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Overuse Injuries in Gymnastics

Emily Sweeney, MD

Pediatric Sports Medicine Physician, Children's Hospital Colorado

Assistant Professor, University of Colorado School of Medicine



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Objectives

- Review overuse injuries that are unique and common to artistic gymnasts



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Disclosures

- No relevant financial disclosures.



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Epidemiology of Overuse Injuries

- Account for 22-60% of injuries in gymnastics (Ahmed 2022, Chandran 2021)
 - Stress fractures
 - Tendonitis
 - Apophysitis
- 1.8 overuse injuries per 1000 hours (O'Kane 2011)
 - Level 9 training 24 hours per week
 - x50 weeks
 - = 1,200 hours per year
 - = >2 overuse injuries per year



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Overuse Gymnastics Injuries

- Upper Extremity
 - Gymnast's Wrist
 - Ulnar Impingement Syndromes
 - Capitellar OCD
- Spine
 - Spondylolysis & Spondylolisthesis
 - Hyperlordotic Low Back Pain
- Lower Extremity
 - Apophysitis
 - Anterior ankle impingement



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Gymnast's Wrist

- Distal Radial Epiphysitis
- 11-14y/o gymnasts
- Higher levels
- Negative ulnar variance and increased load through radius
- Tender at physis
- Pain with axial loading and extension of wrist
- Possible swelling and decreased grip strength
- Immobilization then PT/OT
- Tiger Paws



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Webb (2008), Caine (2013)

Staging of Gymnast's Wrist

- Stage 1: x-rays normal, clinical diagnosis
 - RTP in 2-4 weeks
- Stage 2: x-rays abnormal
 - Widened/hazy physis, cystic changes of metaphysis
 - No upper body loading for 6 weeks
 - RTP in 2-4 months when x-rays & exam improving
- Stage 3: ulnar positive variance
 - RTP depends on ulnar abutment symptoms



<https://www.orthobullets.com/hand/6052/gymnasts-wrist-distal-radial-physal-stress-syndrome>



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Staging of Gymnast's Wrist

- Stage 1: x-rays normal, clinical diagnosis

RTP in 2-4 weeks



Ulnar Impaction Syndrome

- Early closure of distal radial physis and +Ulnar variance
- Degenerative TFCC tears, lunotriquetral tears, bony cyst formation, extensor tendon rupture
- Pain between ulnar styloid and pisiform
- Pain with passive ulnar deviation, +TFCC Grind, +TFCC Compression
- Dx: X-ray, MRI with arthrogram
- Treatment: rest, NSAIDs, steroid injection, activity modification and PT, immobilization, surgery



<https://www.orthobullets.com/hand/6046/ulnar-variance>



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Webb (2008), Caine (2013)

Osteochondritis Dissecans

- Lack of blood supply to bone and cartilage
- Pain, limited motion (especially extension), popping, clicking, catching
- Usually at capitellum of elbow
- MRI to determine lesion stability
 - Stable: 4-6 weeks immobilization (hinged brace), then PT, and progression back to sports



<https://radiologykey.com/ocdchondral-injuries-of-the-elbow/>



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Elbow RTP

Return to Gymnastics Protocol for Females Upper Extremity – Elbow

Step	Tumble Track	Vault	Uneven Bars	Balance Beam	Floor
1			Hang on bar 10-60 s (my need to delay to step 2 or 3 for elbow stability issues)		Shoulder shrug (protraction) in push-up position 10x15
					Handstand at wall 10-60 s
					Front and back walkovers (up to 10)
2	Roundoff x 10				Push-up with shrug (protraction) x10-15
					Cartwheels (up to 15)
3	Roundoff, back handspring		Tap Swings (10-20) (may need to delay until step 4 for elbow stability issues)		Press to handstand
	Front handsprings (may add single saltos)				
4	Standing back handsprings			Walkovers and cartwheels on low then high beam	Roundoff, back handsprings and front handsprings (may add saltos)
5			Glide and long hang kips	Roundoff and back handsprings on line on floor	Pirouetting skills
			Cast to handstands		
6		Handstand hops/blocking drills	Back giants and circling elements	Roundoff and back handsprings	Roundoff, back handspring (add single saltos)
			Dismounts		
7		Handsprings	Pirouetting skills		Standing back handsprings
		Roundoff entry only for Yurchenko ¹			Front handsprings
8		Yurchenko and Tsuk vaults	Front and eagle giants		
			Release elements		



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Spondylolysis

- Stress fracture to pars interarticularis
- Pain with **extension**, rotation, impact
- 2 view standing x-ray (AP and lateral)
- MRI for confirmation
- Management:
 - Activity modification
 - Bracing?
 - What is the optimal timing of rest/PT?



<https://www.orthobullets.com/spine/2058/pediatric-spondylolysis-and-spondylolisthesis>

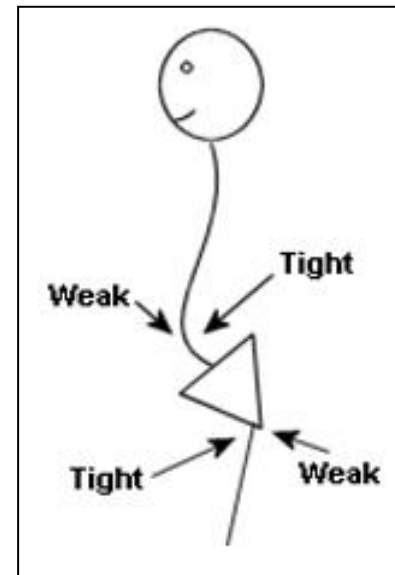
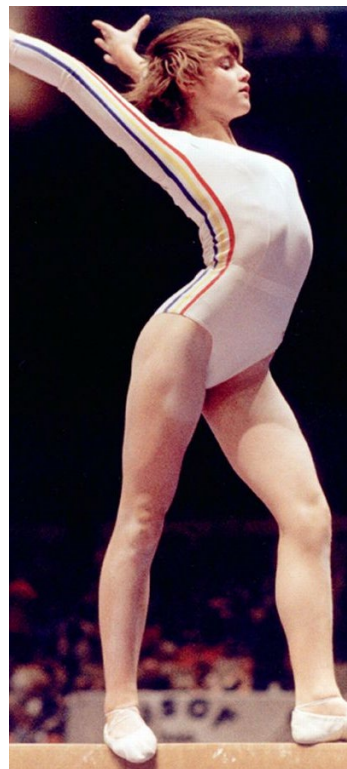


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Hyperlordotic Low Back Pain

- Typically near growth spurt
- Tight thoracolumbar fascia due to rapid growth and poor flexibility
- Can present similar to spondylolysis
- All imaging studies normal
- Management
 - PT – improve thoracic, shoulder, and hip mobility
 - Activity modification
 - Brace for comfort (lumbar corset)



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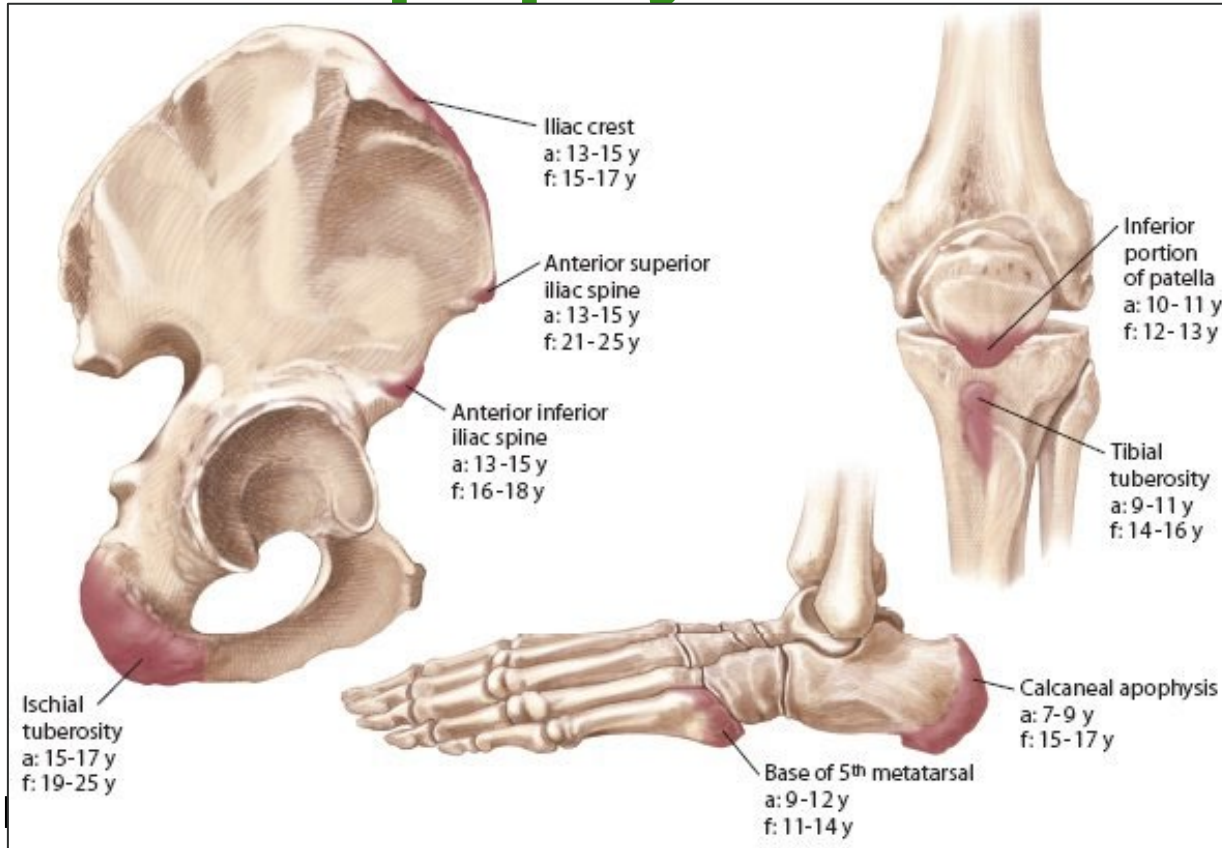
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Apophysitis



Sever's (Calcaneal Apophysitis)

- Repeated traction and frequent impact
- Age 8-14y/o
- Pain with heel v
- Tight gastroc/s
- X-rays normal c
- apophysis
- Treatment: Stretching, Heel cups
 - Cheetah Heel cups, The X-brace

> [J Athl Train.](#) 2022 Sep 12. doi: 10.4085/1062-6050-0266.22. Online ahead of print.

Comparison of Braces for Treatment of Sever's Disease in Barefoot Athletes: A Randomized Clinical Trial

Emily A Sweeney ^{1 2}, Casey C Little ², Julie C Wilson ^{1 2}, Morgan N Potter ³,
Corrine N Seehusen ⁴, David R Howell ^{1 2}

Affiliations + expand

PMID: 36094612 DOI: [10.4085/1062-6050-0266.22](#)



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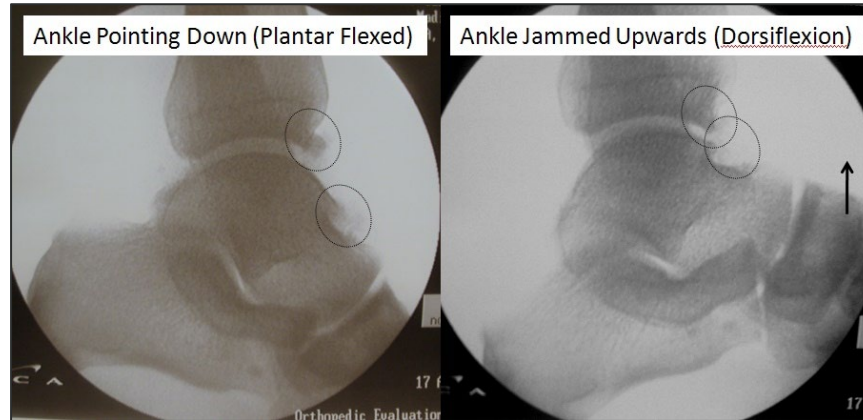
<https://medi-dyne.com/products/x-brace>

<https://medi-dyne.com/products/tulis-cheetah-fitted>

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Anterior Ankle Impingement

- Typically after repeated ankle injuries
- Bony (spurs, osteophytes) or soft tissue
- Pain with landing “short,” dorsiflexion
- Anterior ankle impingement tests
- Treatment: activity modification, NSAIDs, PT (mobilizations), steroid injections, surgery



<https://footeducation.com/anterior-ankle-impingement/>



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Tips and Tricks: Ankle/Wrist ROM

- Ankle Dorsiflexion and Wrist Extension
 - 4.5 inches (10cm) from wall



Dave Tilley, Shift movement science



<https://www.physioprescription.com/sample-page/>

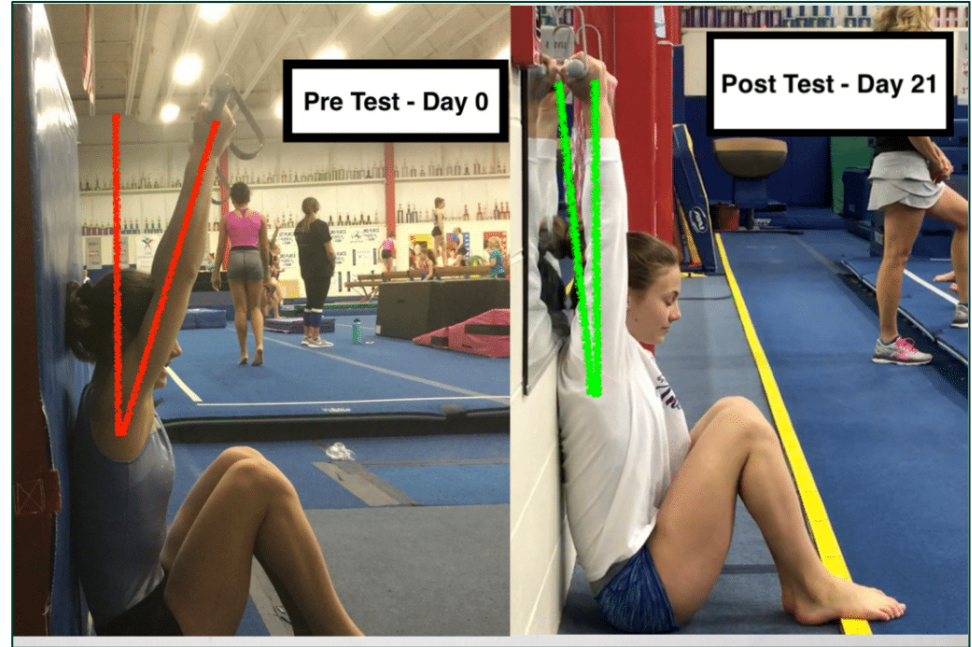


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Tips and Tricks: Shoulder ROM

- Shoulder flexion
 - Pronated
 - Supinated
 - Single line grip




<https://shiftmovementscience.com/the-exact-drills-i-use-to-increase-overhead-shoulder-flexibility/>

Thank You!

Emily.Sweeney@childrenscolorado.org



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 @emiliasweeney

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