# Sports Medicine Update

Monty Mathews, M.D.
University of Nebraska Medical Center
Department of Family Medicine

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University of Nebraska Medical Center

# Objectives

1. Overview and current concepts on concussion
2. Sports Dermatology Review
3. Discuss Groin and Hip conditions

# Concussion-Definition

- Traumatically Induced
- Rapid onset of short-lived impairment, resolves spontaneously-symptoms may evolve over minutes to rarely hours
- Acute signs/symptoms reflect functional NOT structural injury-standard imaging: negative
- +/- LOC
- Range of signs/symptoms and resolution follows sequential course
- Clinical signs/symptoms cannot be explained by other causes

# Symptoms

Physical
- Headache
- Nausea
- Dizziness
- Balance problems
- Blurred vision
- Light sensitivity
- Neck pain

Cognitive
- Concentration
- Remembering
- Mentally foggy
- Slowed processing

Emotional
- Anxious
- Disordered sleep

# Classification

- Simple vs. complex
  - Prolonged symptoms
    - >10-14 days in adults
    - > 4 weeks in children/adolescents
  - LOC > 1 minute
  - Seizure


# History

- International Concussion in Sport Group
  - 1st International conference, Vienna 2001
  - 2nd International conference, Prague 2004
  - 3rd International conference, Zurich 2008
  - 4th International conference, Zurich 2012
  - 5th International conference, Berlin 2016
- NATA Position Statement
  - 21 pages, 46 specific recommendation
- AMSSM Position Statement 2013
- AAP Clinical report- Return to Learn
  - Limited research
  - Expert opinion

# Sideline Evaluation

- Often rapidly evolving in the acute phase
  - Among the most complex injuries in Sports Medicine to Dx-manage
- No perfect diagnostic test
  - Physical finding, bio-markers, neuroimaging, etc.
- Brief assessment of attention, memory, CN function, balance
  - Rapid screening, NOT definitive diagnosis
- Indication for Emergency Management
  - GCS<15
  - Deteriorating mental status
  - Potential spinal injury
  - Progressive worsening symptoms or new neurologic signs

# Sideline Assessment

- Potential signs of concussion
  - LOC
    - How long?
  - Balance or motor incoordination
  - Disorientation or confusion
  - Loss of memory
    - How long?
    - Before of after injury
  - BLANK OR VACANT LOOK
  - Visible facial injury in combination with any of the above

# Maddocks Score

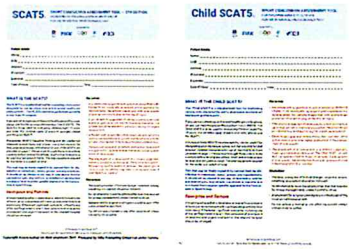
- What venue are we at today?
- Which half is it?
- Who scored last?
- What team did you play last week/game?
- Did your team win the last game?

# Sideline Assessment


# Sideline Management

- ANY SUSPECTED CONCUSSION
  - Removed from play
  - Medically assessed
  - Monitored for deterioration
  - Should not be left alone
  - Should not drive

# SCAT 5



# SCAT 5

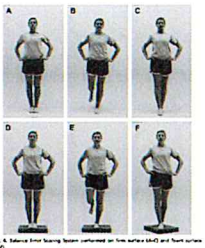
- Most well established and vigorously developed instrument
- Setting?
- > 10 minutes
- Acute (utility decreases significantly 3-5 days post-injury)
- 5-12 y.o. version

# SCAT 5

- Graded symptoms checklist: 22 questions, 6 point Likert-scale
  - Orientation
    - What month is it?
    - What's today's date?
    - What is the day of the week?
    - What year is it?
    - What time is it? (within an hour)
- Immediate memory
  - 5 words, 3 trials
  - Time, place and person are unreliable compared to memory evaluation
- Concentration
  - Digit backwards
  - 3-6 digits
  - Months in reverse order

# SCAT 5

- MBESS
  - Double leg stance
  - Single leg stance
  - Tandem stance
  - Tandem gait
- Coordination
  - Finger to nose




# Initial Management

- Outline expectations early
- Each injury is unique
- Jr. High and High school ages
  - 80-90% resolve within 4 weeks
  - Many earlier
- 1-2 days out of school is optimal
- Most will return with symptoms
  - Academic accommodations
- Light non-contact cardiovascular activity is PROMOTED
  - As long as it does not SIGNIFICANTLY influence symptoms

# Prolonged Recovery Predictors

- Initial severity of symptoms
- Depression
- Anxiety
- Migraine - (chronic) HA
- ADHD
- Learning disabilities
- Sleep disorders

# Common Misconceptions

- Mouth guards
- Helmets
- Soccer Headgear

# Imaging

- Usually not need for diagnosis of concussion
- Non-contrast CT/MRI
- Consider for:
  - GCS< 15
  - Deterioration mental status
  - Focal Neurologic deficits
  - Abnormal fundoscopic exam/papilledema
  - Abnormal C-spine exam
- Bleeding
  - SDH, EDH, intraparenchymal
- C-spine fracture

# Other Measures

- ImpPACT, Cogsport, ANAM, Axon, etc.
  - Baseline NPT, not recommended in children and adolescents, poor reliability
- Acute concussion evaluation (ACE)
- Formal neuropsych testing
- Helmet sensors
  - "Use cannot be supported at this time"-CISG Berlin 2016
- Biomarkers
  - At least 11 examined-none advanced to clinical setting
- Genetics
  - At least 3 genotypes examined, none advanced to clinical setting
- Supplements
  - At least 13 examined, no good human evidence for prevention/Rx

## Which is a current, common concussion management strategy?

A. Grading a concussion at the time of injury to predict outcome.

B. Performing baseline evaluations (such as cognitive and balance testing) prior to injury on athletes so their post-injury function can be compared to these baselines.

C. Holding all concussed athletes out for the same period of time after a concussion to ensure brain healing.

## Which of the following statements reflects a current acceptable return to play (RTP) strategy

A. No same-day RTP regardless of age or level of play.

B. No same-day RTP in adolescent or younger athletes, but adult athletes may RTP the same day if the injury is felt to be mild.

C. May RTP after completion of an RTP protocol despite having symptoms at rest but not during the physical activity.

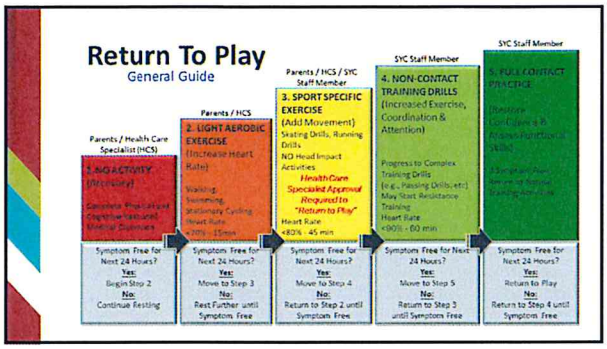
D. May RTP after completion of an RTP protocol despite having symptoms during physical activity.

# Management

- Protect from further injury/aggravation until resolved
  - "window of vulnerability" – days to weeks
- Cognitive Rest
  - RELATIVE avoidance of mentally taxing activities
    - Academic activities
    - Team meetings
    - Loud, bright areas
    - Smartphone
  - Recommend for initial state of recovery
    - Longer is now questioned
  - Strike appropriate balance
    - Okay to try activities
    - Important to maintain connection with teammates/friends/academics

# Return to Play

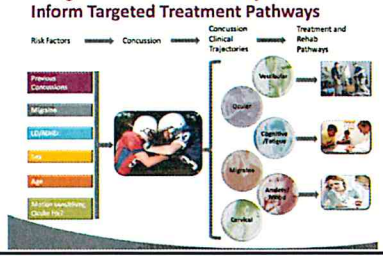
- Gradual increase in activity
- Helpful to keep coaches updated, but also give realistic expectation of return
  - Never make a guarantee
  - Discuss RTP protocol ahead of time with coaches and administration




# NFL Concussion Protocol


# Concussion Clinical Trajectories

**Using Concussion Clinical Trajectories to Inform Targeted Treatment Pathways**




# Sports Dermatology

- Skin Infections
  - Bacterial
  - Impetigo
  - Cellulitis
  - Folliculitis
  - Furuncles/Carbuncles
- Fungal
  - Ringworm-Tinea Pedis, Tinea Corporis Gladiatorum
- Viral
  - Herpes Gladiatorum
  - Molluscum Contagiosum

# Bacterial Infections – Impetigo, Cellulitis, Folliculitis, Furuncle, Carbuncle

- Bacterial Infection usually due to Group A Streptococcus and Staphylococcus aureus
- Primarily associated with neglected minor skin trauma or secondarily infected viral infections
- Face and extremities are common sites
- Can be spread via skin-to-skin or fomites

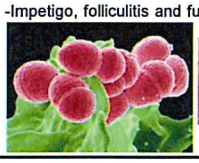
# Impetigo

# Cellulitis

# Continue…

Streptococci (secondary invaders)
-impetigo, erysipelas and lymph-angitis

S. Aureus (invades skin)
-Impetigo, folliculitis and furuncles



## Choose the statement about cellulitis that is true

A. MRSA is resistant to all beta-lactam agents except cephalosporin.

B. Non-purulent cellulitis without prior antibiotics or abscess should be treated like non-MRSA.

C. MRSA causes shallower but much wider infections.

D. Patients with illegal drug use are not at increase risk for MRSA.

## Treatment of Cellulitis- Nonpurulent - Oral

| | Adults | Children |
|---|---|---|
| Dicloxacillin | 500mg q 6 q.h. | 25-50mg/kg/d in 4 doses |
| Cephalexin | 500mg q 6 q.h. | 25-50mg/kg/d in 3-4 doses |
| Clindamycin | 300-450mg q 6-8 q.h. | 20-30mg/kg/d in 4 doses |

## All the following treatments for purulent cellulitis infections are acceptable except:

A. Cephalexin 500mg q 6 q.h.
B. Clindamycin 300-450mg TID
C. Trimethaprim-sulfamethoxazole – 1-2 DS tab BID
D. Doxycyclińe 100mg BID

## Treatment of Cellulitis – Purulent – Considered MRSA-Oral Dosing

| | Adults | Children |
|---|---|---|
| Clindamycin | 300-400mg TID | 40mg/kg/d in 4 doses |
| Trimethoprim-sulfamethoxazole | 1-2 DS BID | 8-12 mg/kg/d TMP in 2 doses |
| Doxycycline | 100mg BID | <45kg 14mg/kg/d BID<br>>45kg 100mg/kg/d BID |
| Minocycline | 200mg once, then 100mg BID | <45kg 100mg BID<br>>45kg 4mg/kg once, then 4mg/kg/d in 2 doses |
| Linezolid | 600mg BID | <12y.o. 30mg/kg in 3doses<br>>12y.o. 600mg BID |
| Tedizolid | 200 mg q.d. | |

# Treatment of Cellulitis MRSA + Strep

| | |
|---|---|
| Clindamycin | 300-450mg TID |
| Amocicillin PLUS Trimethaprim-sulfamethoxazole | 500mg TID<br>1-2 DS tabs BID |
| Amoxicillin PLUS Doxycycline | 500mg TID<br>100mg BID |
| Amoxicillin PLUS Minocycline | 500mg TID<br>200mg once, Then 100mg BID |
| Linezolid | 600mg BID |
| Tedizolid | 200 q.d. |

# Decolonization

- Uncertain efficacy – not universal
- Nasal mupirocin BID for 5 to 10 days
- Mupirocin + topical antiseptic solution (chlorhexadine, triclosan or povidone-iodine) for 5 to 14 days
- Mupirocin + dilute bleach baths (1 tsp bleach/gallon of water) twice weekly for 15 minutes X 3 months
- Rifampin and MRSA antibiotic for 1 to 2 weeks

# Folliculitis

- Inflammation of hair follicles
- Pustule that heals without scarring
- No systemic signs or symptoms
- Staph Aureus most common organism
- Complication of occlusive topical steroid therapy
- Can coalesce and create a carbuncle

# Folliculitis - Treatment

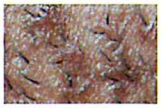
- Localized treat with topical abx (mupirocin)
- Extensive disease – oral antibiotics for 2 weeks or inflammation cleared
  - Dicloxacillin
  - Cephalexin
- Recurrences common

# Pseudomonas Folliculitis

- A.K.A. hot tube folliculitis
- 0.5-3cm, pruritic, round, urticarial plaques with a central pustule (all skin surfaces, except head)
- Most severe when occluded by snug bathing suit
- Eruption clears in 7-10 days
  - Leaves round spots of red-brown, post inflammatory hyperpigmentation

# Pseudofolliculitis Barbae

- Foreign body reaction to hair
- Tightly curled, spiral hair – blacks > whites
- Mechanical problem – stop shaving, permanent hair removal
- Intra-lesional steroids/Hydrocortisone cream – low dose



## NSAA Minimum Treatment before Wrestling for Bacterial Diseases

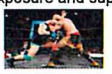
Lesions must be scabbed over with no oozing or discharge and no new lesions should of occurred in the preceding 48 hours. Oral antibiotic for three days is considered minimum to achieve that status. If new lesions continue to develop or drain after 72 hours, MRSA should be considered

## Herpes Lesions – Simplex, fever blisters/cold sores/ Gladiatorum

- Generally HSV, type I
- Prevalence in wrestlers – 3% high school to 40% college
- Clustered vesicles on an erythematous base

## Herpes Gladiatorum

- Location
  - 73% - Head and face
  - 42% - Extremities
  - 28% - Trunk
- Appear 3-8 days after contact
- Primarily at locations of "lock-up" position
- Only from skin-to-skin contact
- Brought on by stress i.e. weight cutting, abraiding or rubbing facial skin, sun exposure and suppressed cell mediated immunity



## NSAA Minimum Treatment Guidelines for Herpetic Conditions

- All lesions must be scabbed over with no oozing or discharge and no new lesions should of occurred in the presiding 48 hours
- Primary outbreak – treated and not allowed to compete for 10 days, if fever or swollen glands, extend to 14 days.
- Recurrent outbreaks require a minimum of 120 hours or oval autivival treatment, again so long as no new lesions have developed and all lesions scabbed over.

## HSV Treatment

| Drug | Primary Infection | Recurrent | Suppression |
|---|---|---|---|
| Acyclovir | 200mg – 5x/d or 400mg 3x/d for 7-10 days | 200mg - 5x/d x 5 days or 800mg BID x 5 days or 400 mg TID x 5 days or 800mg TID x 2 days | 400mg BID |
| Famciclovir | 250mg TID x 10d | 125mg BID x 5d or 1g BID x 1d or 500mg once, followed by 250mg BID x 2d | 250mg BID |
| Valcyclovir | 1g BID x 10d | 500 mg BID x 3days or 1gm q.d. x 5 days | 500mg – 1gm q.d. |

## Antiviral Agents

| Name: Brand (generic) | Dose | Day Supply | Generic Cash Price |
|---|---|---|---|
| Valtrex (valacyclovir) | 1000mg daily | 14 days (14 tablets)<br>30 days (30 tablets) | $50-$325<br>$250-$350 |
| Famvir (famciclovir) | 250mg twice a day | 14 days (28 tablets)<br>30 days (60 tablets) | $150<br>$290 |
| Zovirax (acyclovir) | 400mg twice a day | 14 days (28 tablets)<br>30 days (60 tablets) | $20<br>$40 |

## Molluscum Contagiosum

- DNA Pox Virus
- Central Umbilication
- Flesh-colored, dome-shaped papules

## Treatment

- Clinical course-self-limited
- With no treatment – resolution in 2-8 months
- Avoid treatments that cause scarring
- Cryotherapy/hyfrecator
- Curretage
- Cantharidin
- Imiquimod

## NSAA Treatment Guidelines for Molluscum Contagiousum

- Upon treatment with curretage or hyfrecator, may cover with bio-oclusive and wrestle immediately
- For all lesions:
- Once a lesion is considered non-contagious it may be covered to allow participation

## Fungal Infections

- Tinea pedis
- Tinea capitis
- Tinea corporis
- Tinea cruris
- Tinea versicolor

## Fungal organisms – cause skin infections

- Dermatophytes
  - Trichophyton
  - Microsporum
  - Epidermophyton
- Yeasts
  - Candida
  - Pityrosporum

## Tinea Pedis – Differential Dx

- Dyshidrotic eczema
- Contact dermatitis
- Pitted keratolysis
- Plantar psoriasis

# Dermal Scraping

- Scrape the leading edge
- KOH Prep
- Other diagnostic tools – woods lamp, culture



# Tinea Capitis

- Requires oral antifungal Rx- Griseofulvin, Fluconazole or Terbinafine
- Kerion – boggy, deeper infection

# Antifungal Rx for Tinea Capitis

- Griseofulvin microsize 125mg/5ml
  - 20mg/kg/d x 6-8 weeks
- Fluconazole 40mg/ml or 10mg/ml
  - 3-6 mg/kg/d x 6 weeks
- Terbinafine
  - <20kg – ¼ tab = 62.5 mg daily
  - 20-40kg – ½ tab = 125mg daily
  - >40kg – full 250mg tab daily for 6-8 weeks (cheapest regiment)

# Tinea Corporis

- Papules and plaques with erythema and scale
- Look for annular lesions with central cleaving
- Concentric rings – high specificity
- Well demarcated edges

# Tinea Corporis – Differential Diagnosis

- Nummular eczema
- Granuloma annularae
- Pityriasis rosea
- Psoriasis
- Erythrasma
- Candida
- Cutaneous Larva Migrans

# Treatment

- Topical agents for mild to moderate diseases
- Oral agents for more extensive or resistant cases – adult dosing:
  - Terbinafine 250mg q.d. x 2-4 weeks
  - Fluconazole 150-300mg weekly x 3-4 weeks
  - Griseofulvin 500mg daily for 2-4 weeks

# Antifungals

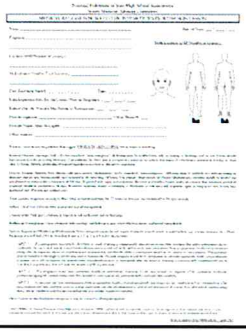
| Name: Brand (generic) | Strength and formulation | Dose and Duration | Quantity and Generic Cost |
|---|---|---|---|
| Lamisil AT (terbinafine) | -1 % Cream | -Apply to affected area 1-2 times daily for up to 2 weeks | 30 grams ~ $13 |
| | -250mg tablet | -250mg once daily for 6 weeks | 42 tablets ~ $5-$10 |
| Lotrimin AF (clotrimazole) | 1% Cream | Apply to affected area 2 times daily for 4 weeks | 30 grams ~ $15 |
| Gris-Peg (griseofulvin) | -Microsize tablet | 500mg per day for 4-6 weeks | 30 tablets ~ $400 |
| | -Ultramicrosize tablet | 375mg per day for 4-6 weeks | 30 tablets ~ $300 |
| Diflucan (fluconazole) | -200mg tablet | 400mg per day for 3-4 weeks | 60 tablets ~ $200-$250 |

# Tinea Versicolor - Treatment

- Topical Antifungals
- Large areas – selenium sulfide
- Small areas – ketoconazole or clotirmazole
- Oral is easy
  - One 400mg dose of ketoconazole or fluconazole

# NSAA Minimum Guidelines for Tinea Lesions

- Oral or tropical treatment for 72 hours on skin
- Oral treatment for 14 days on scalp



# Patient 1

Your next patient is a 26 y/o AD male, training for the Omaha Marathon, CC of "hip pain"

1 month history of insidious "hip" pain

No rest pain

However, it aches when he sleeps on that side

He points to her lateral hip as the source

Pain area in trochanteric bursitis

# Trochanteric Bursitis

Etiology is repetitive movement of the of the gluteus medias tendon over the outer femur

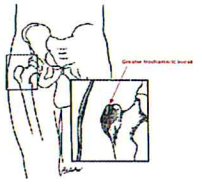
Bursa eventually inflames, thickens and loses it's ability to lubricate the tendon

Women > Men 3:1

Active = inactive

Can occur in any age in SKELETALY MATURE bone

Bilateral 10% of the time



# Principles of Diagnosis

*Key point – tenderness over the trochanter is the key finding

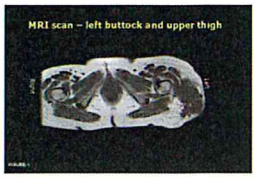
In high BMI patients, tenderness, look for the troch about 8 inches inferior to the iliac crest

May have pain with extreme of ROM (helps DDx with stress fx)

# What about Radiology?

Standing AP (though not a "must" at 1st visit)
- associated lumbar spine disease
- calcifications over bursa
- leg lengths (2cm)

MRI
- Consider if unresponsive to treatment
- Zebras: cancer, AVN
- *Key point - differentiates out gluteus medias tendonitis




# Treatment

NSAID, full dose
Consider use of NSAID patch
Ketoprofen (10%) with lidocaine (5%) in a cream
Ice massage
Physical Therapy
- US
- Ionto/phono phoresis

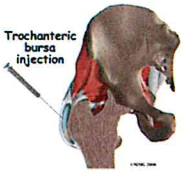
Steroid injection

# Injection *Key Points

Have to use a lot
120mg Kenalog with 4cc each of lidocaine/marcaine

Bursa is very large, 3-4 injections to achieve relief in not unheard of

Repeat every 3-4 weeks for a total of 4 injections




# Case #2

27 y/o AD female runner

CC of "hip pain"

Insidious onset, 3 months duration. Runs on concrete 5-10 miles per week.

Worsening over the past month

Now has pain with walking

Pain at rest

# Exam Findings

She point to her source of "hip pain", which is actually in the groin.

Pain with no pain with internal/external rotation

Pain with int/ext rotation with added axial loading

Xray to the left--→

Likely diagnosis?

What would you do with is patient?

# Femoral neck stress fracture

Pain is described to the medial (danger) side of the hip

Develop in 15% of runners. Females greater than males.

Distance/running surface may place certain patients at more risk

# Femoral Neck Stress Fracture

*Key point – plain x-ray will not reveal most of these

* Key point - Pt's history of groin pain, rest pain AND history of repetitive motion sports is the key to diagnosis

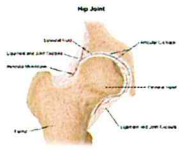
MRI can help to confirm
- ask radiologist for "quick look" MRI


# Treatment

Stress fracture to the superior neck (tension side) need an ortho referral for a pin

Stress fracture to the inferior neck (compression side) can be managed by primary care

*Key point – left untreated, these progress to a full fracture and your young patient will need a total hip replacement




# Primary Care Treatment

Total treatment time about 6 weeks

Crutches

Within first 6 weeks:
- E-stims
- Non weight bearing muscle strengthen
- Running in pool

Progress to cycling once pain at rest is resolved

# Primary Care Treatment

At 6 weeks, start WB

If pain free at 1.5 mile walk, may start gradual return to running

If pain free running 1.5 miles, start to train back into event

Increase by about 10% per week

If pain recurs, back off to walking phase, consider re-imaging

# Other adjuncts

Check bone density

Check thryoid

Eval for eating disorder

Of course, training methods....key point is that different methods for different people. A few keys:
- time on concrete/asphalt to a minimum
- cross training

# Case #3

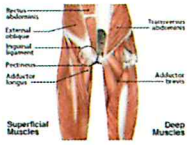
21 year old hockey goalie with insidious onset of "groin pain." Worse with lunges, cough and sit-ups. On exam: No bulge at inguinal canal with cough, although uncomfortable with adduction in frog position. Ultrasound of inguinal region is negative.

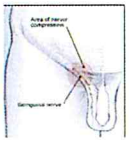
# Differential Dx

- Osteitis pubis
- Distal abdominal rectus strain or avulsion
- Adductor tenoperiostitis
- Rupture of adductor longus
- Adductor muscle strain
- Inguinal hernia
- Athletic pubalgia or sports hernia

# Pathology of Sports Hernia

- Tear/strain external oblique aponeurosis
- Injury to ilio-inguinal nerve




# Treatment

- Rest, ice, NSAID's
- Gentle, deliberate, staged physical therapy
- Surgery – laparoscopic with mesh on open to repair defect
  - >90% - return to activity in 3 months

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BREAKTHROUGHS FOR LIFE.