BOB Crash compilation

- https://www.youtube.com/watch?v=98LPuXzdzBc

Sports Specialty in Chiropractic Medicine

National University of Health Sciences

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- CCSP © Certified Chiropractic Sports Physician
- ICSC Internationally Certified Sports Chiropractor
- USOPC United States Olympic and Paralympic Committee Volunteer Medical Staff
- USABS (United States Skeleton and Bobsleigh) Volunteer Medical Staff
- FICC (Fellow of the International College of Chiropractors)
- 2016 ACA Sports Council Sports Chiropractor of The Year

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Topics in Pathways in Sports Chiropractic

- Sports Related Concussion (SRC)
- Rehabilitative Management of SRC
- Vestibular Management of SRC
- Head Trauma
- Spinal Trauma
- The Collapsed Athlete
- Safesport

USA BOBSLED Codie and Hakeem in Sigulda, Latvia

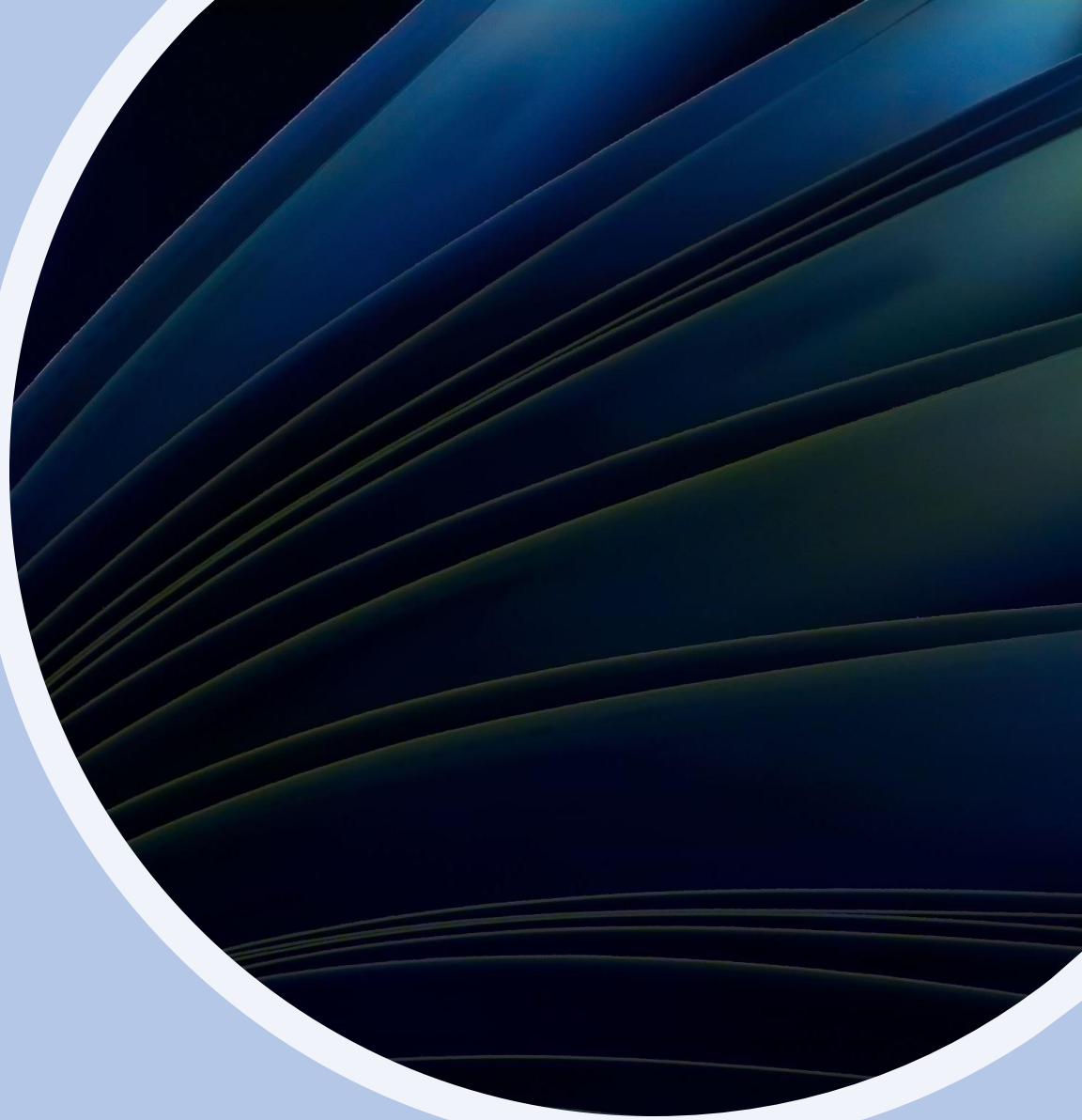
- Sigulda - OneDrive (sharepoint.com)

“YOU NEED TO KNOW

WHAT YOU NEED TO KNOW

BEFORE YOU NEED TO KNOW IT!”

William Moreau DC DACBSP



Austin’s Skeleton Crash at 78 mph

Winterburg, Germany

World Cup 2021

In Slow-Mo

Cornerstone of Concussion Management follows a graduated stepwise rehab. Strategy before returning to sport.

Expect gradual resolution within 7-10 days

Gradual return to school and social activities that does not result in significant exacerbation of symptoms

Proceed through step-wise return to sport / play (RTP) strategy

Same day return to play?

- NO!
- Unanimously agreed that no RTP should occur on the day of concussive injury

- Rest
- This changed from 2012:

- After a brief period of rest during the acute phase (24–48 hours) after injury, patients can be encouraged to become gradually and progressively more active while staying below their cognitive and physical symptom-exacerbation thresholds (ie, activity level should not bring on or worsen their symptoms).
- It is reasonable for athletes to avoid vigorous exertion while they are recovering.
- The exact amount and duration of rest is not yet well defined in the literature and requires further study.

- Rehabilitation
- SRCs can result in diverse symptoms and problems and can be associated with concurrent injury to the cervical spine and peripheral vestibular system. A variety of treatments may be required for ongoing or persistent symptoms and impairments following injury. The data support interventions including psychological, cervical and vestibular rehabilitation.
- In addition, closely monitored active rehabilitation programs involving controlled sub-symptom-threshold, submaximal exercise have been shown to be safe and may be of benefit in facilitating recovery. An example of this is:

- The Buffalo Concussion Treadmill Test

- Refer
- When persistent symptoms exist outside your wheelhouse.

- The Berlin expert consensus is that use of the term ‘persistent symptoms’ following SRC should reflect failure of normal clinical recovery—that is, symptoms that persist beyond expected time frames (i.e, >10–14 days in adults and >4 weeks in children).

- There is preliminary evidence supporting the use of:

- an individualized symptom-limited aerobic exercise program in patients with persistent post-concussive symptoms associated with autonomic instability or physical deconditioning, and

- a targeted physical therapy program in patients with cervical spine or vestibular dysfunction, and

- a collaborative approach including cognitive behavioral therapy to deal with any persistent mood or behavioral issues.

- Currently, there is limited evidence to support the use of pharmacotherapy.
- Concussed athletes should not only be free from concussion-related symptoms, but also should not be taking any pharmacological agents/medications that may mask or modify the symptoms of SRC.

- RECOVER
- At present, it is reasonable to conclude that the large majority of injured athletes recover, from a clinical perspective, within the first month of injury.

- Neurobiological recovery might extend beyond clinical recovery in some athletes. Clinicians know that some student athletes report persistent symptoms for many months after injury, that there can be multiple causes for those symptoms, and that those individuals are more likely to be included in studies conducted at specialty clinics.
- There is a growing body of literature indicating that psychological factors play a significant role in symptom recovery and contribute to risk of persistent symptoms in some cases.

RECOVER

- The strongest and most consistent predictor of slower recovery from SRC is the severity of a person's initial symptoms in the first day, or initial few days, after injury. Conversely, and importantly, having a low level of symptoms in the first day after injury is a favorable prognostic indicator.
- The development of subacute problems with migraine headaches or depression are likely risk factors for persistent symptoms lasting more than a month.

Recovery

Majority (80-90%) resolve in short (7-10 day) period

May take longer in children and adolescents

- Multiple studies suggest that physiological dysfunction may outlast current clinical measures of recovery, supporting a ‘buffer zone’ of gradually increasing activity before full contact risk.

- **An initial period of 24–48 hours of both relative physical rest and cognitive rest is recommended before beginning the RTS progression.

Stage	Aim	Activity	Goal of each step
1	Symptom-limited activity	Daily activities that do not provoke symptoms	Gradual reintroduction of work/school activities
2	Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training	Increase heart rate
3	Sport-specific exercise	Running or skating drills. No head impact activities	Add movement
4	Non-contact training drills	Harder training drills, eg, passing drills. May start progressive resistance training	Exercise, coordination and increased thinking
5	Full contact practice	Following medical clearance, participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6	Return to sport	Normal game play	

- RETURN
  - There should be at least 24 hours (or longer) for each step of the progression.
  - If any symptoms worsen during exercise, the athlete should go back to the previous step.
  - Resistance training should be added only in the later stages (stage 3 or 4 at the earliest).
  - If symptoms are persistent (eg, more than 10–14 days in adults or more than 1 month in children), the athlete should be referred to a healthcare professional who is an expert in the management of concussion.

Concussion Assessment

Balance Error Scoring System (BESS)

Post Concussion Symptom Scale (PCSS)

Neurocognitive Screening, e.g., SCAT5

Vestibular/Ocular-Motor Screening (VOMS)

Dix Hallpike

Concussion Symptom Trajectories

Vestibular

- Balance Problems
- Dizziness

Ocular

- Photophobia
- Phonophobia
- Blurry Vision

Migraine

- Headache
- Nausea
- Photophobia
- Phonophobia

Cognitive

- Drowsiness
- Sleeping Problems
- Difficulty Concentrating
- Mentally “foggy”

Cervical

- Pain
- Numbness
- Tingling

Mood

- Fatigue
- Irritability
- Sadness
- Nervousness

Post- Concussion Symptom Scale (PCSS)

Player's Name: _____ Team: _____ Position: _____

SYMPTOM	RATING None Mod. Severe	BASELINE Date:	TESTING 2 Date:	TESTING 3 Date:	TESTING 4 Date:	TESTING 5 Date:
Headache	0 1 2 3 4 5 6	MIGRAINE				
Nausea	0 1 2 3 4 5 6					
Vomiting	0 1 2 3 4 5 6					
Balance problems	0 1 2 3 4 5 6	VESTIBULAR TRAJECTORY				
Dizziness	0 1 2 3 4 5 6					
Fatigue	0 1 2 3 4 5 6	COGNITIVE				
Trouble falling asleep	0 1 2 3 4 5 6					
Sleeping more than usual	0 1 2 3 4 5 6					
Sleeping less than usual	0 1 2 3 4 5 6					
Drowsiness	0 1 2 3 4 5 6					
Sensitivity to light	0 1 2 3 4 5 6	MIGRAINE				
Sensitivity to noise	0 1 2 3 4 5 6					
Irritability	0 1 2 3 4 5 6	MOOD				
Sadness	0 1 2 3 4 5 6					
Nervousness	0 1 2 3 4 5 6					
Feeling more emotional	0 1 2 3 4 5 6					
Numbness or tingling	0 1 2 3 4 5 6					
Feeling slowed down	0 1 2 3 4 5 6	COGNITIVE				
Feeling mentally "foggy"	0 1 2 3 4 5 6					
Difficulty concentrating	0 1 2 3 4 5 6					
Difficulty remembering	0 1 2 3 4 5 6					
TOTAL SCORE						

Rehabilitative Therapy

The **Buffalo Concussion Treadmill Test**

Use of Graded Exercise Testing in Concussion and Return-to-Activity Management John J. Leddy, MD, FACSM FACP1 and Barry Willer, PhD2

BUFFALO CONCUSSION TREADMILL TEST (BCTT) – INSTRUCTION MANUAL

Purpose

- To investigate exercise tolerance in patients with post-concussive symptoms (PCS) lasting more than 3 weeks.
- To help establish appropriate levels of exercise to aid in Return to Play for concussed athletes and assist in treatment protocols.
- To aid in differentiating between possible diagnoses for concussive symptoms (Cervicogenic injury, PCS, etc.) and etiology of the concussion.
- To identify physiological variables associated with exacerbation of symptoms, and the patient's level of recovery.

Eligibility

- Before beginning the BCTT, participants should be evaluated for medical and physical ability to exercise. Considerations may include (but are not limited to): cardiovascular illness, respiratory dysfunction, serious vestibular/balance problems, motor dysfunction, and certain orthopedic injuries.

  Do not follow the BCTT if the patient is experiencing such cervical dysfunction that the test could cause considerable pain or harm, is experiencing severe vestibular/balance issues that would impair walking on a treadmill, has a history of unstable cardiac or respiratory disease, or has a lower extremity or spinal orthopedic pathology that compromises safe walking

- The BCTT is not recommended for patients scoring higher than 7/10 for symptom severity.

Table 1. Contraindications to Exercise Testing

Absolute

- Acute myocardial infarction (within 2 d)
- High-risk unstable angina*
- Uncontrolled cardiac arrhythmias causing symptoms or hemodynamic compromise
- Symptomatic severe aortic stenosis
- Uncontrolled symptomatic heart failure
- Acute pulmonary embolus or pulmonary infarction
- Acute myocarditis or pericarditis
- Acute aortic dissection

Relative†

- Left main coronary stenosis
- Moderate stenotic valvular heart disease
- Electrolyte abnormalities
- Severe arterial hypertension‡
- Tachyarrhythmias or bradyarrhythmias
- Hypertrophic cardiomyopathy and other forms of outflow tract obstruction
- Mental or physical impairment leading to inability to exercise adequately
- High-degree atrioventricular block

*ACC/AHA Guidelines for the Management of Patients With Unstable Angina/Non-ST-Segment Elevation Myocardial Infarction (350) (see Table 17).

†Relative contraindications can be superseded if the benefits of exercise outweigh the risks.

‡In the absence of definitive evidence, the committee suggests systolic blood pressure of >200 mm Hg and/or diastolic blood pressure of >110 mm Hg. Modified from Fletcher et al.[7]

Safety Considerations

- On testing, participants must be dressed for exercise (comfortable clothing, running shoes), wearing any vision or hearing aids (glasses, etc.), and should be hydrated and well rested.

- It is suggested that two persons assist in conducting the BCTT, in order to assure safety of the participant, with one individual positioned behind the participant (at back of the treadmill) at all times while test is in progress. It is also recommended that one or more persons with CPR training are present during testing.

- It is important to engage in casual conversation with the patient during the exercise test to assess his/her confidence level as well as any changes in cognitive and communicative functioning. As exercise intensifies, note if patient seems to have difficulty communicating, looks suddenly pale or withdrawn, or otherwise appears to be masking serious discomfort.

- Be aware of postural and structural changes (slouching, rounding the back, leaning head) - noting the patient's thoracic and cervical posture can offer clues on the etiology of the injury.

Preparation

Equipment Requirements

- Treadmill with capacity to reach 15 degrees of elevation
  Note: Test can be adapted for treadmills which can reach a minimum of 12 degrees elevation

- Heart rate monitor (Polar brand recommended)

- Borg RPE Scale (Rating of Perceived Exertion) and Concussion Symptom Severity Scale (Likert scale) – *See form attached*

- Test Results form for monitoring heart rate, changes in RPE and symptoms, and relevant observations – *See form attached*

- Chair, water and towel for participant recovery after exercise

Setup

- Attach heart rate monitoring device according to manufacturer's instructions
- Post RPE and Symptom scales within comfortable viewing distance of participant while on treadmill (it is suggested that participant should **not** have to turn head to view scales)

Test Protocol

Starting the Test

1) Inform participant about test procedures and what to expect during the BCTT.

2) Explain and demonstrate the RPE and Likert scales and obtain resting scores. Remind participant that he/she will be asked to rate exertion and symptom severity at each minute during exercise.

   The RPE scale is a measure of perceived physical activity, and can be explained to participants as a measure of "how hard you feel like your body is working". The scale's numbers (6-20) and descriptors should be pointed out.

   The Likert symptom scale is a measure of symptom severity ("how good/bad your symptoms are making you feel right now"), and should be distinguished as being distinct

from RPE. The scale's numbers (1-10) and pictures (expressions of physical pain) should be pointed out.

3) Patient should begin by standing on the ends of the treadmill while the treadmill is turned on. The experimenter should set treadmill at a speed of **3.6mph** for patients over 5'5", and **3.2mph** for those 5'5" and under. Starting incline is **0 degrees**. Speed can be adjusted depending on athletic status or overall comfort of treadmill speed – patients should be moving at a brisk walking pace.

4) After one minute at this pace, treadmill incline is increased to 1 degree. Participant is asked to rate RPE and symptom severity. Subjective scores and heart rate (bpm) are recorded. This procedure is repeated each minute, with ratings and heart rate being recorded, and treadmill increasing in incline at a rate of 1 degree/minute.

   Changes to Likert rating should be specifically clarified/noted (for example, if the rating moves from 2 to 3, it should be clarified if this reflects the addition of a new symptom, increased severity of an existing symptom, etc.). Experimenter should also record general observations as the test progresses.

5) Once treadmill reaches maximum incline (15 degrees or 12 degrees in modified test), speed is increased by **0.4mph** each minute in lieu of increased incline.

6) Once test is terminated (see below), speed is reduced to 2.5mph and incline reduced safety back to 0 for a 2 minute cool-down (if participant is safe to continue). During this time, Likert ratings should continue to be reported each minute.

Terminating the Test

Test continues until:

- Maximum exertion (RPE score of 19.5) is reported **or**
- Test is terminated by experimenter due to a symptom exacerbation that causes significant increase in pain or symptom severity (an increase of more than 3 points on the Likert scale from resting score, addition of several new symptoms, or marked increase in severity of symptoms resulting in difficulty continuing test) **or**
- Experimenter notes a rapid progression of complaints (ex. headache to searing focal pain) between symptom reports, patient appears faint or unsteady, or determines that continuing the test constitutes significant health risk for the participant, **or**
- Patient reports an inability to continue the test safely

Outcomes

Diagnosis

- The BCTT can be used in conjunction with balanced error scoring, cervical proprioceptive screening, manual assessment and soft tissue palpation to determine the presence/absence of post-concussion syndrome or cervical/thoracic injuries.

  Patients who have symptoms, but do not have a physiologic threshold (can exercise to max) should be evaluated for dysfunction of the cervical spine, vestibular system or temporomandibular region.

Treatment/Return to Play

- On completion of the BCTT, concussion patients may be given an exercise prescription based on 80% of the maximum heart rate reached **without** symptom exacerbation. Patients are instructed to exercise at this level for 20 minutes daily without exceeding the time, or heart rate constraints.

  Patients may increase heart rate by swimming, walking or stationary cycling - the athlete should not attempt resistance training.

  If any post-concussion symptoms return along the progression, the athlete must return to the previous asymptomatic stage/maximum heart rate.

- If the patient can exercise to voluntary exhaustion on the BCTT without eliciting symptoms, you may begin the process of returning him/her to play by following the five-step return to play program of the Zurich Consensus Statement.

- Other prescriptions and recommendations will be based on the patient's particular complaints. A patient may be recommended for cervical physical therapy, vestibular physical therapy, infusion therapy or treatment for temporomandibular joint disorders

The Gapski-Goodman Test a.k.a. the "Blackhawk Test"

The use of an intensive physical exertion test as a final return to play measure in concussed athletes: a prospective cohort.

Marshall CM, et al. Phys Sportsmed. 2018.
Show full citation

Abstract

OBJECTIVES: To examine the utility of a novel physical exertion test developed by the Chicago Blackhawks medical staff as a final return to play (RTP) clearance test in youth and young adult athletes, and to determine the relationship between participant and test variables on RTP within asymptomatic athletes diagnosed with concussion.

The Gapski-Goodman Test a.k.a. the "Blackhawk Test"

METHODS: Once asymptomatic and following completion of all RTP steps, concussed athletes underwent the Gapski-Goodman Test (GGT) or modified GGT (mGGT) at partnered Complete Concussion Management Inc. (CCMI) clinics as part of RTP decision-making. Prospective data was collected electronically by trained CCMI clinicians utilizing the CCMI Concussion Database System. A review was conducted to examine data collected between January 2016 and February 2017. Participant and test variables were analyzed to determine relationships with pass/fail rate of the GGT/mGGT.

RESULTS: A total of 759 athletes performed the GGT/mGGT in the study period. Although all asymptomatic, 14.6% of concussed athletes failed the GGT/mGGT while attempting to achieve RTP clearance. Statistically significant relationships were found between failure of the test and symptom severity score on initial presentation and self-reported history of pre-morbid anxiety. When taken together, sex, age, and pre-morbid anxiety significantly predicted the length of time between injury and RTP clearance.

The Gapski-Goodman Test a.k.a. the "Blackhawk Test"

CONCLUSION: The GGT may identify individuals who are not ready to RTP despite a self-reported asymptomatic status and completion of all RTP steps. These results illustrate that RTP clearance decisions based on self-reported asymptomatic status at rest may be inadequate. Instead, monitored, intensive, sport-specific, physical exertion testing should be utilized to inform clinical RTP decisions.

References

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Vestibular Therapy

Vestibular/ Ocular-Motor Screening (VOMS)

Vestibular/Ocular-Motor Screening (VOMS) for Concussion

Vestibular/Ocular Motor Test:	Not Tested	Headache 0-10	Dizziness 0-10	Nausea 0-10	Fogginess 0-10	Comments
BASELINE SYMPTOMS:	N/A					
Smooth Pursuits						
Saccades – Horizontal						
Saccades – Vertical						
Convergence (Near Point)						(Near Point in cm): Measure 1: _____ Measure 2:_____ Measure 3:
VOR – Horizontal						
VOR – Vertical						
Visual Motion Sensitivity Test						

(NIH)

VOMS

Equipment

- Tape Measure (cm)
- Metronome
- Target with 14 Point Font

Age Group

- 9-40 Years Old

Need to evaluate “Baseline Symptoms”

- Record: Headache, Dizziness, Nausea & Fogginess on 0-10 scale prior to beginning screening

Smooth Pursuits

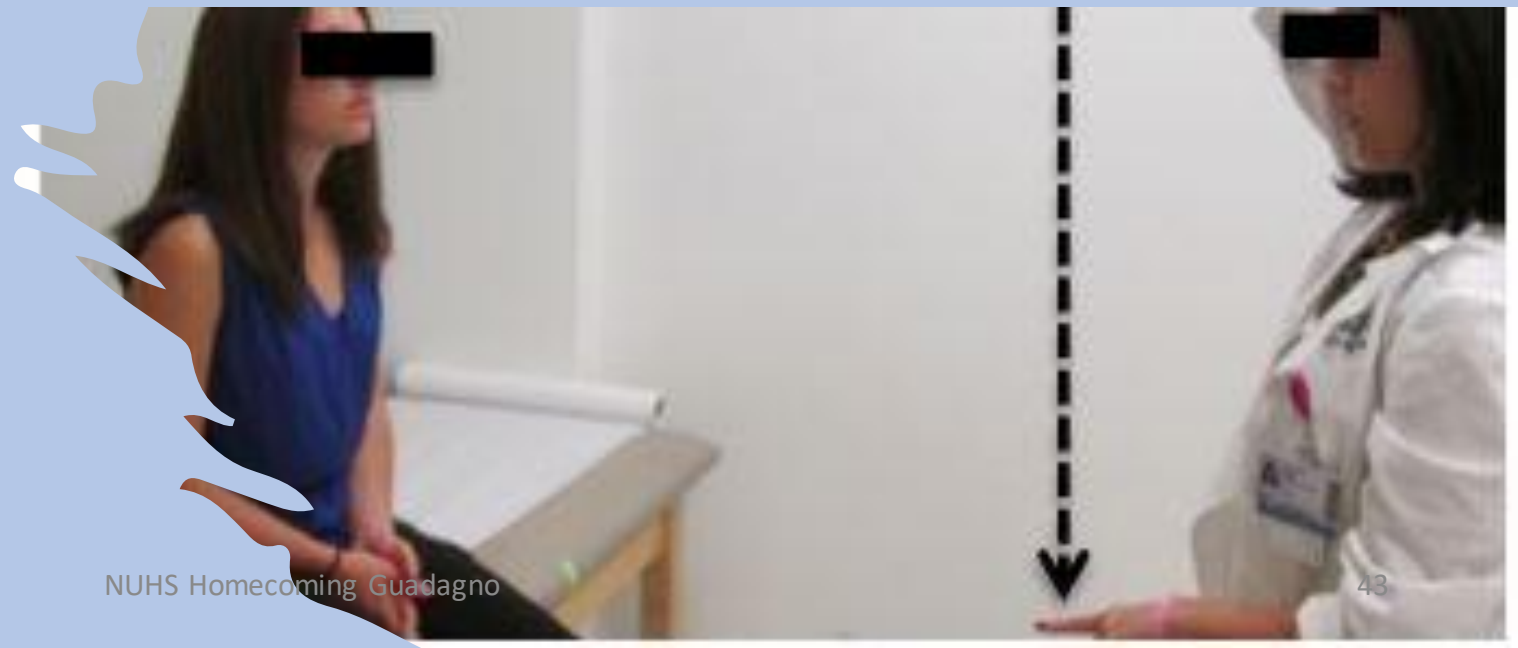
- Hold finger 3 feet from patient face
- Move finger 1.5 feet off midline
- Complete 2 repetitions
- Repeat in vertical plane
- Record symptoms from 0-10 scale

Saccades

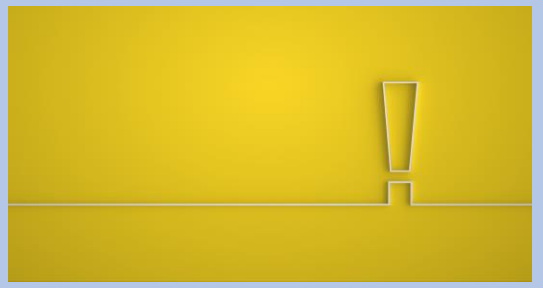
Head is stationary, eyes move

- Hold finger 3 feet from patient face
- Use both hands and have patient gaze 30 degrees both right and left
- Complete 10 repetitions
- Repeat in vertical plane
- Record symptoms from 0-10 scale

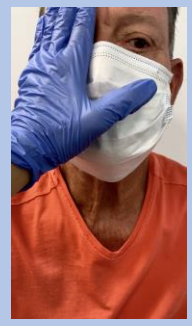
Figure 2. Horizontal saccades.



Convergence

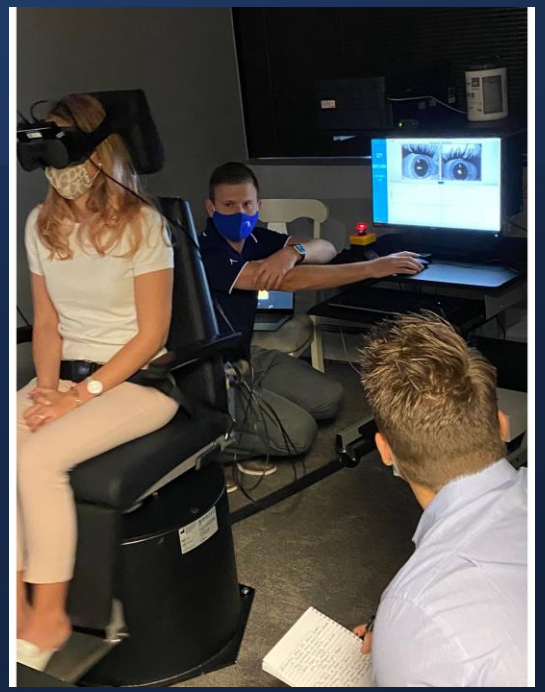


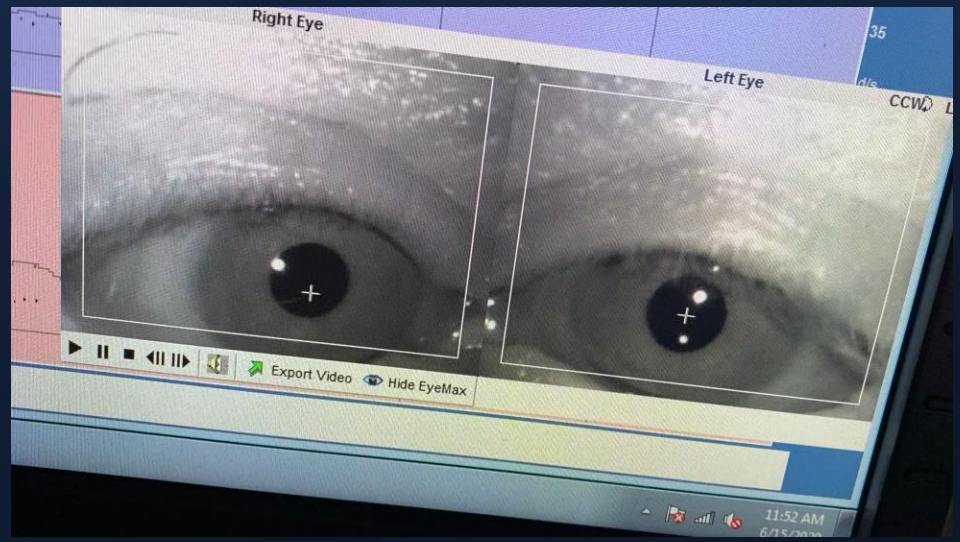
- Bring target with 14-point font towards patients' nose
- Stop when patient reports **diplopia**
- Repeat 3 times



ure 4. Convergence

Dysconjugate Ocular Motility





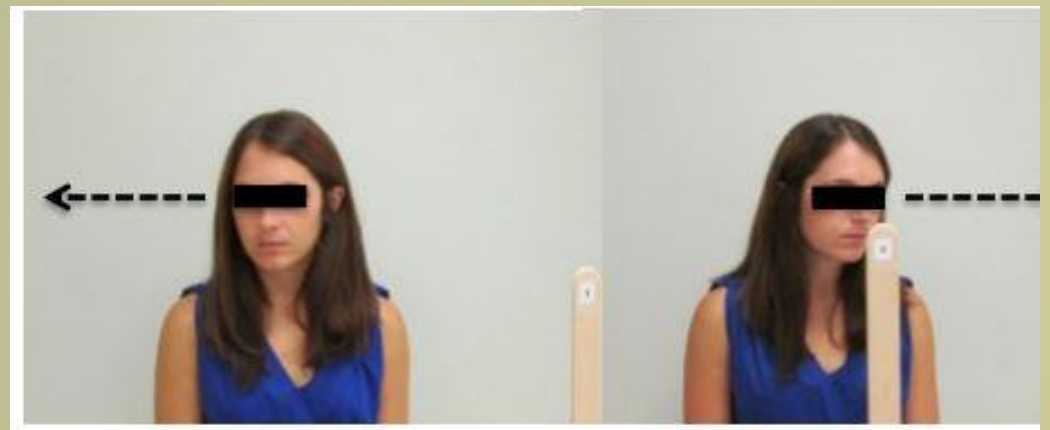


Figure 5. Horizontal VOR.

Vestibular-Ocular Reflex Test

Head moves, eyes are stationary

- Hold target with 14-point font 3 feet away from patient
- Set metronome to 180 beats/minute, 20 degrees off midline
- Repeat 10 times
- Repeat in vertical plane

Vision Motion Sensitivity Test

- Perform standing up
- Face complex visual environment
- Rotate head 80 degrees off midline in each direction
- Set metronome to 50 beats/minute
- Repeat 5 times

Targeted Referrals Based on Symptoms/Assessment

Neurology

- Mood/Cognitive/Migraine Symptoms

Vestibular Audiology/Functional Neurology

- Vestibular Symptoms

Ophthalmology

- Ocular Symptoms

Chiropractic

- Cervical Symptoms

Common Post Trauma Vestibular Pathologies

- Labyrinthine Concussion
- Benign Paroxysmal Positional Vertigo

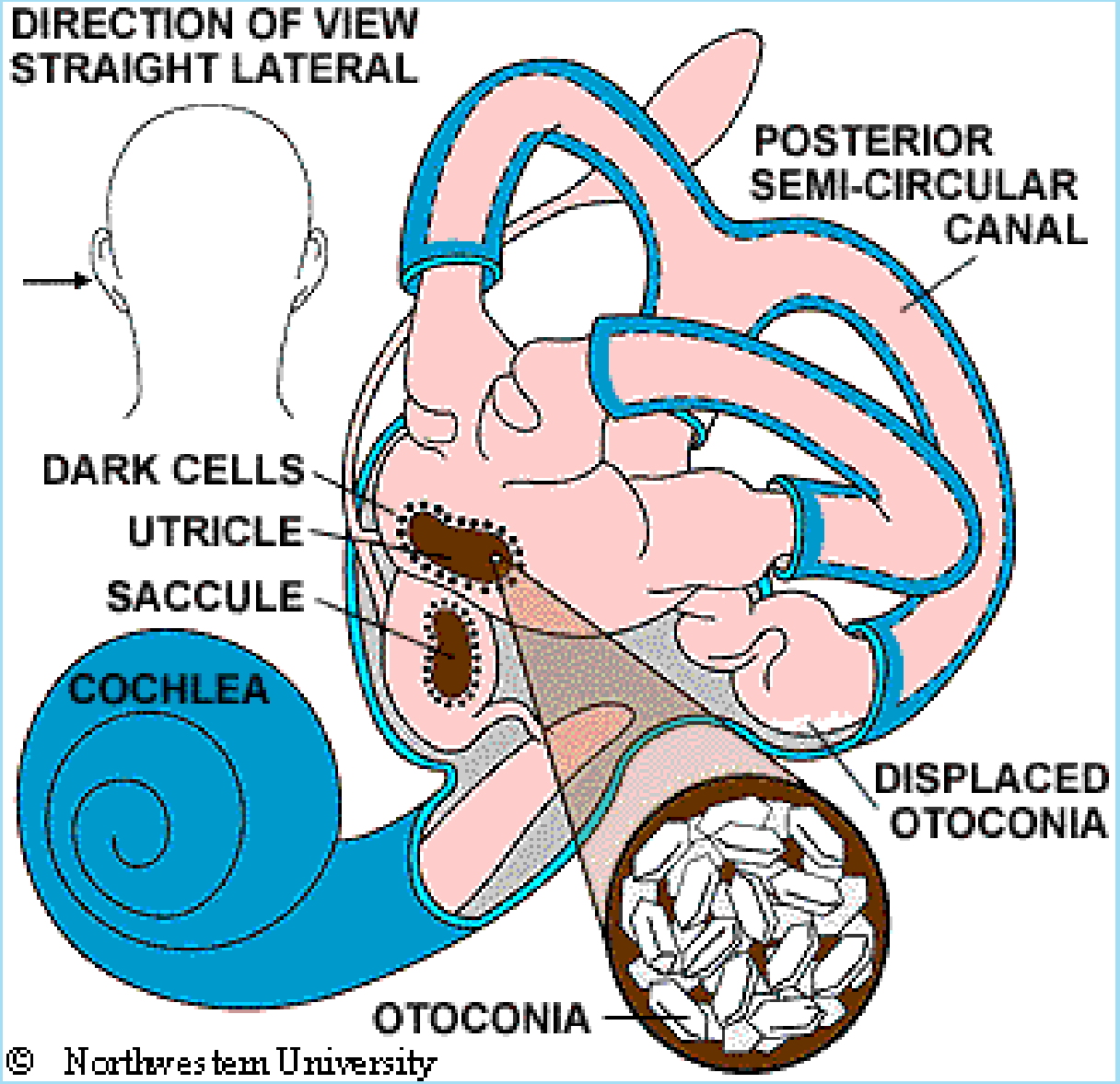
Benign Paroxysmal Positional Vertigo (BPPV)

Presentation Types

- Posterior Canal
- Horizontal Canal
- Anterior Canal

Therapy

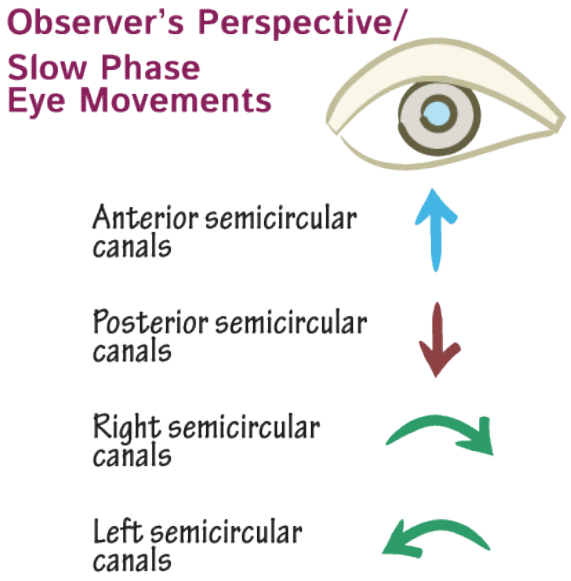
- Canalith Repositioning Maneuvers (CRMs)

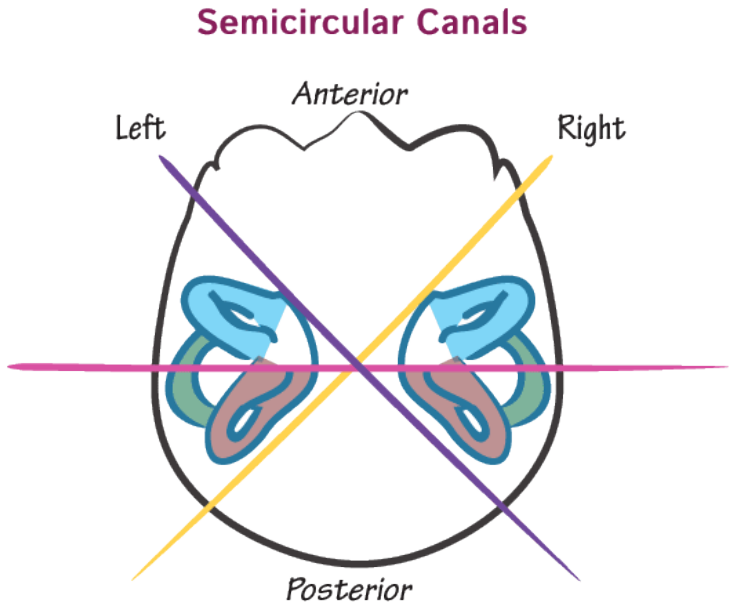


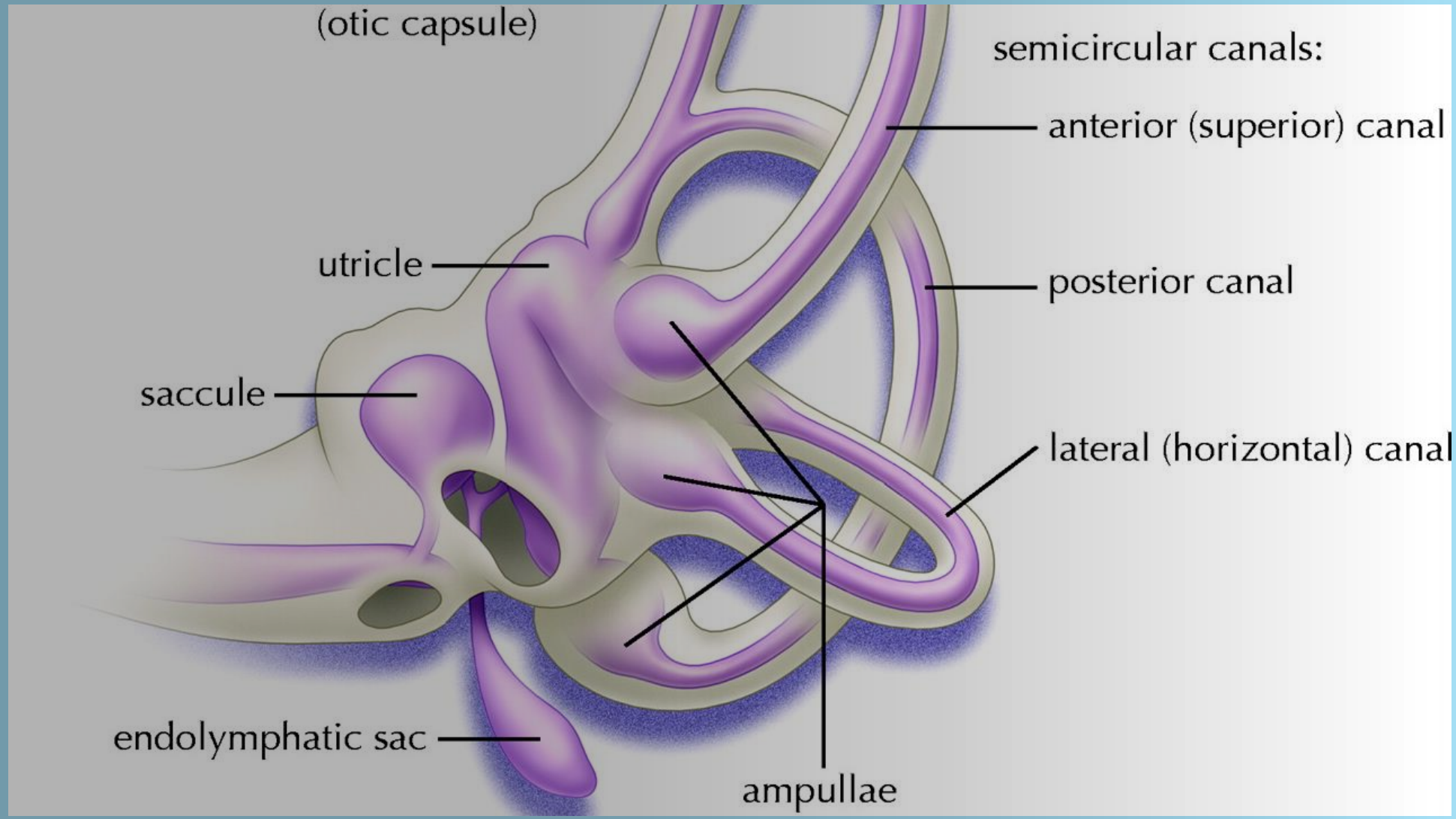
BENIGN PAROXYSMAL POSITIONAL VERTIGO

Benign Paroxysmal Positional Vertigo (BPPV)

- ✓ *Calcium carbonate crystals from the utricle fall into one of the semicircular canals (most often the posterior canal) and stimulate positional vertigo.*
- ✓ *If the RIGHT POSTERIOR CANAL is activated, then from the observer's perspective, the slow phase of the nystagmus is:*
  DOWNWARD W/ CLOCKWISE ROTATION.
- ✓ *The fast phase (which is how the nystagmus is actually named) is in the opposite direction:*
  UPWARD W/COUNTERCLOCKWISE ROTATION.



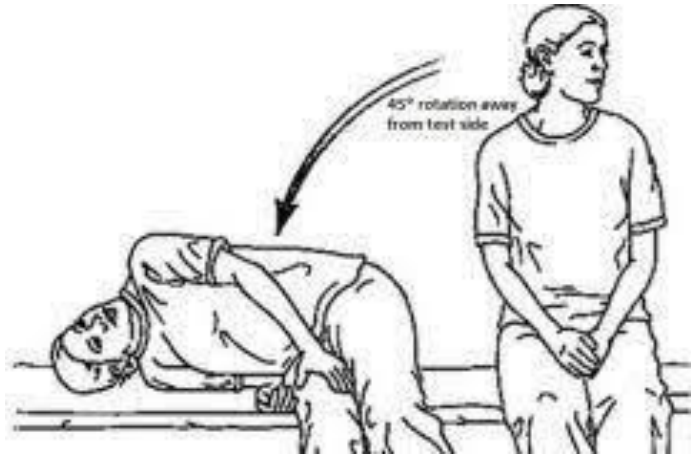


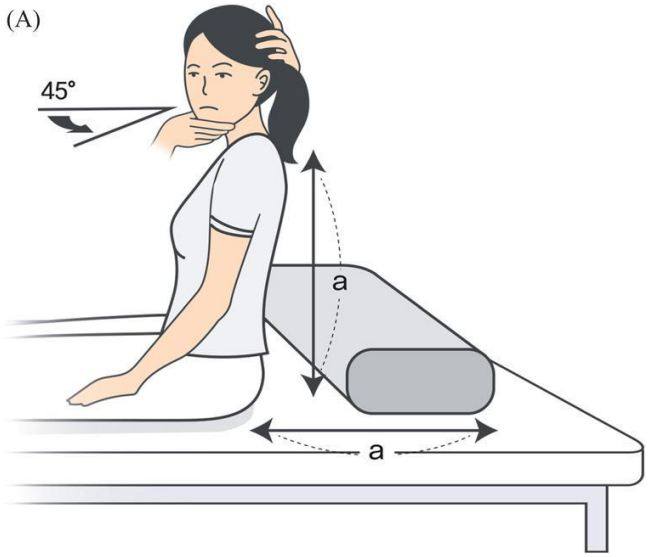


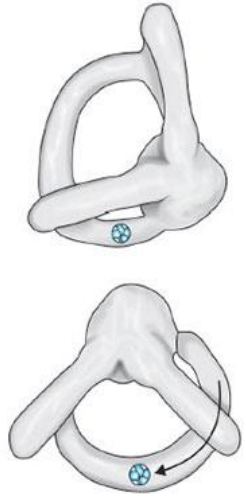
Transient episodes of vertigo provoked by vertical changes in head pitch

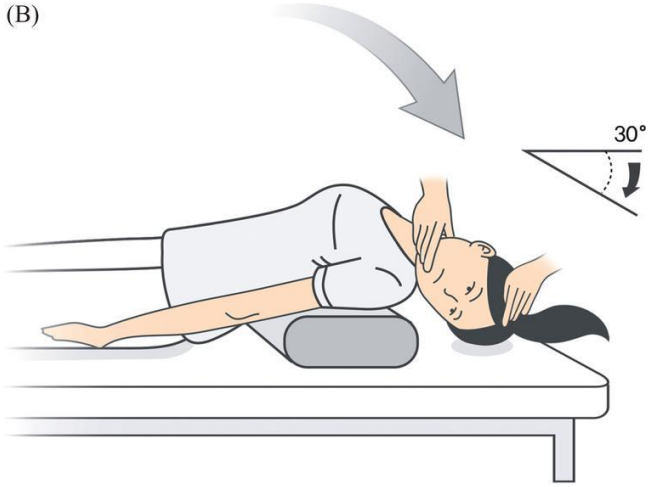
Assessment of PC-BPPV on Chiropractic Table

- Fully Supported Hallpike
- Modified Hallpike
- Sidelying Hallpike









BPPV

Types

- Posterior Canal BPPV
- Horizontal Canal BPPV
- Apogeotropic Posterior Canal BPPV
- Anterior Canal BPPV

Treatments

- Modified Epley/ Gans Repositioning / Semont
- Horizontal Hybrid/ Appiani/ Casani/ BBQ
- Demi-Semont
- Yaccivino/ Reverse Epley

Thank you

- Alyssa Steinweis, AUD, CCC-A, FAAA, Board Certified, ADA-Member, ABS-Member, MBA (Cand.), ACHE- Member

CASE SUMMARIES AY2018/19 continued.

A male collegiate football player was injured attempting to make a tackle during a football game. The athlete was attended to on-field and airlifted to a hospital. He underwent emergency surgery for a fractured C5 vertebra. He will graduate from college though he can no longer play football. Long term prognosis is unknown.

Football Exertional/medical (indirect) A male 18 year old collegiate freshman football defensive back collapsed during a preseason conditioning session. The coach called 911 and he was immediately attended to by athletic trainers. An EMS crew arrived and continued care, but all revival efforts were unsuccessful. Cause of death was acute aortic dissection.

A male 19 year old collegiate football defensive tackle was found medically distressed outside his dorm room following the team's first practice. He was tended to by an athletic trainer until EMS arrived. He was transported to a nearby hospital where he later died. Cause of death was exertional heat stroke

CASE SUMMARIES AY2018/19 continued.

http://nccsir.unc.edu/about/

Soccer Traumatic injury (direct) A female 21 year old collegiate senior soccer player sustained a skull fracture during a soccer game by colliding with another player while attempting to head the ball. The athlete made a full recovery.

Track and Field Traumatic injury (direct) A male collegiate track and field athlete was doing a warm-up exercise when he backed into a javelin sticking out of the ground. The athlete was transported to the hospital via EMS where he had surgery for a punctured and collapsed lung. He is expected to make a full recovery.

HIGH SCHOOL Baseball Traumatic injury (direct) A male high school baseball pitcher was struck by a line drive on the left side of his head. He was knocked unconscious and attended to by athletic trainers and coaches. He was transported to a hospital by ambulance. The athlete suffered a fractured temporal bone, brain bleed, and a concussion. Current prognosis is unknown.

The leading causes of death in athletes are:

1.Sudden Cardiac death.
2.Head/Neck Trauma
3.Exertional Heat Stroke (EHS).

As a member of the sports medicine team the sports chiropractor must be ready and able to perform or assist with emergency procedures to mitigate disability and mortality in the sporting arena as well as in the office setting.

HEAD TRAUMA

Raccoon Eyes

- Basilar Fracture sign

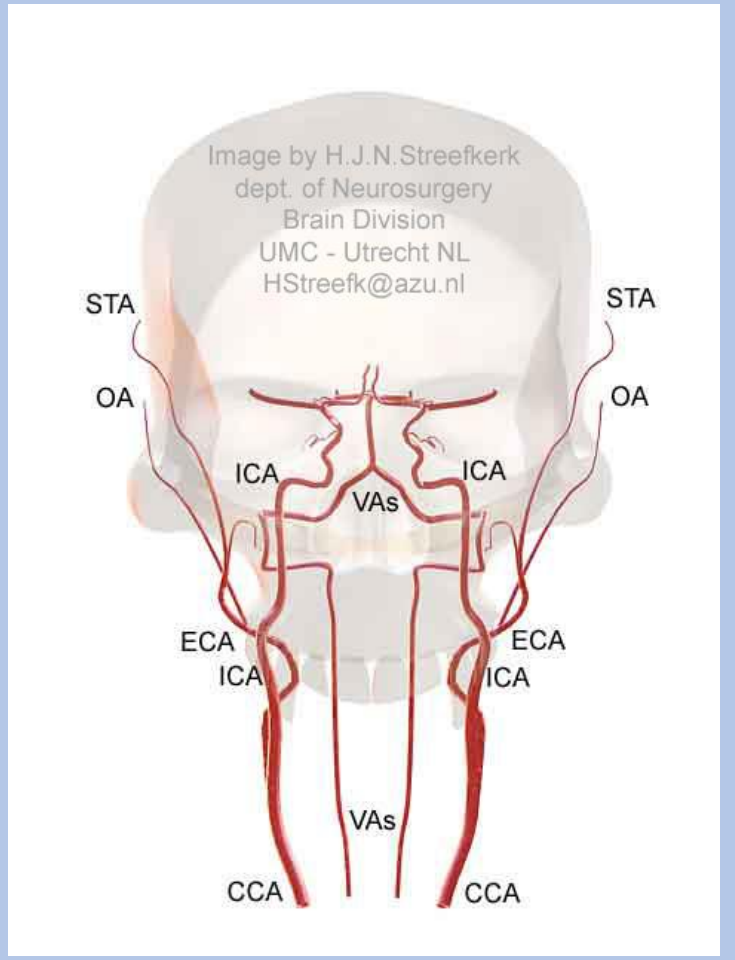
Battle Sign

Source: K.J. Knoop, L.B. Stack, A.B. Storrow, R.J. Thurman:
The Atlas of Emergency Medicine, 4th Edition,
www.accessemergencymedicine

indication of fracture of middle cranial fossa of the skull, and may suggest underlying brain trauma. Battle's sign consists of bruising over the mastoid process, as a result of extravasation of blood along the path of the posterior auricular artery

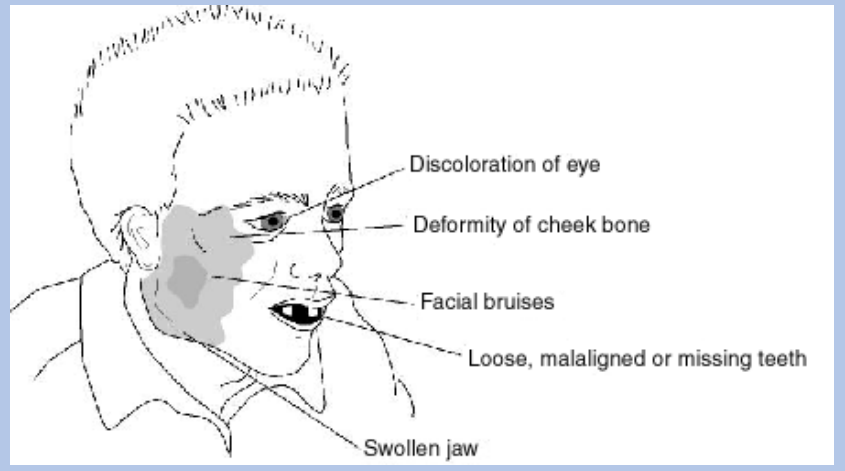
Facial Trauma

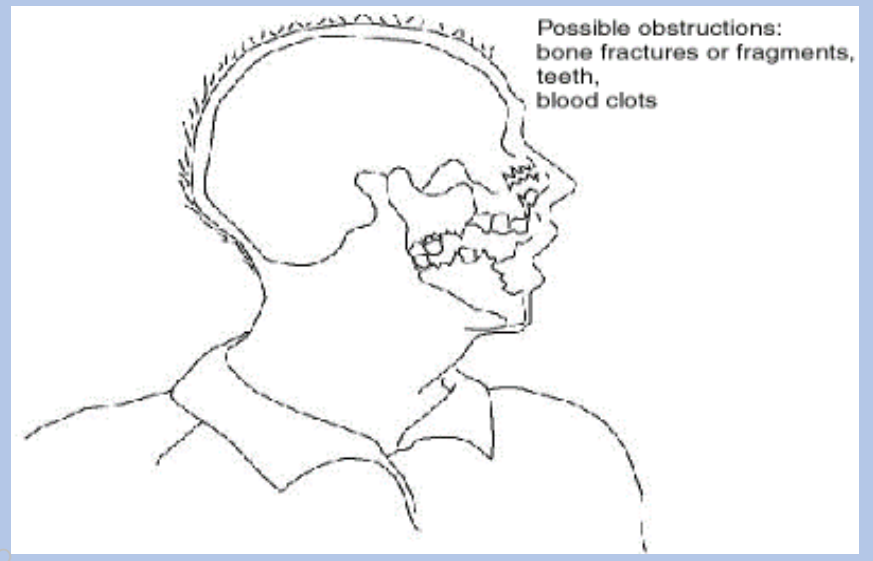
- Facial Trauma ABC's
- PROTECT THE AIRWAY!!!!!!
  - Fractures of face or larynx
  - Edema
  - Blood
  - Avulsed teeth
  - Mouthguard
- C-Spine Precautions



Facial Trauma

- Check for fractures
  - Mandibular
    - Occlusion of teeth
    - Numbness of submental area
    - TMJ pain
    - Intra-oral hematomas
  - Orbital fractures
  - Frontal sinus fractures
  - ZMC fractures





Facial Trauma

- Injuries about the face can lead to upper airway obstructions.
- Bleeding from the face can be profuse.
- Loosened teeth may lodge in the throat.
- If the great vessels are injured, significant bleeding and pressure may occur.

Facial Trauma

- Soft-tissue injuries to the face and scalp are common.
- Wounds to the face and scalp bleed profusely.
- A blunt injury may lead to a hematoma.
- Sometimes a flap of skin is peeled back from the underlying muscle.

Facial Trauma

- A direct blow to the mouth or nose can result in a facial fracture.
- Severe bleeding in the mouth, loose teeth, or movable bone fragments indicate a break.
- Fractures around the face and mouth can produce deformities.
- Severe swelling may obstruct the airway.

Injuries of the Ear

- Ear injuries do not usually bleed much.
- Place a dressing between the ear and scalp when bandaging the ear.
- For an avulsed ear, wrap the part in a moist sterile dressing.
- If a foreign body is lodged in the ear, do not try to manipulate it.

Nasal fractures

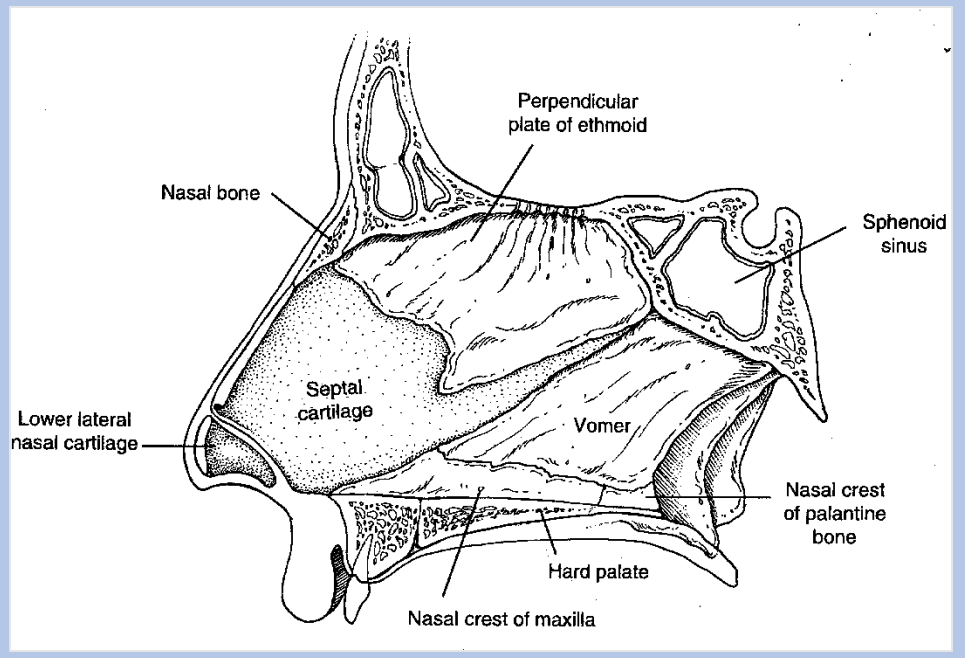
- Most common facial fracture
- Basketball, baseball, soccer, boxing, wrestling, rugby, martial arts, kick-boxing, mountain biking
- Bleeding is the most challenging result

Injuries of the Nose

- Blunt trauma to the nose can result in fractures and soft-tissue injuries.
- Cerebrospinal fluid coming from the nose is indicative of a basal skull fracture.
- Bleeding from soft-tissue injuries of the nose can be controlled with a dressing.

Nasal fractures

- Signs and symptoms
  - Epistaxis
  - Nasal airway obstuction
  - Nasal asymmetry
  - Crepitus over nasal bridge
  - Periorbital ecchymosis
  - Septal deformity or hematoma



Nasal fractures

- Advise athlete to keep head elevated and keep ice on nose for initial 48 hours
- Season ending or delay repair until post season
- After repair: No contact recommended for 6-9 months

Nasal fractures

- Reduction of simple fractures can be done IMMEDIATELY after injury before any edema develops or in the ED under local or general anesthesia after edema resolves
- Should be done within 4 days for children
- Should be done within 10-14 days for adults

Septal hematomas

- Accumulation of blood between septal cartilage and overlying mucoperichondrium
- Prone to abscess
- Pressure necrosis to underlying bone and cartilage
- Saddle nose deformity
- Chronic nasal obstruction

Epistaxis

- Results from mucosal damage secondary to:
  - Environmental factors: temp/humidity
  - Local factors: trauma, anatomy, irritants, iatrogenic, inflammation
  - Systemic factors: HTN, abnormal coagulation or platelets, EtOH use
  - Medications: NSAIDS or ASA (Aspirin)

Epistaxis

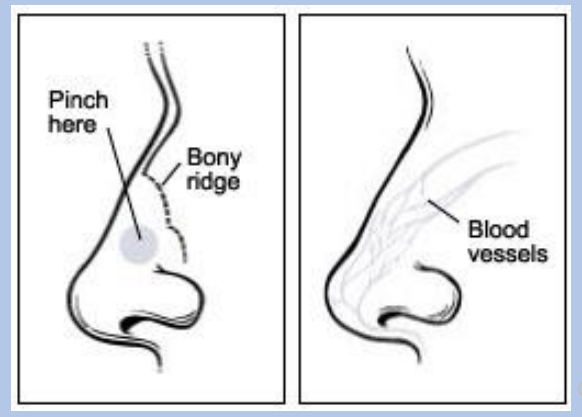
- 95% anterior bleeds (Kiesselbach's)
  - Caused by trauma or drying of mucosa
- 5% posterior bleeds
  - Usually non-traumatic
  - Profuse bleeding after fracture can be caused by laceration of the anterior ethmoid artery
    - Usually requires reduction and packing to control bleeding

Treatment of Epistaxis

- Sit forward with neck extended
- Gently blow each nostril to remove clots
- Pinch anterior nose for 2-5 minutes
- Ice to back of neck (reflex vasoconstriction)
- Nasal packing with gauze or tampon

Epistaxis Management

Epistaxis → Compression, ice, nasal spray → Locate site



Anterior (95%)

↓

Anterior packing

↓

Anterior cautery / QR powder

↓

Posterior packs/surgery

Posterior (5%)

↓

Posterior packing

ENT consult

↓

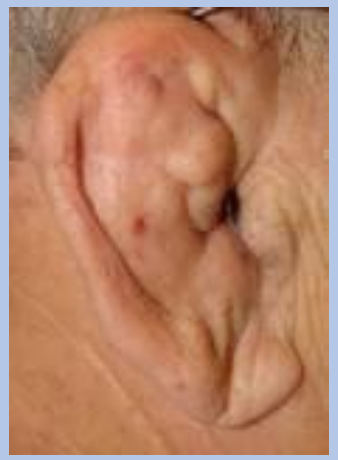
Surgery

↓

Admit

Epistaxis Management

Auricular Hematoma



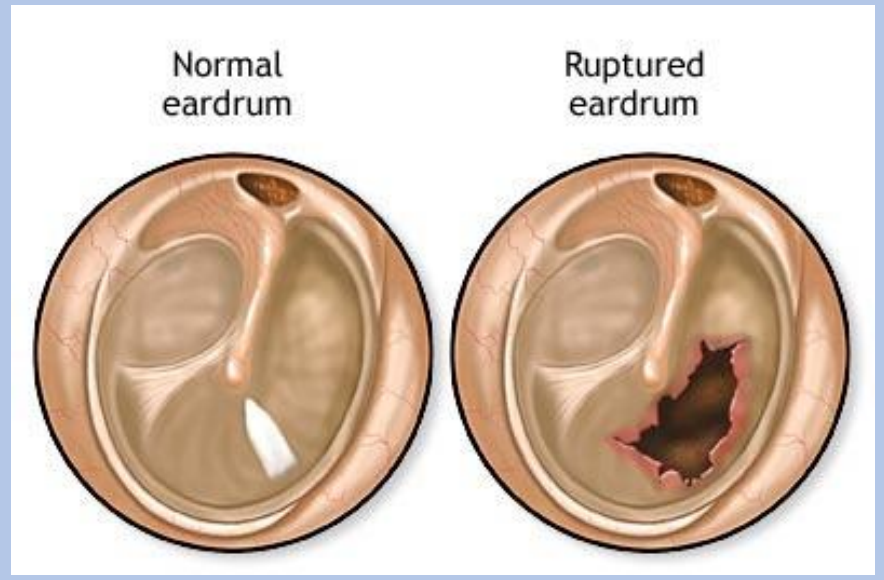
- Trauma causes bleeding between skin and cartilage
- Fluctuant bluish swelling in auricle

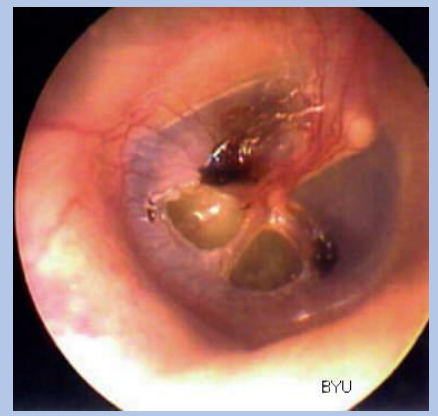
- Untreated →
  - Pressure necrosis
  - Fibroneocartilage formation
  - Unsightly scarring

- Tx: prompt drainage & compression 7-10 days

Tympanic Membrane Rupture

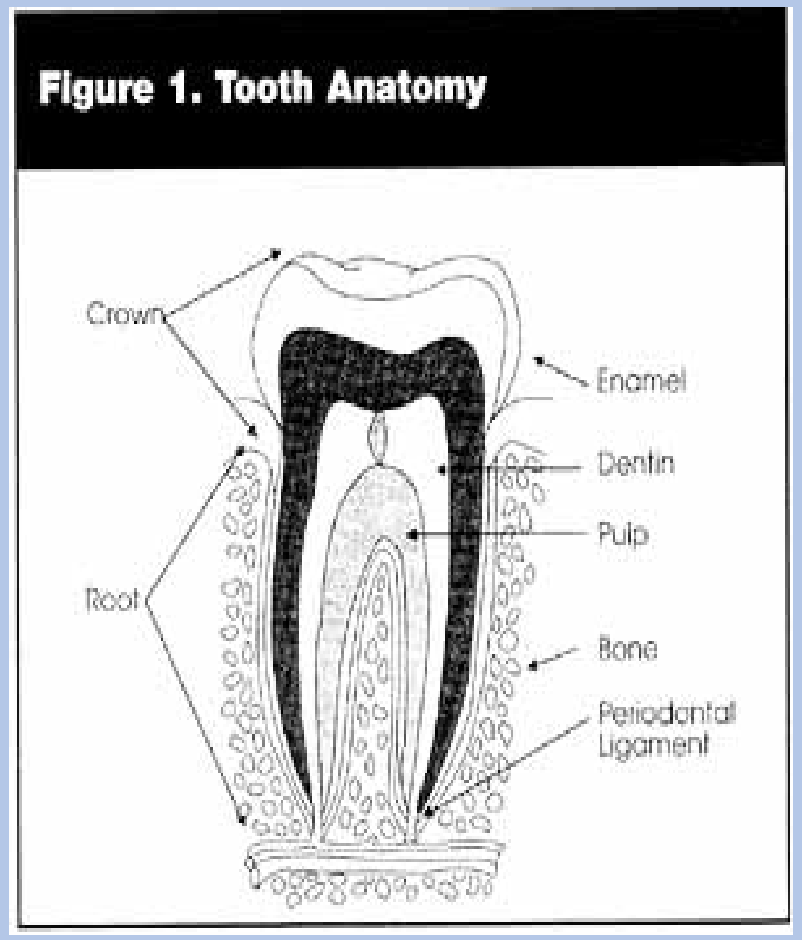
- Symptoms
  - Painful “pop”
  - Minor bleeding
  - Unilateral hearing loss
  - Can have vertigo &/or nausea
- Exam
  - Otoscopic exam
  - Hemotympany





Dental trauma

- Sensitivity to inhaled air indicates trauma to dentin or pulp
- All injuries except cracks or chips to the enamel should see a dentist immediately



Dental trauma

- Fractures
  - Enamel: white
  - Dentin: yellow
  - Pulp: red
- Loose teeth can be fractured through root and should have x-rays

Tooth Fracture

- Enamel Fracture
  - Small chips in enamel
  - Uniform color at fracture site
  - Dentist referral to smooth rough enamel edges prn
  - RTP

Tooth Fracture

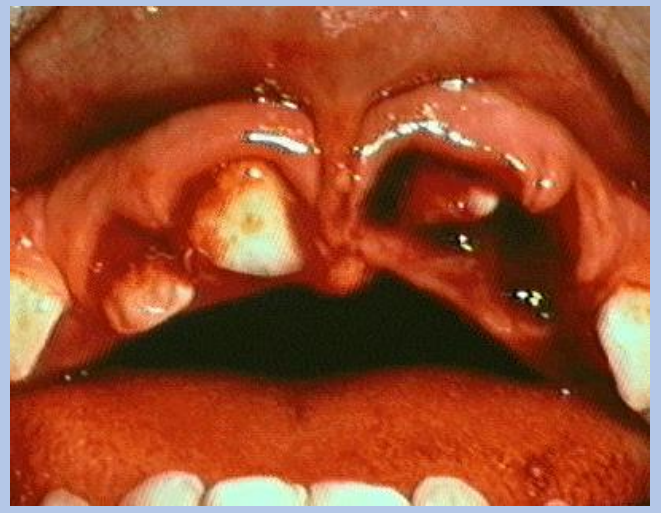
- Dentin Fracture
  - Sensitivity to inhaled air
  - Yellow dentin at fracture site
  - Relieve pain:
    - Apply clove oil
    - Super-glue piece on
    - Tooth kit cement
    - Splint w/ mouthguard
  - Dental attention within 24 hours

Tooth Fracture

- Pulp Fracture
  - Use finger pressure to expose larger fractures
  - Pink or red pulp at fracture site
  - Relive pain (cover)
  - Immediate dental referral for root canal and cap

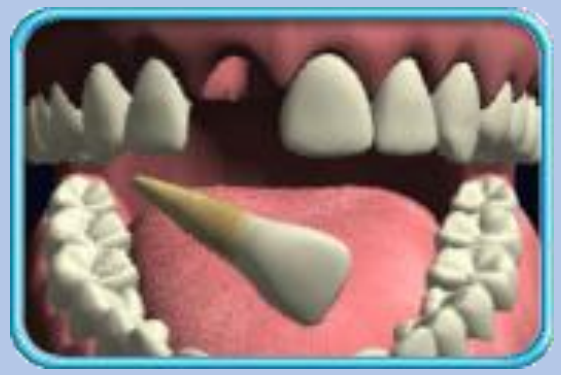
Tooth Luxation

- Incomplete displacement
- Reduce tooth
  - Do NOT pull impacted teeth back out
- Provide splint if possible
  - Mouthguard, towel bite
- To dentist <24 hrs
  - Repositioning
  - Custom splinting
  - +/- root canal therapy
  - Long-term follow up



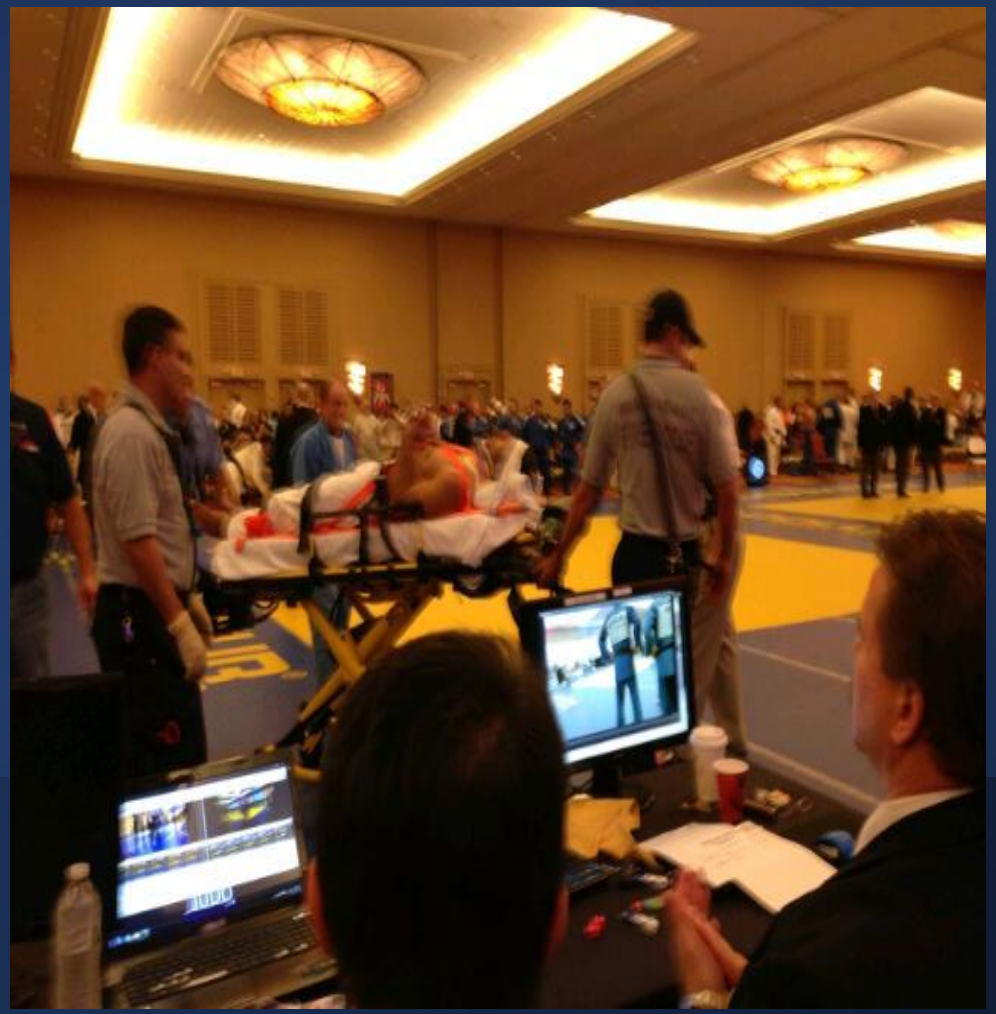
Tooth Avulsion ("knocked out")

- Pick up tooth by ENAMEL only, not roots
- Re-implant w/in 30 min = 90% success
- After 6 hrs, <5%
- If can't replace, transport in Save-A-Tooth solution > milk > saline buccal pouch
- Prophylactic antibiotics & Tetanus booster
- Dentist referral ASAP

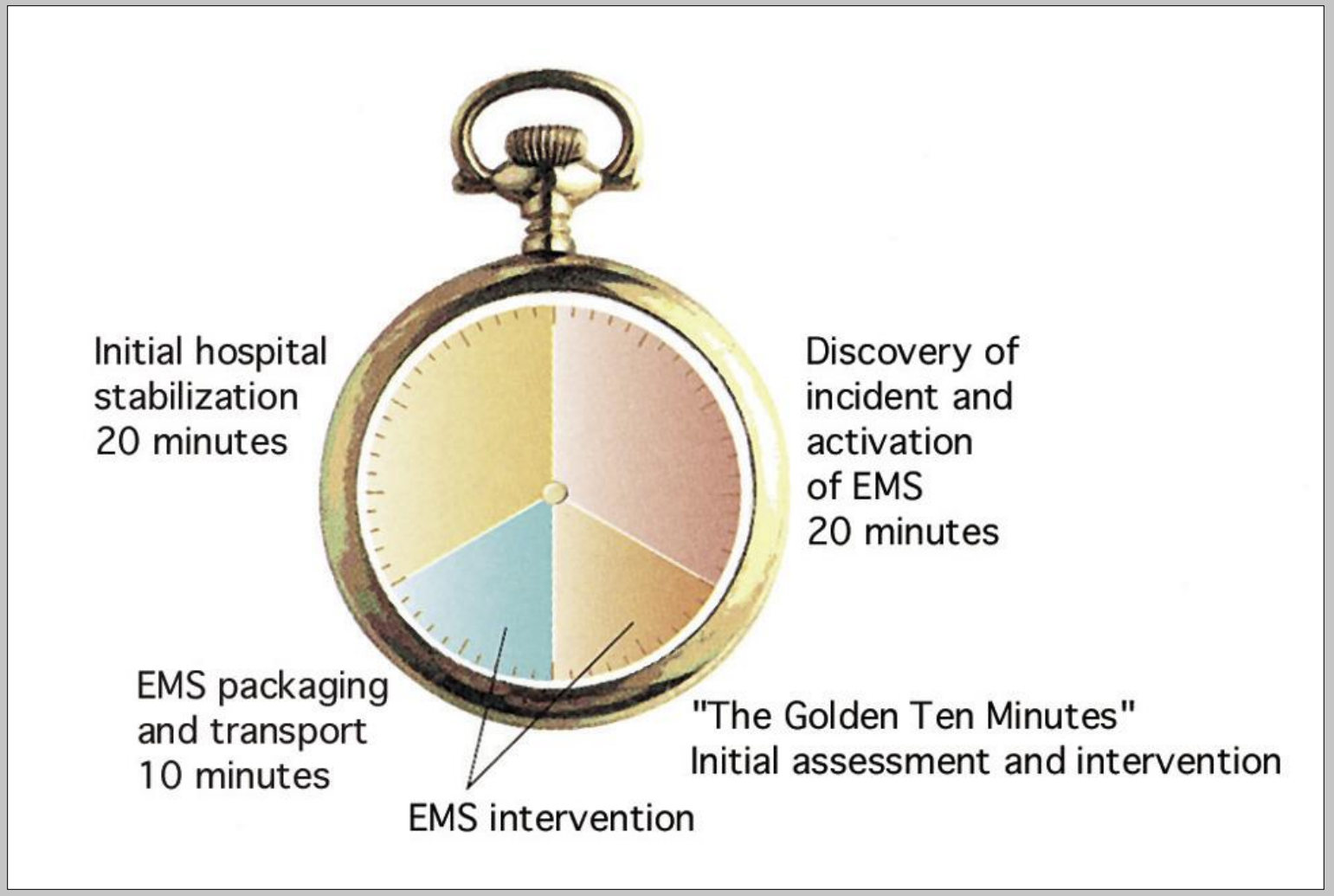


- Aspirated teeth need to be removed by bronchoscopy

SPINAL TRAUMA



THE GOLDEN HOUR



Patient Assessment Process

- Scene size-up
- Initial assessment
- Provide spinal immobilization
- Identify and treat life threats
- Focused history and physical exam
- Provide transport if needed
- Detailed physical exam
- Reassess vital signs
- Ongoing assessment

Initial Assessment

- Determine responsiveness.
- An alert and oriented patient does not need CPR.
- You may also suspect cervical spine injury.
- Protect the spine.

Rapid Trauma Assessment

- Maintain spinal immobilization keeping airway intact.
- Assess the head.
- Assess the neck.
- Apply a cervical spine immobilization collar.

Rapid Trauma Assessment

- Assess the chest.
- Assess the abdomen.
- Assess the pelvis.
- Assess all four extremities.
- Roll the patient with spinal precautions.
- Assess baseline vital signs.

Baseline Vital Signs

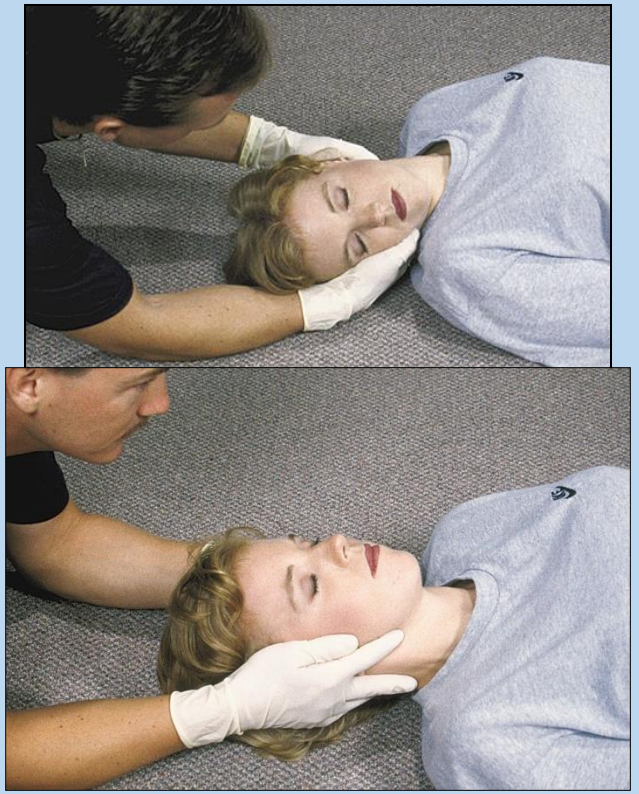
- Key signs used to evaluate a patient's condition
- First set is known as baseline vitals.
- Repeated vital signs compared to the baseline

Baseline Vital Signs

- Vital signs always include:
  - Respirations
  - Pulse
  - Blood pressure
- Other key indicators include:
  - Skin temperature and condition in adults
  - Capillary refill time in children
  - Pupils
  - Level of consciousness

Stabilization of the Cervical Spine
(1 of 2)

- Hold head firmly with both hands.
- Support the lower jaw.
- Move to eye-forward position.
- Maintain the position until patient is secured to a backboard.

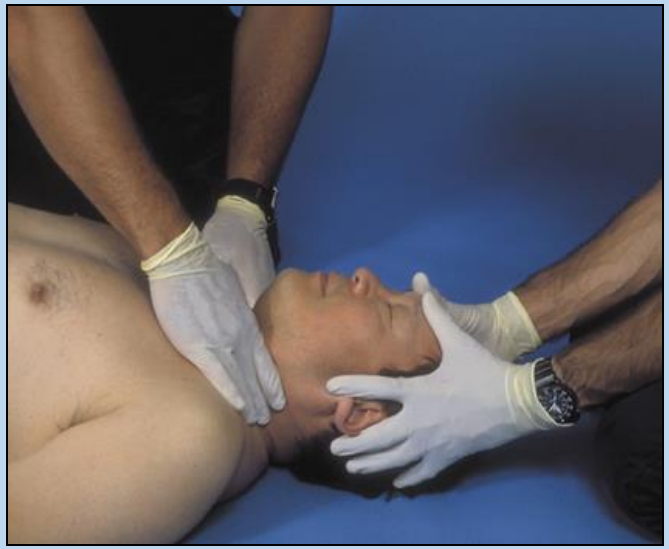


Stabilization of the Cervical Spine
(2 of 2)

- Do not force the head into a neutral, in-line position if:
  - Muscles spasm
  - Pain increases
  - Numbness, tingling, or weakness develop
  - There is a compromised airway or breathing

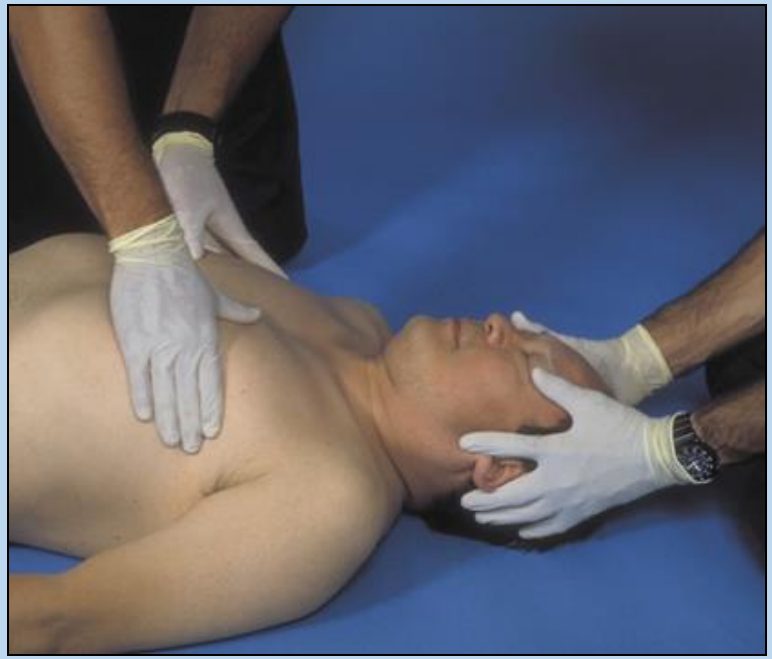
Head, Neck, and Cervical Spine

- Feel head and neck for deformity, tenderness, or crepitation.
- Check for bleeding.
- Ask about pain or tenderness.



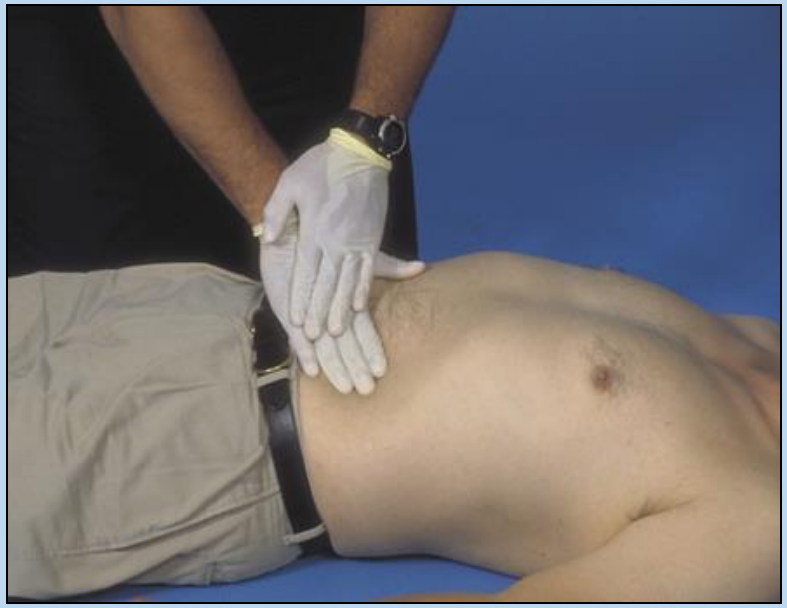
Chest

- Watch chest rise and fall with breathing.
- Feel for grating bones as patient breathes.
- Listen to breath sounds.



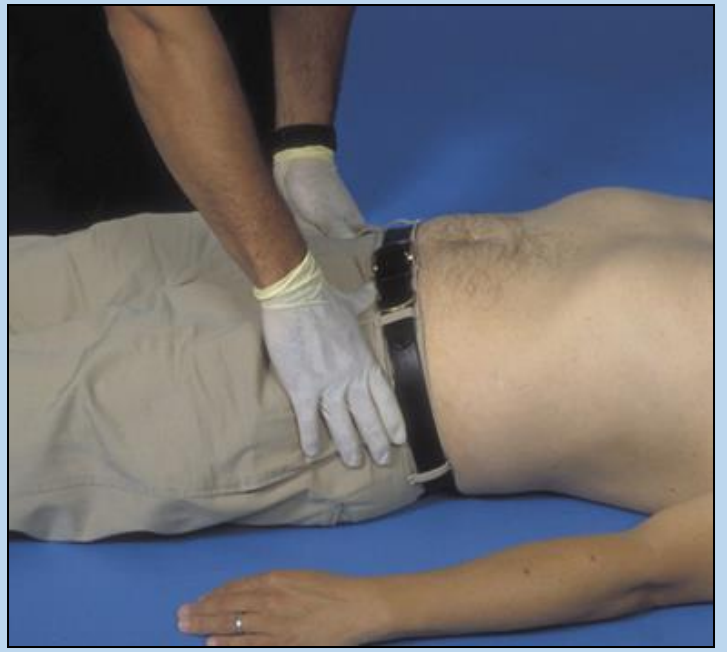
Abdomen

- Look for obvious injury, bruises, or bleeding.
- Evaluate for tenderness and any bleeding.
- Do not palpate too hard.



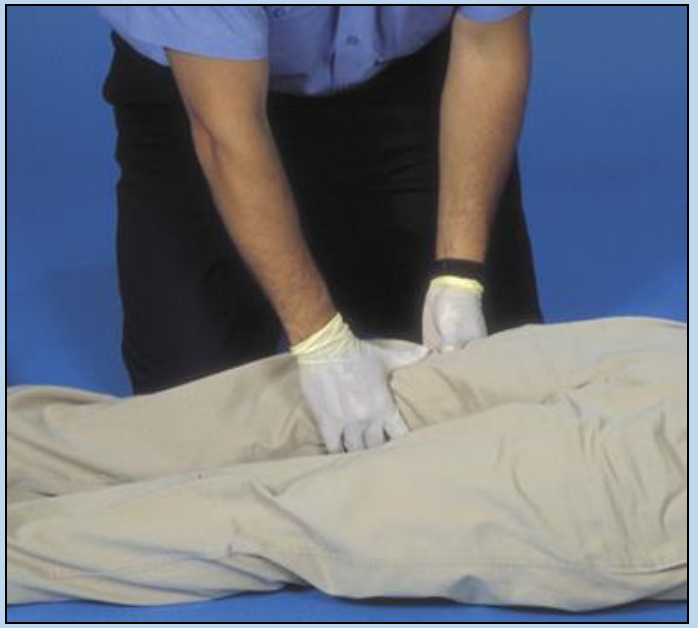
Pelvis

- Look for any signs of obvious injury, bleeding, or deformity.
- Press gently inward and downward on pelvic bones.



Extremities

- Look for obvious injuries.
- Feel for deformities.
- Assess
  - Pulse
  - Motor function
  - Sensory function



Evaluating Neurovascular Function

- Examination of the injured limb should include assessment of the following:
  - Sensation
  - Motor function
  - Pulses

The Collapsed Athlete

- October 20, 1997 Hawaii Ironman World Championship. *Sian Welch is assisted after crawling across the finish line just behind Wendy Ingraham, who also crawled across.*

CASE SUMMARIES AY2018/19

Baseball Exertional/medical (indirect) A male 21 year old collegiate baseball player collapsed on the field during baseball practice. He was transported to a nearby hospital but could not be revived. Cause of death is pending autopsy but is suspected to be cardiac related.

Basketball Exertional/medical (indirect) A male 21 year old collegiate senior basketball guard collapsed following a pick-up basketball game with friends. Efforts to revive him were unsuccessful. Cause of death was cardiomyopathy.

A male 24 year old collegiate basketball player collapsed following a pick-up basketball game. Bystanders transported him to a nearby hospital. He was not able to be revived. Cause of death is pending autopsy but is suspected to be cardiac related

CASE SUMMARIES AY2018/19 continued.

Cross Country Exertional/medical (indirect) A male collegiate cross country runner collapsed during practice. He was transported to a hospital and later diagnosed with heat stroke and rhabdomyolysis. A full recovery is expected.

Football Traumatic injury (direct) A male 20 year old collegiate football linebacker was injured during a football game. He came off the field complaining of a headache and was placed into concussion protocol. While heading toward the locker room for treatment, he collapsed. On site EMS personnel transported him to a hospital. He underwent emergency brain surgery. A full recovery is expected.

A male 19 year old collegiate sophomore football offensive lineman was injured during a football game. He was injured during a tackle and was immediately unable to move his legs. He is currently paralyzed from the waist down and is recovering in a long term facility. A long term prognosis is unknown

Collapse

- Is the most common medical condition affecting athletes in endurance events such as marathons and triathlons.
- Race distance, temperature and humidity.

(O'Conner et al.)

- 85% of collapse occur after athlete crosses finish line.

(Holtzhausen & Noakes)

Collapse

- Most cases of collapse are benign. But in some circumstances it can be severe and life threatening.
- Importance of attending physician being aware of proper evaluation and management of the collapsed athlete, which can sometimes be the difference between life and death.

Collapse-Benign

- Exhaustion
- Postural Hypotension
- Dehydration
- Muscle cramps

Serious Collapse

- Hyponatremia
- Hypoglycemia
- Heat Stroke
- Cardiac Arrest
- Seizures, brain hemorrhage
- Diabetic Coma

On Field Evaluation

- Level of consciousness.
  - Awake and alert. Cause of collapse likely benign.
  - Diminished LOC. Possible life threatening.
    - Possible cardiac life support needed.
    - ABC's first priority.
- Vital Signs
  - Temperature
  - Heart rate
  - Blood Pressure

On Field Evaluation

- The location of the collapse is a clue to severity.
  - After athlete finishes a race, much less of a concern then if collapse occurs before finish line.
- Important questions
  1. How much and what type of fluid ingested during race? (Dehydration, hyponatremia, hypoglycemia)
  2. How much urine was passed during the race?
     - Dehydrated most likely will not be urinating.
  3. Was there any vomiting or diarrhea during race?
     - Contributes to dehydration.
  4. How much carbohydrates were ingested before and during race.
     - Hypoglycimia

On Field Evaluation

5. Was there recent illness or medication?
   - May impair heat tolerance or fluid imbalance.
6. Was the athlete well trained and prepared for the competition?
   - Inadequate preparation makes collapse more likely.
7. Did the athlete have any symptoms?
   - Chest pain, palpitations, nausea, wheezing which may be underlining medical condition.

On Field Examination

Examination

- Vital signs.
  - Most endurance athletes have low resting heart rates.

    (Mayers & Noakes; O'Conner et al.)
- Signs of dehydration
  - Thirst and the ability to spit.
  - Skin turgor "tenting"

    (Holtzhausen & Noakes, O'Conner et al.)

On Field Evaluation of the Collapsed Athlete

- Signs of over hydration.
  - Athlete may look and feel “puffy”
    - Rings, Watches and shoes fit more tightly than before.
  - In severe cases pitted edema in legs
  - Hyponatremia
    - Blood sodium levels
    - Weight gain after race suggests fluid overload.

On Field Evaluation of the Collapsed Athlete

- The vast majority of athletes that collapse do so for benign reasons.
- Findings suggest benign cause of collapse:
  - Athlete is conscious and alert
  - Temperature is greater than 95 degrees but less than 104 degrees.
  - Systolic BP greater than 100 mm hg and heart rate less than 100 bpm.

On Field Evaluation of the Collapsed Athlete

- Findings suggest Serious cause of collapse:
  - Unconscious or diminished mental status.
    - Confuses, disorientated or aggressive
  - Temperature less than 94 or higher than 104 degrees.
  - Systolic BP less than 100 mmhg; heart rate greater than 100 bpm

Causes of Collapse in Endurance Athletes

- Postural Hypotension
  - Heat exhaustion or syncope
  - Low blood pressure while standing
- Most common cause
  - Blood pooling in dilated vessels of skin and lower limbs.
  - Loss of muscle pumping action from lower legs after cessation of exercise

(Holtzhausen & Noakes, O'Conner et al.; Sandell et al.)

Causes of Collapse in Endurance Athletes

- Dehydration
  - Decrease of circulation blood volume, increases the risk of postural hypotension.
- Treatment
  - Elevating of legs and feet until normal circulation is re-established
  - Fluid as tolerated
    - Replacement of electrolytes and carbohydrates better than water. (Sports Drinks)

Causes of Collapse in Endurance Athletes

- Muscle Cramps
  - Common in all strenuous sports activities.
  - More common and severe in hot and humid environments.
- Two common etiologies
  - Sodium depletion
  - Muscle fatigue caused by over use

(Bentley; Miles & Clarkson)

Causes of Collapse in Endurance Athletes

- Treatment
  - Keep affected muscles in stretched position.
  - Application of ice and/or massage.
  - Cramps due to fatigue occur early in season

Causes of Collapse in Endurance Athletes

- Dehydration
  - Variety of effects on athletes which may impair performance and increase likelihood of collapse.

    (ACSM; Casa et al.)
  - Leads to reduced blood volume.
  - Reduces time exercise can be sustained before heat related fatigue and eventual collapse.

Causes of Collapse in Endurance Athletes

- Signs and Symptoms
  - Severe thirst
  - Dry mouth
  - Difficulty producing spit
  - Increased heart rate
  - Decreased blood pressure
  - Poor skin turgor

Causes of Collapse in Endurance Athletes

- Hyponatremia
  - Most common serious cause of collapse
  - Replacement of relatively hypertonic sweat with a hypotonic fluid that contains little or no sodium
  - Commonly seen in longer endurance racers and more common in females, slower runners and those drinking water instead of sport drinks.

    (Noakes; Sandell et al.; Speedy et al.)

Causes of Collapse in Endurance Athletes

- Symptoms depend of severity of sodium deficit. (Normal rage 135-145 mEq/L)
  - Mild (131-134 mEq/L)
    - Generally causes no symptoms
  - Moderate (126-130 mEq/L)
    - Malaise, Nausea, Fatigue and Confusion.
    - “Phantom running”
      - Persistent and involuntary leg movement at rest.
  - Severe (less than 126 mEq/L)
    - Coma, Seizures and even Death

Causes of Collapse in Endurance Athletes

Examination

- Temperature of 103 degrees with stable BP and heart rate.
- Diminished LOC when moderate to severe
- Puffy, rings, watches, shoes, wrist bands often feel tight.
- Gaining weight during competition.

Causes of Collapse in Endurance Athletes

Exception

- Sometimes athletes can be dehydrated, have a low blood volume due to only partial replacement of sweat loss with hypotonic fluid.
- This hypovolemic type of Hyponatremia seems more common in the faster finishers.

Causes of Collapse in Endurance Athletes

- Experience suggests one should assume Hyponatremia if :
  - Temperature , Blood Pressure and Heart Rate are normal in the collapsed athlete who exhibits diminished LOC.

    (Holtzhausen & Noakes; Mayers & Noakes)

Causes of Collapse in Endurance Athletes

- Hypoglycemia
  - Less frequent cause of collapse
  - Can occur when liver production of glucose decreases as liver glycogen stores are depleted.

    (Holtzhausen & Noakes; Sandell et al.)
  - Commonly seen in distance events longer than four hours
  - Seen in athletes who fail to eat and drink sufficient carbohydrates before and during event
  - Most often seen in diabetics and eating disorders

Causes of Collapse in Endurance Athletes

- Signs and Symptoms
  - Weakness, Nausea, Anxiety, Sweating, Slurred Speech and eventually Coma
- Treatment
  - Administer glucose (Sports drinks, candy, etc)

As a rule-of-thumb, most
athletes should consume 200ml to 300ml of fluid every 15 MINUTES of exercise.

354.8ml=12ounces

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. Those most prone to heat exhaustion are elderly people, those with high blood pressure, and those working or exercising in a hot environment.

- Core Temp is < 104 degrees F (40 degrees C)
- Dehydration present
- Negative Neurological indicators.
- Sensorium is unaltered
- Profuse sweating
- It takes only 30 minutes for cell damage to occur with a core body temperature of 105 degrees.

The following are factors producing dangerous heat stress ：

- high-intensity training
- oppressive environmental conditions
- full football uniform
- long delay in providing medical treatment

Heat Illness

According to the CDC, heat illness during practice or competition is the leading cause of death among U.S. high school athletes.

What is **HEAT STROKE**?

Heat stroke is the most serious heat-related illness. It occurs when the body becomes unable to control its temperature: the body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes.

Heat stroke can cause death or permanent disability if emergency treatment is not provided.

What are the warning signs of a heat stroke?
include the following:
An extremely high body temperature (above 103°F)
Red, hot, and dry skin (Anhydrosis in late stage)
Rapid, strong pulse
Throbbing headache
Dizziness
Nausea
Confusion
Unconsciousness

Assess mucous membranes and skin turgor for dehydration.

To determine skin turgor, the health care provider grasps the skin on the back of the hand, lower arm, or abdomen between two fingers so that it is tented up. The skin is held for a few seconds then released. Skin with normal turgor snaps rapidly back to its normal position

For HEAT STROKE the following Action is recommended:
Survival depends on rapid cooling. It takes 3 mins for every 1 degree F of cooling.
COLD water immersion of the victim is GOLD standard; If this is not available place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan vigorously.
Monitor body temperature and continue cooling efforts until the body temperature drops to 101-102°F. (Rectal)

Exertional heat stroke is one of the top three killers of athletes and soldiers in training.

From 2010-15, 20 athletic heat stroke fatalities were reported.

- It takes seven to 14 days for a body to adapt to exercising in the heat.

- Dehydration at levels of 3 to 4 percent body mass loss can reduce muscle strength by an estimated 2 percent.

Recommendations :

For the first week or so, hold shorter practices with lighter equipment so players can
acclimate to the heat.

- Follow a work-to-rest ratio, such as 10-minute breaks after 40 minutes of exercise.
- Get an accurate measurement of heat stress using a *wet-bulb globe temperature, which
accounts for ambient temperature, relative humidity and radiation from the sun.
- If someone is suffering from exertional heat stroke, remember to cool first and transport second.
- Have large cold tubs ready before all practices and games in case cold water immersion is needed to treat exertional heat stroke.

Acclimatization takes 14 days

Physiologic adaptations:

- Sweating begins at lower core Temp.
- Increased skin blood flow facilitates heat removal from core.
- Decreased NaCl excretion in sweat/urine
- Improved exercise economy and decreased HR decreases overall CV strain

- Athlete will lose acclimatization in 18-28 days of inactivity.

Precautions to install :

- Cold Water Immersion should be set up prior to any high risk event.
- Follow a proper heat-acclimatization program to reduce risk
- Monitor environmental conditions on a regular basis
- Promote and monitor proper hydration
- Should an emergent situation occur, be prepared to initiate emergency action plan.

The warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting
- An athlete could suffer from heat exhaustion AND a concussion simultaneously.

The skin may be cool and moist. The pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke.

Heat Stroke can also occur with NO prodromal signs of Heat Exhaustion.

What steps can be taken to cool the body during heat exhaustion?

- Drink cool, nonalcoholic beverages.
- Rest.
- Take a cool shower.
- Seek an air-conditioned environment.
- Wear lightweight clothing.

References

- Sports Medicine for the Emergency Physician edited by Anna Waterbrook. Cambridge Medicine 1st ed. 2016
- Thank You to Lt. Col. Nick Pintianida US Army

Ethical Considerations

SAFESPORT


Olympic gold meda
Raisman says she
by Larry Nassar
Lawsuit says USA Gymnastics paid McKayla Maroney to keep quiet about sexual abuse
Former USA Gymnastic
doctor Larry Nassar ple
three more sexual assau
Simone Biles Says She, Too, Was Abused by Larry Nassar

- What kind of culture are we supporting? Or ignoring?
- Are we encouraging an environment of ethical behavior?
- Are we paying attention to cues of misconduct or abuse?
- -coaching practices
- -team culture

- Consider becoming Safesport trained.
- Created by the USOC
- • An independent non-profit organization • Headquartered in Denver, Colorado
- • Training programs and SafeSport Code are utilized by the U.S. Olympic and Paralympic Movements, including each of the 49 NGBs

- 45 MILLION U.S. YOUTH PARTICIPATE IN ORGANIZED SPORT EACH YEAR
- 1 / 5 REPORT BEING BULLIED
- 1 / 10 WILL BE VICTIMS OF SEXUAL ABUSE

- Safesport focuses on
- Bullying
- Harassment
- Hazing
- Physical abuse
- Emotional abuse
- Sexual misconduct and abuse

- Education and Training: – Sports participants at EVERY level
- • From rec leagues to the pros – All ages – U.S.

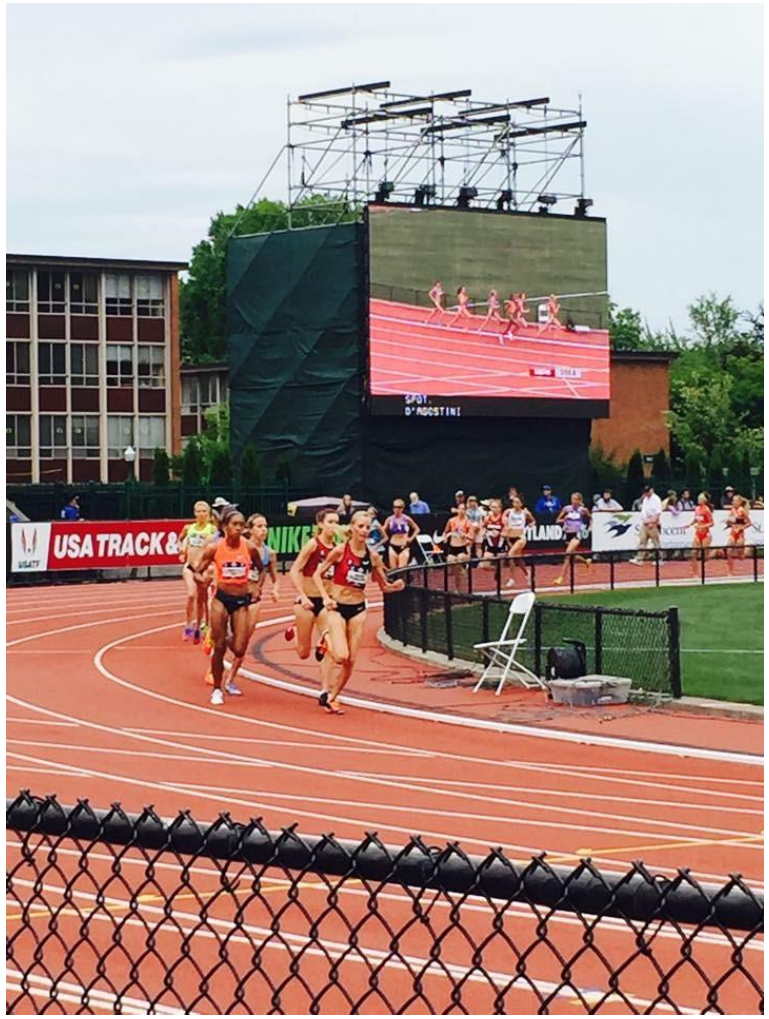
- • Reporting and Investigating: – Safe, professional and confidential place for individuals to report sexual abuse within the U.S. Olympic and Paralympic Movements

- SafeSport Helpline (Web + App)
- Access live, confidential help over the phone
- 866-200-0796.

YOU are Part of the Solution.

THE HEALTH OF THE ATHLETE IS CONSIDERED FIRST-BEFORE ALL OTHER CONSIDERATIONS

THE GOLDEN RULE



To start your Olympic Journey::

- https://www.teamusa.org/Team-USA-Athlete-Services/Medical/Sports-Medicine/Volunteer-Program#:~:text=Contact%20us%20at%3A%20sportsmedicinevolunteerprogram%40usopc.org

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