicidal Ideation- Passive/Active
 - Chronic Pain- Head and Body
 - Impaired Life Functioning- School/Home/Physical/Mental
- Parents endorsed after 2nd + Concussion

“ My child has Changed”

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IS THERE A CONNECTION BETWEEN CONCUSSION AND SUICIDAL THINKING IN YOUTH?



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YOUTH CONCUSSION 101



- A traumatic brain injury caused by a direct or indirect blow to the head, neck or body that transmits force to the brain-causing a temporary disruption of brain function rather than structural damage.
- 1.1- 1.9 million pediatric concussions per year
- ~75% kids age 5-17- initially present to Primary Care/Peds
- ~54% kids ages 0-4 present to ER
- **Pediatricians are at the Frontline for Pediatric Concussion Care**

No single symptom or sign can confirm/exclude Concussion

Can be difficult to Diagnose

- Current Presentation
- Timing of Injury
 - [<72 hours]- SCAT tool Sport Concussion Assessment Tool
 - [>72 hours]- SCOAT6 tool- Office Assessment Tool
- Patient vs Parent symptom
- Standard Assessment Tools Vary

Symptom Based Measures vs Cognitive

- Headache
- Mental Fog
- Dizziness
- Light/Noise Sensitivity

Shah SN, Chizuk HM, Fong H, Hannon M, Mannix RC. Does This Child Have a Concussion? The Rational Clinical Examination Systematic Review. *JAMA*. 2026;335(17):1515–1524. doi:10.1001/jama.2026.1233

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CONCUSSION IMPACTS BRAIN FUNCTION



MECHANICAL IMPACT

- Sudden forceful impact to the head

NEURONAL DYSFUNCTION

- Electrical activity, Neuronal communication

CHEMICAL CHANGES

- Release Neurotransmitters- altering brain function.

METABOLIC CHANGES

- Energy production and utilization in neurons.

INFLAMMATION

- Healing process incurred post concussion includes inflammation- while healing sx of headaches and cognitive difficulties.

TEMPORARY IMPAIRMENT

- Memory, Attention, Concentration, Headache, Dizziness, NV, Sensitivity to light/sound
- Mood, Anxiety, Depression, Behavior, Emotional Dysregulation

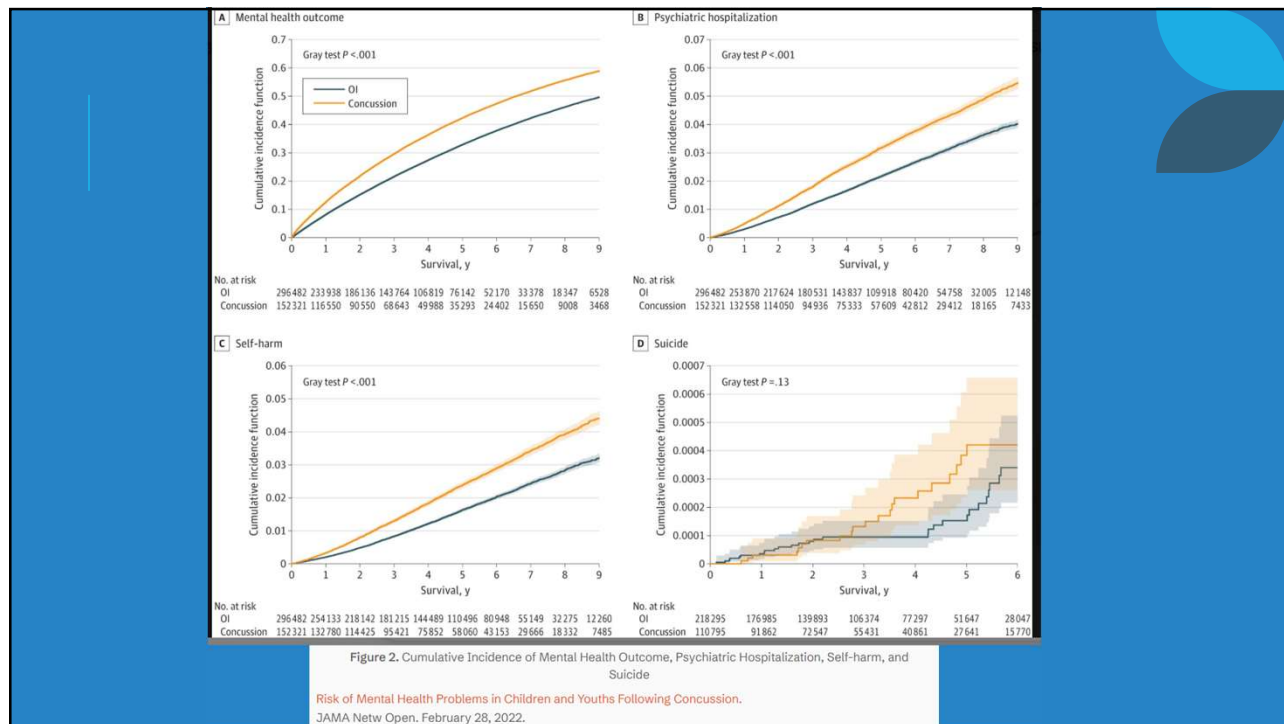
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YOUTH CONCUSSION AND MENTAL HEALTH

- Strong Evidence that Adolescent Concussion is associated with changes in Mental Health.
- 3.3-fold Greater risk for Depression diagnosis after Concussion.
- 36% of HS students with Concussion hx reported Persistent Depressive sx for up to 12 months (Santimento et al 2023- 6)
- Teens with Post Traumatic Headache- 5x odds of elevated mental health symptoms [Williams et al 13]

- Preinjury Mental Health concerns and Prior Concussions may be a risk for persistent symptoms (Iverson GT et al 2017- 15)
- **Youth Athletes with Pre-Injury ADHD, Learning Problems, Substance Use, Migraine, MORE SEVERE and PERSISTENT CONCUSSION Sx**

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ADULT CONCUSSION CORRELATES WITH INCREASED SUICIDE RISK

- Several Studies of Veteran Population- TBI/Concussion- linked to PTSD, Depression and Suicide
- 20 year longitudinal study from Canada's Office of Registrar
 - Suicide rate 3.3x general population for concussions that occur on weekdays
 - Suicide rate 4x general population for concussions on weekends (Fralick et al [2016]- 7)
- Retrospective Cohort Study from Denmark- 34,529 deaths by suicide
- Adults with TBI have increased risk of suicide, Incidence Rate of 1.90 (Madsen et al [2018]- 8)
- Chronic Traumatic Encephalopathy [CTE] associated with or core feature Depression and Suicide **Inconclusive-** (Iverson et al -2016- 2)

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POST CONCUSSIVE SYNDROME AND MOOD

- MOST Concussion patients recover 2-4 weeks.
- 34-44% patients report symptoms at 3-6 months.
- 21-25% of Concussed Teens develop PPCS- Persistent Post Concussive Symptoms.
- Adolescent Girls longest have Longer Recovery Period. (**Santos et al 2023- 5**)
- **Female Teens may have more persistent concussion symptoms than boys (Iverson GT et al 2017)**

My
Patients

**40% report clinically significant depressive symptoms,
6-fold higher risk of suicidal ideation if there is a hx of Depression
14% report thoughts of self-harm**

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YOUTH RISK BEHAVIOR SURVEILLANCE SYSTEM

**YOUTH RISK
BEHAVIOR
SURVEY**

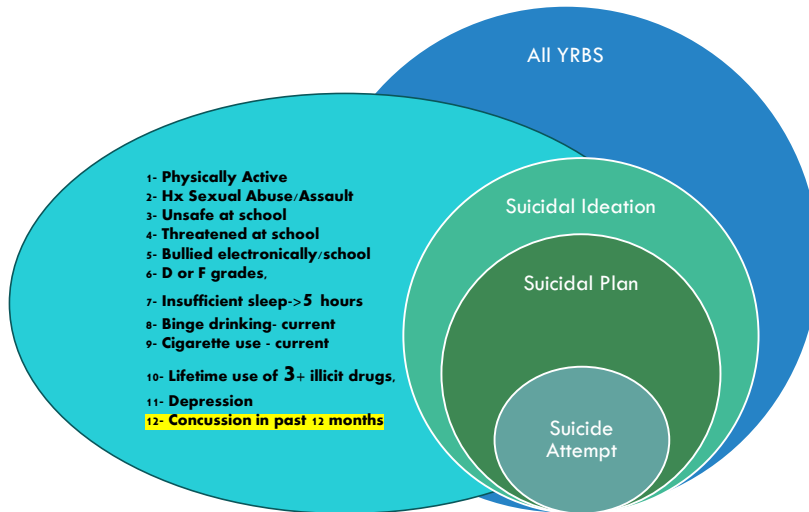
DATA SUMMARY &
TRENDS REPORT

Monitors SEVERAL
Behavior RISKS
over past 20 yrs

Concussion is a
“ RISK” in the
Survey!

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ASSOCIATION BETWEEN CONCUSSIONS AND SUICIDALITY IN HS STUDENTS IN THE US



- Association between Concussion and Suicidality
- Many Variables!!!
- BUT when CONTROLLING for Variables
- **Significant Relationship between Concussion and Suicide Attempts in BOYS ONLY**

Iverson et al 2022

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PRIOR STUDIES USED YRBS TO DETERMINE

OF THE GENERAL YOUTH POPULATION
IF **CONCUSSION IS A RISK FACTOR**

ASSOCIATED WITH SUICIDALITY

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**THIS NEXT STUDY USED YRBS TO
EXAMINE**

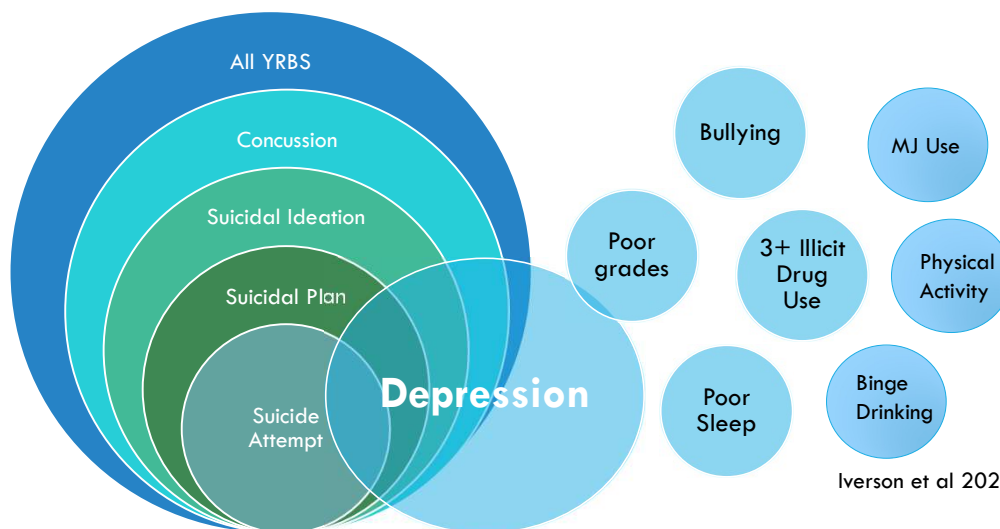
**OF YOUTH WHO HAVE SUSTAINED
A CONCUSSION
HOW STRONG IS THEIR RISK FOR
SUICIDALITY**

**AND OTHER MENTAL HEALTH
CONCERNS?**



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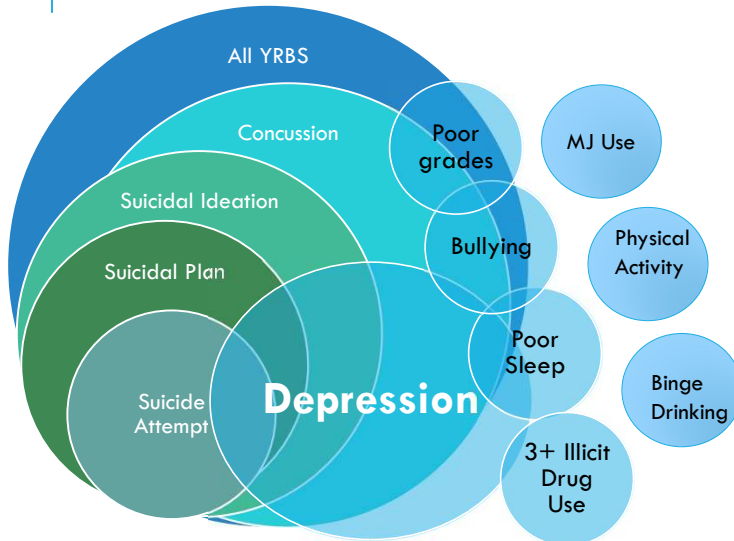
EXAMINING SUICIDALITY IN ADOLESCENTS WHO HAVE SUSTAINED CONCUSSIONS



Iverson et al 2023- 13

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EXAMINING SUICIDALITY IN ADOLESCENTS WHO HAVE SUSTAINED CONCUSSIONS



- **OF the Youth who HAD Concussion within 12 months**

25% had Suicidal Ideation

- **Gender Differences for Concussion + Suicide Risk**

- **3+ Risk Factors**
- **SIGNIFICANTLY**
 - **INCREASED**
 - **Suicide Risk**

Iverson et al 2023- 13

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YRBS 2021- CONCUSSION AND SUICIDE RISK

Of Youth with **Concussion** [15.2% of 2019 YRBS]

- 25% Endorsed Suicidal Ideation
- 20% Endorsed Suicide Plan
- 15% Endorsed Suicide Attempt

Of Youth **IN TOTAL** 2019 YRBS Data

- 19% Endorsed Suicidal Ideation
- 16% Endorsed Suicide Plan
- 9% Endorsed Suicide Attempt

GREATER PERCENTAGE Of Youth WITH hx of Concussion experienced Suicidal Ideation, Plan and Attempt

Than ALL YOUTH Sampled in YRBS 2019

YRBS 2021 Summary

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YOUTH WITH CONCUSSIONS EXPERIENCE MENTAL HEALTH RISKS

Of Youth with Concussion [15.2% of YRBS]

- 25% Endorsed Suicidal Ideation
- 20% Endorsed Suicide Plan
- 15% Endorsed Suicide Attempt
- **Depression** is a significant compounding factor for suicidal ideation, plan and attempt

Modifiable Risk Factors- Compound Effect:

- 3+ Modifiable Risk factors substantially increased risk of Suicidal Ideation, Plan and Attempt
- Bullied
- Poor Sleep
- Poor Grades
- Illicit Drugs 3+
- Marijuana Use
- Binge Drinking

YRBS 2021 Summary

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GENDER DIFFERENCES CONCUSSION AND SUICIDE RISK

Girls

- 31% of had Suicidal Ideations
- *[When Adjusted for Depression]*
 - **Illicit Drug Use**
 - **MJ Use**
 - Bullied
 - Poor Sleep
 - 3+ Stressors-Suicide Attempt 17%--31%

BOYS

- 19% had Suicidal Ideations
- *[When Adjusted for Depression]*
 - **Bullied- only independent factor**
 - Physical Activity 5+ days =
 - DECREASED RISK of Suicide Plan and Attempt
- 3+ Stressors- Suicide Attempt-10%--33%

YRBS 2023 Summary

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CONCUSSION + DEPRESSION

**STRONGEST PREDICTOR
OF SUICIDE RISK**

IN BOTH GIRLS AND BOYS

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**EVIDENCE OF
STRONG ASSOCIATION
BETWEEN YOUTH
CONCUSSION AND SUICIDALITY**

In youth with recent history
of concussions

Medical Professionals
should

Closely evaluate and
monitor for

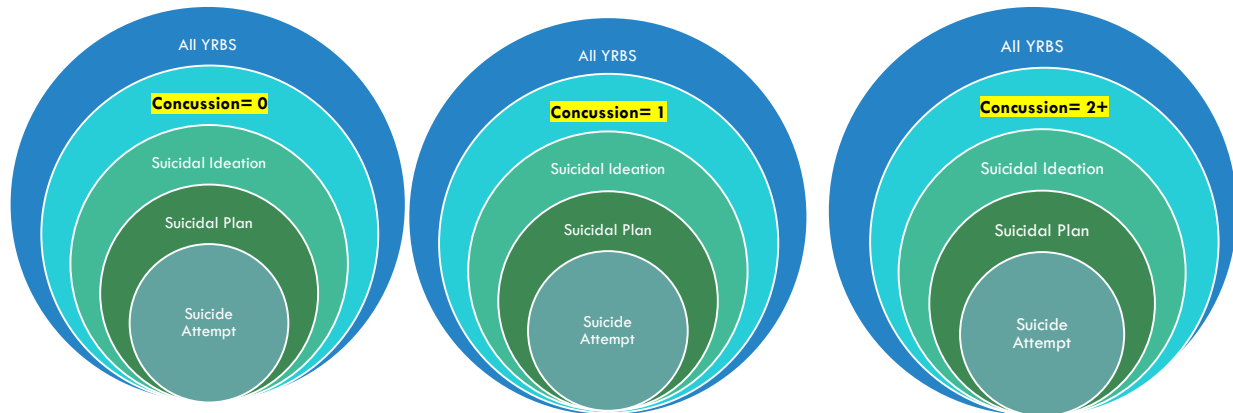
**MENTAL HEALTH and
LIFE STRESSORS**

- 1- Significant Number of HS students who sustain a concussion report experiencing Suicidality
- 2- Strong Association between Depression and Concussion
- 3- After controlling for depression, psychosocial stressors are independently related to suicidality in youth with concussion
- 4- Cumulative Modifiable Risk Factors 3+ strongly associated with Suicidality

Iverson et al 2023- 13

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CONCUSSION EXPOSURE AND SUICIDE



Kay et al 2023

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In youth with history of
MULTIPLE concussions

**Medical Professionals
should**

**Closely evaluate and
monitor for**

**MENTAL HEALTH and
SUICIDALITY**

2+ CONCUSSIONS INCREASE SUICIDALITY

- Greater Odds of reporting suicide attempts compared to Students who reported a single Concussive Event
- Strength of Association did not occur in Females-
 - **ONLY in Males**
- Adolescents who reported concussion were at increased odds of reporting poor mental health and suicidal thinking.

Kay et al 2023

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IS MY **CLINICAL EXPERIENCE**
CONGRUENT WITH **THE EVIDENCE?**

YES!!!!!!

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JULISA

15 yo **Female** Cheerleader

Concussion x 4 over past 3 years

1 month ago sustained 4th concussion while in practice

Hx of Social Anxiety, Hx of Bullying, Hx of Sexual Abuse

Recent- Insomnia, Declining/Failing Grades

New Depressive mood and Passive Suicidal Ideation

Last week Pediatrician advised – No Cheerleading

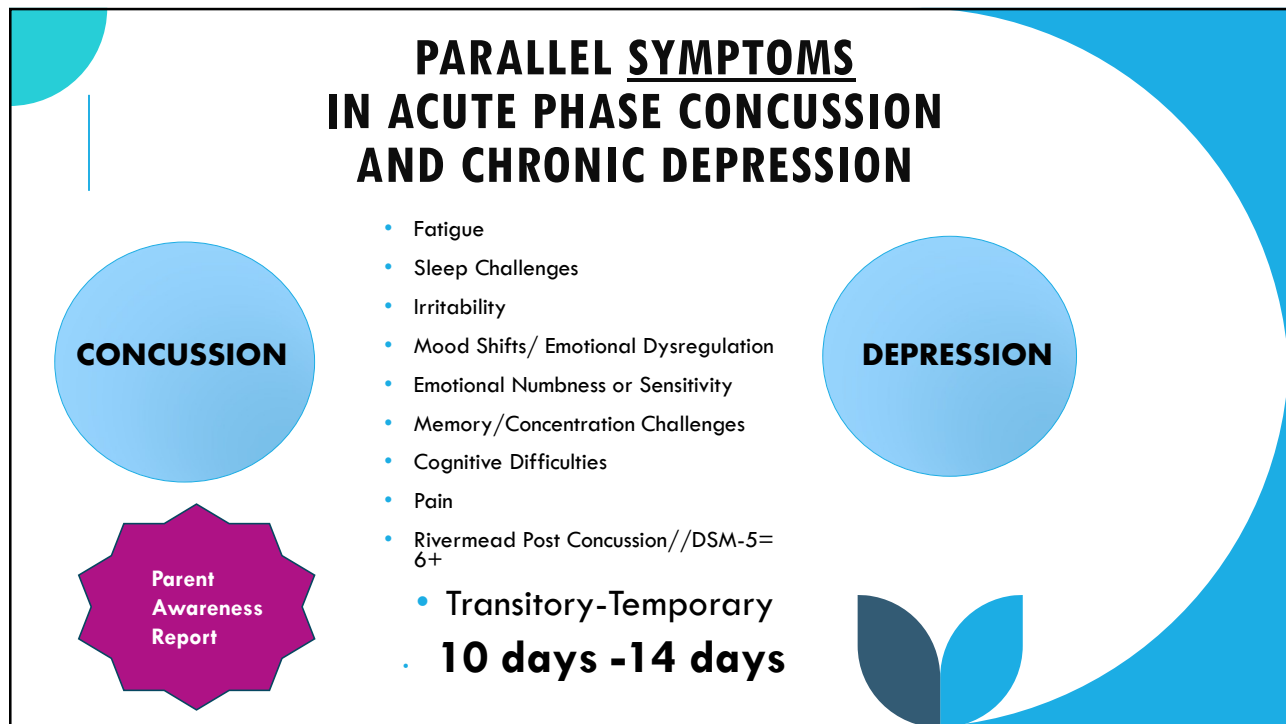
Patient felt frustrated, and isolated and **made a suicide attempt-** Admitted to Inpatient Psychiatry – stepping down

Arrives in PHP program for treatment – sees Dr. Naidoo

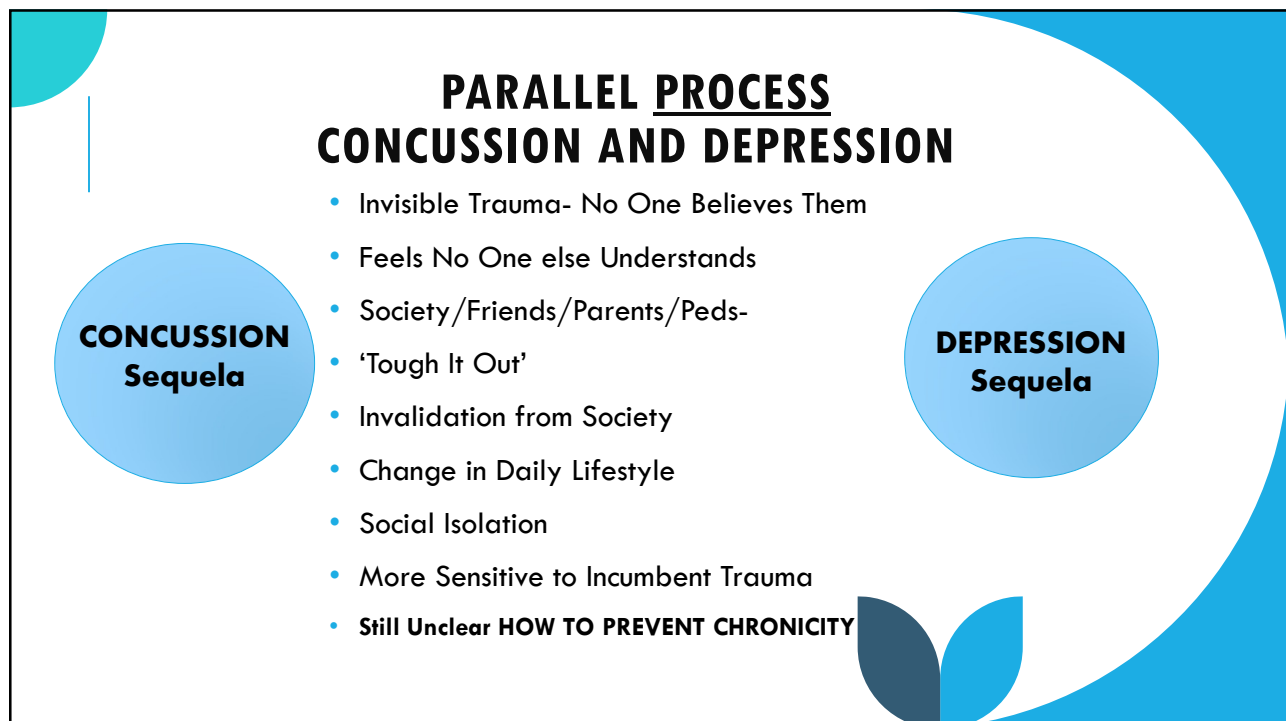
Parent endorses depressive symptoms are s/p Concussion



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HS SPORTS WITH HIGHEST CONCUSSION RISK

1. **Boys Tackle Football**
2. **Girls Soccer**
3. **Boys Lacrosse**
4. **Boys Ice Hockey**
5. **Boys Wrestling**
 - **Cheerleading**
 - **Girls Basketball**



[Avenues for Prevention Using the Epidemiology of Sport-Related Concussion From a Large High School Surveillance Study.](#)
Neurosurgical Focus. 2024. Bretzin AC, Pollard-McGrandy AM, Davis ER, Wiebe DJ, Covassin T.

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SPORT CESSATION MAY INCUR INCREASED SI RISK

PROACTIVE RECOMMENDATIONS

1. How will removing patient from sport affect their mental health?
2. Is their social/identity shifting due to concussion sequela or mental health?
3. Can we restrict physical activity while remaining involved in sport?
4. Could a letter with recommendations from you for sports team coach be helpful?
5. Could a referral to mental health specialist be helpful?
6. Process of Advocacy **BUILDS ALLIANCE**
7. Alliance **BUILDS ADHERENCE**= Follow our advice!



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CONCUSSION AND YOUTH SUICIDE RISK

#	Key Points
1	Youth Concussion and Suicide/Depression STRONG Association
2	MORE Evidence for BOYS with concussion to have increased suicide risk than girls. HOWEVER there is Evidence that BOTH GENDERS have INCREASED Suicide Risk s/p Concussion
3	2+ Concussion, Older age at Concussion, + 3+ Social Stressors INCREASE Risk for Youth Suicide
4	Concussion + Depression = HIGHEST Risk for Suicidal Ideation, Plan and Attempt in Youth
5	Screen Youth with Concussion for Depression and Suicide Risk 12 months post injury
6	Females with Concussion most likely to develop Post Concussive Syndrome

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**MUST INCREASE
COLLABORATIVE
EFFORTS
Between
Concussion Specialists
AND
Mental Health
Specialists**

FUTURE FORWARD

- DO NOT IGNORE Assessment +Treatment of Mental Health Concerns in Concussed Youth
- Monitor for Mental Health Concerns
- **@Initial Dx of Concussion and follow ups**
- Empower Parents to f/up Concussion Protocol Adolescent Adherence may need support and reinforcement
- Empower Parents to look out for warning signs of Depression and Youth Suicide Risk factors
 - Youth Suicide can be PREVENTED

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PODCAST EPISODE 43

GO SECURE THE FOLLOWING ITEMS IN YOUR HOME

TO REDUCE ACCESS
TO LETHAL MEANS

TO
PREVENT SUICIDE

GO SECURE

G
• Guns
O
• Overdose Options
• Prescription Pills, Over the Counter Pills, Vitamins, Cough Medicine, Cleaning Supplies
S
• Sharps- Razors, Knives, Art Supplies, Pencil Sharpeners, Glass, Garage, Pins
E
• Electronic Cords, Belts, Bungee Cord, Items for hanging
C
• Car Keys
U
• Underage Drinking
R
• Re- Attempt
E
• Entrance-exit-window-doors

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LEARN MORE ON HOW TO PREVENT SUICIDE

Private Practice

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Dr. Shivana Naidoo, MD

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PODCAST


**Thinking It Through with
Dr. Naidoo, Child
Psychiatrist**

Shivana Naidoo, MD

When it comes to mental health treatment and your child, there are a ton of tough questions. What IS the diagnosis? Is therapy enough? Should we try medication? Is this a 'real' problem?

PHOTOS: SHIVANA

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POST-TEST QUESTIONS

Which Post Concussive Syndrome Symptom is most strongly linked to negative mental health outcomes?

- 1- Cognitive Changes
- 2- Dizziness
- 3- Headache
- 4- Light Sensitivity

What youth sport has the greatest risk of incurring a concussion?

- 1- Soccer
- 2- Cheerleading
- 3- Tackle Football
- 4- Rugby

Which Pre-Injury Risk Factor has the strongest association with Suicide Risk Post Concussion?

- 1- Prior history of ADHD + Prior history of Depression
- 2- Prior history of Depression
- 3- Prior history of Depression+ Hx of Concussion
- 4- Prior history of Concussion

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REFERENCES

1. Centers for Disease Control and Prevention (CDC). 1991-2021 High School Youth Risk Behavior Survey Data. Accessed 7/29/2024. Available at: <http://yrbs-explorer.services.cdc.gov/>.
2. Iverson GL. "Suicide and Chronic Traumatic Encephalopathy." (2016) *J Neuropsychiatry Clin Neuroscience*. 28:9-16.
3. Chrisman SPD, Richardson LP. (2014) Prevalence of Diagnosed Depression in Adolescents With History of Concussion. *Journal of Adolescent Health*. 54 (5):582-586.
4. Ledoux AA, Webster RJ, Clarke AE, Fell DB, Knight BD, Gardner W, Cloutier P, Gray C, Tuna M, Zemek R. "Risk of Mental Health Problems in Children and Youths Following Concussion." *JAMA Netw Open*. 2022 Mar; 5(3): e221235.
5. Santos JPL, Jia-Richards M, Kontos AP, Collins MW, Versache A. (2023) *International Journal of Environmental Research and Public Health*. 20, 6274. 1-21
6. Sarmiento, K.; Miller, G.F.; Jones, S.E. (2022) "Sports-or physical activity-related concussions and feelings of sadness or hopelessness among US high school students: Results from the 2017 youth behavior risk survey." *J. Sch. Nurs.* 2022, 38, 203-209.
7. Fralick M, Thiruchelvam D, Tien HC et al. "Risk of Suicide Following Concussion". *CMAJ* 2016; 188:497-504.
8. Madsen T, Attette E, Orlovsky S. "Association Between Traumatic Brain Injury and Risk of Suicide." *JAMA* 2018; 320(6):580-588. doi:10.1001/jama.2018.10211.
9. Mantey DS, Omega-Njemnobi O, Barroso CS, Kelder SH. "Self-reported history of concussions is associated with risk factors for suicide completion among high school students." *Journal of Affective Disorders*. Volume 263, 15 February 2020, Pages 684-691.
10. Kay JJM, Coffman CA, Harrison A, Tavakoli AS, Torres-McGehee TM, Brogli SP, Moore RD. 2023. "Concussion Exposure and Suicidal Ideation, Planning and Attempts Among US High School Students". *Journal of Athletic Training*. 2023; 58 (9) 751-758
11. Iverson, Grant L. PhD, Merz, Zachary C. PhD, Terry, Douglas P. PhD. "Playing High School Football Is Not Associated With an Increased Risk for Suicidality in Early Adulthood". *Clinical Journal of Sport Medicine* 31(6):469-474, November 2021. DOI: 10.1097/JSM.0000000000000890.
12. Iverson, Grant L. and Justin E Karr. "Association Between Concussions and Suicidality in High School Students in the United States." *Frontiers in Neurology* 13 (2022): 810361-810361
13. Iverson, Grant L., Charles E Gaudet, and Justin E Karr. "Examining Suicidality in Adolescents Who Have Sustained Concussions." *Journal of Neurotrauma* 40:7-8 (2023): 73-741.
14. Williams MW, Karr JE, Day AM, Glueck AC, Kapoor S, Han DY. "Post Traumatic Headache is Associated with Worse Anxiety and Mood Symptoms in Adolescent Mild Traumatic Brain Injury." *Neurol Neurobiol (Tallinn)*. 2022 ; 5(2): . doi:10.31487/j.nmb.2022.02.04.
15. Iverson GL, Gardner AJ, Terry DP, Ponsford JL, Sills AK, Broshek DK, Solomon GS. "Predictors of Clinical Recovery from Concussion: A Systematic Review" *British Journal of Sports Medicine* 2017; 51: 941- 948

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ADDITIONAL REFERENCES

1. Max JE, Kestley E, Wilde EA, Bjeler ED, Schachar RJ, Saunders AE, Ewig-Cobbs L, Chapman SB, Dennis M, Yang TT, Levin HS. Depression in children and adolescents in the first 6 months after traumatic brain injury. *International Journal of Developmental Neuroscience*. Volume 30, Issue 3, May 2012, Pages 239-245.
2. Redelmeier D, Fralick M. Accessed via: <https://soundcloud.com/cmajpodcasts/150790-res>. 7.25.24.
3. Iverson, Grant L, and Douglas P Terry. "High School Football and Risk for Depression and Suicidality in Adulthood: Findings From a National Longitudinal Study." *Frontiers in Neurology* 12 (2022): 812604–812604.
4. Fisher, Lauren B et al. "Prevalence of Suicidal Behaviour Following Traumatic Brain Injury: Longitudinal Follow-up Data from the NIDRR Traumatic Brain Injury Model Systems." *Brain Injury* 30.11 (2016): 1311–1318.
5. Silverberg ND, Iaccarino MA, Panenka WJ, Iverson GL, McCulloch KL, Dams-O'Connor K, Reed N, McCrea M: American Congress of Rehabilitation Medicine Brain Injury Interdisciplinary Special Interest Group Mild TBI Task Force. Management of Concussion and Mild Traumatic Brain Injury: A Synthesis of Practice Guidelines. *Arch Phys Med Rehabil*. 2020 Feb; 101(2):382-393. doi: 10.1016/j.apmr.2019.10.179. Epub 2019 Oct 23. PMID: 31654620.
6. Simpson G, Tate R. Suicidality in people surviving a traumatic brain injury: prevalence, risk factors and implications for clinical management. *Brain Inj*. 2007;21(13-14):1335-1351. doi:10.1080/02699050701785542
7. Teasdale TW, Engberg AW. Suicide after traumatic brain injury: a population study. *J Neurol Neurosurg Psychiatry*. 2001;71(4):436-440. doi:10.1136/jnnp.71.4.436
8. Bahraani NH, Simpson GK, Brenner LA, Hoffberg AS, Schneider AL. Suicidal ideation and behaviors after traumatic brain injury: a systematic review. *Brain Impair*. 2013;14(1):92-112. doi:10.1017/Brimp.2013.11
9. Simpson GK, Tate RL. Preventing suicide after traumatic brain injury: implications for general practice. *Med J Aust*. 2007;187(4):229-232
10. Max JE, et al. Psychiatric disorders in children and adolescents after severe traumatic brain injury: a controlled study. *J. Am. Acad. Child Adolesc. Psychiatry*. (1998)
11. JAMA. "Trends in Suicide Rates by Race and Ethnicity in the United States." Accessed on August 4, 2023.
12. Shah SN, Chitak MM, Fong H, Hamon H, Manly BC. Does This Child Have a Concussion? The Rational Clinical Examination Systematic Review. *JAMA*. Published online April 06, 2026. doi:10.1001/jama.2026.1233 <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2780380>.
13. Harmon KG, Whelan BM, Aukerman DF, et al. Diagnosis of Sports-Related Concussion Using Symptom Report or Standardized Assessment of Concussion. *JAMA Netw Open*. 2024;7(6):e2416223. doi:10.1001/jamanetworkopen.2024.16223
14. Bretzin AC, Pollard-McGrandy AM, Davis ER, Wiebe DJ, Covassin T. Avenues for prevention using the epidemiology of sport-related concussion from a large high school surveillance study. *Neurosurg Focus*. 2024 Jul;57(1):E3. doi: 10.3171/2024.4.FOCUS24153. PMID: 38950434.
15. Yang J, Brock GN, Steelesmith DJ, Thompson AJ, Ukonozaka EH, Bridge JA, Fontanella CA. Association Between Concussion and Risk of Suicide Among Youth and Young Adults. *Am J Prev Med*. 2026 Mar;70(3):108127. doi: 10.1016/j.amepre.2025.108127. Epub 2025 Sep 23. PMID: 40997962.
16. Chlitzman SPD, Whelan BM, Zorick DF, Hitt BJ, Wang J, Marcynyszyn LA, Rivara FP, McCarty CA. Prevalence and risk factors for depression, anxiety and suicidal ideation in youth with persistent post-concussive symptoms (PPCS). *Brain Inj*. 2021 Nov 10;35(12):1331-1337. doi: 10.1080/02699052.2021.2008490. Epub 2021 Nov 28. PMID: 34841998; PMCID: PMC10460267.
17. Chlitzman SPD, Whelan BM, Zorick DF, Hitt BJ, Wang J, Marcynyszyn LA, Rivara FP, McCarty CA. Prevalence and risk factors for depression, anxiety and suicidal ideation in youth with persistent post-concussive symptoms (PPCS). *Brain Inj*. 2021 Nov 10;35(12):1331-1337. doi: 10.1080/02699052.2021.2008490. Epub 2021 Nov 28. PMID: 34841998; PMCID: PMC10460267.
18. Bretzin AC, Pollard-McGrandy AM, Davis ER, Wiebe DJ, Covassin T. Avenues for prevention using the epidemiology of sport-related concussion from a large high school surveillance study. *Neurosurg Focus*. 2024 Jul;57(1):E3. doi: 10.3171/2024.4.FOCUS24153. PMID: 38950434.

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THANK YOU!! Q &A??



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