CURRENT STATUS OF CONCUSSION MANAGEMENT IN CENTRAL OREGON

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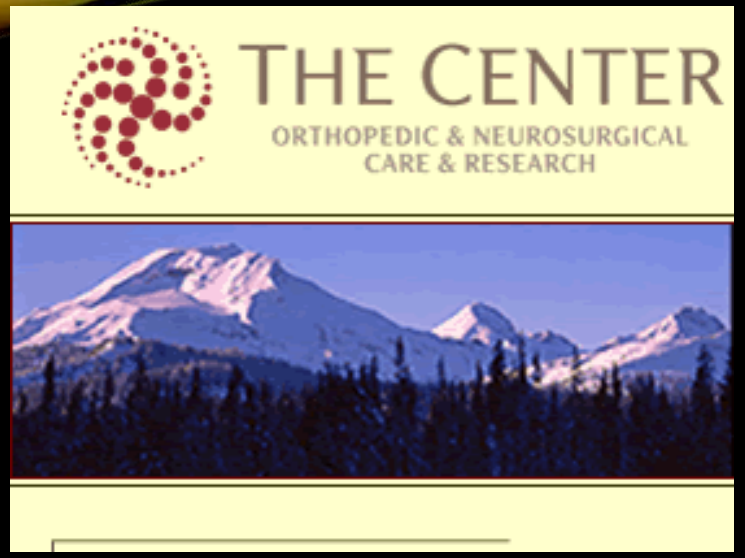


OUTLINE

Current protocols for Bend LaPine School District

Data for Bend LaPine School District

How did we do?

What else are we doing?

EPIDEMIOLOGY

- Centers for Disease Control and Prevention estimated that 1.6-3.8 million sports- and recreation-related concussions occur in the United States each year 2014. Newer data indicates that CDC data banks capture 1/9 concussions.

EPIDEMIOLOGY

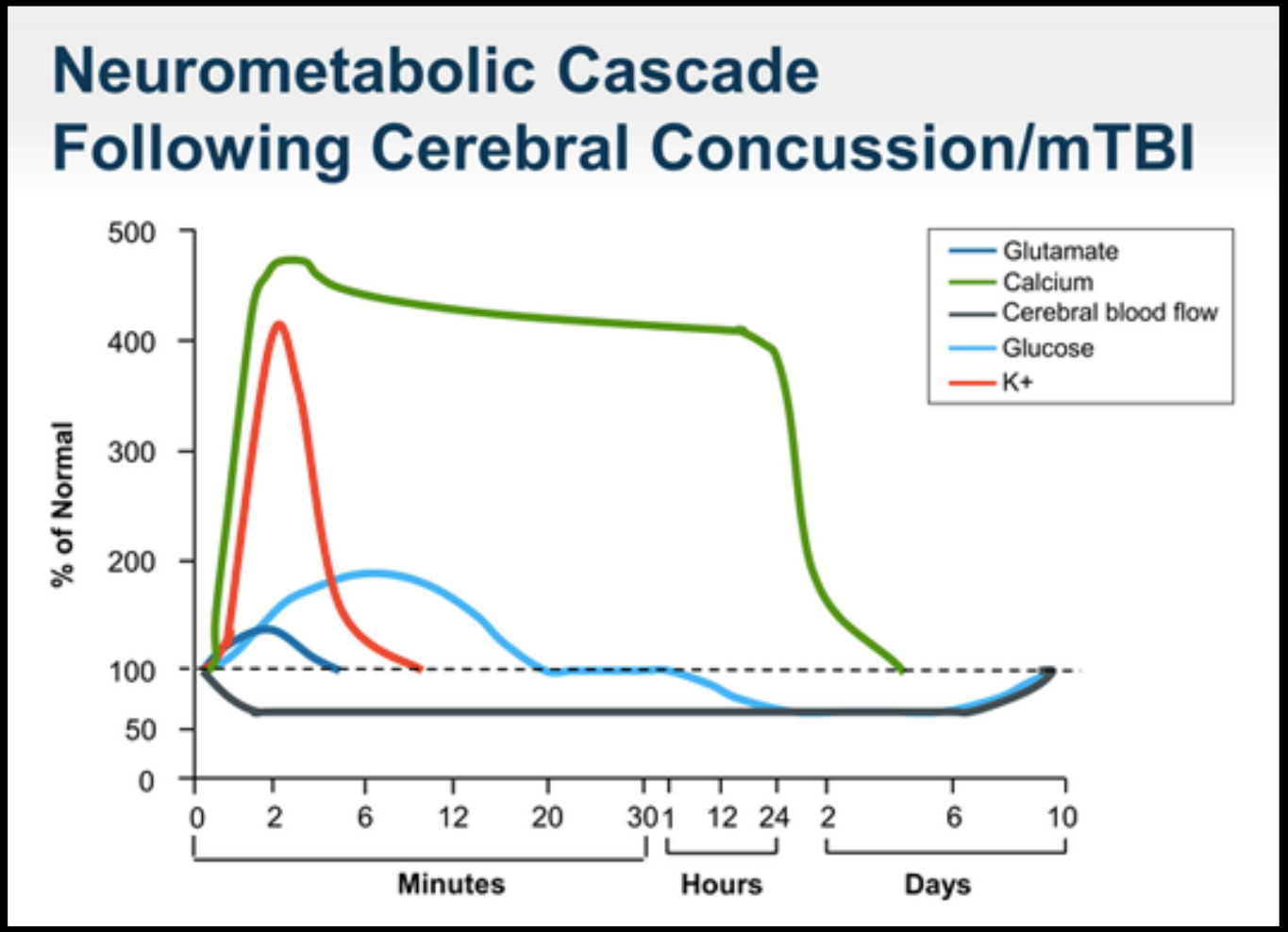
- Approximately 1.74 million people sustain a TBI in the US each year
- High incidence in football, hockey, soccer, boxing
- Up to 20% of athletes in a contact sport experience a concussion
- > 80% of athletes with a past concussion did not recognize it as such
- Evans, R. W., FAANClinical, & Baylor, N. (2017, January). Concussion and mild traumatic brain injury. Retrieved February 5, 2017, from https://www.uptodate.com/contents/concussion-and-mild-traumatic-brain-injury?source=search_result&search=concussion&selectedTitle=1~50#H1378019

DEFINITION OF CONCUSSION

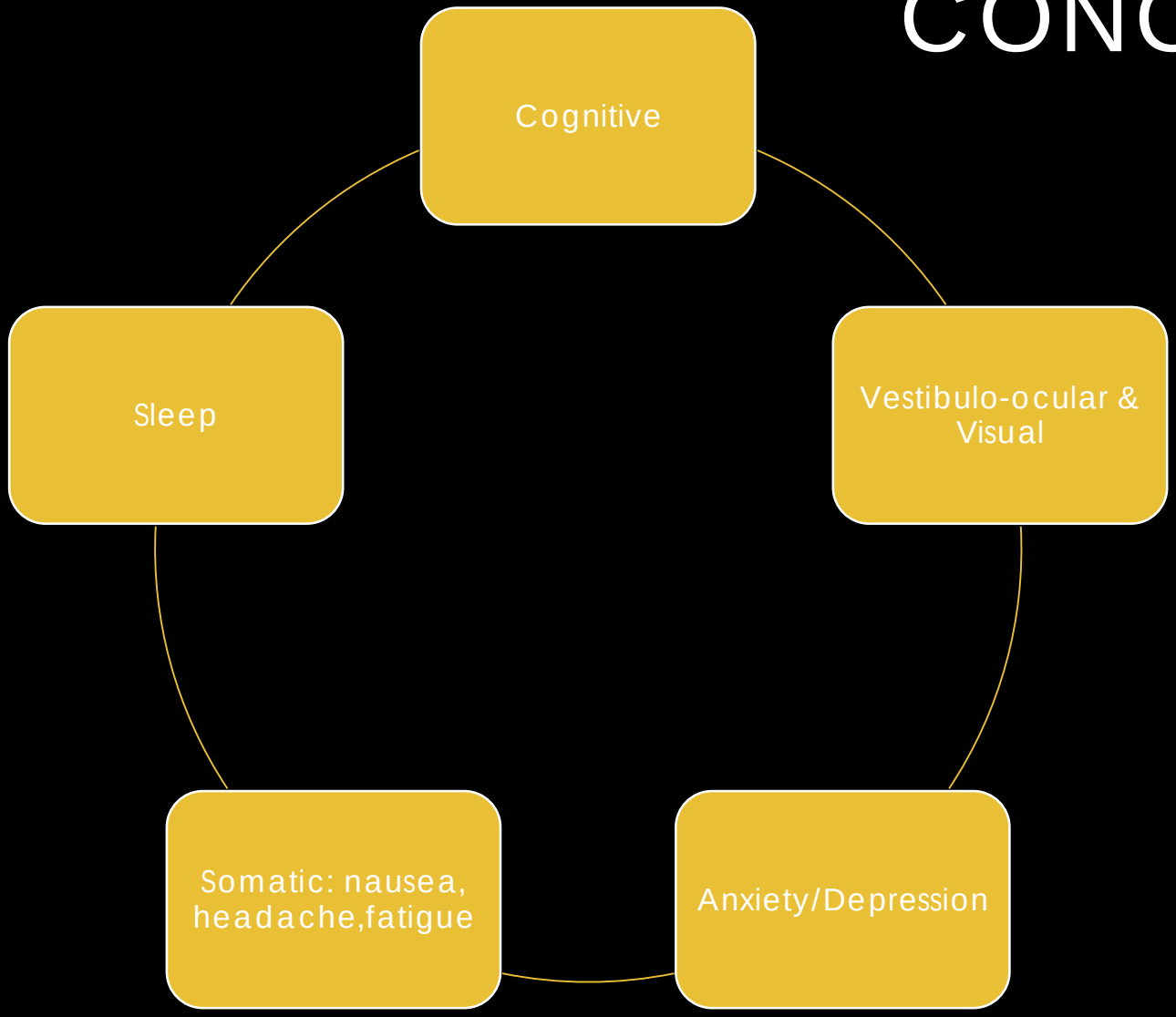
- CDC – a type of traumatic brain injury (TBI) caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth.

- **No Loss of Consciousness** is needed to diagnose concussion.

PATHOPHYSIOLOGY



CONCUSSION


Cognitive
Vestibulo-ocular & Visual
Anxiety/Depression
Somatic: nausea, headache,fatigue
Sleep

SECOND IMPACT SYNDROME

Occurs when a second head injury occurs before the first has fully healed:

- Dysautoregulation of cerebrovasculature
- Catecholamine induced hypertension
- Leads to fatal brain edema
- All reported cases are in athletes < 20 years old

Estimated 50% mortality

CURRENT PROTOCOLS/RESOURCES

- Bend LaPine School District – updated 2017
- OCAMP/CBIRT https://cbirt.org/concussion/concussion-resources
- CDC Heads Up http://www.cdc.gov/headsup/providers/training/index.html
- NFHS http://www.nfhs.org/media/1018446/suggested_guidelines_management_concussion_april_2017.pdf
- Berlin 5th International Consensus 2016 bjsm.bmj.com/content/early/2017/04/26/bjsports-2017-097699

BEND LAPINE SCHOOL DISTRICT PROTOCOL

- Routine baseline ImPACT testing for high risk sports, offered to other sports
- ATC sideline evaluation and referral
- Cognitive and physical rest (progressive return to activity)
- School accommodations, Return to Learn
- Release to play: symptom free, normal balance testing and attending school without accommodations, then post-injury ImPACT testing
- Final clearance occurs after completion of return to play protocol

SCAT 5

- bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097506SCAT5.full.pdf

SCAT 5 is developed for ages >13

Child SCAT 5 is developed for ages 5-12

Table 2
Frequency of symptoms observed at the sideline evaluation and observed or reported at the initial follow-up examination

Symptoms of injured athletes	Percentage
Sideline evaluation	
Headache	93.6
Dizziness	85.1
Confusion/disorientation	83.0
Nausea	53.2
LOC	25.5
Retrograde amnesia	13.0
Vomiting	4.3
Initial follow-up examination	
Headache	57.4
Cognitive impairment	55.3
Fatigue	44.0
Memory problems	37.2
Nausea	31.9
Concentration problems	29.8
Dizziness	23.4
Weakness	17.0
Irritability	17.0
Impaired vision	14.9
Sleep problems	14.9
Sensitivity to light	12.8
Depression	10.6
Nervousness	8.5
Vomiting	0.0
Other sensory problems	0.0

Abbreviation: LOC, loss of consciousness.

From Erlanger D, Kaushik T, Cantu R, et al. Symptom-based assessment of the severity of concussion. J Neurosurg 2003;98(3):480; with permission.

VISUAL TESTING

VOMS –

Smooth pursuits

Quick change pursuits

Focusing on an item brought to the nose

Focusing while turning your head

Focusing while turning your body

BALANCE ERROR SCORING SYSTEM

Box 1: Balance error scoring system (BESS)

Test procedure

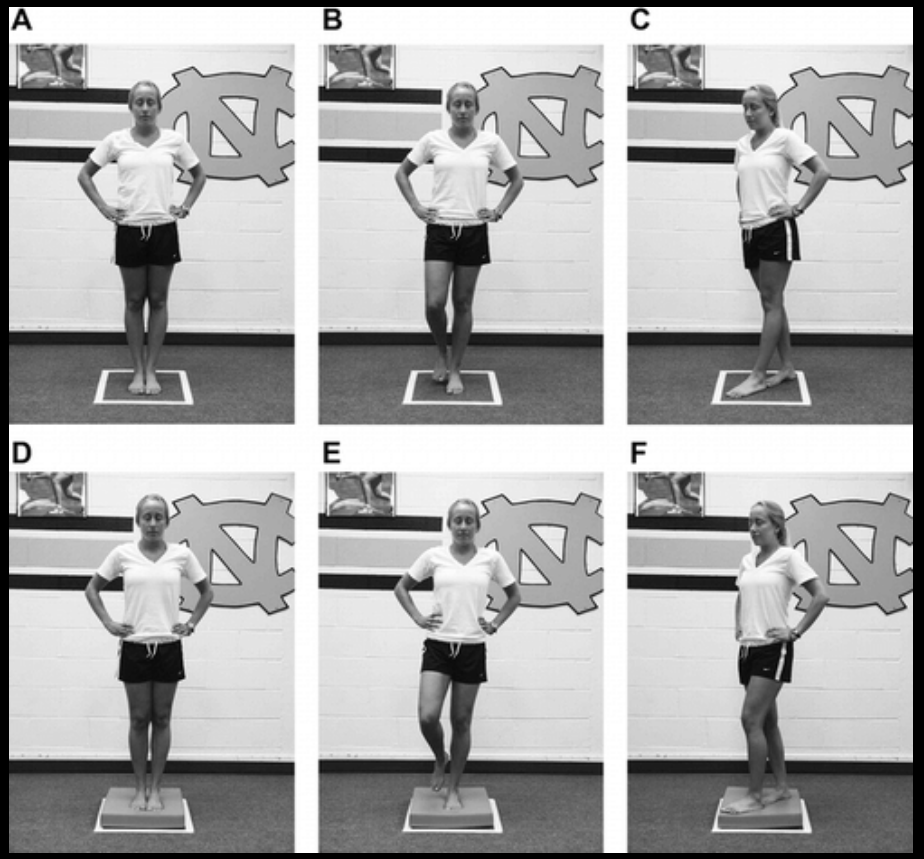
- Test in three different stances (both feet, nondominant foot, tandem), two times each (once on firm surface, once on medium-density foam 45 cm^2 × 13 cm thick, density 60 kg/m^3, load deflection 80–90 kg).
- Place hands on iliac crests, close eyes.
- Once eyes are closed, test for 20 seconds.
- On one foot, elevated leg is maintained at 20° to 30° hip flexion and 40° to 50° knee flexion.
- Stand as quietly as possible in position.
- If balance is lost, make any necessary adjustments to return to position.
- One error point for each error committed
- Incomplete test if unable to maintain stance for more than 5 seconds.
- Maximum score of 10.

Scoring system

- Errors
- Hands lifted off iliac crest
- Opening eyes
- Step, stumble, or fall
- Moving hip into more than 30° of flexion or abduction
- Lifting forefoot or heel
- Remaining out of testing position for more than 5 seconds
- Add 1 point for each error during a 20-second trial

Modified from Guskiewicz KM. Postural stability assessment following concussion: one piece of the puzzle. Clin J Sport Med 2001;11(3):186–7.

BESS TESTING POSITIONS



AT SCHOOL /ON THE FIELD

- 6 high schools (Bend, Mt. View, Summit, LaPine, Sisters, Crook County, Madras and Culver) have dedicated athletic trainers trained in side line evaluation of concussion supervised by Center physicians. Redmond HS and Ridgeview have athletic trainers supervised by Desert Orthopedic physicians.
- Athletic Trainers are available at school, practices and games.
- Center physicians attend football, soccer, basketball games and wrestling matches.
- Pulled from the game/practice, no return to play that day.

RED FLAGS

- Worsening headache
- LOC or fluctuating level of consciousness
- Increasing irritability
- Seizures
- Neck pain
- Pupils becoming unequal in size
- Repeated vomiting
- Slurred speech
- Can’t recognize people or places
- Numbness or weakness in arms/legs
- Unusual behavior change

WHEN TO GO TO THE ER

- Prolonged Loss of Consciousness
- Vomiting, especially >2 times
- Increasing symptoms
- Neurological deficit
- Signs of a skull fracture
- Suspected cervical spine injury
- Social situation
- Travel considerations

EVALUATION WITH NEUROIMAGING

Routine CT scanning is **NOT** needed for the diagnosis of a concussion

CONCUSSION MANAGEMENT

Athletic Trainers

School Nurses/Counselors

ER, Urgent Care

PCPs/Specialty Care/NeuroPsy

Teachers/Coaches

FOLLOW UP AFTER ATC EVAL

- ER if neurological deficits or LOC or if after repeat evaluations and stabilization/improvement send home with Concussion guide
- Refer to Now Care at the Center for follow up – seen by physiatrist or neurosurgery PA for management and eventual clearance
- May be seen by PCP, school based clinic NP, Pediatrician, neuropsychologist, neurologist or orthopedist

BASELINE IMPACT TESTING

- “Mandatory” Baseline neurocognitive (ImPACT) Testing for high risk sports
  - Football
  - Girls and Boys soccer
  - Girls and boys basketball
  - Wrestling
- Recommended for Lacrosse, rugby, alpine skiing, volleyball, others
- Paid for by TCF for mandatory testing, offered $15 for all others
- Tests memory, reaction time and ability to do “new learning”

USEFULNESS OF IMPACT

- Additional information regarding memory and reaction time
- Athletes tested every 2 years to account for age improvement in reaction time
- Memory testing is more sensitive for assessing concussion than mental status questions
- Use of a neuropsychologist is key in interpretation
- Administer in groups of 4 or less
- Quality control reviews of baseline testing for invalid or suboptimal effort

RECOMMENDATIONS FOR COMPUTERIZED NT TESTING

- Be aware of limitations
- ImPACT continuing to improve
- Recent adjustment of “Reliable change” or statistically significant differences reported for comparison with baseline to post-injury scores
- Should be considered only a part of a multi-dimensional approach to concussion management
- With “passport” any clinician can access ImPACT scores, but interpretation is a concern.

IMPACT POST INJURY TEST

- No longer in protocol for automatic post-injury test within 72 hours if it is clearly a concussion.
- Athlete and parents are given instructions for cognitive and physical rest.
- Academic accommodations are provided to student and school.
- Once athlete is symptom free, BESS testing is within a normal range, then post-exertional ImPACT testing is performed at that time either at the Center or at the school.

RETURN TO BASELINE

- BESS returned to normal control level in collegiate athletes in 4 days post concussion, in high school athletes in 7 days. (Guskiewicz)
- ImPACT testing commonly returns to baseline in 10-14 days.
- Divided attention gait task in collegiate athletes took 6 weeks to return to control levels. (Chou)

Student Name:_____ Date of Evaluation_____ Staff Contact:_____

ACADEMIC ADJUSTMENTS FOLLOWING CONCUSSION

Following concussion, students who receive academic adjustments without penalty for missed work are more successful and better able to reintegrate into school. Use this list as a guide. Be flexible and monitor frequently for signs of fatigue. Provide adjustments as needed, and remove when no longer necessary.

GENERAL	COGNITIVE/THINKING	FATIGUE/PHYSICAL	EMOTIONAL
No school until specified To be reviewed on: _____	Reduce class assignments and homework to critical tasks only. Exempt non-essential written classwork or homework. Base grades on adjusted work.	Allow time to visit school nurse/counselor for treatment of headaches or other symptoms.	Develop plan so student can discreetly leave class as needed for rest.
Adjust class schedule (alternate days, shortened day, abbreviated class, late start to day).	Provide extended time to complete assignments/tests. Adjust due dates.	Allow strategic rest breaks (e.g., 5-10 minutes every 30-45 minutes) during the day.	Keep student engaged in extra-curricular activities. Allow student to attend but not fully participate in sports practice.
No PE classes (Including weight training, aerobics, yoga, dance) until cleared by a healthcare professional. No physical play at recess.	Once key learning objective has been presented, reduce repetition to maximize cognitive stamina (e.g., assign 5 of 30 math problems).	Allow hall passing time before or after crowds have cleared	Encourage student to explore alternative and appropriate activities of non-physical nature.
Avoid noisy and over-stimulating environments (e.g., band) if symptoms increase.	Allow student to demonstrate understanding of concepts orally instead of in writing.	Allow student to wear sunglasses indoors. Control for light sensitivity (e.g. draw blinds, sit away from window, hat with brim).	Develop an emotional support plan for the student (e.g., identify adult to talk with if feeling overwhelmed).
Allow student to drop high level or elective classes without penalty if accommodations go on for a long period of time.	Provide written instructions for homework/classwork that is deemed essential.	Allow student to study or work in a quiet space away from visual and noise stimulation.	Provide quiet place to allow for de-stimulation.
Allow student to audit class (i.e., participate without producing or grades).	Provide class notes by teacher or peer. Allow use of computer, smart phone, tape recorder.	Allow student to spend lunch/recess in quiet space for rest and control for noise sensitivity.	
Remove or limit testing (e.g., midterms, finals, standardized) or high stakes projects.	Allow utilization of notes and/or word banks for test taking due to memory issues.	Provide a quiet environment to take tests.	
Alternate periods of mental exertion with periods of mental rest.		Don't substitute mental for physical activity (e.g., assign reading during PE).	

If student symptoms persist for several months and/or are severe (i.e., symptoms compromise student's attendance, or quantity of work is so limited that it jeopardizes grades/credit accumulation), contact your district or building 504 coordinator to determine if a 504 plan would be beneficial. If prolonged recovery requires specialized instruction/placement, or modified curriculum, refer student for special education services.

Adapted from
Oregon Concussion and Management Program (OCAMP) and
Slocum Sports Concussion Program

ACADEMIC PROTOCOLS

- https://cbirt.org/sites/cbirt.org/files/resources/academic_accommodations_8.30.17.pdf
- Brain 101 – Ann Glang, undergoing renovations
- Return to Learning protocol recommended by the AAP Pediatrics 2013 Nov;132(5):948-957

cbirt

TBI Tips

Return to Academics Protocol after Concussion/Mild TBI

After a concussion, teachers might be unaware of a student's cognitive difficulties during recovery because s/he looks normal. Rest is needed for the brain to recover from a concussion. Taxing the brain with academic activity can impede or prolong recovery. Most students will recover fully in a few days or weeks, but some will take longer to heal. Each brain injury is different. If full recovery is not evident in three months, an IEP might be helpful to meet a student's specific learning challenges.

Not all students will need academic accommodations following concussion; consult with each student's healthcare provider. All steps in this academic protocol must be completed before a student-athlete is ready to proceed to a return-to-play protocol.

Step 1. Total rest.	• No mental exertion (computer, texting, video games, or homework), stay at home, no driving.
Step 2. Light mental activity.	•Up to 30 minutes of mental exertion but no prolonged concentration, stay at home, no driving. •Progress to next level when able to handle 30 minutes of mental exertion without worsening of symptoms.
Step 3. Part-time school.	•Maximum accommodations (shortened day/schedule, built-in breaks, provide quiet place for mental rest, no significant classroom or standardized testing, modify rather than postpone academics, and provide extra time, extra help, and modified assignments). •Progress to next level when able to handle 30–40 minutes of mental exertion without worsening of symptoms.
Step 4. Part-time school.	•Moderate accommodations (no standardized testing, modified classroom testing, moderate decrease in extra time, help, and modification of assignments). •Progress to next level when able to handle 60 minutes of mental exertion without worsening of symptoms.
Step 5. Full-time school.	•Minimal accommodations (no standardized testing, but routine testing ok; continued decreasing extra time, help, and modification of assignments; might require more supports in academically challenging subjects). •Progress to next level when able to handle all class periods in succession without worsening of symptoms AND medical clearance is given for full return to academics.
Step 6. Full-time school.	•Full academics with no accommodations (attends all classes, full homework).

Should symptoms continue beyond 3–4 weeks, prolonged in-school support is required. Request a 504 meeting to plan and coordinate. If you have questions, contact Oregon's TBI coordinator at 1-877-872-7246.

RETURN TO LEARN

Once a patient can concentrate on a task and tolerate visual and auditory stimulation for 30 – 45 minute, they may return to school with academic adjustments:

- Limited course load
- Shortened classes or school day
- Increased rest time
- Aids for learning (Ex: class notes, tutor)
- Postponement of high-stakes testing (Ex: ACT/SAT)

Ear plugs and tinted glasses may also help with the return to school

DURATION OF SYMPTOMS OF CONCUSSION

- Risk factors for prolonged symptoms
  - High school athletes (compared to collegiate or professional)
  - History of prior concussion
  - Higher number of postconcussion symptoms

- Arch Phys Med Rehabil. 2014;95(3Suppl):S210-229

TIME LOSS FROM WORK/SCHOOL

- Headache and fatigue were significant predictors of >10 days of time loss from sport in NHL.
- Benson, et al. CMAJ. 2011; 183: 905-911

- In adults only the higher initial symptom severity on symptom checklist mean 42.5/126 was a predictor for symptoms lasting>28 days.
- Meehan, et al. J Sci Med Sport 2016 sep;19 (9):722-725.

CONCUSSION RECOVERY

- Majority (80-90%) of concussions resolve in 7-10 days
- Recovery time may be longer in children
- Persistent symptoms (>10 days) are reported in 10-15%

Symptoms >3 months = Post-Concussive Syndrome

SYMPTOMS ASSOCIATED W/ PROLONGED RECOVERY

① Initial signs or symptoms (>4)

② Loss of consciousness for > 1 minute

③ Vestibular symptoms (dizziness, vertigo, abnormal gait)

④ Delayed symptom onset

⑤ Number of prior concussions

⑥ **Premorbid conditions:** history of headache/migraine, learning disorder (Ex: dyslexia, ADHD), psychiatric disorder (Ex: anxiety, depression), or family history of any of the above

SYMPTOM MANAGEMENT

Headaches:

- Ibuprofen 400mg TID (SE: rebound HA)
- Gabapentin 100 – 300mg TID
- Amitriptyline/Nortriptyline – low dose
- Vitamin B2 (riboflavin) 400mg daily
- Magnesium 600mg daily
- Alpha lipoic acid
- Coenzyme Q10
- Acupuncture

Dizziness, Neck Pain and Vertigo

- Physical Therapy, Occupational Therapy

SYMPTOM MANAGEMENT

Nausea

- Activity modification
- Ondansetron (SE: HA, drowsiness, dizziness)

Sleep Disturbance

- Sleep hygiene
- Melatonin 3-5mg
- Essential oils (lavender)

PSYCHOLOGICAL INTERVENTION

Risk for clinical depression:

- 0 concussions: 6.4%
- 1-2 concussions: 9.8%
- 3+ concussions: 21.2%

Refer for counseling and/or treat with SSRI

Clinically Relevant

CLINICAL SCIENCES

Recurrent Concussion and Risk of Depression in Retired Professional Football Players

KEVIN M. GUSKIEWICZ[1,2], STEPHEN W. MARSHALL[2,3], JULIAN BAILES[4], MICHAEL MCCREA[5,6], HERNDON P. HARDING JR[7], AMY MATTHEWS[8], JOHNA REGISTER MIHALIK[1], and ROBERT C. CANTU[6,9]

[1]Departments of Exercise and Sport Science, [2]Orthopedics, and [3]Epidemiology, University of North Carolina at Chapel Hill, Chapel Hill, NC; [4]Department of Neurosurgery, West Virginia University School of Medicine, Morgantown, WV; [5]Neuroscience Center, Waukesha Memorial Hospital, Waukesha, WI; [6]Department of Neurology, Medical College of Wisconsin, Milwaukee, WI; [7]Department of Psychiatry, Florida State University College of Medicine, Tallahassee, FL; [8]Neurosurgery Service, Emerson Hospital, Concord, MA; and [9]Neurological Sports Injury Center, Brigham and Women's Hospital, Boston, MA

ABSTRACT

GUSKIEWICZ, K. M., S. W. MARSHALL, J. BAILES, M. MCCREA, H. P. HARDING JR, A. MATTHEWS, J. R. MIHALIK, and R. C. CANTU. Recurrent Concussion and Risk of Depression in Retired Professional Football Players. *Med. Sci. Sports Exerc.*, Vol. 39, No. 6, pp. 903–909, 2007. Purpose: The purpose of our study was to investigate the association between prior head injury and the likelihood of being diagnosed with clinical depression among retired professional football players with prior head injury exposure. Methods: A general health questionnaire, including information about prior injuries, the SF-36 (Short Form 36), and other markers for depression, was completed by 2552 retired professional football players with an average age of 53.8 (± 13.4) yr and an average professional football-playing career of 6.6 (± 3.6) yr. A second questionnaire focusing on mild cognitive impairment (MCI)-related issues was completed by a subset of 758 retired professional football players (50 yr and older). Results: Two hundred sixty-nine (11.1%) of all respondents reported having prior or current diagnosis of clinical depression. There was an association between recurrent concussion and diagnosis of lifetime depression ($\chi^2 = 71.21$, $df = 2$, $P < 0.001$), suggesting that the prevalence increases with increasing concussion history. Compared with retired players with no history of concussion, retired players reporting three or more previous concussions (24.4%) were four times more likely to be diagnosed with depression; those with a history of one or two previous concussions (16.3%) were 1.5 times more likely to be diagnosed with depression. The analyses controlled for age, number of years since retirement, number of years played, physical component scores on the SF-36, and diagnosed comorbidities such as osteoarthritis, coronary heart disease, stroke, cancer, and diabetes. Conclusion: Our findings suggest a possible link between recurrent sports-related concussion and increased risk of clinical depression. The findings emphasize the importance of understanding potential neurological consequences of recurrent concussion. Key Words: CONCUSSION, HEAD INJURY, NEUROLOGIC, DEMENTIA, PSYCHIATRIC, NEUROLOGICAL RISK FACTORS

Guskiewicz, K., et al. Medicine & Science in Sport & Exercise, 2007;39(6), 903-909.

PHYSICAL REST – HOW LONG?

- Headaches and exercise
- Exaggerated sympathetic nervous system responses
- Increased heart rate
- Disturbed cerebral auto-regulation and cerebral blood flow

- Subsymptom threshold exercise
- Leddy, et al. Clin J Sport Med. 2010;20:21-27.

EXERCISE THERAPY

JAMA | Original Investigation

Association Between Early Participation in Physical Activity Following Acute Concussion and Persistent Postconcussive Symptoms in Children and Adolescents

Anne M. Grool, MD, PhD; Mary Aglipay, MSc; Franco Momoli, PhD; William P. Meehan III, MD; Stephen B. Freedman, MDCM, MSc; Keith Owen Yeates, PhD; Jocelyn Gravel, MD; Isabelle Gagnon, PhD; Kathy Boutis, MD; Willem Meeuwisse, MD, PhD; Nick Barrowman, PhD; Andrée-Anne Ledoux, PhD; Martin H. Osmond, MDCM; Roger Zemek, MD; for the Pediatric Emergency Research Canada (PERC) Concussion Team

IMPORTANCE Although concussion treatment guidelines advocate rest in the immediate postinjury period until symptoms resolve, no clear evidence has determined that avoiding physical activity expedites recovery.

OBJECTIVE To investigate the association between participation in physical activity within 7 days postinjury and incidence of persistent postconcussive symptoms (PPCS).

CONCLUSIONS AND RELEVANCE Among participants aged 5 to 18 years with acute concussion, physical activity within 7 days of acute injury compared with no physical activity was associated with reduced risk of PPCS at 28 days. A well-designed randomized clinical trial is needed to determine the benefits of early physical activity following concussion.

EXERCISE THERAPY

It is clear that *some rest*, both physical and cognitive, is beneficial to allow the brain to recover from the acute metabolic crisis of concussion. Conversely, *too much rest* after concussion may have adverse physiological and psychological consequences and contribute to prolonged symptoms.

Leddy, J. J., Baker, J. G., & Willer, B. (2016). Active Rehabilitation of Concussion and Post-concussion Syndrome. *Physical Medicine and Rehabilitation Clinics of North America, 27*(2), 437-454. doi:10.1016/j.pmr.2015.12.003

Regular physical activity enhances CBF control

BUFFALO CONCUSSION TREADMILL TEST

Standardized exercise test:

- Safely quantifies exercise capacity of concussed patients
- Starting speed is 3.2 – 3.6 mph, 0% incline
- Incline is increased by 1% each minute
- Test is stopped at the report of symptom exacerbation
- The heart rate is recorded at the threshold of symptom exacerbation and forms the basis for the target heart rate, or “individual exercise prescription”
- Individual is told to exercise 20 min/day, WITHOUT exceeding target heart rate
- Increase target heart rate by 5-10 bpm every 2 weeks

HELMET SAFETY

While there is no concussion-proof helmet, a helmet can help protect from a serious brain or head injury

RETURN TO PLAY

- No athlete can return to play sooner than 7 days post injury.
- Regardless of release to full play without restrictions by a provider, the school will implement a Return to Play progression for each athlete.
- Athlete must be participating in regular school academics without restrictions. (Return to Learn)
- A typical progression is Day #1 – light aerobic activity, Day #2 – sports specific exercise (no equipment/helmets), Day #3 – non-contact training, Day#4 – contact practice, Day#5 full play.
- Athlete stops progression if symptoms return.

ZURICH PAPER

Table 1 Graduated return to play protocol

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity	Symptom limited physical and cognitive rest	Recovery
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity <70% maximum permitted heart rate No resistance training	Increase HR
3. Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities	Add movement
4. Non-contact training drills	Progression to more complex training drills, eg, passing drills in football and ice hockey May start progressive resistance training	Exercise, coordination and cognitive load
5. Full-contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

Oregon School Activities Association
25200 SW Parkway Avenue, Suite 1
Wilsonville, OR 97070
503.682.6722 FAX 503.682.0960 http://www.osaa.org

CONCUSSION – RETURN TO PARTICIPATION MEDICAL RELEASE

Student Name: _____ **Date of Birth**: ___/___/___ **School/Grade**: _____

Date of Injury: ____ / ____ / ____ **Sport/ Injury Details**: _____

At this time, the student is:
- ☐ symptom-free at rest
- ☐ symptom-free at exertion
- ☐ scoring within a normal range on ImPACT
- ☐ NOT symptom-free at rest
- ☐ NOT symptom-free at exertion
- ☐ NOT scoring within a normal range on ImPACT

When ImPACT is utilized, please either attach or allow access to baseline and post concussive scores with percentiles.

Comments:_____

Completed by (Printed name): _____ Signature: _____ Date: _____

☐ Registered Athletic Trainer ☐ Coach ☐ Athletic Director ☐ Other: _____

Graduated, Step-wise Return-to-Participation Progression

1. **No activity**: Complete rest, both physical and cognitive. This may include staying home from school or limiting school hours and/or homework as activities requiring concentration and attention may worsen symptoms and delay recovery.
2. **Light aerobic exercise**: Walking or stationary bike at low intensity; no weight lifting or resistance training.

Before progressing to the next stage the student must be healthy enough to return to school full time

3. **Sport-specific exercise**: Sprinting, dribbling basketball or soccer; no helmet or equipment, no head impact activities.
4. **Non-contact training**: More complex drills in full equipment. Weight training or resistance training may begin.
5. **Full contact practice**: Participate in normal training activities.
6. **Unrestricted Return-to-Participation/full competition**. **(Earliest Date of Return-to-Participation**: _____)

The student should spend a minimum of one day at each step. If symptoms re-occur, the student must stop the activity and contact their trainer or other health care professional. Depending upon the specific type and severity of the symptoms, the student may be told to rest for 24 hours and then resume activity one-step below where he or she was when the symptoms occurred. ***Graduated return applies to all activities including sports and PE classes.***

This section to be completed by Physician/Health Care Professional:

☐ Student **may NOT return** to any sport activity until medically cleared.

☐ Student should **remain home from school** to rest and recover with a projected return date _____

☐ Please **allow classroom accommodations,** such as extra time on tests, a quiet room to take tests, and a reduced workload when possible.

Additional Recommendations: _____

☐ Student **may begin graduated return at stage circled above.** If symptom free at rest and with graded exertion, can return to participation on date above.

☐ Student is now **cleared for full contact practice/participation**: symptom free at rest and exertion and has completed a graduated Return-to-Participation protocol.

Physician/Health Care Professional Signature: _____ **Date**:_____

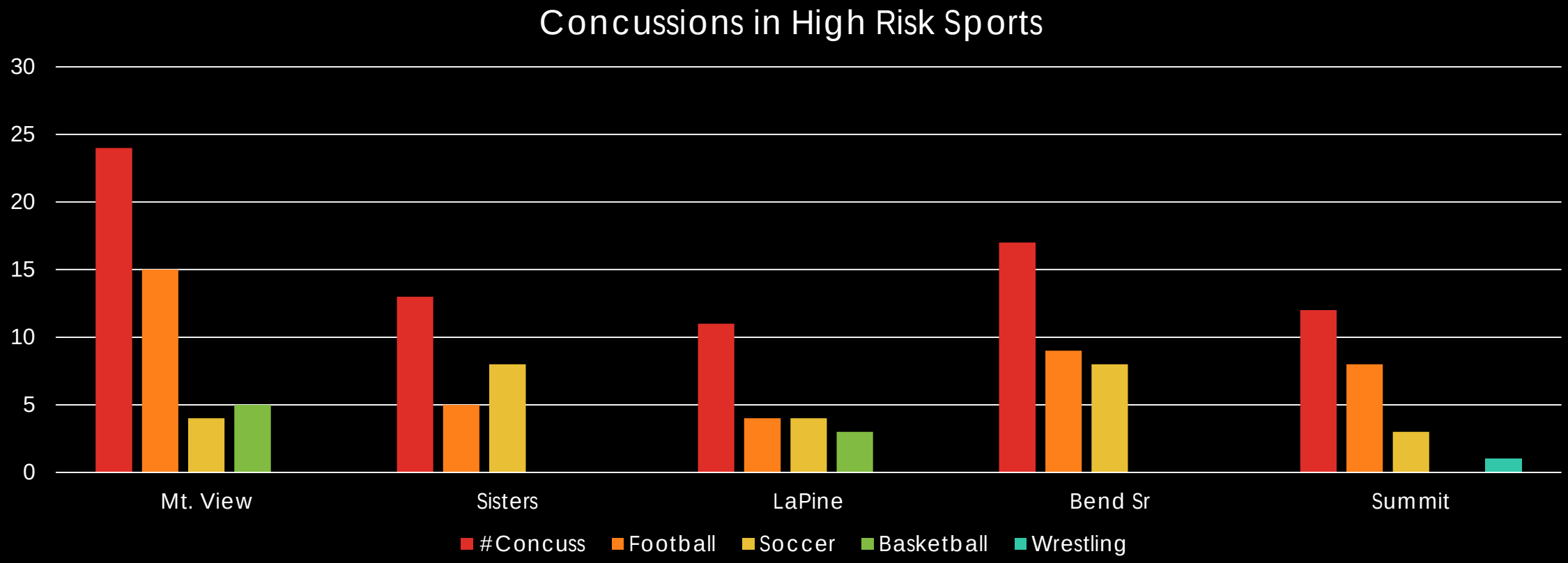
Physician/Health Care Professional Name/Title: _____ **Phone**:_____

Per OAR 581-022-0421 "Health Care Professional" means a Physician (MD), Physician's Assistant (PA), Doctor of Osteopathic (DO) licensed by the Oregon State Board of Medicine, nurse practitioner licensed by the Oregon State Board of Nursing, or Psychologist licensed by the Oregon Board of Psychologist Examiners."

SPORTSWARE DATA 2011-2013

- 2 academic years
- 5 high schools with ATC recorded concussions
- 282 total concussions in 2 years
- 17 recurrent concussions in 14 athletes = 17/282 =6% recurrent concussion rate
- Time between concussions, mean = 9 months, range .5-24 months
- Time between date of injury to return to play was 4 -111 days (small subset, Mt. View). Mean = 25.7 days

BEND LAPINE SCHOOL DISTRICT YR 2013-2014



2013-2016 ACADEMIC YEARS

- Total of 275 concussions treated by our ATC's in Bend, Sisters, Lapine, Crook County = 6 high schools
- 19 Recurrent Concussions
- Recurrence rate 6.5%, similar to 6% rate from years 2011-2013
- **Reported recurrent rates in high school athletes in Ohio were 13.5-15%**
- **Castile, L, et al. Br J Sports Med 2012; 46:603**

RECURRENT CONCUSSIONS 2013-2016

Average days between concussions was 224 days (270 days 2011-2013)

Range of days between concussions was 12 – 573 days

11 of 24 repeat concussions (in 19 athletes) had an interval between concussions of > 300 days

9 of 24 repeat concussions had an interval of 2 weeks to 3.5 months

7/19 athletes had a family history of migraines

BRAINLINE.ORG, JANE GILLETT, MD, NEUROLOGY

- If an athlete suffers 2 concussions in 1 year, “I recommend a year off from sport after the last concussion. This is considered a conservative recommendation.”

- DOES 1 YEAR OFF THE SPORT MAKE SENSE GIVEN THE COMMON COHORT WHO SUFFERS A REPEAT CONCUSSION IN >300 DAYS?

OTHER EFFORTS IN CENTRAL OREGON

- Every 2-3 months community concussion call/meeting to review latest literature and discuss/troubleshoot local issues. School nurses, physicians, PA's and nurse practicioners, PT's and other providers from Burns, Hermiston, Klamath Falls and Medford have joined us. To participate send an email to mthurber@thecenteroregon.com or call Mekenna at 541-322-2214.
- Concussion Conference Planning Committee – meets as needed. National experts come to our community – 2011, 2014, 2017
- Multi-disciplianry Concussion Clinic – monthly with myself, PT, ST and Sue Hayes from HDESD. Weekly clinics on Fridays – physician only

RETURN TO LEARN COACH

- Sue Hayes and Joe Devine from HDESD volunteered in 2015-2016 academic year to attend multidisciplinary clinic and go out to schools to give individual students and teachers coaching to implement return to learn plans for student struggling with return to academics.
- Grant received from TCF to continue efforts this academic year 2016-2017.
- Community group led by Sue Hayes to discuss options for sustainable funding for this valuable service.

CONCUSSION MANAGEMENT

- Return to play protocols are more structured and when applied reduce recurrent concussion.
- Return to learn protocols are developing, but there are still many challenges.
- Pooling of community resources improves concussion management.

- Thank you!