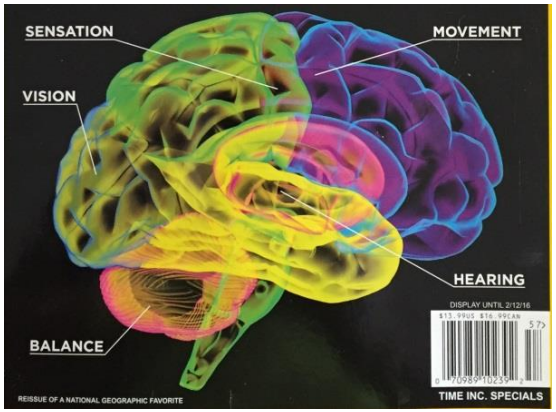
Concussion

'Recognition and Management'



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Disclaimer

- **The content of this presentation was developed by the Concussion Task Force at USA Swimming to educate coaches, athletes, healthcare professionals, and support staff on current, best practice guidelines for concussion management.**
- **The 'Return to Swim Protocol' during recovery from concussion has been adapted from and adheres to the standard of care, as outlined in the 2016 Berlin Consensus Statement on Concussion in Sports.**
- **The Concussion Task Force and USA Swimming are not responsible for any alterations of the content of this presentation which is intended solely for the purpose of education.**

Concussion
‘Basic Facts’

Concussion Task Force

'Goals'

- **Develop educational programs to: RAISE AWARENESS AND CHANGE BEHAVIOR towards understanding good concussion management in order to..**
- **REDUCE PREVENTABLE CONCUSSIONS AND DECREASE THE TIME REQUIRED TO SAFELY RETURN concussed swimmers to full competition**

Concussion Task Force

'Goals'

- **To help coaches answer 2 simple questions:**
  - **How will the concussion impact my swimmer's training?**
  - **When can my swimmer resume training?**

Concussion
‘Basic Facts’

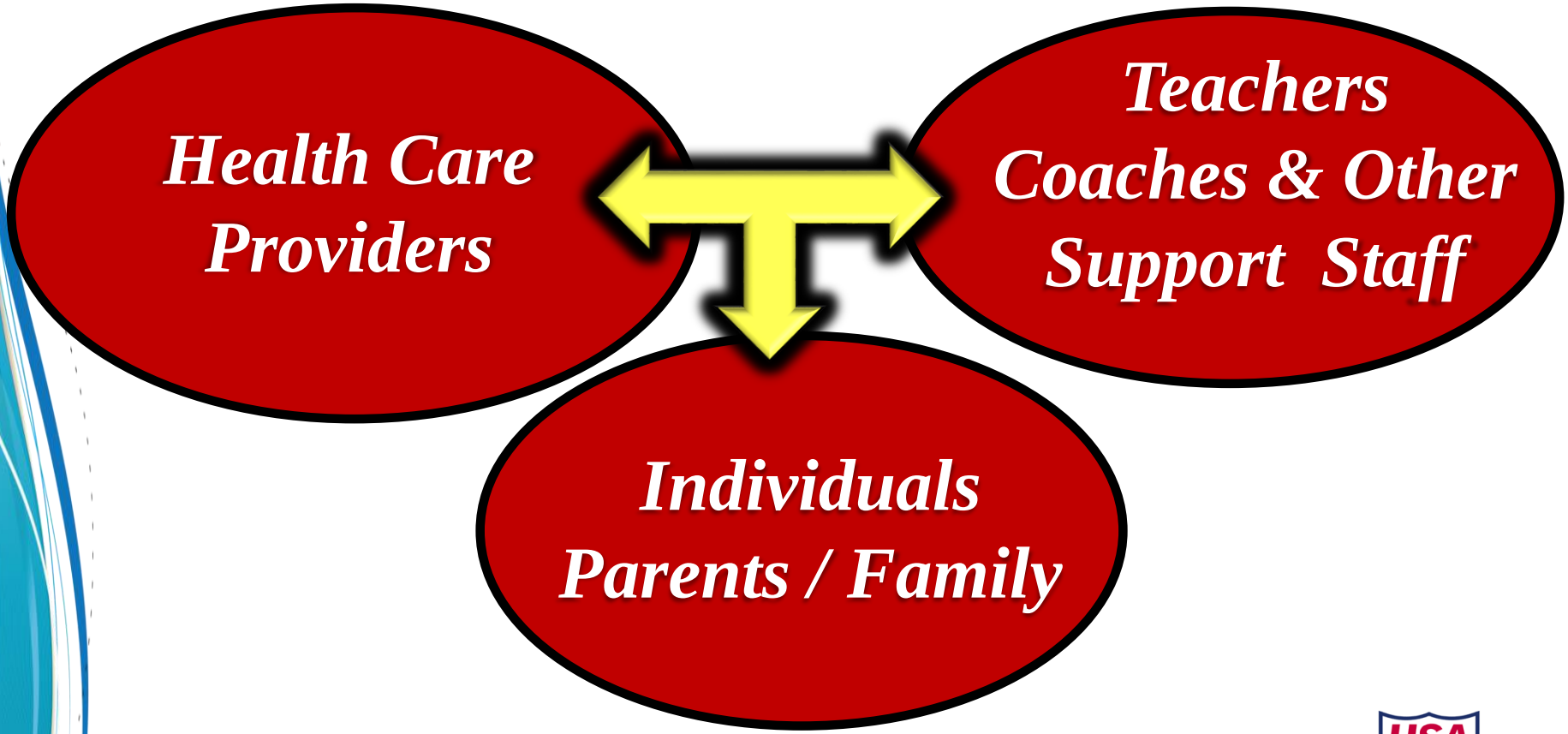
Concussion Definition

- **Is a Traumatic Brain Injury:**
  - **Which results from either a direct or indirect contact to the head or body (e.g. whiplash)**
  - **Often results in short-lived changes in normal brain function**

Basic Facts

- **Swimmers with a suspected concussion should not resume activity on the same day**
- **Concussion treatment should be supervised by a qualified healthcare provider (as defined by various state laws)**
- **Following recommendations of the healthcare provider is important to good recovery**
- **Coaches should communicate with the healthcare provider, athletes, and family - <u>'The Team Approach'</u>**

The Team that Takes Care of the Teams



More Basic Facts

- **Swimmers are susceptible to repeat concussion during recovery**
- **Multiple concussions may lead to longer recovery for subsequent concussions**
- **Younger swimmers may have prolonged symptoms and recovery**
- **<u>EARLY recognition</u> and initiation of appropriate treatment is critical to good and timely recovery**

Early Recognition of Concussion

Concussion Symptoms Can Vary!

Affective / Energy

- Mental Fatigue
- Sleep Disturbances

Physical

- Headache
- Balance problems
- Eye, ear, and stomach symptoms

Emotional

- Depression
- Anxiety
- Behavior
- Personality

Cognitive

- Difficulty concentrating
- Memory Problems
- Mentally ‘foggy’
- Slowed processing

Concussion Recognition
'Signs versus Symptoms'

SIGNS AND SYMPTOMS

These signs and symptoms may indicate that a concussion has occurred.

SIGNS OBSERVED BY COACHING STAFF	SYMPTOMS REPORTED BY ATHLETE
Appears dazed or stunned	Headache or "pressure" in head
Is confused about assignment or position	Nausea or vomiting
Forgets sports plays	Balance problems or dizziness
Is unsure of game, score, or opponent	Double or blurry vision
Moves clumsily	Sensitivity to light
Answers questions slowly	Sensitivity to noise
Loses consciousness (even briefly)	Feeling sluggish, hazy, foggy, or groggy
Shows behavior or personality changes	Concentration or memory problems
Can't recall events prior to hit or fall	Confusion
Can't recall events after hit or fall	Does not "feel right"

www.cdc.gov/concussion

Thorough Concussion Management
Why?

Post-Concussion Syndrome

- **Swimmers who delay reporting concussion symptoms are at risk for longer recovery**
- **Not engaging the medical staff AND continuing to participate in athletic activity during the immediate post-concussion period may lead to longer recoveries for swimmers**

Post-Concussion Syndrome

- **Typical recovery from concussion symptoms takes about 1 week**
- **Longer recovery can take weeks to months**

Sequential evaluation and thorough follow-up are the keys to prevention

Two Rare Conditions

- **There is controversy and a lot of media coverage of two rare and serious conditions**
  - **‘Second Impact Syndrome’**
  - **‘Chronic Traumatic Encephalopathy’ (CTE)**
- **These two conditions are thought to be preventable with proper recognition and management of an initial concussion**

Current Concussion Management Guidelines

Concussion Management

"The 3 Basic Steps"

RFP & E

- **Remove From Play & Educate**

R-R-R

- **Rest and Reduce - Physical Exercise & Cognitive Tasks**
- **Refer to specialists (as needed)**

A-A-A

- **Academic Adjustments and Accommodations at School**

Current Standard of Care

Return-To-School Activities

Consensus statement

Table 2 Graduated return-to-school strategy

Stage	Aim	Activity	Goal of each step
1	Daily activities at home that do not give the child symptoms	Typical activities of the child during the day as long as they do not increase symptoms (eg, reading, texting, screen time). Start with 5–15 min at a time and gradually build up	Gradual return to typical activities
2	School activities	Homework, reading or other cognitive activities outside of the classroom	Increase tolerance to cognitive work
3	Return to school part-time	Gradual introduction of schoolwork. May need to start with a partial school day or with increased breaks during the day	Increase academic activities
4	Return to school full time	Gradually progress school activities until a full day can be tolerated	Return to full academic activities and catch up on missed work

Consensus Statement on Concussion in Sport: the 5th International Conference on Concussion in Sport, Berlin 2016

Graduated return-to-sport (RTS) strategy

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	

Consensus Statement on Concussion in Sport: the 5th International Conference on Concussion in Sport, Berlin 2016

RTS strategy – Key Points

- **Initial period of 24–48 hours of both relative physical and cognitive rest is recommended before beginning the RTS progression**
- **At least 24 hours (or longer) for each step of the progression; go back to the previous step if any symptoms worsen during exercise**
- **Resistance training added only in the later stages (stage 3 or 4 at the earliest)**
- **If symptoms persist (> than 10–14 days in adults or more than 1 month in children), refer to healthcare professional who is an expert in the management of concussion**

Consensus Statement on Concussion in Sport: the 5th International Conference on Concussion in Sport, Berlin 2016

Adapted Guidelines for ‘Return-To-Swim’

Return-To-Swim (RTSw) Guidelines

	Signs & Symptoms (Usually up to 4 weeks)	Rest Protocol (Duration Varies)	Return to Swim (RTSw) / School Protocols (Duration Varies)	Return to Competition Protocol
Physical	• LOC • Headache &/or Neck Pain • Dizziness &/or Nausea • Confusion • Disorientation • Blurred Vision/Double Vision • Staring/Dazed/Stunned • Light &/or Noise Sensitivity • Slurred Speech • Balance Problems • Uncoordinated Movements	• Remove from Pool/Practice • Remove from Dryland Activities	**Follow RTSw Protocol –** **** 24 hours between Stages****	• **Completed RTSw Protocol** • **Medical Clearance (as per State Law)**
Cognitive	• Concentration &/or Memory Difficulty • Mentally "foggy/groggy/hazy" • Forgetfulness • Slowed processing of basic information • Slowed processing & answering of questions	• Remove from School Activities (as needed) • Decision should be made my health care provider	• Tolerate 30 Minutes Light Mental Activity w/minimal change in symptoms • Increase Activity as tolerated (30 min increments) • Avoid Removal from School for Prolonged Periods (weeks)	• Symptom Free
Emotional	• Sadness • Nervousness (more than baseline) • Unusually Angry • Unusually Irritable	• Monitor for Change in Symptoms	• Symptom Free	• Symptom Free
Sleep	• Sleeping too much or too little • Difficulty Initiating & /or Maintaining Sleep	• Monitor for Change in Symptoms • Avoid Complete or Persistent Rest	• Symptom Free	• Symptom Free
Energy Levels	• Mental Fatigue • Drowsiness	• Monitor for Change in Symptoms	• Symptom Free	• Symptom Free

Return-To-School Guidelines
'*Key Points*'

- **The decision to keep the athlete out of school should be made by the healthcare provider**
- **There is no evidence to say that keeping the athlete out of school is useful**
- **Determination of school absence should be made on an individualized basis depending on symptoms and signs, <u>not as a specific prescribed time frame</u>**

Return-To-Swim (RTSw) Guidelines

	Signs & Symptoms (Usually up to 4 weeks)	Rest Protocol (Duration Varies)	Return to Swim (RTSw) / School Protocols (Duration Varies)	Return to Competition Protocol
Physical	• LOC • Headache &/or Neck Pain • Dizziness &/or Nausea • Confusion • Disorientation • Blurred Vision/Double Vision • Staring/Dazed/Stunned • Light &/or Noise Sensitivity • Slurred Speech • Balance Problems • Uncoordinated Movements	• Remove from Pool/Practice • Remove from Dryland Activities	**Follow RTSw Protocol –** **** 24 hours between Stages****	• **Completed RTSw Protocol** • **Medical Clearance (as per State Law)**
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Return-To-Swim (RTSw) Guidelines
'*Key Points*'

- **Stage 2 of RTSw requires the athlete be 100% symptom-free or back to pre-concussion functioning**
- **This means that before a healthcare provider 'approves' the start of Stage 2 RTSw, they must be sure that 'ALL FIVE' points of 'recovery' at home, school, and medical have been satisfied**

Return-To-Swim (RTSw) Guidelines

'When will Healthcare Provider Clear for Stage 2?

'The Five Points of Recovery'

1. **Home (Parent / Guardian)**
   - ✓ **Confirms symptom-free and tolerates 100% pre-concussion stimulation (i.e. texting, computers, video games, homework, chores)**
2. **School (Teachers / Counselor) – 'Teacher Feedback Form'**
   - ✓ **Documents symptom-free and tolerates 100% pre-concussion school demands (classroom and homework)**
3. **Neurocognitive Testing (Eg: SCAT-3; Child SCAT-5; ImPACT®)**
   - ✓ **Documentation that athlete is 100% back to baseline neurocognitive testing and/or at estimated pre-concussion scores**
4. **Physical Therapy (PT) &/or Athletic Trainer (AT)**
   - ✓ **Documentation from PT &/or AT that athlete has been checking in and/or has completed therapy goals**
5. **Medications**
   - ✓ **Confirmation and documentation that athlete is off all OTC and prescription medications for treatment of concussion symptoms and sleep aids**

Return-To-Swim (RTSw) Guidelines
'*Key Points*'

- **'RTSw progression' and ultimate 'medical clearance for full return to competition' is the responsibility of the healthcare professional designated by state law**
- **'Symptom-limited activity' in Stage 1 of RTSw protocol should be medically supervised**

Return-To-Swim (RTSw) Guidelines
'*Key Points*'

- **Be familiar with and adhere to mandates of the various 'State Laws' regarding concussion management**
- **Adhere to the 'Concussion Management Protocol for Return to Sport' for each University and School**

Return-To-Swim (RTSw) Guidelines
'*Key Points*'

- **There is no single right or wrong timeline for progression through the various 'stages'**
- **Important to recognize the difference between exercise programs being used to rehabilitate athlete's with injuries and the RTSw exercises**

Return-To-Swim (RTSw) Guidelines
'*Where and When*'

- **In water RTSw is recommended if adequate pool space is available AND appropriate supervision is available for changing signs and symptoms**
- **If unavailable recommend land based RTSw**
- **The athlete progresses to the next stage provided they have no symptoms for 24 hours after the previous stage**

Return-To-Swim (RTSw) Guidelines
'*Stage 1*'

- **Symptom limited activity**

Return-To-Swim (RTSw) Guidelines
'*Stage 2 – Light Aerobic Exercise*'

- **20 minutes**
  - **Age appropriate max heart rate (55-65%)**
    - **Pool/workout speed slower than warm-up/warm-down speed or no faster than 65% of 100 time**
  - **Kicking recommended with a kickboard**
    - Increases cardiovascular function
    - Swimmer can see around them
    - Need to assess influence of exertional activity on symptoms
    - Start with front kicking and progress to back kicking
- **If land based, recommend use of bike or elliptical**
  - **Avoid treadmill**

Return-To-Swim (RTSw) Guidelines
'*Stage 3 – Sport-specific Exercise*'

- **30 minutes**
  - **Age appropriate max heart rate (65-70%)**
    - **Pool/workout speed similar to warm-up/warm-down speed or no faster than 70% of 100 time**
  - **Add limited head movement**
    - Use sports cord on land to practice freestyle with side breathing and assess if signs and symptoms recur
    - Use a snorkel first in water
  - **All 4 strokes (in order)**
    - **Breast, Back, Free, Fly**
  - **OPEN TURNS ONLY**

Return-To-Swim (RTSw) Guidelines
'*Stage 4 – Non-Contact Training Drills*'

- **30 minutes**
  - **Age appropriate max heart rate (70-80%)**
    - **Pool/workout speed should be no faster than aerobic speed or 75% of 100 time**
  - **More complex interval training**
  - **All 4 strokes**
    - **No particular order**
  - **Add coordination and cognitive load**
  - **OPEN TURNS ONLY**

Return-To-Swim (RTSw) Guidelines
'*Stage 5*'

- **Full Practice**
  - **Pool/workout speed should be no faster than 80% of 100 time**
  - **Introduce 'STARTS' at this Stage**
  - **Introduce 'FLIP TURNS' at this Stage**

Return-To-Swim (RTSw) Guidelines
'*Stage 6*'

- **Return to competition without restrictions**

Return-To-Swim (RTS) Guidelines

	Signs & Symptoms (Usually up to 4 weeks)	Rest Protocol (Duration Varies)	Return to Swim (RTS) / School Protocols (Duration Varies)	Return to [illegible] Protocol
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Club Swim Coaches' Knowledge, Attitudes, and Beliefs of Pediatric Athletic Concussion (BAKPAC-SWIMCOACH)

Tamara McLeod et al.

Influence of Prior Concussion Education on Club Swim Coaches' Perceived Importance, Knowledge, and Confidence Regarding Sport-Related Concussion

- Coaches are aware of the importance regarding concussion recognition and management
- Perceived knowledge and confidence in their knowledge is more notable in club swim coaches who have been educated on concussions recognition and management
- Therefore concussion education is important even if some state laws do not require education for club coaches

Influence of Athletic Trainer Access on Club Swim Coaches' Perceived Importance, Knowledge, and Confidence Regarding Sport-Related Concussion

- **Perceived knowledge and confidence in their knowledge is more notable in club swim coaches who have access to Athletic Trainers**
- **Therefore access to Athletic Trainers serves a dual role –providing athletic training services and sharing of concussion knowledge via regular communication**

Club Swim Coaches' Access to and Collaboration with Healthcare Providers

Most clubs do not have established relationships with athletic trainers and other healthcare providers

Developing partnerships between swim clubs and healthcare providers may be beneficial!!

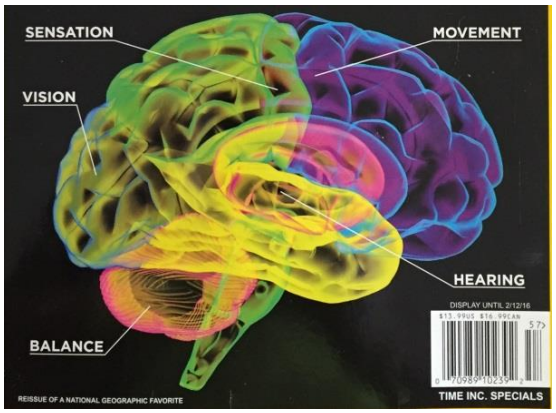
- **Improve access following concussions**
- **Timely referrals**
- **Dependable and steady communication**

Suggestions to Improve Communication between Coaches and the Rest of Concussion Treatment Team?

- Change attitude and culture regarding concussions in swimming
- Lack of designated concussion management team
- Parent / swimmer point person for concussion management teams
- Access to reliable and knowledgeable healthcare providers
- Communications directly with healthcare providers

Suggestions to Improve Communication between Coaches and the Rest of Concussion Treatment Team?

- **Better communication between ALL concussion management team members**
- **Group communication via technology**
- **Standardized checklists and forms**
- **Standardized guidelines, policies, and procedures**
- **Education**



Successful Concussion Recovery

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Education + Thorough Management + Communication

“We always hope for the easy fix: the one simple change that will erase a problem in a stroke. But few things in life work this way. Instead, success requires making a hundred small steps go right - one after the other, no slipups, no goofs, everyone pitching in.”

— Atul Gawande, Better: A Surgeon's Notes on Performance

“Better is possible. It does not take genius. It takes diligence. It takes moral clarity. It takes ingenuity. And above all, it takes a willingness to try.”

— Atul Gawande, Better: A Surgeon's Notes on Performance

Questions?

Selected References

- McCrory, P., et al., *Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012.* Br J Sports Med, 2013. 47(5): p. 250-8.
- Evans, RW. Concussion and mild traumatic brain injury. Up-To-Date. Accessed February 4th, 2015.
- http://www.cdc.gov/concussion/; Accessed December 4th; 2015.
- CDC (2012). Heads up to schools: A fact sheet for school nurses. A heads up for schools: Knowing your concussion.
- Kelly, J.P. and J.H. Rosenberg, *Diagnosis and management of concussion in sports.* Neurology, 1997. 48(3): p. 575-80.
- *REAP The Benefits of Good Concussion Management. McAvoy K. Center for Concussion. Rocky Mountain Hospital for Children, Denver, www.RockyMountainHospitalforChildren.com.*
- Purcell, L., *What are the most appropriate return-to-play guidelines for concussed child athletes?* Br J Sports Med, 2009. 43 Suppl 1: p. i51-5.
- Giza, C.C., et al., *Summary of evidence-based guideline update: evaluation and management of concussion in sports: report of the Guideline Development Subcommittee of the American Academy of Neurology.* Neurology, 2013. 80(24): p. 2250-7.
- Harmon, K.G., et al., *American Medical Society for Sports Medicine position statement: concussion in sport.* Br J Sports Med, 2013. 47(1): p. 15-26.
- DeMatteo, C., et al., *A Balanced Protocol for Return to School for Children and Youth Following Concussive Injury.* Clin Pediatr (Phila), 2015.
- Halstead, M.E., et al., *Returning to learning following a concussion.* Pediatrics, 2013. 132(5): p. 948-57.

Selected References

- de Kruijk JR, Leffers P, Meerhoff S, Rutten J, Twiinstra A. *Effectiveness of bed rest after mild traumatic brain injury: a randomised trial of no versus six days of bed rest.* J Neurol Neurosurg Psychiatry, 2002 Aug;73(2):167-72.
- Ritter KS, McLeod IA, Robinson K, Welch Bacon CE, Mistry DM, Rodeo S, Valovich McLeod TC. *Influence of Prior Concussion Education on Club Swim Coaches' Perceived Importance, Knowledge, and Confidence Regarding Sport-Related Concussion*. Submitted to the 2017 National Athletic Trainers' Association Clinical Symposium. Houston, Texas.
- McLeod IA, Robinson K, Welch Bacon CE, Mistry DM, Rodeo S, Valovich McLeod TC. *Influence of Athletic Trainer Access on Club Swim Coaches' Perceived Importance, Knowledge, and Confidence Regarding Sport-Related Concussion*. Submitted to the 2017 National Athletic Trainers' Association Clinical Symposium. Houston, Texas
- Robinson K, McLeod IA, Welch Bacon CE, Mistry DM, Rodeo S, Valovich McLeod TC. *Club Swim Coaches' Access to and Collaboration with Healthcare Providers*. Submitted to the 2017 National Athletic Trainers' Association Clinical Symposium. Houston, Texas