

The background features a gradient from light green at the top to dark blue at the bottom. On the left side, there are several concentric circular patterns and a large arc with a scale ranging from 140 to 260. The scale is marked with numbers every 10 units (140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260). The circular patterns consist of solid and dashed lines, some with arrows indicating a clockwise direction. The overall aesthetic is technical and scientific.

MENTAL HEALTH & TBI

MARCH 8, 2024

VIVIANE UGALDE, MD

OUR MISSION

- To promote the health and safety of kids through access to sports medicine services and education

OUR VISION

- To provide access to sports medicine services and injury prevention for all Central Oregon youth



THE CENTER
FOUNDATION

WHY DID WE ORGANIZE THIS SYMPOSIUM?

- Access to mental and behavioral health providers with knowledge of TBI and concussion is limited and the comfort of our community providers is low in taking on these patients.
- Misinformation or lack of knowledge leads to comments from providers like, “Come back and see me when your TBI is healed.”

OBJECTIVES

- WHAT IS A CONCUSSION?
- WHAT IS SECOND IMPACT SYNDROME?
- HOW IS A CONCUSSION DIAGNOSED?
- WHAT ARE COMMON SYMPTOMS?
- HOW DO WE ASSESS AFFECTIVE SYMPTOMS IN THE CLINIC?
- WHAT IS NORMAL RECOVERY?
- HOW DO AFFECTIVE SYMPTOMS AFTER CONCUSSION AND PAST HISTORY OF AFFECTIVE DISORDERS RELATE TO RECOVERY?
- RISK OF RECURRENT CONCUSSION



EPIDEMIOLOGY

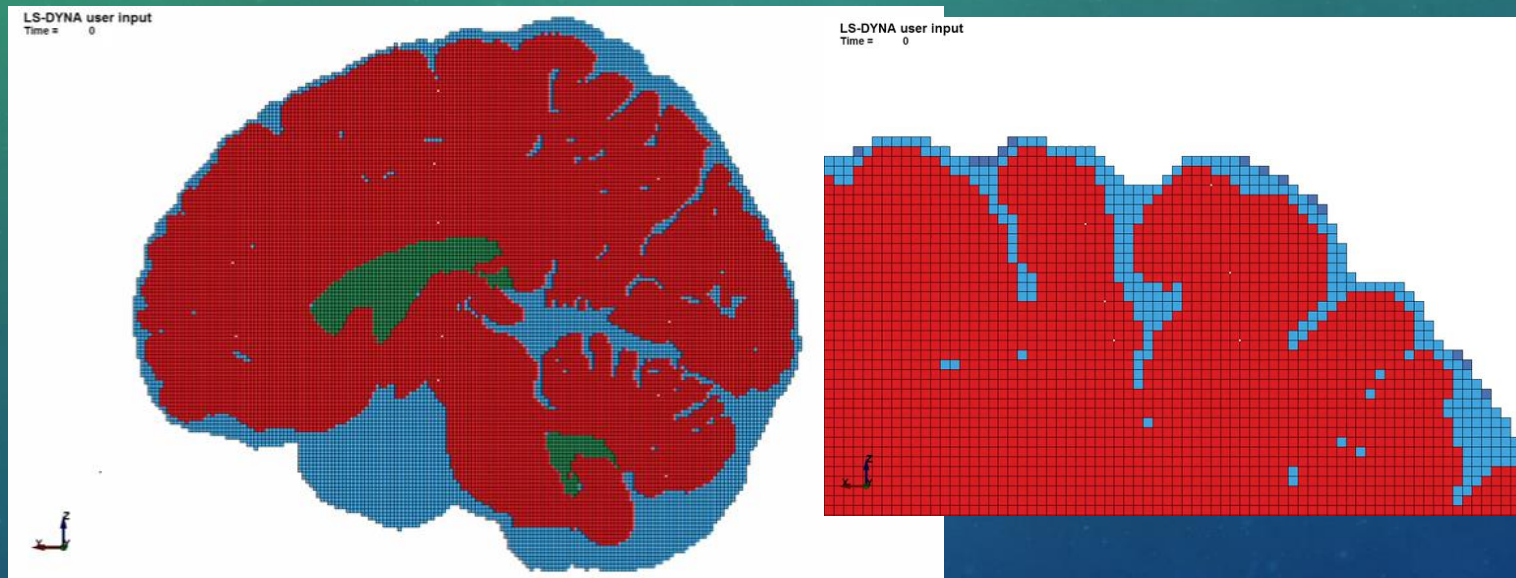
- For children and adults, a review found 1.3 million people with concussion in the US. 79% were diagnosed in the ER, but many more don't seek medical attention.
- In adolescents 19% reported a concussion in their lifetime.
- 5-35% of military service personnel suffer concussion, typically from blast injuries.
- Motor vehicle accidents are a common cause in both adults and children.
- Bryan, 2016, Pediatrics. Langer, 2020, J Head Trauma Rehabil.
- Rigg, 2011, PMR



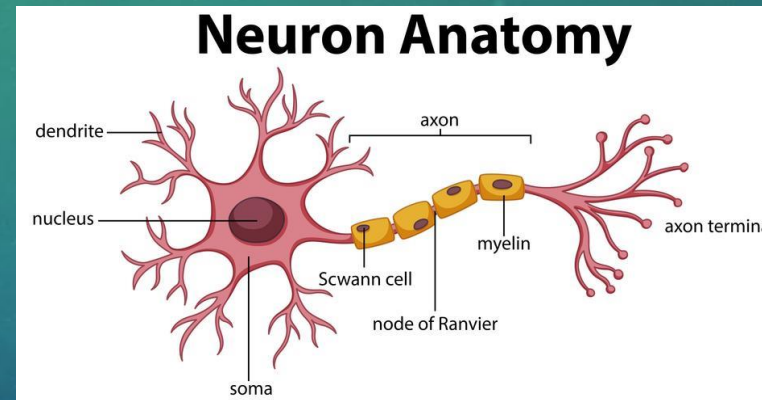
CONCUSSION BRAIN CHANGES

A bump, blow or jolt to the head or body that causes the brain to move rapidly back & forth
Causes stretching of brain, causing chemical changes, and cell damage
Causes change in how brain works (signs & symptoms)
Once these changes occur, brain is more vulnerable to further injury and sensitive to increased stress

BRAIN MOTION...



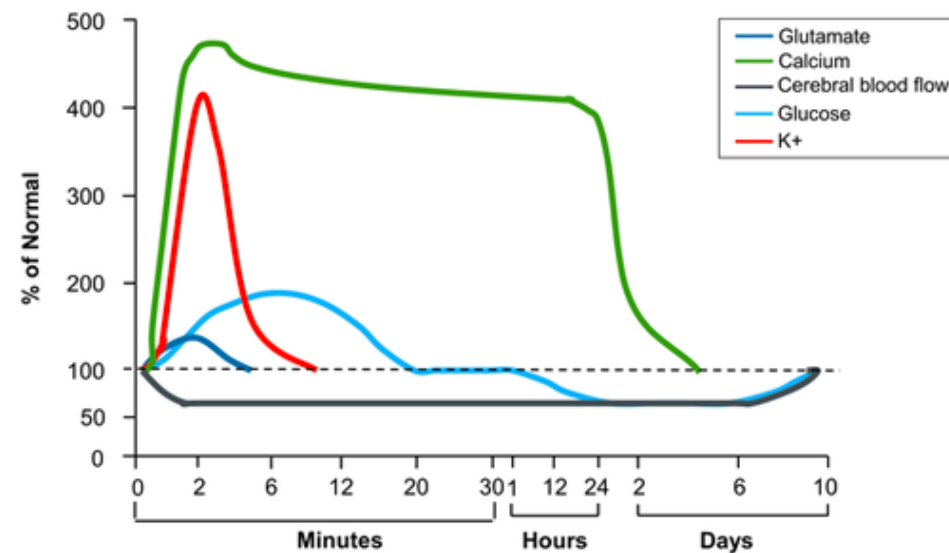
NERVE CELLS ARE LONG AND
PRONE TO ROTATION AND
SHEARING INJURY



CEREBRAL NEURONS ARE <1MM TO
100 MM = 4 INCHES IN LENGTH

PATHOPHYSIOLOGY

Neurometabolic Cascade Following Cerebral Concussion/mTBI



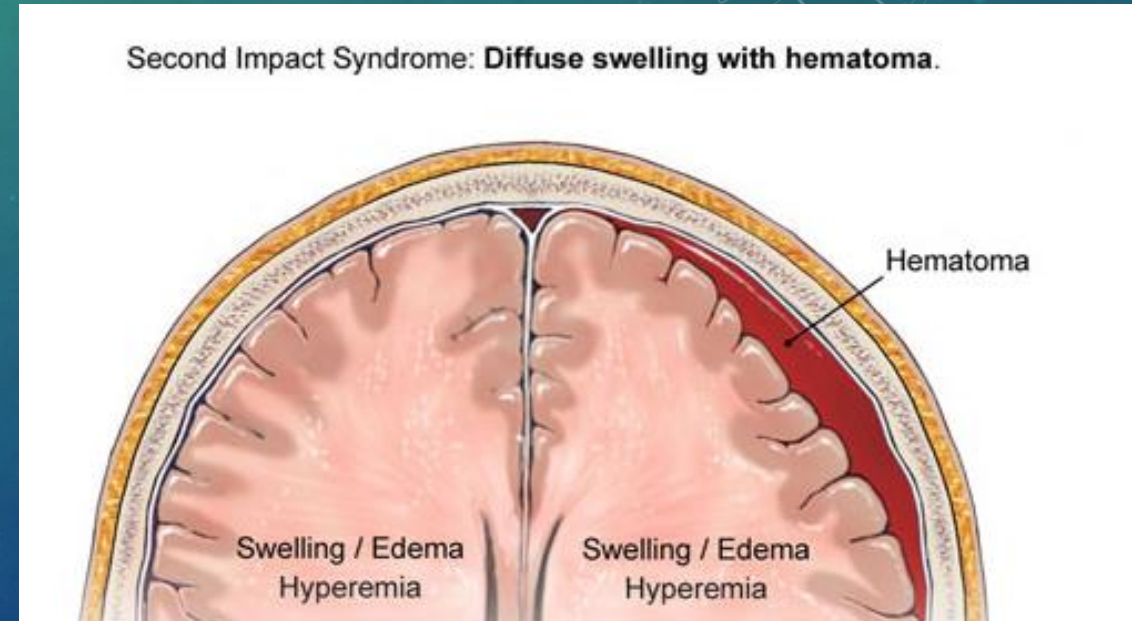
DIAGNOSIS OF CONCUSSION

- 1) Plausible Mechanism of injury - doesn't have to have a direct blow to the head, but of sufficient force to cause motion of the brain in the skull
- 2) Signs and symptoms – initial symptoms are important. Loss of consciousness (in <20%), dazed, confused, asking same question repeatedly, retrograde or post traumatic amnesia. Post concussion symptom checklist allows focus of most severe symptoms. Delayed onset of symptoms can occur with increased cognitive or physical load after rest
- 3) Confounding factors – acute psychological stress, severe MSK pain, whiplash, pulmonary or circulatory disruption, syncope, hypoglycemia prior to a fall, psychologically traumatic event or alcohol or drugs
- Silverberg, APMR 2020; 101:382

SECOND IMPACT SYNDROME

WHAT'S THE BIG DEAL?

- VERY RARE, BUT ALMOST ALWAYS CATASTROPHIC
- OCCURS WHEN THE BRAIN SWELLS RAPIDLY AFTER A PERSON SUFFERS A 2ND CONCUSSION BEFORE SYMPTOMS FROM AN EARLIER ONE HAVE RESOLVED, USUALLY IN FIRST 24 HOURS





MAX'S & JENNA'S LAW

- **Max's Law** (2010) applies only to Oregon School Districts. **Jenna's Law** (2014) extends the intent of Max's Law to Oregon youth sports and referee organizations.
- Both laws require school and non-school youth athletic programs to:
 - Create policies and procedures
 - Provide annual coach training
 - Track training
 - Ensure that staff practice good concussion management
 - Restrict play when a concussion is suspected
 - Provide educational materials/programs



PROTECTIVE GEAR – DOES IT PREVENT CONCUSSION?

- Helmets – protects from skull fractures and major bleeding, but not concussion. Newer helmets are reducing G forces, but determining reduction in the number of concussions or eliminating concussion is still to be determined.

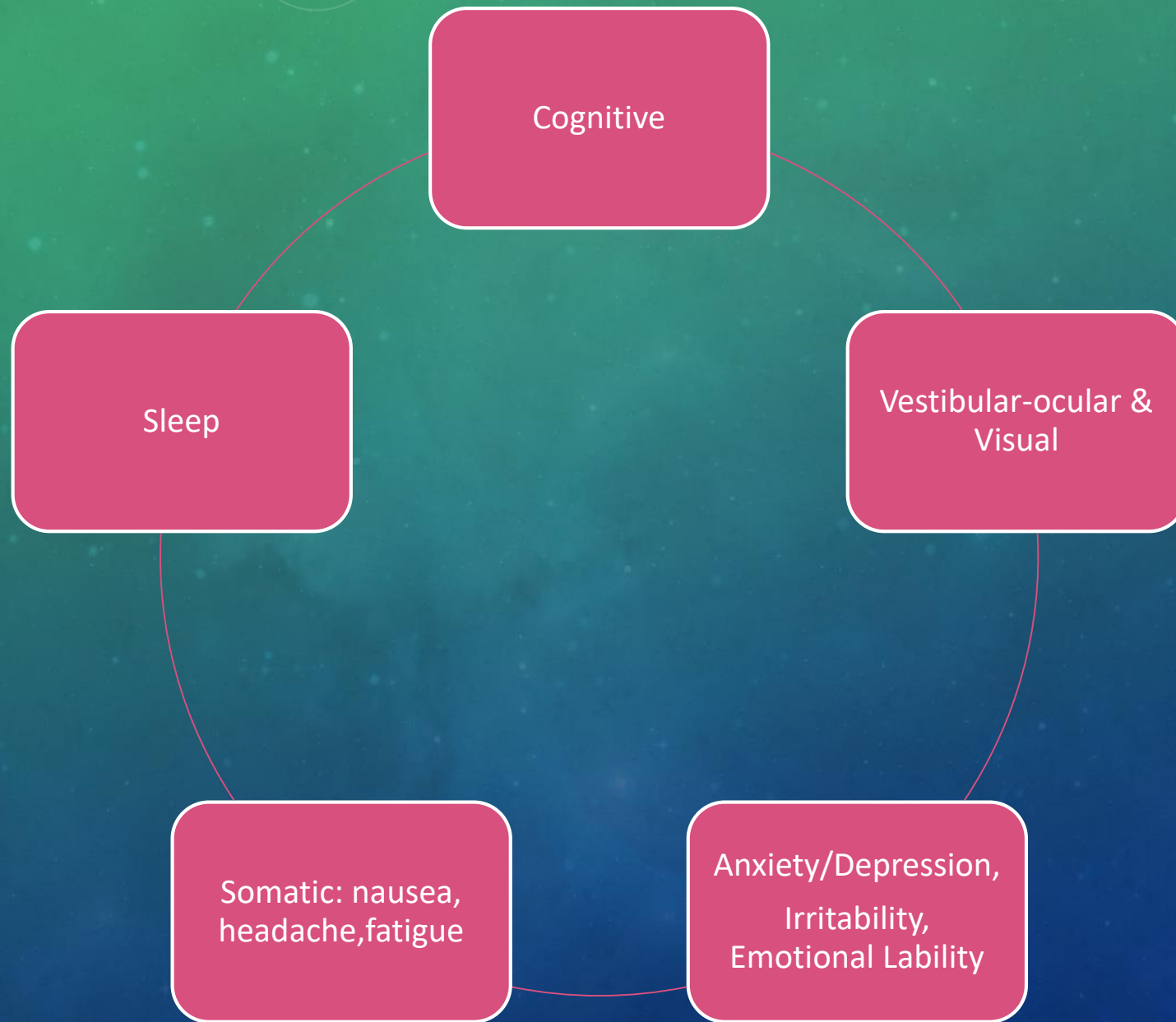
SECOND IMPACT SYNDROME

- Q collars , cowboy collars – do not prevent concussion
- Mouth guards – 28% reduction in concussion in hockey for all ages and now recommended for all levels of play.
- Rule changes – has reduced severe brain injuries and number of concussions



OTHER PREVENTION STRATEGIES

- Neuromuscular training in warm up 3x/week in the Rugby Union showed reduced concussion rates. More studies are needed in other sports
- Rule or policy changes: Body checking in youth hockey decreased concussion rates by 58%.
- Limiting contact in practices in all levels of American football has reduced concussion rates by 64%.



SYMPTOM ASSESSMENT TRACKING SHEET



THE CENTER
FOUNDATION

Concussion Symptom Assessment Tracking Form

Name: _____ Date & Time of Injury: _____

School/Team: _____ Injury Detail: _____

Instructions: The athlete, along with their parent/guardian, should rate his/her symptoms based on the severity using the six-point scale below:

None = 0, Mild = 1 or 2, Moderate = 3 or 4, Severe = 5 or 6

	30 min After Injury	Day 1 AM	Day 1 PM	Day 2 AM	Day 2 PM	Day 3 AM	Day 3 PM
Headache							
"Pressure in Head"							
Neck Pain							
Nausea/vomiting							
Dizziness							
Vision problems							
Balance problems							
Sensitivity to light							
Sensitivity to noise							
Feeling slowed down							
Feeling like "in a fog"							
"Don't feel right"							
Difficulty concentrating							
Difficulty remembering							
Fatigue/low energy							
Confusion							
Drowsiness							
Trouble falling asleep							
Feeling more emotional							
Irritability							
Sadness							
Feeling nervous/anxious							
Total (add scores)							

****Danger Signs (seek immediate medical attention if any are present):** Progressively worsening headache, one pupil larger than the other, repeated vomiting, slurred speech, seizures, loss of consciousness, cannot recognize people, drowsy and can't be awakened, and weakness/numbness.**



NEURO &
ORTHOPEDIC
PHYSICIAN
CLINIC

For immediate medical assistance, call 911.

An athlete may be evaluated by a physician on the same day or following day,
check-in through NOWcare at The Center, 2200 NE Neff Road in Bend.

Monday thru Friday 9:00 a.m. - 4:00 p.m.

OUR NP INTAKE HISTORY FORM

Current Injury:

Date of Injury _____

How were you injured? _____

☐ Motor vehicle injury ☐ On the job injury ☐ Sports injury
What symptoms did you experience immediately?

☐ Loss of consciousness (knocked out)? ☐ Dazed or confused?

☐ Memory loss (before or after injury)?

Do your symptoms get worse with physical activity? ☐ Yes ☐ No

Do your symptoms get worse with mental activity? ☐ Yes ☐ No

If 100% is "feeling perfectly normal," what percent of normal
do you feel? _____%

If not 100%, why? _____

Past History:

Prior Head Injury/Concussion:

Date: Loss of Consciousness ☐ Yes ☐ No
Memory loss ☐ Yes ☐ No
How long to get back to normal _____

Date: Loss of Consciousness ☐ Yes ☐ No
Memory loss ☐ Yes ☐ No
How long to get back to normal _____

Date: Loss of Consciousness ☐ Yes ☐ No
Memory loss ☐ Yes ☐ No
How long to get back to normal _____

Date: Loss of Consciousness ☐ Yes ☐ No
Memory loss ☐ Yes ☐ No
How long to get back to normal _____

Prior to your current injury:

Learning Disability?

☐ Dyslexia ☐ ADHD ☐ ADD ☐ On 504 ☐ On IEP

☐ Other _____

☐ Headaches: Number per week _____ Per month _____

☐ Migraines: Number per week _____ Per month _____

☐ Sleep disturbances ☐ Insomnia ☐ Sleep apnea

Before your injury, did you have the following?

☐ Vertigo ☐ Dizziness

Have you ever had any of the following?

☐ Meningitis ☐ High fever ☐ Premature birth

Do you have any of the following?

☐ Anxiety ☐ Depression ☐ Other _____

Hospitalized for mental health? _____

Before your injury, did you have any previous neck/spine

injuries? ☐ Yes ☐ No If yes, when? _____

Before your injury, did you have any previous visual issues

or changes? ☐ Yes ☐ No If yes, when? _____

Family History:

☐ Concussion or traumatic brain injury

☐ Alzheimer's or early onset dementia

☐ Parkinsons

☐ Headaches or migraines

☐ Anxiety or depression

☐ Aneurysm or bleeding

☐ Brain tumors or cancer

☐ Stroke

Do you currently use:

☐ Alcohol ☐ Tobacco ☐ Medical Marijuana

☐ Drugs ☐ Prior Drug Use

Do you have a personal history of:

☐ Diabetes ☐ Hypertension ☐ Heart disease

☐ Stroke If yes, when: _____

☐ Heart Attack If yes, when: _____

Current Academics:

School name _____

School year _____

Sports played _____

Current Grades:

☐ AP ☐ IB ☐ A's ☐ B's ☐ C's ☐ D-F's

Previous Academics:

Years of High School completed _____

Years of College completed _____

Sports played _____

Previous Grades:

☐ AP ☐ IB ☐ A's ☐ B's ☐ C's ☐ D-F's

MENTAL HEALTH ASSESSMENTS IN THE CLINIC

- Using the MHP reinterview as the criterion standard, a **PHQ-9** score ≥ 10 had a sensitivity of 88% and a specificity of 88% for major depression. PHQ-9 scores of 5, 10, 15, and 20 represented mild, moderate, moderately severe, and severe depression, respectively
- GAD-7
- Scores of 5, 10, and 15 represent cut-points for mild, moderate, and severe anxiety, respectively. When used as a screening tool, further evaluation is recommended when the score is 10 or greater.

OTHER MENTAL HEALTH

- PCL 5 screen for PTSD
- Initial research suggests that a PCL-5 cutoff score **between 31-33** is indicative of probable PTSD across samples. However, additional research is needed.
- Consider in MVA, assaults, domestic/intimate partner violence

PCS CATASTROPHIZING SCALE AGES 16-78

13 questions, Likert scale 0-4

Range 0-52

≥30 indicated high level of catastrophizing

When I experience these symptoms...	Not at all	To a slight degree	To a moderate degree	To a great degree	All the time
1. I worry all the time about whether the symptoms will end.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I feel I can't go on.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It's terrible and I think it's never going to get any better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. It's awful and I feel that it overwhelms me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I feel I can't stand it anymore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I become afraid that the symptoms will get worse.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I keep thinking of other events during which I experience the symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I anxiously want the symptoms to go away.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I can't seem to keep it out of my mind.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I keep thinking about how difficult it is.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I keep thinking about how badly I want the symptoms to stop.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. There's nothing I can do to reduce the intensity of the symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I wonder whether something serious may happen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

FEAR OF MENTAL ACTIVITY

17 questions, 1-4 score

Range 17-68

≥37 – above average level of fear of mental activity

≥48 – high level of fear of mental activity

	Strongly disagree	Disagree	Agree	Strongly Agree
1. I'm afraid that I might injure my brain if I perform mental activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. If I were to try to overcome it, these symptoms would increase.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. My brain is telling me I have something dangerously wrong.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. These symptoms would probably be relieved if I were to train my brain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. People aren't taking my medical condition seriously enough.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. My accident has put my brain at risk for the rest of my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. These symptoms always mean I have injured my brain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Just because something aggravates these symptoms does not mean it is dangerous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I am afraid that I might injure my brain accidentally.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Simply being careful that I do not perform any unnecessary mental activities is the safest thing I can do to prevent these symptoms from worsening.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I wouldn't have this many symptoms if there wasn't something potentially dangerous going on in my brain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Although I experience these symptoms, I would be better off if I were mentally active.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. These symptoms let me know when to stop performing mental activities so that I don't injure my brain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. It's really not safe for a person with a condition like mine to perform a lot of mental activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I can't do all the things normal people do because it's too easy for my brain to get injured.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Even though something is causing me a lot of symptoms, I don't think it's actually dangerous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. No one should have to perform mental activities when he/she experiences these symptoms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PEDS MENTAL HEALTH

- Adolescent PHQ-9 (ages 12-18)
- Total Score Depression Severity
 - 0-4 No or Minimal depression
 - 5-9 Mild depression
 - 10-14 Moderate depression
 - 15-19 Moderately severe depression
 - 20-27 Severe depression
- SCARED (Anxiety related disorders)
- Total score >25 is consistent with an anxiety disorder

SCAT6 MENTAL HEALTH TOOLS

Supplementary Material for Child Sport Concussion Office Assessment Tool 6 - Child SCOAT6™

child SCOAT6™

Pediatric Depressive Symptoms
Short Form 8a



Please respond to each question or statement by marking one box per row.


In the past 7 days...	Never	Almost Never	Sometimes	Often	Almost Always
I could not stop feeling sad	1	2	3	4	5
I felt alone	1	2	3	4	5
I felt everything in my life went wrong	1	2	3	4	5
I felt like I couldn't do anything right	1	2	3	4	5
I felt lonely	1	2	3	4	5
I felt sad	1	2	3	4	5
I felt unhappy	1	2	3	4	5
It was hard for me to have fun	1	2	3	4	5

Depression Screen Score:

Supplementary Material for Child Sport Concussion Office Assessment Tool 6 - Child SCOAT6™

child SCOAT6™

Pediatric Anxiety
Short Form 8a



Please respond to each question or statement by marking one box per row.

In the past 7 days...	Never	Almost Never	Sometimes	Often	Almost Always
I felt like something awful might happen	1	2	3	4	5
I felt nervous	1	2	3	4	5
I felt scared	1	2	3	4	5
I felt worried	1	2	3	4	5
I worried when I was at home	1	2	3	4	5
I got scared really easy	1	2	3	4	5
I worried about what could happen to me	1	2	3	4	5
I worried when I went to bed at night	1	2	3	4	5

Anxiety Screen Score:



Child Report	Strongly Disagree				Strongly Agree
1. I have put parts of my life on hold	0	1	2	3	
2. I have avoided my usual activities	0	1	2	3	
3. I cannot do activities which (might) make my symptoms worse	0	1	2	3	
4. My school work might harm my brain	0	1	2	3	
5. I should not do my normal school work with my present symptoms	0	1	2	3	
6. My head pain is telling me that I have something dangerously wrong	0	1	2	3	
7. I worry that when I have to think or concentrate too hard that I will bring on a headache	0	1	2	3	
8. My headaches put my head and brain at risk for the rest of my life	0	1	2	3	
9. I purposely avoid doing activities that might elicit a headache	0	1	2	3	
10. I'm afraid that I might make my headache pain worse by concentrating too much or being too mentally active	0	1	2	3	
11. I wouldn't have this much pain if there weren't something potentially dangerous going on in my head	0	1	2	3	
12. I avoid external reminders of a stressful experience (for example, people, places, conversations, activities, objects, or situations)	0	1	2	3	
13. I stop what I am doing when my symptoms start to get worse	0	1	2	3	
14. If I know that something will make my symptoms worse I don't do it anymore	0	1	2	3	
15. Because of my symptoms most days I spend more time resting than doing activities	0	1	2	3	
16. Most days my symptoms keep me from doing much at all	0	1	2	3	

Fear Avoidance Behaviour: Child Score:



Parent Report	Strongly Disagree				Strongly Agree
1. My child has put parts of his/her life on hold	0	1	2	3	
2. My child has avoided his/her usual activities	0	1	2	3	
3. My child cannot do activities which (might) make his/her symptoms worse	0	1	2	3	
4. My child's school work might harm his/her brain	0	1	2	3	
5. My child should not do his/her normal school work with his/her present symptoms	0	1	2	3	
6. My child's head pain is telling me that she/he has something dangerously wrong	0	1	2	3	
7. My child worries that when she/he has to think or concentrate too hard that she/he will bring on a headache	0	1	2	3	
8. My child's headaches put his/her head and brain at risk for the rest of his/her life	0	1	2	3	
9. My child purposely avoids doing activities that might elicit a headache	0	1	2	3	
10. My child is afraid that she/he might make his/her headache pain worse by concentrating too much or being too mentally active	0	1	2	3	
11. My child wouldn't have this much pain if there weren't something potentially dangerous going on in his/her head	0	1	2	3	
12. My child avoids external reminders of a stressful experience (for example, people, places, conversations, activities, objects, or situations)	0	1	2	3	
13. My child stops what he/she is doing when his/her symptoms start to get worse	0	1	2	3	
14. If my child knows that something will make his/her symptoms worse he/she won't do it anymore	0	1	2	3	
15. Because of my child's symptoms most days he/she spends more time resting than doing activities	0	1	2	3	
16. Most days my child's symptoms keep him/her from doing much at all	0	1	2	3	

Fear Avoidance Behaviour: Parent Score:

RECOVERY

- 86-89% of children recovery within 90 days. 45% recover 14 days. (Zemek, 2016, JAMA)
- 48% of adults recover by 6 months in an ER study (Coffeng, 2020, BMC Open), contrary to the 14 days typically reported in athletes

PROLONGED RECOVERY - >28 DAYS

- **Mechanism of injury**- Loss of consciousness and amnesia present. Higher levels of forces are associated with prolonged recovery, bike, skateboard, ski/snowboard, MVA
- **Other Predictors**— prior concussions, number of concussions, spacing between injuries, recovery of prior concussion with symptoms lasting greater than one week, anxiety/depression past or present, learning disabilities (controversial), physician diagnosed **migraine** (past or present), sx of HA, noise sensitivity, fatigue, answering questions slowly and >4 error on mBESS. (Zemek, 2016, Ugalde 2024 in submission)
- **Symptom burden** - Initial severity score of 33 or greater predicted recovery >28 days and a score of 16 or less predicted recovery of <28 days. (MeehanJ Pediatr. 2013 September ; 163(3): 721–725.)
- In children an extensive review found initial symptoms severity, sleep disturbance and symptoms with VOMS (vestibular) testing were the only factors strongly associated with prolonged recovery (Makdissi, 2023 Br J Sports Med).

PREDICTORS FOR ADULTS FOR PROLONGED RECOVERY

- the highest probability of PPCS derived in the Derivation Cohort were: Age >61 years ($p^{\wedge} = 0.54$), bipolar disorder ($p^{\wedge} = 0.52$), high pre-injury primary care visits per year ($p^{\wedge} = 0.46$), personality disorders ($p^{\wedge} = 0.45$), and anxiety and depression ($p^{\wedge} = 0.33$)
- Langer,et al. (2021) Prediction of risk of prolonged post-concussion symptoms: Derivation and validation of the TRICORDRR (Toronto Rehabilitation Institute Concussion Outcome Determination and Rehab Recommendations) score. PLoS Med 18(7): e1003652. <https://doi.org/10.1371/journal.pmed.1003652>

MENTAL HEALTH & RECOVERY

- Recovery > 28 days was 5x more likely with history of affective disorders and family history of disorders in children and young adults (Legarreta, 2018 JNS Pediatrics; Mooney 2022 JNS Peds). Many others have also found this relationship, but others dispute it (Makdissi 2023, Br J Sports Med).

DEVELOP NOVEL AFFECTIVE SYMPTOMS/DISORDERS AFTER CONCUSSION

- In a recent controlled study, children with mTBI were more likely to develop novel psychiatric disorders by 3 months post injury compared to orthopedic injuries, even when controlling for prior psychiatric history, family psychiatric history and socioeconomic status. Max, 2021, Neurotrauma
- In a secondary analysis of a RCT in concussion in youth with recovery > 30 days found 40% had clinically significant depressive and 25% anxiety symptoms (Chrisman, 2021, Brain Injury).

CURRENT ACTIVE SYMPTOMS WITH CONCUSSION

- Current affective symptoms in 12-18 year olds measured by GAD-7 were associated with prolonged recovery >30 days. The PHQ-8 was not (Wilmoth, 2021, Arch Clinical Neuropsych).
- Active affective symptoms of current concussion was associated with an increased risk of recurrent concussion; irritability 2.24x, sadness 2.04x and nervousness 2.05x, Trouble falling asleep 1.96x and sleeping less than usual 2.07x (Curry, 2019, J Ped)

AFFECTIVE DISORDERS AND RISK OF RECURRENT CONCUSSION

- Prospective youth football, 5x increased risk of concussion with prior history of depression (Chrisman, 2019, J Ped)
- Retrospective study of Pediatric PCP clinics, 1.59x increase risk of recurrent concussion with prior history of anxiety (Curry, 2019, J Ped)
- In an ImPACT database analysis study, athletes with self reported depression and taking medications showed a 2.19x increased risk of Also higher symptoms of headache, nausea, balance difficulties, sensitivity to light and noise, numbness and visual changes with a current concussion compared to those not reporting a prior history of depression. Cognitive symptoms of fatigue, drowsiness, feeling slowed down, foggy and decreased concentration and memory were also higher in the depressed group taking medications. The only sleep symptom that was significant was sleeping too much (Ali, 2021, JNS Ped).

RECURRENT CONCUSSIONS IN CENTRAL OREGON (RETROSPECTIVE REVIEW N=522, AGES 5-18)

- With prior history of concussion, days to recovery of headache and return to play were longer than first time concussions.
- If you had prior history of headache your risk of recurrent concussion was 2.73x greater
- If you have a history of depression your risk of recurrent concussion was 2.75x greater
- If you have a history of anxiety your risk of recurrent concussion was 3.05x greater
- These relationships are not clearly understood and need further prospective study
- (Ugalde, in submission process)
- History of prior concussion is clearly a predictor of recurrent concussion (Makdissi, 2023, Br J Sport Med)

REFERRAL TO BEHAVIORAL HEALTH

- Anxiety related to disruption of school, work, relationships
- Depression with all of the above
- PTSD like symptoms for some, especially if MVA or assault
- Address Fear and Avoidance
- EMDR not contraindicated

SCREEN TIME

- No screens for 48-72 hours then gradual return
- [JAMA Pediatrics](#) 2021 Nov; 175(11): 1–8.
- Effect of Screen Time on Recovery From Concussion
- A Randomized Clinical Trial
- Theodore Macnow, MD, Tess Curran, MD, MPH, [...], and Rebekah Mannix, MD, MPH
- Recovery was 3.5 days in those restricted from screens for the first 48 hours and 8 days for those not restricted.



OTHER TREATMENT RECOMMENDATIONS

- **Dizziness and vertigo or +VOMS** – refer to vestibular PT, OT vision at Sparks (St. Charles doesn't have an OT vision specialist at this time), neuro-optometry or Dr. Plasker (neuro-chiropractor)
- **Poor cognition** – branched chain amino acids (see supplement sheet). Can consider hyperbaric oxygen, but only level V evidence.
- **Light and noise sensitivity** – hats, blue tint glasses, sunglasses, noise cancelling ear buds, but encourage exposure desensitization rather than ongoing avoidance
- **Physical activity**– get them to walk or move for 20 minutes daily. If exercise triggers symptoms sent them for Buffalo Concussion treadmill test for exercise script. TAI and Laura Ahmed at Aspire do a good job with this.



Mild TBI/Concussion Temporary Accommodations Plan

These are recommendations and over time may need to be adjusted through the school Concussion Management Team. If any questions or concerns please call your provider. **"PLEASE SIGN BACK OF FORM ROI"**

Patient name: _____ Date: _____

Current symptoms: ☐ Headaches ☐ Difficulty remembering ☐ Sensitivity to light ☐ Fatigue ☐ Decreased attention

☐ Other: _____

Physician Name: _____ Phone: _____ Physician Signature: _____

The patient will be reevaluated for revision of these recommendations in _____ weeks. Date: _____

☐ These Are Initial Recommendations ☐ These Are Follow-Up Recommendations

Area	Requested Accommodations	Comments/ Clarifications
Attendance	<input type="checkbox"/> No School until _____ <input type="checkbox"/> Partial School day as tolerated by student <input type="checkbox"/> Full school day as tolerated by student	
Breaks	<input type="checkbox"/> If symptoms appear/worsen, allow student to go to quiet area or nurse's office; if no improvement after 30 min allow dismissal to home <input type="checkbox"/> Water bottle in class / snack every 3-4 hours as needed <input type="checkbox"/> Allow breaks during the day as needed by student or school personnel	
Visual Stimulus	<input type="checkbox"/> Limit iPad use <input type="checkbox"/> Limited computer, TV screen, bright screen use <input type="checkbox"/> Allow handwritten assignments or more instructions for homework <input type="checkbox"/> Allow student to wear sunglasses/hat in school, seat student away from windows and bright lights <input type="checkbox"/> Change classroom seating to front of room as necessary	
Auditory Stimulus	<input type="checkbox"/> Avoid loud classroom activities and/or classes (i.e. band, shop, choir) <input type="checkbox"/> Lunch in a quiet place with a friend <input type="checkbox"/> Allow student to wear earplugs as needed <input type="checkbox"/> Allow class transitions before bell	
School Work	<input type="checkbox"/> Simplify tasks <input type="checkbox"/> Reduce overall amount of in-class work or homework to essentials. <input type="checkbox"/> No homework <input type="checkbox"/> Extra tutoring/assistance requested <input type="checkbox"/> May begin make-up of essential work (critical tasks only, consider alternative ways for student to demonstrate knowledge) <input type="checkbox"/> Provide extended time to complete assignments and/or shortened assignments	
Testing	<input type="checkbox"/> No or limited testing during recovery periods (midterms, finals, standardized, unit tests) until student is cleared. <input type="checkbox"/> Additional time/untimed testing <input type="checkbox"/> No more than one test a day <input type="checkbox"/> Provide extended time to take tests in a quiet environment (do not mark if student is deferred from test taking)	
Emotional Development Plan	<input type="checkbox"/> Develop an emotional support plan for the student (may include an adult with whom the student can talk, if feeling overwhelmed)	
Physical Activity	<input type="checkbox"/> No physical exertion/athletics/gym/recess <input type="checkbox"/> Walking in PE/recess only <input type="checkbox"/> May begin return to play (see OSAA form)	
Extracurricular Activities	<input type="checkbox"/> Ok to participate in school dances <input type="checkbox"/> Ok to attend school/sporting events/field trips (Please specify) <input type="checkbox"/> Other (Please specify)	

Parents: Please share this document with your School Nurse or Concussion Management Team.



CONCUSSION COACHING

An extension of Traumatic Brain Injury support in your school

(541) 693-5712

sue.hayes@hdsd.org

PARTNERING WITH SCHOOLS WHEN CONCUSSIONS DON'T RESOLVE

We know that 70% of concussions are going to resolve within 4 weeks, however, when a student exhibits persisting symptoms, the struggle to engage in school, physical and social activities may continue. We offer concussion support as an extension of your team.

OUR TEAM OF COACHES

- Trained in Concussion/TBI
- Experienced in instructional and personal coaching strategies
- Trained in Special Education
- Experienced in working and collaborating with school teams

OUR SERVICES

- Extensive classroom observations and feedback
- Coaching for students and teachers
- Coaching for parents (including clarifying school supports and providing communication assistance)
- Development and monitoring of plans
- Communication with counselors, nurses and necessary members of the Concussion Management Team in your school



TAP US FOR SUPPORT WHEN:

- Students are unresolved after the typical 4-week period, or persisting symptoms indicate a need for earlier intervention
- Students are not attending school even though they have been released to attend
- You are in need of a coach to academically assess the student
- Gathering information for the development and support of 504 plans
- A parent is in need of more information on concussion or needs to share their story and is requesting extensive time
- Students are concussed and have a history of mental health concerns, anxiety, behavioral issues, ADD, ADHD, or a history of prior concussions
- Students have been part of developing a school plan with staff and are unable to follow it
- You would like to increase communication with local physicians in order to create more seamless transitions (including sharing the Accommodations form)
- A student may not graduate due to concussion-related challenges

FIRST LINE PROVIDERS

- The Center Foundation ATCs @ High School
 - Bend LaPine, Sisters, Crook County, Madras
- Redmond and Ridgeview HS have independent ATCs, partial with Culver HS
- School RN
- ER – tried to introduce ACE/SCAT 5, not readily adopted. Do have school accommodations in EPIC
- PCP – increasing adoption of SCAT5 and school accommodations form
- Now Care



Welcome to Bend-La Pine Schools

High Schools

BEND SENIOR HIGH

230 NE 6th Street • Bend, OR 97701

541-355-3700

541-355-3910 fax

BEND TECH ACADEMY @ MARSHALL HIGH

1291 NE 5th Street • Bend, OR 97701

541-355-3500

541-355-3510 fax

CALDERA HIGH

15th Street • Bend, OR 97702

541-355-5000

541-610-1858 fax OSAA form

541-355-5110 fax school accommodations

LA PINE HIGH

51633 Coach Road, P.O. Box 306 • La Pine, OR 97739

541-355-8400

541-945-7803 fax OSAA form

541-355-8410 fax school accommodations

MOUNTAIN VIEW HIGH

2755 NE 27th Street • Bend, OR 97701

541-355-4400

541-945-7630 fax OSAA form

541-355-4410 fax school accommodations

REALMS HIGH

20730 Brinson Blvd • Bend, OR 97701

541-355-5500

541-355-5510 fax

SUMMIT HIGH

2855 NW Clearwater Drive • Bend, OR 97703

541-355-4000

541-945-7637 fax OSAA form

541-355-4210 fax school accommodations

Middle Schools

CASCADE MIDDLE

19619 Mountaineer Way • Bend, OR 97702

541-355-7000

541-355-7010 fax

HIGH DESERT MIDDLE

61000 Diamondback Lane • Bend, OR 97702

541-355-7200

541-355-7210 fax

LA PINE MIDDLE

16360 1st Street, P.O. Box 305 • La Pine, OR 97739

541-355-8200

541-355-8210 fax

PACIFIC CREST MIDDLE

3030 NW Elwood Lane • Bend, OR 97703

541-355-7800

541-355-7810 fax

PILOT BUTTE MIDDLE

1501 NE Neff Road • Bend, OR 97701

541-355-7400

541-355-7410 fax

REALMS MIDDLE

63175 OB Riley Road • Bend, OR 97703

541-355-4900

541-355-4910 fax

SEVEN PEAKS MIDDLE (Private)

19660 Mountaineer Way • Bend, OR 97702

541-382-7755

541-382-8044 fax

SKY VIEW MIDDLE

63555 18th Street • Bend, OR 97701

541-355-7600

541-355-7610 fax

Elementary Schools

AMITY CREEK MAGNET @ THOMPSON

437 NW Wall Street • Bend, OR 97703
541-355-2800

BEAR CREEK ELEMENTARY

51 SE 13th Street • Bend, OR 97702
541-355-1400
541-355-1410 fax

BUCKINGHAM ELEMENTARY

62560 Hamby Road • Bend, OR 97701
541-355-2600
541-355-2610 fax

ELK MEADOW ELEMENTARY

60880 Brookswood Blvd • Bend, OR 97702
541-355-1500
541-355-1510 fax

ENSWORTH ELEMENTARY

2150 NE Daggett Lane • Bend, OR 97701
541-355-1600
541-355-1610 fax

HIGH LAKES ELEMENTARY

2500 NW High Lakes Loop • Bend, OR 97703
541-355-1700
541-355-1710 fax

HIGHLAND MAGNET @ KENWOOD

701 NW Newport Avenue • Bend, OR 97703
541-355-1900
541-355-1910 fax

JUNIPER ELEMENTARY

1300 NE Norton Ave • Bend, OR 97701
541-355-1800
541-355-1810 fax

LA PINE ELEMENTARY

51615 Coach Road • La Pine, OR 97739
541-355-8000
541-355-8010 fax

LAVA RIDGE ELEMENTARY

20805 Cooley Road • Bend, OR 97701
541-355-2400
541-355-2410 fax

NORTH STAR ELEMENTARY

63567 NW Brownrigg Ln • Bend, OR 97703
541-355-2300
541-355-2310 fax

PINE RIDGE ELEMENTARY

19840 Hollygrape Street • Bend, OR 97702
541-355-2700
541-355-2710 fax

PONDEROSA ELEMENTARY

3790 NE Purcell Blvd • Bend, OR 97701
541-355-4300
541-355-4310 fax

R. E. JEWELL ELEMENTARY

20550 Murphy Road • Bend, OR 97702
541-355-2100
541-355-2110 fax

ROSAND ELEMENTARY

52350 Yaeger Way, P.O. Box 3360 • La Pine, OR 97739
541-355-8100
541-355-8110 fax

SILVER RAIL ELEMENTARY

61530 SE Stone Creek Lane • Bend, OR 97702
541-355-2900
541-355-2910 fax

THREE RIVERS K-8

56900 Enterprise Drive • Sunriver, OR 97707
541-355-3000
541-355-3010 fax

WESTSIDE VILLAGE MAGNET @ KINGSTON

1101 NW 12th Street • Bend, OR 97703
541-355-2000
541-355-2010 fax

WILLIAM E. MILLER ELEMENTARY

300 NW Crosby Drive • Bend, OR 97703
541-355-2500
541-355-2510 fax

Redmond School District

145 SE Salmon Drive
Redmond, OR 97756
(541) 923-5437
FAX: (541) 923-5142

<https://redmondschools.org>

Redmond High School
675 SW Rimrock Way
Redmond, OR 97756
(541) 923-4800
Fax # 541-548-0809

<http://rhs.redmond.k12.or.us>

Ridgeview High School
4555 SW Elkhorn Ave
Redmond, OR 97756
(541) 504-3600
Fax # 541-504-3601

<http://rvhs.redmond.k12.or.us>

Elton Gregory Middle School
1220 NW Upas Ave
Redmond, OR 97756
Phone: (541) 526-6440
Fax # 541-526-6441

<http://egms.redmond.k12.or.us>

Obsidian Middle School
1335 SW Obsidian Ave
Redmond, OR 97756
(541) 923-4900
Fax # 541-923-6509

<http://oms.redmond.k12.or.us>

Hugh Hartman Elementary School
2105 W Antler Ave.
Redmond, OR 97756
(541) 923-8900
Fax # 541-923-8901

<https://hartman.redmondschools.org>

John Tuck Elementary School
209 NW 10th Street
Redmond, OR 97756
(541) 923-4884
Fax # 541-923-4883

<http://tuck.redmond.k12.or.us/>

M.A. Lynch Elementary School
1314 SW Kalama Ave
Redmond, OR 97756
(541) 923-4876
Fax # 541-923-4875

<http://lynch.redmond.k12.or.us>

Sage Elementary School
2790 SW Wickiup
Redmond, OR 97756
(541) 316-2830
Fax # 541-316-2831

<http://sage.redmond.k12.or.us>

Tom McCall Elementary School
1200 NW Upas Ave
Redmond, OR 97756
(541) 526-6400
Fax # 541-526-6401

<http://mccall.redmond.k12.or.us>

Vern Patrick Elementary School
3001 SW Obsidian Ave
Redmond, OR 97756
(541) 923-4830
Fax # 541-923-4833

<http://patrick.redmond.k12.or.us>

Additional Bend Schools

Trinity Lutheran School

2550 NE Butler Market Rd • Bend, OR 97701
541-382-1850
541-382-1850 fax(same)

BEND INTERNATIONAL SCHOOL (K-8)

63020 OB Riley Road • Bend, OR 97703
541-797-7038
541-797-7040 fax

BEND INTERNATIONAL SCHOOL (K-8)

63020 OB Riley Road • Bend, OR 97703
541-797-7038
541-797-7040 fax

BEND-LA PINE SCHOOLS ONLINE

63567 NW Brownrigg Ln • Bend, OR 97703
541-355-6500

DESERT SKY MONTESSORI (K-6)

150 NE Bend River Mall Suite 260 • Bend, OR 97703
541-350-2090
541-320-9032 fax

GED OPTION PROGRAM

520 NW Wall Street • Bend, OR 97703
541-355-1052

TRANSITION CO-OP

2500 NE Twin Knolls, Suite #210 • Bend, OR 97702
541-355-5630
541-355-5639 fax

RSDFlex

4555 SW Elkhorn Ave
Redmond, OR 97756
(541) 923-8928

Fax # _____

<http://rsdflex.redmond.k12.or.us>

StepUP at Edwin Brown Education Center

850 SW Antler Ave
Redmond, OR 97756
(541) 923-4868

Fax # 541-923-4867

<http://stepup.redmond.k12.or.us>

Terrebonne Community School

1199 B Street
Terrebonne, OR 97760
(541) 923-4856

Fax # 541-923-4825

<http://terrebonne.redmond.k12.or.us>

Tumalo Community School

19835 Second Street
Bend, OR 97703
(541) 382-2853

Fax # 541-389-4197

<http://tumalo.redmond.k12.or.us>

CONTACT SPORTS AND COGNITIVE DECLINE?

- Over 4 years of high school or collegiate sports there was no significant decline in neurocognitive testing. Pre and post season and over 4 seasons
- [Sports Med.](#) 2020 May;50(5):1027-1038. doi: 10.1007/s40279-019-01200-y.
- **Effect of Routine Sport Participation on Short-Term Clinical Neurological Outcomes: A Comparison of Non-Contact, Contact, and Collision Sport Athletes.**
- [Eckner JT](#)¹, [Wang J](#)², [Nelson LD](#)³, [Bancroft R](#)⁴, [Pohorence M](#)⁴, [He X](#)², [Broglia SP](#)⁵, [Giza CC](#)⁶, [Guskiewicz KM](#)⁷, [Kutcher JS](#)^{8,9}, [McCrea M](#)³.

LONG TERM EFFECTS OF CONCUSSION

- TYPICALLY FULL RECOVERY
- MULTIPLE CONCUSSIONS CAN BE ASSOCIATED WITH LONG TERM HEADACHE SYNDROMES, MILD NEURO-COGNITIVE DEFICITS, DEPRESSION/ANXIETY
- CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE) OUTCOMES, STILL TOO EARLY TO TELL. MORE EVIDENCE OF THE TOTAL NUMBER OF SUB-CONCUSSIVE BLOWS MAY BE A SIGNIFICANT FACTOR ALONG WITH GENETICS, ETC.
- A SINGLE CONCUSSION HAS NOT BEEN ASSOCIATED WITH CTE
- MEZ, ET AL. ANN NEUROL. 2020 JAN; 87(1): 116–131. PUBLISHED ONLINE 2019 NOV 23. DOI: 10.1002/ANA.25611