Sideline Management Assessment Response Techniques (SMART)

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Steven Cole, ATC, MEd
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Michael Petrizzi, MD, FAAFP

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Dr. Petrizzi is a graduate of the medical college at State University of New York (SUNY) Downstate Medical Center. He completed his family medicine residency at the University of North Carolina (UNC) at Chapel Hill, as well as a fellowship. Dr. Petrizzi practices full-spectrum family medicine, from newborn to nursing home, with a sports medicine concentration. He is the recipient of the SUNY Downstate Medical Center's George Liberman, MD, Award in Family Practice for excellence in family medicine teaching and has served on the Virginia Department of Education Policy on Concussion for Student Athletes subcommittee. As part of his passion for caring for high school athletes, he continues to serve on the Virginia High School League Sports Medicine Advisory Committee and is the Atlee High School team physician. He is the co-developer of the Sideline Management Assessment Response Techniques (SMART) workshop, designed to train Family Physicians to appropriately evaluate and manage injuries on the athletic field and sidelines. He has authored or edited numerous articles and books about sports medicine. This will be his 24th year presenting at FMX, specializing in field-side management, casting and splinting, exam techniques, and joint injections.
Steven Cole, ATC, MEd

Associate Athletics Director for Internal Operations and Administration, College of William & Mary

Prior to taking over the day-to-day operation of the College of William & Mary’s Athletics Department, Mr. Cole led the college’s sports medicine program for 27 years. His areas of expertise include management of spine-injury, concussion, and other on-field injuries sustained by college athletes. Mr. Cole has been teaching for more than 30 years. He co-developed the SMART (Sideline Management Assessment Response Techniques) workshop for primary care physicians and has spoken on sports medicine topics nationally and abroad.
Learning Objectives

1. Compare assessment techniques used to examine athletes with injuries that are common to specific sports.
2. Evaluate athletes for potential sprains, strains, dislocations, fractures, ligament tears or head and neck injuries and provide stabilization as appropriate.
3. Practice the use of a Rapid Diagnosis Guide to evaluate the nature and extent of an injury and perform sideline functional assessment drills to determine athletes’ readiness to return to play.
Why This Topic?

- National Athletic Trainers Association (NATA) data shows that < 20% of schools have a true team doctor/school relationship.
- Few schools have BOC certified Athletic Trainers.
- Reviewing material in this forum can improve both the competence and confidence of Team Doctors and Athletic Trainers.
- Primary Care physicians have a blend of clinical skills that are a natural fit.
Why so few physicians on sidelines?

- NOT REQUIRED
- Time and Interest
- Liability Concerns (Team Physician Consensus Statement)
- Insecurity
  - Only 20% of medical schools and 47% of primary care clinical programs have a musculoskeletal training curriculum
  - Sports medicine is a new specialty with few trained and few programs
  - Increasing number of participants
Goals

• Improve the quality and quantity of medical coverage for student-athletes
• Increase the confidence and competency of physicians providing care to athletes
• Affirm those of you who are actively serving your school
• Encourage and empower others of you to get involved and/or convert a colleague to do so
S.M.A.R.T.™ Workshop
Sideline Management Assessment
Response Techniques

On-Field Management of the Injured Athlete
Step by Step Approach to On-Field Assessment of Injuries
Pre Event Organization

Components of an Emergency Action Plan (EAP)

- Personnel
- Equipment
- Communication
- Transportation
- Venue Location
- Emergency Care Facilities
- Documentation
Pre Event Organization

• Each athletic program should have an EAP, *venue specific*, developed in conjunction with local EMS

• Healthcare providers for athletic competition (MDs, EMTs, ATs) should develop an emergency plan and protocol for dealing with such injuries when they occur *and* rehearse on regular basis

Pre-Event “Time Out”

• Sports medicine care teams should conduct a “Time Out” *before* athletic events to ensure EAPs are reviewed and plan out the options with the personnel and equipment available for that event.
Prepare for Special Situations

- Every emergency situation and every patient is different
- Individual circumstances must dictate appropriate actions
  - CPR
  - Combative athlete
  - Confined space
  - Unstable or uneven surfaces
  - Extrication
  - Water Rescue

- No such thing as “always” and “never”
Step By Step Approach to On-Field Assessment of Injuries

Primary survey/resuscitation

• assess LOC-ABC
• provide immediate basic life support measures as needed
• quickly make decision regarding transportation

Secondary survey

• SAMPLE history
• vital signs
• secondary assessment
  – head to toe survey
  – Re-assess all systems once sitting up then again when standing

- Neurologic assessment should be performed before and after full-body immobilization!
  - Motor
  - Sensation
Step By Step Approach to On-Field Assessment of Injuries

• Observation
  • Scene size-up
    • Scene/situation safe and under control
    • MOI/nature of injury
      – c-spine stabilization required
  • Number of patients
  • Additional EMS assistance needed

• Controlled Approach
Step By Step Approach to On-Field Assessment of Injuries

- Call for Assistance
- Removal from Field
Game Time

• Breakout Sessions
  – On-Field Management of Spine Injured Athlete
    • Removal of Protective Equipment
  – Upper and Lower Extremity Evaluation
    • Fracture/Dislocation Management
  – 2 min Drill: Return to Play Functional Assessment
    • Sideline Head Injury Evaluation
    • Functional Testing
S.M.A.R.T.™ Workshop
Sideline Management Assessment Response Techniques
On-Field Management of the Spine Injured Athlete
Guidelines for Appropriate Care of the Spine Injured Athlete

- Heightened suspicion of potentially catastrophic spine injury:
  - MOI
  - unconscious or altered level of consciousness
  - neurological complaints and/or deficits
  - significant midline spine pain
  - obvious spinal column deformity
Guidelines for Appropriate Care of the Spine Injured Athlete

• Protective athletic equipment may be removed prior to transport to an emergency facility.

• Equipment removal may be performed by at least 4 rescuers trained and experienced with equipment removal at the earliest possible time.
  – if fewer than 4 people are present, equipment may be removed at the earliest possible time after enough trained individuals arrive

  FACILITATES:
  • Packaging
  • Emergency Department Physician Evaluation
  • Diagnostic Testing
Guidelines for Appropriate Care of the Spine Injured Athlete

- Athletic protective equipment varies by sport and activity and styles of equipment differ within a sport or activity.
- The sports medical team must be familiar with the types of equipment specific to the sport and associated techniques for removal of the equipment.
Guidelines for Appropriate Care of the Spine Injured Athlete

If an athlete is prone and not breathing, you must log roll them to establish an airway

- With shoulder pads on, place their under arm at their side to roll
- Without shoulder pads, extend their under arm to support the head during the roll
- The appropriateness of repositioning the head into a spin-neutral position should be assessed on an individual basis with resistance and pain as a guide
Techniques for Appropriate Care of the Spine Injured Athlete

- Log Roll vs. Eight Person Lift (formerly known as lift and slide)
  - research compared techniques to assess movement in healthy individuals and destabilized c-spines of cadavers
  - Both techniques created movement; more with log roll
Prone Log Roll

Pull Technique

Push Technique
Log Roll

*If a person is prone and not breathing, you must log roll to establish an airway*
8 Person Lift  (former Lift and Slide)

Placing a supine athlete on a spine board
Guidelines for Appropriate Care of the Spine Injured Athlete

Establishing an airway through the Face Mask

- In the event of respiratory distress or arrest, prior to facemask and/or helmet removal, pocket mask may be positioned through facemask for ventilator assistance
Facemask Removal: Combined Tool Approach

- Facemask removal tools should be readily available
  - cordless screwdriver
  - cutting device
  - specialty tools for quick release facemask hardware
Facemask Removal
Guidelines for Appropriate Care of the Spine Injured Athlete

Appropriate spinal alignment must be maintained

- Realize that the helmet and shoulder pads elevate an athlete’s trunk when in the supine position
- Should either the helmet or shoulder pads be removed – or if only one of these is present – appropriate spinal alignment must be maintained
- The front of the shoulder pads can be opened to allow access for CPR and defibrillation
Head and Neck Stabilization
Shoulder Pad Removal techniques

- 8 person lift
- Elevated torso technique
- Flat torso technique
  - May incorporate jersey and pad cutting into log roll or 8-person lift procedures
Football Helmet and Shoulder Pad Removal: Flat Torso technique
Football Helmet Removal

**Question:** If the helmet is removed on-site prior to transport, does the facemask need to be removed? *Based upon the type of helmet.*

- Do not spread at ear holes, carefully rotate helmet anteriorly to clear occiput region
- With suspected spinal injury, do not remove helmet until after initial radiological films are taken and reviewed
Shoulder Pad Removal – Flat Torso

Spinal immobilization must be maintained while removing the shoulder pads
Shoulder Pad Removal: Elevated Torso Technique

Straddle technique:
• Rescuer 1 stabilizes c-spine;
• Rescuer 2 elevates torso while,
• Rescuer 3 removes pads
  – contraindicated if suspect thoracic or lumbar injury
You will have to live with your actions for the rest of your life!
Let’s Practice !!!

• Log Roll: Push and Pull
• 8 Person Lift
• Straddle Lift
• Helmet and Shoulder Pad Removal
  – Flat Torso
  – Elevated Torso
Sideline Management Assessment Response Techniques

Fracture and Dislocation Management
On-field management of fractures and dislocations
Sideline splinting and immobilization techniques
Complications: Urgent Action Required

- Hemorrhage
  - Pelvic/femur fx

- Open fracture
  - Immobilize and transport

- Arterial injury
  - Assess distal pulse
  - If absent, attempt reduction: much gained, little lost
  - Reassess pulse
  - Transport

- Nerve Injury
  - Must always assess distal sensation

- Tenting
  - Attempt reduction to prevent skin necrosis

- Compartment Syndrome
  - Five P’s
    - Pressure
    - Pallor
    - Parasthesias
    - Pain
    - Pulselessness
      - High index of suspicion
      - Generally develops later
        - Repeat assessments
Acute Fracture Management

- Immobilization: splinting preferred over casting to account for swelling
- Pain relief: analgesics, narcotics
- Control of swelling: ice, elevation
- Crutches if lower extremity injury
- Imaging may be delayed in suspected stable fractures
  - ie. office the next morning versus ER that night
- Tuning Fork can be a useful sideline tool to screen for fractures
Dislocations: Management Issues

• On field urgent reductions
  – Knee
  – Hip
  – Elbow
  – Ankle

• Field side rapid reductions
  – Shoulder
  – Patella
  – Finger
Dislocation Pearls

• Most dislocation feel better with traction

• In-line traction will reduce a large amount of dislocations acutely and is safe to attempt for even inexperienced clinicians
  – “Just pull on it”

• Exception
  • MCP dislocations of the hand should be pushed over the top to avoid entrapment of the volar plate
Dislocation Pearls

• Neurovascular injuries occur at the time of the dislocation not as a result of reduction attempts
  – Document pre-reduction status

• Suspicion of a fracture should not delay attempts at reduction
  – May increase pain
  – Most isolated dislocations do not have significant swelling early
  – Lots of swelling suspect fracture
S.M.A.R.T.™ Workshop
Sideline Management Assessment Response Techniques

Upper Extremity Evaluation
With and without Football protective equipment

Upper Extremity Fracture and Dislocation Management
Objectives

• Surface anatomy, muscle testing, special tests
  – Cervical Spine
  – Shoulder
  – Elbow, Wrist, Hand

• On-Field management of fractures & dislocation
Cervical Spine Exam

- **Surface Anatomy**
  - C 3 thru 7

- **Manual Muscle Tests**
  - Neck Flexion
  - Neck Extension
  - Lateral Bending
  - Rotation

- **Special Tests**
  - Spurling’s Compression
  - Distraction Test
  - Brachial Plexus Tension Test
Foraminal Compression and Distraction

• Spurling’s Test
  – Positive if: axial compression with neck sidebent toward affected side recreates symptoms

• Distraction Test
  – Positive if: axial compression with neck sidebent away from affected side relieves symptoms
Brachial Plexus Tension Test

- Examiner sidebends neck away from affected arm while applying pressure to depress shoulder
- Positive if re-creates symptoms in affected arm
Shoulder Exam

• Surface Anatomy: Palpate
  – Sternoclavicular joint
  – Clavicle
  – Acromioclavicular joint
  – Coracoid process
  – Tip of Acromion
  – Proximal Humerus
  – Spine of the Scapula
Shoulder Exam

• Manual Muscle Tests
  – Flexion & Extension
  – Abduction & Adduction
  – Internal & External Rotation
  – Horizontal Abduction & Adduction

• Special Tests
  – Piano Key
  – AC Shear and Distraction Tests
  – Sulcus Sign
  – Apprehension Test
  – Hawkins-Kennedy Impingement Test
  – Drop Arm Test
Sulcus Sign
Shoulder Dislocation

- Anterior/inferior 95%
- Most common large joint dislocation
- Abducted/ER positioning as MOI
- Isometric testing of deltoid to check for axillary nerve damage
  - Sensory testing usually adequate if unable to activate deltoid pre and post reduction
- Reduction techniques:
  - Stimson, countertraction, self reduction, others
Shoulder Reduction Technique:
Start with mild humeral traction & then add scapular manipulation

- Pull down to disengage the locking mechanism (window shade)
- Try to avoid letting the humeral head “clunk” in.
Shoulder Exam

Location of Pain & Other Symptoms

Fell Down--Pain on Top of Shoulder
  - A-C Separation
    1. Piano Key Sign
    2. A-C Shear Test

Fell Down--Pain in Front of Shoulder
  - Dislocation
    1. Apprehension Test
    2. Axilla Region Palpation

Neck Twisted--Burning Pain Down Arm
  - Stinger
    1. Rule out other causes of pain
    2. Test strength around shoulder

Arm Goes Limp
  - Subluxation
    1. Apprehension Test
    2. Relocation Test

Pain on Raising Shoulder
  - Rotator Cuff
    1. Empty Can
    2. Full Can
    3. Drop Arm Test

Rotator Cuff
  - Pain on Raising Shoulder
    1. Empty Can
    2. Full Can
    3. Drop Arm Test

Pain on Raising Shoulder
  - Rotator Cuff
    1. Empty Can
    2. Full Can
    3. Drop Arm Test
Shoulder Exam

Location of Pain & Other Symptoms

1. Piano Key Sign
2. A-C Shear Test
A-C Separation
Fell Down--Pain on Top of Shoulder

1. Apprehension Test
2. Axilla Region Palpation
Dislocation
Fell Down--Pain in Front of Shoulder

1. Rule out other causes of pain
2. Test strength around shoulder
Stinger
Neck Twisted--Burning Pain Down Arm

1. Apprehension Test
2. Relocation Test
Subluxation
Arm Goes Limp

1. Empty Can
2. Full Can
3. Drop Arm Test
Rotator Cuff
Pain on Raising Shoulder

Location of Pain & Other Symptoms

1. Piano Key Sign
2. A-C Shear Test
A-C Separation
Fell Down--Pain on Top of Shoulder

1. Apprehension Test
2. Axilla Region Palpation
Dislocation
Fell Down--Pain in Front of Shoulder

1. Rule out other causes of pain
2. Test strength around shoulder
Stinger
Neck Twisted--Burning Pain Down Arm

1. Apprehension Test
2. Relocation Test
Subluxation
Arm Goes Limp

1. Empty Can
2. Full Can
3. Drop Arm Test
Rotator Cuff
Pain on Raising Shoulder
Elbow, Wrist, and Hand Exam

• Manual Muscle Tests
  – Elbow Flexion & Extension
  – Wrist Flexion & Extension
  – Pronation & Supination
  – Finger Opposition
  – Pinch Strength

• Special Tests
  – Valgus Stress Test
  – Tennis Elbow Test (Lateral Epicondylitis)
  – Finkelstein Test
Elbow Dislocation

- Reduction technique for posterior dislocation
  - Prone, elbow flexed
  - Correct med/lat translation proximally
  - Grab wrist, apply down traction with supination
  - Other hand applies pressure to olecranon while pronating arm
  - “Clunk” confirms
Elbow Reduction Technique

• Neutral rotation & Downward traction
• Landmarks:
  – Medial Epicondyle
  – Lateral Epicondyle
  – Olecranon starts superior, ends inferior
Elbow Exam

1. Deformity
2. Check wrist pulse
3. Sensation

Dislocation

Fell on Arm or Outstretched Hand

Hyperextension

Little League Elbow

Medial Elbow Pain in Young Pitcher

Gradual Onset of Pain After Heavy Use

Lateral Epicondylitis

1. Medial Epicondylitis Test

1. Tennis Elbow Test
2. Cozen's Test
Wrist and Hand Exam

- Surface Anatomy: Palpate
  - Scaphoid
  - Pisiform
  - Radial Head
  - Ulnar Styloid
Phalangeal joint dislocations

- Place thumb proximally behind dislocated joint.
  - Slight extension can help.
- Apply gentle steady in-line traction increasing force as needed.
- May need digital block if unable to reduce.
- Soft tissue interposition may occur.
  - Requires significant hyperextension
Thumb and Finger Injuries

- Gamekeeper’s Thumb (UCL injury)
- Mallet Finger
- Jersey Finger
- Metacarpal Fractures (including Boxer’s)
- FOOSH
Wrist Exam

**How Injured?**

- **Fell on Outstretched Hand**
  - 1. Pain in Anatomical snuffbox
  - 2. Pain with supination and pronation

- **Club or Racquet Hits Ground**
  - 1. Pain with resisted motion using involved tendon

- **Broken Navicular**
  - 1. Tender at base of hypothenar eminence

- **Broken Hamate**
  - 1. Pain flexing 4th and 5th fingers

- **Pain After Exercise**
  - 1. Pain with resisted motion using involved tendon

- **Tendonitis**
  - Pain After Exercise
Hand Exam

Type of Injury

Finger bent back

- Jersey finger
  - Inability to flex the DIP Joint

- Volar plate
  - Pain on volar surface of finger

Fist hits hard object

- Fractured metacarpal
  - 1. Tender at site of fracture
  - 2. Malrotation of fingers in fist

Thumb pulled back

- Gamekeeper's Thumb
  - 1. UCL Valgus stress test
  - 2. Pain on UCL

Finger bent forward

- Mallet Finger
  - Inability to extend DIP

- Buttonhole Finger
  - Inability to extend PIP
Let’s Practice !!!

• Shoulder Reduction Techniques
• Elbow Reduction Techniques
• Phalange Reduction Techniques

• Sugar Tong splint
• Thumb Spica Sugar Tong splint
S.M.A.R.T.™ Workshop

Sideline Management Assessment Response Techniques

Lower Extremity Evaluation
With and without Football protective equipment

Lower Extremity Fracture and Dislocation Management
Objectives

• Surface anatomy, muscle testing, special tests
  – Hip
  – Knee
  – Foot and Ankle

• On-Field management of fractures & dislocation
Hip Exam

Surface Anatomy: Palpate

- Anterior Superior Iliac Spine (ASIS)
- Iliac crest
- Posterior Superior Iliac Spine (PSIS)
- L 4
Hip Reduction Technique

Figure 1. The patient is placed supine on a gurney, and the pelvis is fixed to a backboard with a strap. The patient’s hip and knee are flexed to 90 degrees. The physician places one foot on the board, with a knee behind the patient’s knee. The physician holds the patient’s knee in flexion by holding the ankle down and applies an upward force to the hip by lifting with his or her calf and then gently rotates lower leg. Captain Morgan reproduced with permission from Diageo PLC.

Assistant stabilizes pelvis in place of board and strap if these are not available.
Hip Exam

Location of Pain

Groin
- Adductor strain
  1. Crossing legs against resistance
  2. Pain and weakness on strength testing

Upper Hip and Abdomen
- Flexor strain
  1. Palpable gap
  2. Pain on strength testing
- Hip Pointer
  1. Increase in pain with hip movement
  2. Discoloration over iliac crest
- Gluteus medius
  1. Pain with single leg stance

Outer Thigh Into Knee
- Trochanteric bursitis
  1. Snapping hip
  2. Crossing leg and rotating causes pain

Deep Vague Pain
- Stress fracture
  1. Pain at extremes of motion
  2. Pain after exercise

Upper Hip and Abdomen
- Groin
- Outer Thigh Into Knee
- Deep Vague Pain
Thigh Exam

Location of Pain

Anterior Thigh
- Quadriceps contusion
  1. Point tender over contusion
  2. Tightness and swelling in thigh

Pain and Lump in Anterior Thigh
- Myositis Ossificans
  1. Lump in muscle belly
  2. Loss of ROM over 2-3 weeks

Posterior Thigh
- Hamstring Tear
  1. Muscle divot in severe cases
  2. Pain and weakness on strength tests
Knee Exam

• Surface Anatomy: Palpate
  – Tibial Tuberosity
  – Patella
  – Medial joint line
  – Pes anserine insertion
  – Lateral joint line
  – Fibular Head
  – Lateral Collateral ligament
Knee Exam

• Manual Muscle Tests
  – Hip Flexion
  – Knee Extension
  – Knee Flexion

• Special Tests
  – Valgus/Varus Stress Tests
  – McMurray’s Test
  – Thessaly Test
  – Lachman Test
  – Posterior Sag Test
  – Quadriceps Active
Positive Lachman Test
Field Side Dislocation Management: Patella

- Most often laterally
- Hemarthrosis; pain over medial retinaculum
- + Patellar apprehension
- Reduce by extending knee, gently applying medial pressure onto patella to relocate
On Field Dislocation Management: Knee

- High risk vascular/nerve injury
- 80% amputation if not reduced <8 hours
- Suspect if joint opens under valgus/varus stress

- Assess NV on field: reduce ASAP
- Tibia downward traction and anterior force on proximal tibia
- Must keep overnight, arteriogram to r/o intimal injury
  - Some controversy as to best protocol after reduction
  - Some recommend no arteriography if ABI are normal
Knee Exam

Symptoms

Immediate Swelling After Injury
- Cruciate lig. tear
- Patellar dislocation
- Patellar fracture

Locked Knee
- Torn cartilage

Knee gives way
- Collateral lig. tear
- Cruciate lig. tear

Pain below patella
- Jumper's Knee

Pain under knee cap when climbing stairs
- Osgood Schlatter's
- Chondromalacia
- Inflamed Plica

1. Lachman's test
2. A/P Drawer

1. Joint line tenderness
2. McMurray's test

1. Valgus test
2. Varus test
3. Lachman's test

1. Pain at base of patella and on patella tendon
2. Inflammed Plica

1. Visible increase in tibial tuberosity
2. Palpate tibial tuberosity

1. Patella compression test

Jumper's Knee
- Pain below patella
- Collateral lig. tear
- Cruciate lig. tear

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3. Lachman's test

1. Pain at base of patella and on patella tendon
2. Inflammed Plica

1. Visible increase in tibial tuberosity
2. Palpate tibial tuberosity

1. Patella compression test
Foot and Ankle Exam

• Surface Anatomy: Palpate
  – Medial Malleolus
  – Navicular
  – Head of 1st Metatarsal
  – Lateral Malleolus
  – Base of 5th Metatarsal
  – Achilles Tendon
Foot and Ankle Exam

• **Manual Muscle Tests**
  – Dorsiflexion
  – Plantar Flexion
  – Inversion
  – Eversion

• **Special Tests**
  – Anterior Drawer
  – Kleiger’s Test
  – Talar Tilt Test
  – Tap Test
  – Squeeze Test
## Lower Leg Exam

<table>
<thead>
<tr>
<th>Symptoms</th>
</tr>
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<tbody>
<tr>
<td>Pain in shin after exercise</td>
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<tr>
<td>Sudden onset of severe pain in back of leg</td>
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<tr>
<td>Kicked in shin--now has numbness and swelling</td>
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<tr>
<td>Pain in shin with numbness or weakness during exercise</td>
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<table>
<thead>
<tr>
<th>Conditions</th>
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<tbody>
<tr>
<td>Shin splints</td>
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<tr>
<td>Stress fracture</td>
</tr>
<tr>
<td>Gastrocnemius tear</td>
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<tr>
<td>Compartment syndrome</td>
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<tr>
<td>Exertional compartment syndrome</td>
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</tbody>
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<table>
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<th>Symptoms</th>
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</thead>
<tbody>
<tr>
<td>1. Weak post tibialis</td>
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<tr>
<td>2. Weak ant tibialis</td>
</tr>
<tr>
<td>3. Pain on medial crest of tibia</td>
</tr>
<tr>
<td>1. Palpable gap in muscle belly</td>
</tr>
<tr>
<td>2. Painful and weak plantarflexion</td>
</tr>
<tr>
<td>1. Increase pain pressure with exercise</td>
</tr>
<tr>
<td>2. Numbness and tingling in feet and toes</td>
</tr>
<tr>
<td>1. Consider referral for pressure testing</td>
</tr>
</tbody>
</table>
Ankle Exam

How Injured?

Turned out–Medial Pain
- Deltoid ligament sprain
  1. Deltoid ligament pain with passive eversion

Turned in–Lateral Pain
- Anterior talofibular ligament sprain
  1. Anterior drawer test
  2. Talar tilt test

Turned out and twisted–high ankle pain
- Interosseous membrane and tib-fib ligament tear
  1. Sharp pain with forceful dorsiflexion
  2. Sharp pain with external rotation of foot
Ankle Reduction Technique

Lateral Ankle Dislocation Reduction
Foot Exam

Pain Location

- Back of Heel
  - Achilles Tendinitis
    - 1. Restriction and pain with dorsiflexion
    - 2. Palpable pain and crepitus
  - Retrocalcaneal bursitis
    - 1. Pain and tenderness in front of achilles tendon

- Bottom of Heel
  - Plantar fasciitis
    - 1. Plantar fasciitis test
    - 2. Tenderness over arch and heel

- Outside of Foot
  - Jones Fracture
    - 1. Tap test
    - 2. Tuning fork

- Ball of Foot
  - Metatarsalgia
    - 1. Pain over met heads
    - 2. Change in activity or footwear
  - Morton’s Neuroma
    - 1. Compression of foot
    - 2. Palpate between met heads

Ball of Foot

- Plantar fasciitis
  - Pain Location
  - 1. Pain and tenderness in front of achilles tendon
  - 2. Tenderness over arch and heel

- Jones Fracture
  - 1. Tap test
  - 2. Tuning fork

- Metatarsalgia
  - 1. Pain over met heads
  - 2. Change in activity or footwear

- Morton’s Neuroma
  - 1. Compression of foot
  - 2. Palpate between met heads
Let’s Practice !!!

• Hip Reduction Technique
• Knee Reduction Technique
• Patella Reduction Technique
• Ankle Reduction Technique

• Stirrup splint
S.M.A.R.T.™ Workshop
Sideline Management Assessment
Response Techniques

2-Minute Drill: Sideline Return to Play Issues and Functional Assessment

- Functional Testing
- Return to Play Decisions
Definition: Return-to-play is the process of deciding when an injured or ill athlete may safely return to practice or competition.

Goal: Return injured/ill athlete to competition without putting the individual or others at undue risk for injury or illness.
RTP Summary

1. Understand the *requirements* of the individual Job, sport, activity
2. Understand the *disease process*
   Injury (trauma or overuse) or illness
3. Understand the *principles of recovery* from injury or illness
4. Managed on an *individual* basis
5. Re-evaluate and monitor
6. Keep your differential diagnosis *broad*
Return after Injury

- Full ROM without pain
- 90% strength vs uninvolved
- Normal neurovascular status
- Normal proprioception
- Functional tests
  - Physiologic
    - cardiovascular fitness
    - sport-specific testing
- Desires to return
  - Psychological
Return to Play Decisions

- Functional issue *not* a Time issue
- Answer is with the uninvolved side
- Quality of movement as well as quantity
Lower Extremity Functional Tests

• Toe Raises
• Single Leg Hops
• Four Squares
• Mini Squats
• Duck Walk
• Cutting Drills/Figure 8
• Carioca, controlled stop
• Single Hop for distance
• Triple Hop for distance and time
Upper Extremity Functional Tests

- Against Wall
  - Wall push up
  - Two Hand Ball balance
  - Single Arm Ball Balance
- On Floor
  - Push up
  - Two Hand Ball Balance/Ball Push Up
  - Plyo-Push Up (clap hands at top)
  - Wheelbarrow
  - Helmet/step walkovers
  - Plank/Windmill Plank
Let’s Practice !!!

• Functional Tests
  – Lower Extremity
  – Upper Extremity
S.M.A.R.T.™ Workshop
Sideline Management Assessment Response Techniques

Sideline Return to Play and Functional Assessment of Concussions
Stages of Concussion Management

1. Sidelines Assessment
2. Follow-Up Management
3. Return to academic and athletic participation
THE GOALS of a sidelines assessment are twofold:
- to determine if a concussion is probable or not
- to assess for any additional injuries or “red flags” that indicate urgent referral.

It is NOT to determine the severity of a concussion or to determine when return to participation will be in the future.
Foundation of A Concussion Assessment

- **Be suspicious** with any head or neck injury (broken nose, bleeding lip)
- Evaluate all suspected concussions with the same thoroughness
  - **Be thorough** enough to detect a probable concussion or to be able to say there was not a concussion and allow return to participation.
- Think **Physical, Cognitive, Emotional, Sleep**:
  - Assess Signs and Symptoms
  - Neurologic Examination for concussion
  - General exam for additional injuries and “red flags”
Signs and Symptoms

**Physical**
- Headache
- Nausea
- Dizziness
- Balance problems
- Visual problems

**Cognitive (thinking)**
- Confusion
- Feeling “foggy”
- Feeling slowed down
- Difficulty concentrating

**Emotional**
- Irritable
- Sadness
- Anger
- More emotional
- Nervousness

**Sleep**
- Drowsiness
- Fatigued
- Loss of Consciousness
- Convulsion/Seizure
Warning Signs

• When to send to ER or get imaging study
  – Warning signs of increased intracranial pressure (internal bleeding)
    • Loss of consciousness > 30 seconds
    • Convulsions/seizures
    • Deteriorating level of consciousness or behavior
    • Headache that is getting worse
    • Late onset or persistent vomiting
    • Late onset or worsening amnesia or short term memory loss
    • Focal neurological signs (motor function, vision, speech)
  – Associated head or neck injury
Sidelines Assessment

• If the athlete has any symptoms and/or performs poorly with one of these tools
  – they are presumed to have suffered a concussion and
  – they are not allowed to return to activities / practice / competition that day – even if their symptoms clear.

• If with your initial evaluation
  1. the athlete does not have any signs or symptoms
  2. passes your evaluation
  3. and they remain asymptomatic with an exercise challenge
  – they may be allowed to return to participation if you are 100% confident in your assessment.

When in doubt, sit them out.
Cognitive Assessment on the Sidelines - CDC Card

**On-Field Mental Status Evaluation**

(This mental status assessment is recommended for high school-age athletes and older. Any inability of the athlete to respond correctly to the questions below should be considered abnormal.)

<table>
<thead>
<tr>
<th>Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>What period/quarter/half are we in?</td>
</tr>
<tr>
<td>What stadium/field is this?</td>
</tr>
<tr>
<td>What city is this?</td>
</tr>
<tr>
<td>Who is the opposing team?</td>
</tr>
<tr>
<td>Who scored last?</td>
</tr>
<tr>
<td>What team did we play last?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anterograde Amnesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask the athlete to repeat the following words: Girl, Dog, Green</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Retrograde Amnesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask the athlete the following:</td>
</tr>
<tr>
<td>Do you remember the hit?</td>
</tr>
<tr>
<td>What happened in the play prior to the hit?</td>
</tr>
<tr>
<td>What happened in the quarter/period prior to the hit?</td>
</tr>
<tr>
<td>What was the score of the game prior to the hit?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask the athlete to do the following:</td>
</tr>
<tr>
<td>Repeat the days of the week backwards (starting with today)</td>
</tr>
<tr>
<td>Repeat the months of the year backward (starting with December)</td>
</tr>
<tr>
<td>Repeat these numbers backward 63 (36), 419 (914), 6294 (4926)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Word List Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask the athlete to repeat the three words from earlier: Girl, Dog, Green</td>
</tr>
</tbody>
</table>

- Physical exam;
- Neuro exam;
- BESS; finger to nose;
- Nystagmus
Physical Exam on the Sidelines-Eye Exam

• “H” Test
  – Regular extra ocular range of motion
  – Take your time; go slow to see smoothness of motion; hold out at edges
  – Abnormal: **jerky pursuit; Nystagmus at extremes of vision**

• Saccades
  – Looking from fingertip to nose and back
  – Horizontal and Vertical
  – Abnormal: **under shooting or over shooting**

• Horizontal Gaze Stability
  – Keeping eyes fixed on nose, turn head back and forth
  – Abnormal: ‘hang time’ of eyes, nystagmus
  – Particularly look for worsening of symptoms
Abnormal eye tracking

- Jerky Pursuits
- Saccades
- Lateral Nystagmus
Eye Tracking

Abnormal

Normal
Physical Exam on the Sidelines – The Eye Exam

Normal Tracking

Poor Tracking
Vestibular Ocular Motor Evaluation -
Horizontal Saccades

Normal

Abnormal
Vestibular Ocular Motor Evaluation

Horizontal VOR

Vertical VOR
Vestibular Ocular Motor Evaluation

Visual Motor Sensitivity

Accommodation
Vestibular Ocular Motor Evaluation - Convergence
Cognitive Assessment on the Sidelines - King-Devick Test

- Consists of single digit number series
- Read from left to right out loud
- Time to completion and errors recorded
- < 2 minutes to administer
- Symptoms + > 3 seconds over baseline = concussion

- High degrees of test–retest and inter-rater reliability
- Requires vision, eye movements, language function and attention in order to perform
King-Devick Test

Normal

Abnormal
Physical Assessment on the Sidelines - Balance Tests

• BESS Test
  – Double leg stance
  – Single Leg stance
  – Tandem stance
    » Eyes open, then closed

• Timed Tandem Gait
  – 10 steps along line, timed.
    » Eyes open, then closed
Physical Assessment on the Sidelines - Coordination Tests

• **Finger-to-nose task**
  - Patient sits in chair w/ 1 arm fully outstretched (shoulder flexed at 90).
  - Patient then attempts to perform 5 successive finger-to-nose repetitions using index finger.
  - Patient must touch nose, then fully extend elbow 5 times in under 4 seconds
Physical Assessment on the Sidelines-
Dropstick Test

• Athlete sits with dominant forearm resting on table,
• Un-expectantly drop stick after a 2 to 8 second pause; 8 trails.
• Record each dropped distance.
Let’s Practice

• Station 1 – Vestibular Ocular Motor Evaluation

• Station 2 – King-Devick Tests, Dropstick Test, and Stroop Tests

• Station 3 – BESS, Finger to Nose Task, Tandem Walk and SCAT3 test
S.M.A.R.T.™ Workshop

Sideline Management Assessment Response Techniques

Hands-On Skills for the Sideline Physician

Summary
Problem Solving/ Risk Mitigation

➢ Aviate
➢ Navigate
➢ Communicate
Pre Event Organization

• Develop an emergency plan and protocol *and* rehearse on regular basis
  – Pre-Event “Time Out”

• Developed a transportation plan; spine injured athletes should be transported to a hospital that can deliver immediate, definitive care for these types of injuries.

• Prepare for Special Situations
  – No such thing as “always” and “never”
Pre Event Organization

• Be familiar with the types of equipment specific to the sport and associated techniques for removal of the equipment.

• Protective athletic equipment *may* be removed *prior* to transport to an emergency facility for patients with a suspected CSI. If fewer than 4 people are present, equipment may be removed at the earliest possible time after enough trained individuals arrive.
Documentation of Services

• You will provide some form of service during the course of a season/event
• How will you communicate results and recommendations to parents and other healthcare providers?
• Your athletic trainer or coach may already have a mechanism that you can build upon
Documentation of Services

• Consider providing the following:
  – Diagnosis
  – Initial treatment plan
  – Follow-up recommendations
  – Any applicable timeline for recovery or return-to-play

• Make sure your procedures are HIPAA compliant
Review

• Be suspicious of a concussion and hold the athlete from further activities until they can be completely evaluated and cleared.
• The signs and symptoms of a concussion can change daily and will be different in each person. Make sure you evaluate the athlete looking at all of these: cognitive, physical, emotional, sleep.
• Evaluate symptoms and functional deficits that are commonly found with a concussion and look for any associated injuries that may need further evaluation.
• There are many tools to help you on the sidelines and in the office. The law recommends that you use one.
• Initial treatment is based on both physical and cognitive rest until the symptoms resolve.
Monitoring & Follow-Up

• Before sending the athlete home:
  – Monitor closely (2-4 hours after injury) for any worsening signs or symptoms suggestive of building pressure
  – More thoroughly evaluate them with a complete concussion test (SCAT3)
  – Give and review a Concussion Handout to a parent or room mate
  – Arrange for a follow up evaluation within 24-36 hours
Keys to Concussion Treatment

• Physical Rest
  – Avoid activities that elevate heart rate
  – Applies to all activities: practice, competition, physical education, dance, non-school based activities, household chores
  – Avoid further trauma / injury to the brain
  – Sleep is essential
    • But you do not need to awaken the patient during the night
  – Remember to eat properly

• Cognitive Rest
  – Limit concentration effort
    • Homework, school work, job-related work
    • Texting, computer, video games or television use
    • May require changes to a normal academic day

• Bottom Line: Don’t do anything that makes symptoms worse!
Return To Learn

- Different approach/timetable than return to participation
- Provide a patient handout – ACE Care Plan School Version

### Returning to School (Continued)

Until you (or your child) have fully recovered, the following supports are recommended: (check all that apply)

- No return to school. Return on (date)___________________________
- Return to school with following supports. Review on (date)___________________________
- Shortened day. Recommend ___ hours per day until (date)___________________________
- Shortened classes (i.e., rest breaks during classes). Maximum class length: _____ minutes.
- Allow extra time to complete coursework/assignments and tests.
- Lessen homework load by ________%. Maximum length of nightly homework: _____ minutes.
- No significant classroom or standardized testing at this time.
- Check for the return of symptoms (use symptom table on front page of this form) when doing activities that require a lot of attention or concentration.
- Take rest breaks during the day as needed.
- Request meeting of 504 or School Management Team to discuss this plan and needed supports.
### Returning to Participation

<table>
<thead>
<tr>
<th>Rehabilitation Stage</th>
<th>Functional Exercise</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rest until asymptomatic</td>
<td>Complete physical and cognitive rest</td>
<td>Recovery</td>
</tr>
<tr>
<td>2. Light aerobic activity</td>
<td>Walking, swimming, stationary cycling. Mild intensity</td>
<td>Increase HR</td>
</tr>
<tr>
<td>3. Sport-specific activity</td>
<td>Running or skating drills. No head impact activities</td>
<td>Add movement</td>
</tr>
<tr>
<td>4. Non-contact training drills</td>
<td>Progression to more complex training drills</td>
<td>Exercise, coordination, cognitive load</td>
</tr>
<tr>
<td>5. Full contact practice</td>
<td>Following medical clearance. Normal training activities</td>
<td>Restore confidence, assessment of functional skills by coaching staff</td>
</tr>
<tr>
<td>6. Return to play</td>
<td>Normal game play</td>
<td></td>
</tr>
</tbody>
</table>

Note: Once asymptomatic and Stage 1 has been completed, each subsequent step should take 24 hours (no accelerated “stages or days”)

---

**Rehabilitation Stage**

1. **Rest until asymptomatic**
   - Complete physical and cognitive rest
   - **Objective**: Recovery

2. **Light aerobic activity**
   - Walking, swimming, stationary cycling. Mild intensity
   - **Objective**: Increase HR

3. **Sport-specific activity**
   - Running or skating drills. No head impact activities
   - **Objective**: Add movement

4. **Non-contact training drills**
   - Progression to more complex training drills
   - **Objective**: Exercise, coordination, cognitive load

5. **Full contact practice**
   - Following medical clearance. Normal training activities
   - **Objective**: Restore confidence, assessment of functional skills by coaching staff

6. **Return to play**
   - Normal game play
TAKE HOME MESSAGE

• Student-athletes need you!
• Most high schools nationwide have little to no medical coverage
• Great community service and practice builder
• Hope to encourage you and others to help your local school’s athletic program
Remember!

➢ Plan ahead

➢ Practice
Thank you for caring and wanting to be the BEST!

Please complete the evaluations/post tests before you leave, your feedback is important!