

Pediatric Sport Medicine

VDFP Dine and Learn
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Presenter Disclosure

I have no financial disclosures or conflicts of interest with the material in this presentation

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Overview

Clinical Practice Pearls

Treatment Principles: Physio and activity modification

Do not miss: SCFE, RIO

Acute traumatic knee

Flat feet

Injury prevention

Foot Cases

Handouts, Resources

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Treatment Principles:

Conservative treatment is very vanilla

Physiotherapy

Rest/**Activity Modification**/Pacing

The Extra: Ice (or heat), NSAIDS, Braces, Orthotics

Professional hand holding, reassurance, and cheerleading



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Physiotherapy

Not all physiotherapy is equal.

Kids often need **active physiotherapy**, meaning they are being taught to strengthen and stretch and are being sent home with a progressive home exercise program

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Physiotherapy

Explain how physio will help them

- Helps with pain, helps the injured tissue heal, restores ROM and builds muscle strength (that supports the joints), improves performance, decrease risk of reinjury

Explain their **responsibility** in the treatment plan

- Home exercises

Explain that it takes **time** to work

- Just like it took time for you to learn to play soccer so well

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Physiotherapy didn't work: Troubleshooting

Too active / No rest

eg. doing physio and dancing 15 hours a week

Too sedentary

Eg. 5 min of HEP then 6 hours screen time and ride to school

Home exercises not getting done

Didn't try for long enough (eg. starting point 6-12 weeks*)

Not the right physiotherapy (eg. passive physio - laser therapy, did physio for a different body part)

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Activity Modification

Consider recommending activity modification when appropriate, rather than just rest

Upper extremity injuries: can still walk, run, hike ect.

Lower extremity injuries: may be able to walk to school, bike, swim, paddle ect.

Overuse knee pain = break from running and jumping

Kids need to move, and pulling them from physical activity and their social circles completely comes with mood issues, increased screen time ect.

Often balancing other health issues: eg. ADHD, anxiety, elevated BMI

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Let's talk about pacing

Kid A: Pushes through pain

Kid B: Stops moving when there is pain

Kid A needs break

If pain occurs after activity and resolves in the morning, ok to continue

Set expectations: "sunburn won't heal if we keep going in the sun"

Learning to listen to their body

Kid B needs to be encouraged to move

Pain doesn't equal harm

Movement will help decrease pain. (Although sometimes it can increase initially)

Tolerable zone of pain: "spicy level, or volume"

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Do not miss: SCFE

Slipped capital femoral epiphysis

Adolescent (need open growth plate)

Femoral head slips with respect to the rest of the femur



Knee pain: always check the hips

Pain with FADIR/Arc of motion
Compare IR

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Do not miss: RIO

Differential diagnosis not to miss for atraumatic MSK pain

RIO

Rheumatologic
Infectious
Oncologic

Clues

Constitutional symptoms (eg. fevers, fatigue)

Red hot joint

Atraumatic swollen joint or family is trying hard to "come up" with an injury

Bone lesions on x-rays



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Do not miss: Acute traumatic knee

Most common injuries that present with acute knee:

Fracture (visible on x-rays); or bone contusion (will show up on MRI)

ACL tear

Meniscus tear

Patellar dislocation

We like to see these early

Ok to have us coordinate the MRI

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Early management of acute knee with normal x-ray

Control pain

Control swelling

Early movement

- ❖ Knee immobilizer* off in 7-10 days
- ❖ WBAT with crutches, can self wear the crutches
- ❖ ROM
- ❖ Pacing - ok to tolerate a little discomfort

Better than knee immobilizer is a hinged ROM knee brace:
For acute patellar dislocation - 3 weeks in 30 deg to 90 deg/full flexion
Keeps patella reduced in groove and allows soft tissue to heal in a shortened position.



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Why early movement

Early gentle movement won't worsen the injury

- Decreases pain and swelling
- Improves mobility and function
- Happier patients

As they are waiting for their specialist appointment and imaging encourage physio

- ❖ MRI and specialist appointments won't treat the injury
- ❖ Even if surgery is needed, will need physio before and after
- ❖ Consider offering exercises if \$ is a barrier (?make a follow up appointment)

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Flat Feet

Often normal and don't require treatment

Flatfoot can be normal in most infants and toddlers as the arch does not typically develop until around 5 years of age (Joseph, 2009); POSNA

Ligamentous laxity, extra subcutaneous fat

1/5 children never develop an arch

*Flexible flat feet - arch appears when up on toes or feet hanging free

Consider referring flat feet: if **pain, rigid***, **severe**

What Parents Should Know About Flatfeet, Intoeing, Bent Legs, And Shoes For Children. Staheli L. https://global-help.org/products/what_parents_should_know_about_flatfeet_intoeing_bent_legs_and_shoes_for_children/



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Word about the apophysis

Secondary ossification center/growth plates (place where bone is growing and maturing)

Attachment sites for tendons

Only present in kids/ skeletally immature patients

Weaker than adjacent bone and tendon - so more prone to injury in this age group

Susceptible to acute and overuse injuries

Acute trauma = apophyseal avulsion, apophyseal traction injury

Chronic overuse = apophysitis

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Common types of apophysitis

Sever's Disease (heel)

Osgood Schlatter's Disease (tibial tuberosity)

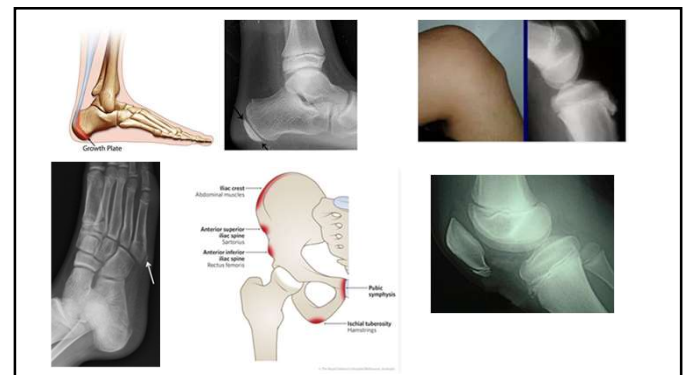
Little League Elbow (medial epicondyle)

Little League Shoulder (proximal humerus)

Iliac crest apophysitis

Sinding-Larsen-Johansson syndrome (inferior patellar pole)

Iselein's Disease (base of 5th metatarsal/outside edge foot)



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Injury prevention: Scheduling

Child's age rule

- ❖ Hours/week of organized sports should be no more than the age of your child

Rule of 2s

- ❖ For every 2 hours of organized sports, ensure child has 1 hour of free play

Schedule breaks

- ❖ Limit 1 sporting activity to 5 days per week
- ❖ 1 day off per week from organized sport
- ❖ 1-3 months off per year from a single sport

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Injury Prevention: Sport Diversification

Participation and sampling variety of different sports

Up to and including the start of puberty and growth

Early sport specialization is a risk factor for **injury**

Higher chance of **higher level** and **long-term** participation (including adulthood)

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Abby: 8 yo F left ankle sprain & "abnormal x ray"

Reason for referral:

8 yo f, rolled ankle with bruising and swelling, 2 weeks later swelled up again during a hike

xray report: "abnormal"

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Abby: 8 yo F left ankle sprain & "abnormal x ray"

Ankle Xray:

"corticated calcific density adjacent to the inferior tip of the lateral malleolus either an unfused accessory ossicle or old ununited fracture fragment"



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Abby: 8 yo F left ankle sprain

Diagnosis: Ankle Sprain

Don't let the x-ray report distract you
Treat it like a regular ankle sprain

Kid's get ankle sprain
Important to treat ankle sprains
(recurrence)

Os subfibulare:

Usually asymptomatic

Theories on the etiology:

1. Avulsion fracture attributable to the pull of the ATFL
2. Unfused accessory ossification center

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Abby: Management of Ankle Sprain

Management:

Early Movement

Swelling can last several weeks

Day 1-2: POLICE, Crutches

Day 3: Crutches PWB with heel-toe gait, ROM exercises from handout

Week 1-2: Connect with physio

Consider ASO Lace up Ankle Brace

Why Physio?

ROM, strength, balance, prevent recurrence

Why Brace?

Immediate risk-reducing effect

Enhances proprioception while the patient undergoes neuromuscular training and while healing and re-establishment of protective reflexes occurs.

<https://emergencycarebc.ca/wp-content/uploads/2019/04/Ankle-Sprain-1.pdf>

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Julia: 7 yo F ankle sprain & “abnormal x ray”

HPI: Inverted ankle on trampoline

Ankle x rays:
“small bone densities adjacent to the medial and lateral malleoli, suggesting avulsion fragments”

Diagnosis: Ankle Sprain
 Don't let the x-ray report distract you
 Treat it like a regular ankle sprain



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Michael: 10 yo M, likely Sever's

REASON FOR REFERRAL

Likely Sever's. Affecting his life and causing him to limp.

Showed some stretching and recommended OTC medications

Looking for opinion on further treatment and review of x rays to ensure we are on the right track

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Michael: 10 yo M, likely Sever's


HPI Right heel pain x 3-4 months No injury. Intermittent. Worsens with running PMHx Autism	SH Hockey 2-5 times a week Soccer and rugby recently ended Starting ball hockey shortly Summer: planned break from organized sports, family camping and biking
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Michael: 10 yo M, likely Sever's

Exam Gait altered, no swelling positive heel squeeze test

Calcaneal x rays:
“Minimal fragmentation and subtle sclerosis of the calcaneal apophysis with adjacent soft tissue swelling, most in keeping with apophysitis/Sever's disease. No additional significant findings.
 Also - no bone cyst



Report just describing normal anatomy

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Michael: 10 yo M, likely Sever's

Differential diagnosis for heel pain:

- bone cyst (rule out by xray)
- calcaneal stress fracture (high level training, amenorrhea)
- Achilles tendinopathy
- (Fat pad contusion, plantar fasciitis)

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Michael: 10 yo M, likely Sever's

Diagnosis: Sever's Apophysitis

Benign condition

Painful irritation of the apophysis (growth plate at the heel bone) - where achilles attaches

Brought on with activity - impact and traction on the apophysis

Can come and go dependent on the amount of rest he takes and types of physical activities he engages in

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Sever's Apophysitis: Management plan for Michael

Activity modification

Rest from running and jumping activities over the summer, when he doesn't have any sports scheduled and family will be primarily camping, and biking

Hold off on ball hockey right now and running challenge at school, and stick with ice hockey

If having lots of pain with walking, then take more immediate rest from sports and physical activities for a few weeks to allow the pain to settle

Decrease volume of running heavy sports next year: play either rugby or soccer, not both at the same time

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Sever's Apophysitis: Management



Heel padding:

- ❖ Tuli cups, tuli cheetah sleeve, bauerfeind achillotrain
- ❖ Ensure the padding is also in his sports footwear



Physiotherapy: stretch calves

- ❖ Alternatively: <https://www.luriechildrens.org/en/specialties-conditions/sever-disease-calcaneal-apophysitis/>

Pain management: Ice after activities, +/- topical Voltaren PRN, +/- Advil, Tylenol PRN

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Samantha: 13 yo F, inversion injury and lateral foot pain

HPI

3 weeks ago landed from a jump, inverted her ankle.

Next day she hit it against a hot tub

Day after she performed at a hip hop show

Then asked her mom for crutches, but continued to participate in some jumping activities (eg. bouncy castle at birthday party)

Pain at lateral foot/base of 5th metatarsal

SH: Horseback riding, cross country, mountain biking

Exam

Antalgic Gait

TTP at the lateral foot (base of the 5th metatarsal)

No TTP at the lateral ankle
No TTP over the peroneal tendons.
No pain with resisted eversion or passive inversion

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Samantha: 13 yo F, inversion injury and lateral foot pain

Foot xray:

No acute fracture identified.

Normal base of fifth apophysis with no evidence of superimposed fracture identified.

Bony alignment remains anatomic

Or

Accessory center of ossification noted adjacent to the base of the 5th metatarsal



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Samantha: 13 yo F, inversion injury and lateral foot pain

Differential diagnosis

Peroneal tendinopathy

Ankle sprain

Fracture:

-orientation in transverse/horizontal, rather than longitudinal

"There is an incomplete subacute appearing transverse fracture through the proximal diaphysis of the fifth metatarsal"



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Iselin's "Disease": Apophysitis of the 5th Metatarsal

Lateral foot pain

Onset may be

- ❖ acute (after ankle inversion)
- ❖ insidiously (from activities)
- ❖ +/- friction from skates or similar

Tenderness and often a bony prominence at the base of the 5th metatarsal

May need oblique view on x rays to appreciate apophysis

Symptoms may resolve after a few weeks or persist for a few years

Dependent on activity level

Apophysis doesn't close until ~18th birthday

Management: Similar to Sever's

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Samantha: Iselin's / Apophyseal Traction Injury

Management:

4 weeks in boot (pain stopped at 3 weeks)

- ❖ While in walking boot: come out for some ROM
- ❖ No bouncy castles
- ❖ Avoiding activities that hurt (even with boot on)

Once pain free and boot discontinued:

- ❖ gradual return to activities (ok to go watersliding at birthday party)
- ❖ ASO ankle brace (to prevent her from having an ankle sprain)
- ❖ physio

pain recurred few weeks later (after Disneyland trip)

then was up and down depending on activity level over the summer

she asked to go back in the boot, we did boot for 1 week, and took a break from running, jumping activities for a month, and returned to physio.

Was 95% better 1 month follow up

haven't heard from her since

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Jordan: 12 yo M, hockey player with foot bumps

HPI

Pain over the medial navicular area

Atraumatic onset 4 months ago

Pain when ice skating

New hockey skates 4 months ago

Little to no discomfort with

shoewear



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Jordan: 12 yo M, hockey player with foot bumps

SH

Main sport is hockey. Plays 12 hours/week

Exam

Erythema over both navicular tuberosities

Skin also appeared thickened

TTP medial navicular

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Jordan: 12 yo M, hockey player with foot bumps

Foot X rays:

Accessory centres of ossification are noted adjacent to the bases of both 5th metatarsals

Not relevant to location of pain



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Jordan: Skate boot problem, mechanical skin dermatosis

Management

Punch out problem areas

Navicular area

(Base of the 5th metatarsal)

+/- padding (Eg. doughnut)

+/- stretching

They punched out the skates and 4-5 months later no more pain

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Summary

Management principles: Activity modification and active physiotherapy

Do not miss: SCFE, RIO

Acute knee injury with effusion: Refer early, hinged knee brace, and early movement

Flat feet: May need treatment if pain, rigid (no arch when up on toes), or severe.

Injury Prevention Principles: Encourage a variety of sports and avoid overscheduling

Foot cases: Don't let the x ray reports distract you

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Google resources I like to use

AAOS conditioning programs (eg. foot and ankle, knee)

Acute Ankle Sprain: <https://emergencycarebc.ca/wp-content/uploads/2019/04/Ankle-Sprain-1.pdf>

Lurie Children's Hospital Sports Medicine Handouts (eg. Sever's, patellofemoral pain)

FIFA 11 ACL injury prevention program:

- ◆ free booklet - PDF
- ◆ Youtube videos: University of Iowa FIFA 11

What Parents Should Know About Flat Feet, Intoeing, Bent Legs, And Shoes For Children. Stahell L.

- ◆ https://global-help.org/products/what_parents_should_know_about_flatfeet_intoeing_bent_legs_and_shoes_for_children/

24-hour Canada Movement Guidelines

Injury prevention:

- ◆ Ted Talk – Changing the game in you sports. John O'Sullivan <https://www.youtube.com/watch?v=VXw0XGOVQw>
- ◆ <https://youthsportsparenteducation.usu.edu/wp-content/uploads/2019/01/Youth-Sport-Parent-Guide-v2.pdf>
- ◆ <https://www.healthlinkbc.ca/pregnancy-parenting/keeping-your-child-safe/preventing-childrens-injuries-sports-and-other>
- ◆ <https://changingthegameproject.com/timeout-the-importance-of-downtime-for-youth-sports-families/>

