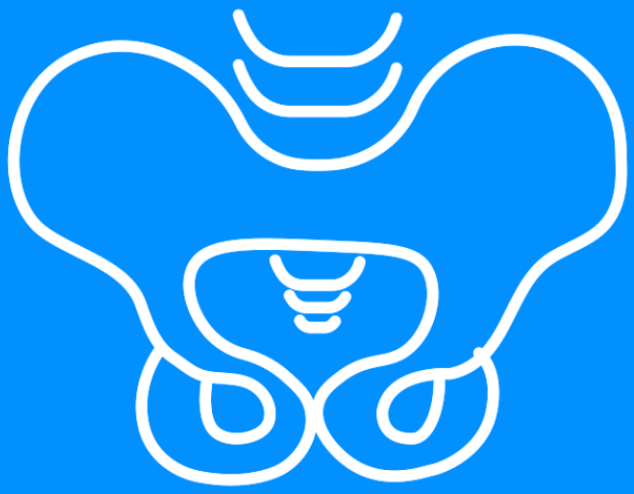

PELVICON

Symposium

SPECIAL TOPIC || COCCYDYNIA

Multi-Disciplinary Virtual Conference
July 19, 2025

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PELVICON

Symposium

SPECIAL TOPIC || COCCYDYNIA

Jessica Reale
PT, DPT, WCS
@southernpelvichealth

Nicole Cozean
PT, DPT, WCS
@nicolecozeandpt

Co-founders of PelviCon, Symposium Hosts and Speakers

Saturday. 19th of July, 2025

9:00AM - 6:30PM EST

100% ONLINE

Live Virtual Conference Platform

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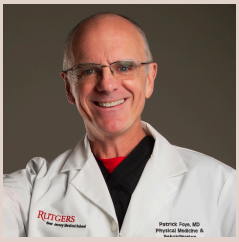
THE SPEAKER LINEUP



Patrick Foye, MD
@tailbone.doctor

John Vogel, DO
@drjohnvogel

Frank Feigenbaum, MD
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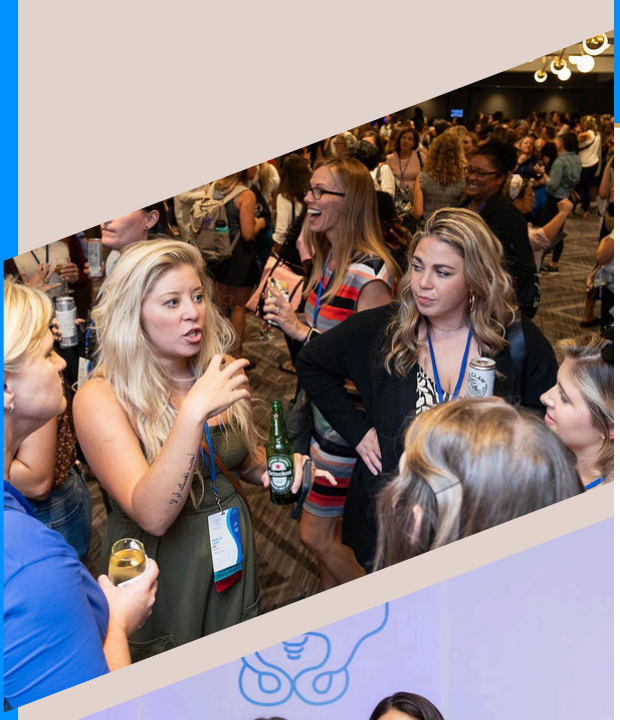
Anna Hammond
PT, DPT, OCS, PCES
@core_exercise_solutions

Adriaan Louw
PT, PhD
www.whyyouhurt.com



Stay in Touch!

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Welcome & Agenda

We are thrilled to have you join this year's Symposium on coccydynia brought to you by PelviCon!

We hope this increases your confidence in treating your patients with coccydynia and results in better patient outcomes.

Would love to see you at an in-person PelviCon event in the future!

9am - Welcome! Nicole and Jessica Introduction
9:15am - Dr. Patrick Foye: Medical Management, Differential Diagnosis and Background Information
10:40am - Dr. Patrick Foye Q&A
11:00am - Dr. John Vogel: Pain Management Strategies for Coccydynia
11:45am - Dr. Frank Feigenbaum: The Role of Tarlov Cysts in Coccydynia
12:30pm - Dr. John Vogel + Dr. Frank Feigenbaum Q&A
1:45pm - Dr. Jessica Reale & Dr. Nicole Cozean: Getting to the Bottom of It: Treating Coccydynia with Confidence (Evaluation and Treatment Techniques)
3:45pm - Dr. Anna Hammond: Exercise-Based Strategies for Coccydynia
4:30pm - Dr. Adriaan Louw: Coccydynia - A Pain Science Approach
5:15pm - Dr. Adriaan Louw + Dr. Anna Hammond Q&A
5:30pm - Dr. Jessica Reale & Dr. Nicole Cozean - Putting It All Together. Conclusions + Wrap-Up
*** all times approximate and in EST*

In health,
Nicole & Jessica

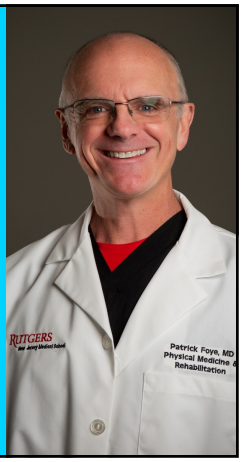
PELVICON

Coccyx Pain

Overview, Background and Differential Diagnosis

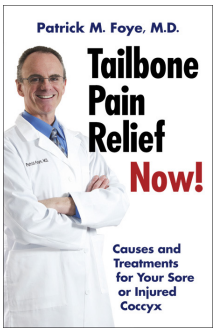
Patrick Foye, M.D.
www.TailboneDoctor.com

PELVICON Symposium



Disclosures

- My book, "Tailbone Pain Relief Now!" is available on Amazon: paperback, e-book, and audio-book.
- (I tried to make the e-book free version for those attending this conference, but Amazon has put a pause on me giving out my e-book for free.)



PELVICON Symposium

Patrick Foye, M.D.

PELVICON Symposium

About Dr. Foye

- Patrick Foye, M.D.
- Director, Coccyx Pain Center,
- Rutgers New Jersey Medical School, Newark
- Professor,
- Physical Medicine and Rehabilitation
- Board certified in both: PM&R,
- and Pain Medicine
- Office: (973) 972-2802
- Doctor.Foye@gmail.com
- www.TailboneDoctor.com

Musculoskeletal / Pain / PM&R

- Muscles, Tendons, Ligaments, Bones, Joints, Discs, Nerves, etc.
- "Head to Toe"?
- Head, Torso, Spine, and 4 limbs
- Spine
  - = Cervical, Thoracic, Lumbar, Sacral. (+ _____)
- Missing =
  - Parts of the pelvis that are not the sacrum or hips… e.g. the coccyx and the pelvic floor

PELVICON Symposium

Let me go 1.5 inches more inferior

Entered a new domain…

- Proctalgia Fugax
- Radiation Proctitis
- Anal Fissures
- Perianal Abscess
- Retrorectal hemartomas
- Chordomas (usually fatal)
- Pilonidal cysts
- Prostatitis
- Pudendal neuropathy
- Interstitial Cystitis
- Pelvic Floor muscles: Obturator internus, levator ani, etc.
- Pain with vaginal sex, anal sex, rectal object insertions

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Coccyx Pain: Patrick Foye, MD, PM&R at N.J.Med.School

Publications on Coccyx Pain (1)

1) **Foye** PM, et al. **Coccydynia** Successfully Treated with Ganglion Impar Blocks: A Case Series. American Journal of Physical Medicine and Rehabilitation. 2005; 84(3):218.
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5) **Foye** PM**.** New approaches to Ganglion Impar Blocks, via **Coccygeal** Joints. Regional Anesthesia and Pain Medicine. 2007 May-Jun;32(3):269.
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8) **Foye** PM**.** Ganglion Impar Blocks for Chronic Pelvic and **Coccyx** Pain. Pain Physician. 2007 Nov;10(6):780-1.
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16) **Foye** PM. Dextrose prolotherapy for recalcitrant coccygodynia fractures. J Orthop Surg (Hong Kong). 2008 Aug;16(2):270.
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20) **Foye** PM**.** Imaging Studies Detecting Retrorectal Tumors. Turkish Journal of Gastroenterology. 2009 Jan;20(1):81.
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26) **Foye** PM**.** Coccyx Pain Diagnostic Workup: Necessity of MRI in Detecting Malignancy Presenting with **Tailbone** Pain. AJPMR, 2010 April;89(4):S33.

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27) **Foye** PM**,** Stitik TP**.** Diagnostic Ultrasound in a Patient with **Tailbone** Pain: Detecting Coccygeal Dislocation/Listhesis but Failing to Detect an Avulsion Fracture of the Coccyx. AJPMR, 2010 April;89(4):S33.
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49) **Foye**, PM, Shenouda M. In: Maigne J-Y, Doursounian L. (ed.) Coccyx Disorders. (Best Practice Publishing, 2018). Papers from The First International Symposium on Coccyx Disorders. Chapter: Ganglion Impar (Walther) Sympathetic Nerve Procedures for Coccydynia. Pages 106-116. Online at: https://www.bestpractice-publishing.com/index.php/product/coccyx-disorders/

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54) **Foye** PM, et al. Avascular Necrosis (AVN) of the Coccyx as a Cause of Coccydynia (Tailbone Pain). WebmedCentral PAIN 2018;9(8):WMC005505. Available online here: http://www.webmedcentral.com/article_view/5505

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59) **Foye** PM, et al. Fluoroscopy During Coccygectomy for Rectal Cancer. Techniques in Coloproctology. (Tech Coloproctol) 24, 1099 (2020). https://link.springer.com/article/10.1007/s10151-020-02305-7. https://doi.org/10.1007/s10151-020-02305-7

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Publications on Coccyx Pain (10)

… Have all my publications mattered?

…*PROBABLY NOT MUCH!!*

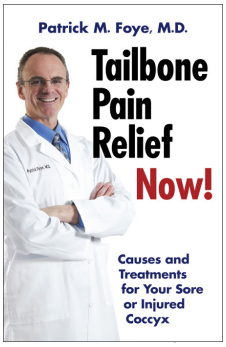
- **Still patients travel in from near and far,**
- **reporting that their medical doctors and therapists do NOT know how to evaluate or treat their tailbone pain. We all see this.**
- **Good news: that's why we are all here! To all learn more, to help these patients!**

Publications on Coccyx Pain

2015, published book:

Tailbone Pain Relief Now!

- 272-pages
- 31 chapters
- *Written for **PATIENTS***
  - *Knowledge = Empowerment*
- All about the tailbone.
  - Anatomy, injuries, testing, treatments, and more.



I do also have a regular life…

- outside of treating and publishing about coccyx pain…

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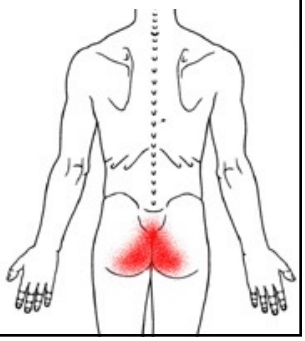
Outline for this Lecture

- Anatomy
- Symptoms
- Physical Exam
- Diagnostic Tests
- Differential Diagnosis
- Treatment



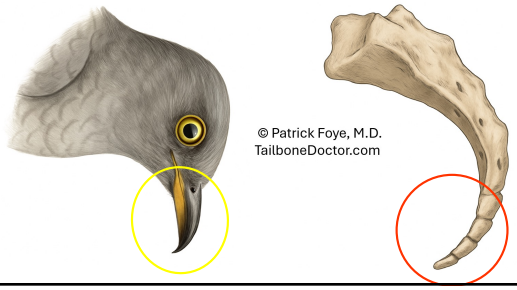
Lecture Goals for Pelvic Floor Physical Therapists

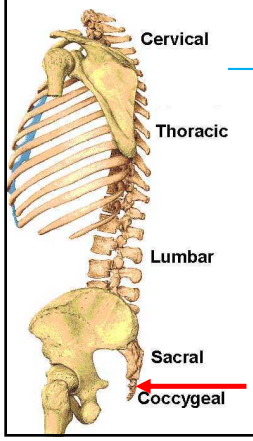
- Diagnostic imaging studies of the coccyx:
  - Seated x-rays. MRI. CT scans. Bone scans.
- Watch for fatal cancers at the coccyx.
- Collaboration across specialties
- Specific treatment based on a specific diagnosis
  - (Just like for back pain, knee pain, pelvic floor pain, etc., avoid the "black box" approach.)

PELVICON Symposium

"Coccyx" means Cuckoo

- from Greek kokk x, *cuckoo, coccyx*
- **The cuckoo bird's curved beak ~ The curve of the coccyx**



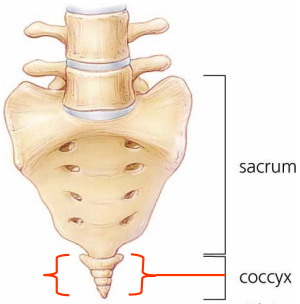


Anatomy

- "*Vestigial* Tail"
  - But not "useless"
- "Tail ***bone***"
  - **But** *not just one* "bone"

PELVICON Symposium

Anatomy



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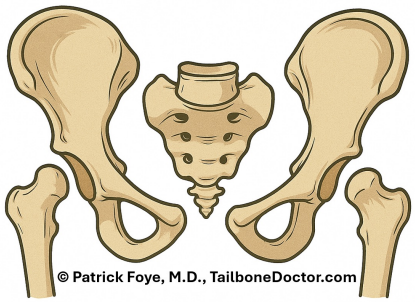
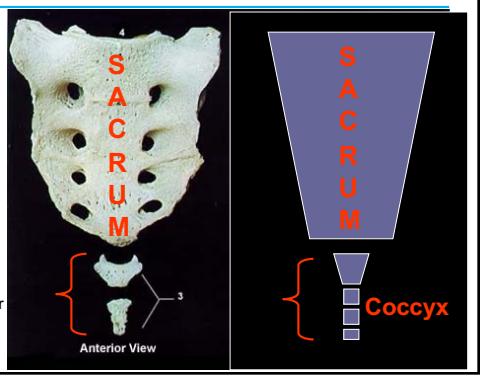
Anatomy: Pelvis Disarticulated

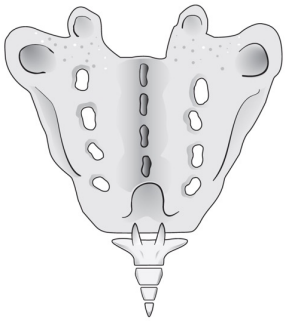


Anatomy: Disarticulated

Coccyx:
3-5 bones
Variable number
Variable fusion
Variable size,
Variable shape



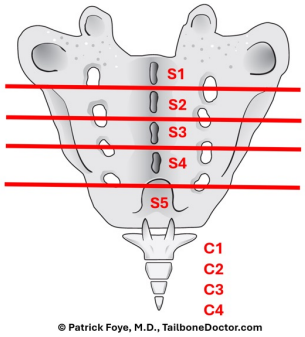
Anatomy: SACRUM and coccyx



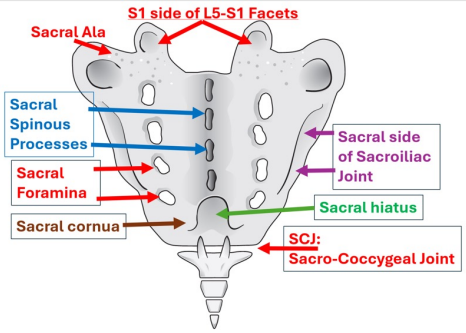
Anatomy: SACRUM and coccyx

5 sacral bones, fused

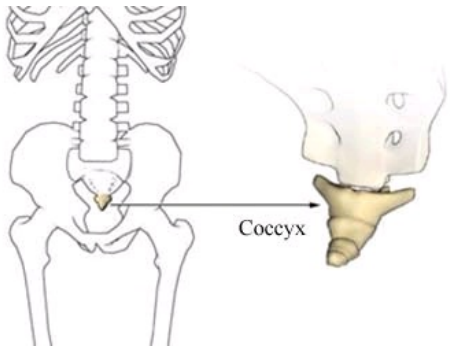
3-5 coccyx bones, variable fusion



Anatomy: SACRUM and coccyx



Anatomy… Coccyx



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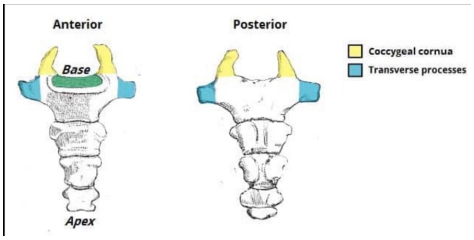
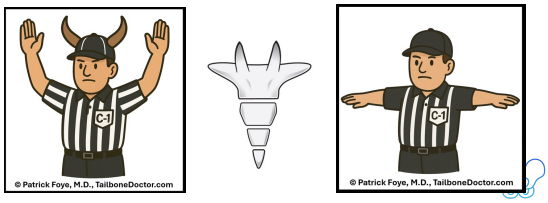
Coccyx Anatomy: Top to Bottom

- **Top** = **Base**. SCJ = SacroCoccygeal Joint.
- **Bottom** = **Apex** = lowest tip.
- Like an *upside-down* mountain summit to climb



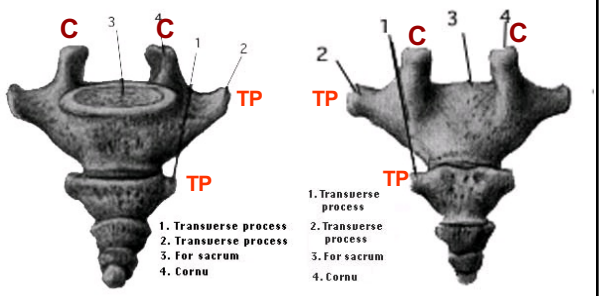
Coccyx Anatomy: C1 is different

- C1 = 1st coccygeal vertebral body.
  - Has 2 **cornua** = 2 "horns" extending up to sacrum
  - Has 2 **transverse processes**, projecting laterally



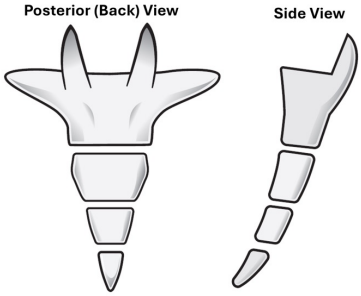
Front and Back Views of Coccyx

- **Anterior View** **Posterior View**



Front and Back Views of Coccyx

- Posterior (Back) View Side View



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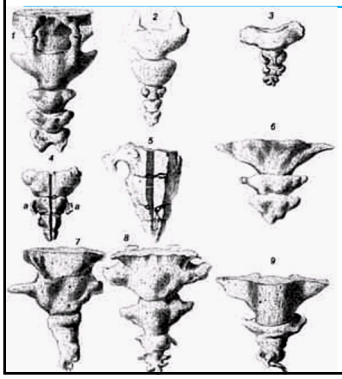
Coccyx Variability



Smaller than the pinky finger… yet it can cause profound pain and suffering

Coccyx attachments: MUSCLES

- **Levator ani:** 3 muscles:
  - Puborectalis: Rectal sling, *NOT* attached to coccyx
  - Pubococcygeus: Pubic bone to coccyx
  - Iliococcygeus: From the ischial spine and obturator fascia, to coccyx.
- **Coccygeus** (aka ischiococcygeus)
- **"Pelvic Diaphragm"** =
  - Levator ani PLUS the Coccygeus (ischiococcygeus)
- **Gluteus maximus**
- **External anal sphincter**

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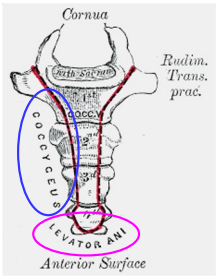
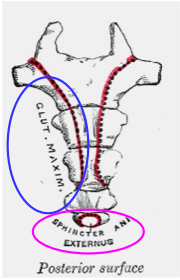
Coccyx attachments: MUSCLES

- Anterior-Lateral: Coccygeus (ischiococcygeus)
- Anterior lower coccyx: levator ani

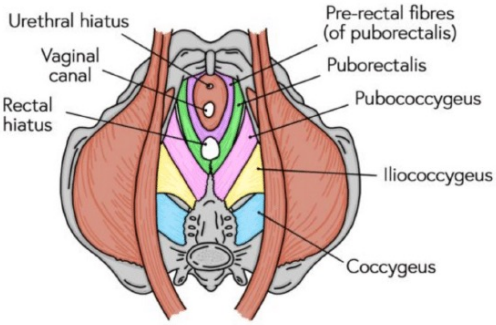


Coccyx attachments: MUSCLES

- Posterior-Lateral: Gluteus maximus
- Posterior lower coccyx: external anal sphincter



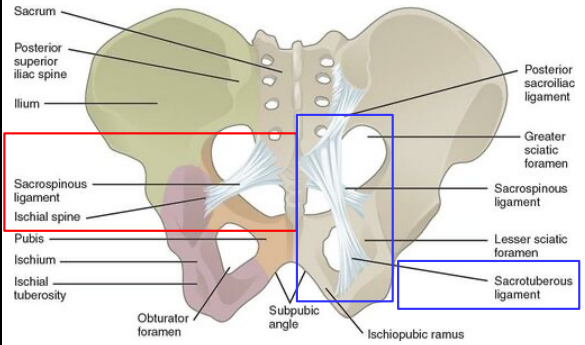
Coccyx attachments: MUSCLES



Coccyx LIGAMENTS

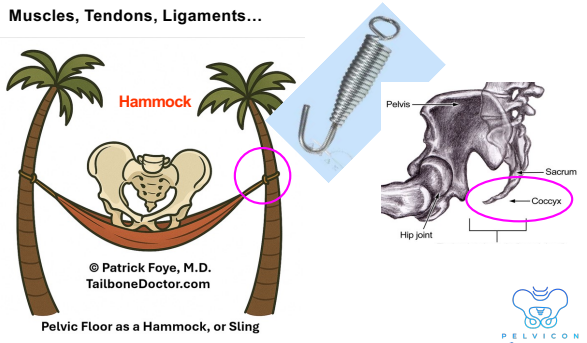
- **Sacrotuberous**: from ischial tuberosity, bilat.
- **Sacrospinous**: from ischial spine, bilat.
- **Sacrococcygeal**: anterior, posterior, and lateral sacrococcygeal ligaments.
  - ALL = Anterior Longitudinal Ligament.
  - PLL= Posterior Longitudinal Ligament.
- **Anococcygeal raphe:**
  - not a "ligament" (does not connect bone-to-bone)
  - fibrous band from the anus to the coccyx, helps support pelvic floor and the position of the anus

LIGAMENTS



Sling-Function of Pelvic Floor

Muscles, Tendons, Ligaments…



Pelvic Floor as a Hammock, or Sling

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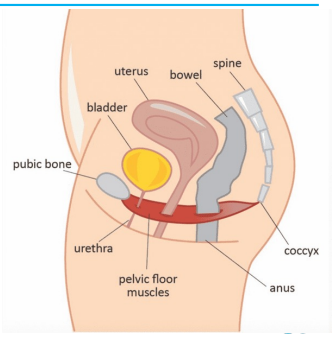
Sling-Function of Pelvic Floor

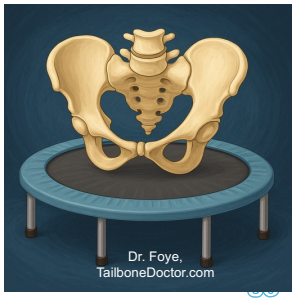
Front to back:

1. **Pubic bone**
2. **Urinary Bladder**
3. **Uterus**
4. **Rectum/Colon**
5. **Coccyx**

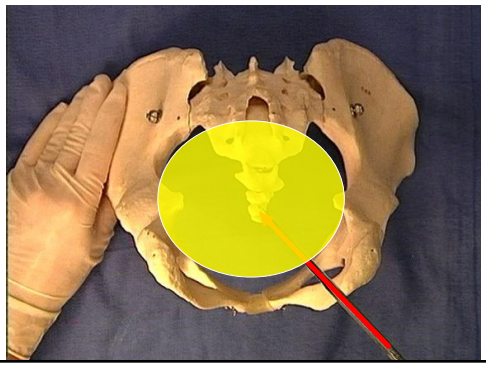


Pelvic Floor as a Sling / Hammock versus a "Trampoline".

- The Sling/ Hammock (prior slide) is great for a simplified view.
- But technically the pelvic floor is more of a **TRAMPOLINE**, since there are attachments all the way around.



Anatomy: Looking from below



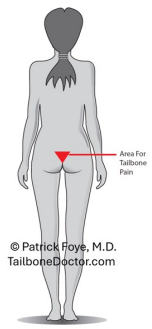
Let's move on from Anatomy

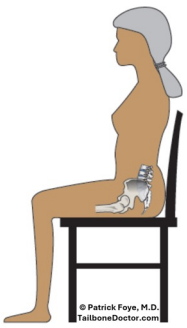
- **To symptoms…**

Coccydynia History: symptoms

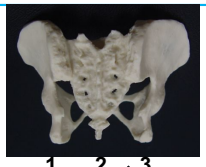
- "Tailbone pain"
- Severe and sharp or dull ache
- Pain Radiation: lower sacral and perineal areas, even posterior thigh
- Notoriously persistent/chronic
  - Substantial compromise of quality-of-life
- **Pain worsened by sitting**
  - Patients may lean to one side,
  - Patients may lean forward
  - Often worse arising from prolonged sitting

Sitting on the Coccyx.

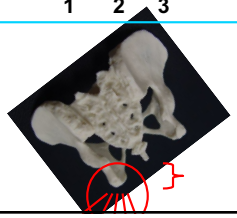




Sitting on the Coccyx. "Tripod"

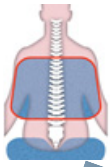


1 coccyx.
2 ischial bursae.



Better with leaning to either side

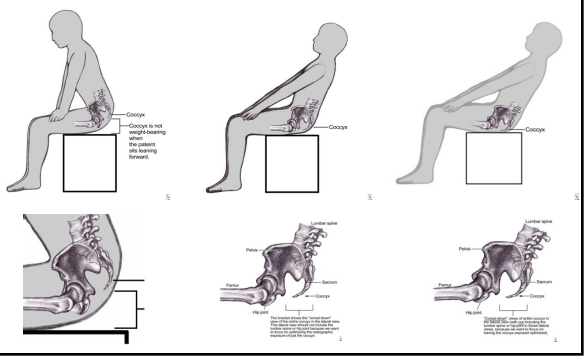
Sitting on the Coccyx. "Tripod"



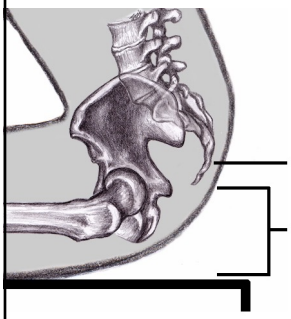
1 coccyx.
2 ischial bursae.

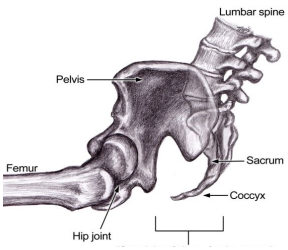
Worse with leaning back

Sitting on the Coccyx. Positional



Sitting on the Coccyx. Positional





OTHER (non-coccyx) symptoms

- Lumbar pain: discs, facet joint pain, etc.
- Buttock pain
  - Sacroiliac joint pain
  - Piriformis muscle pain
- Radicular pain down the leg
  - Piriformis syndrome vs. lumbosacral radiculopathy
- Anal or rectal: pain, constipation
- Hip pain: hip joint vs. lateral/trochanteric pain
- Pilonidal symptoms: swelling/lump, oozing pus

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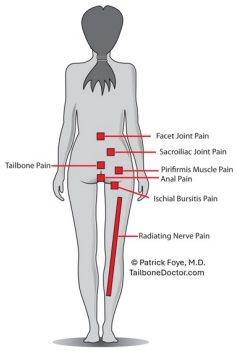
OTHER (non-coccyx) symptoms



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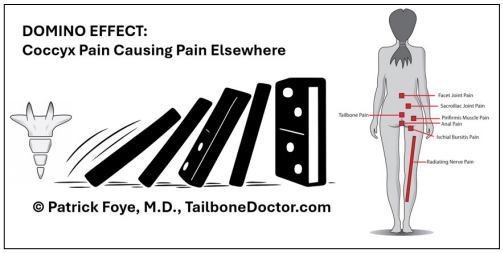
OTHER (non-coccyx) symptoms

- **Domino effect:**
  - Coccyx pain causes abnormal sitting posture.
  - Abnormal sitting posture leads to pain at other areas.



Coccydynia Mechanisms of Injury

Trauma:

EXTERNAL
versus
***INTERNAL* …**

SUDDEN, ABRUPT
versus
***REPETITIVE, SUSTAINED* …**

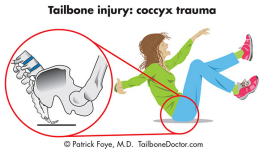
Coccydynia Mechanisms of Injury

Abrupt External Trauma:

- Fall onto buttocks/coccyx
- Motor vehicle accident

Resulting in:

- Contusions
- Sprained / Torn Ligaments
  - Can cause Hypermobility
- Fractures
- Dislocations



Coccydynia Mechanisms of Injury

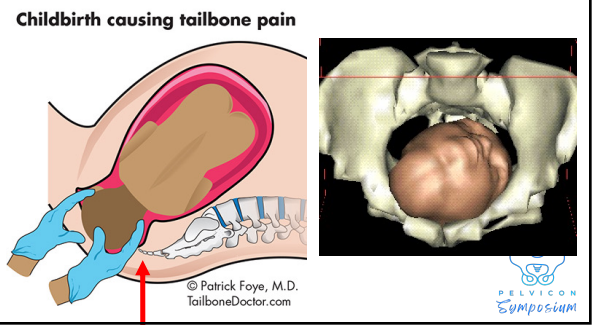
Repetitive or Sustained External Trauma:

- Cycling
- Rowing
- Sit-ups
- Yoga “Boat Pose”

- Sitting
  - Computer time
  - Commuting to work
  - Long Flights
  - Hospital beds
  - Labor and Delivery

Coccyx trauma during childbirth

Internal Trauma…



Coccydynia Mechanisms of Injury

Other:

- **ARTHRITIS:**
  - OA: Osteoarthritis
    - aka DJD: degenerative joint disease
  - Spondyloarthropathies.
    - ankylosing spondylitis
- **Sympathetic Nervous System Hyper-activity**
  - **Fight-or-Flight.**
  - **Ganglion Impar**
  - **Causes persistently high pelvic muscle tone, spasms**
- **IDIOPATHIC** ~ Unknown cause
  - This is NOT a final diagnosis until imaging is done

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Coccydynia Causes: "Rule-outs"

Beyond typical musculoskeletal pathology…

Consider:

- Cancer, tumor, malignancy
- Infections: Osteomyelitis, Perianal Abscess, etc
- Pilonidal cyst, Fistula (tunnel)

Coccydynia Causes: "Rule-outs"

Beyond musculoskeletal pathology…

Consider:

- Hemorrhoids
- Referred pain coming from elsewhere
  - e.g., intra-pelvic pathology: GI, GU, Gyn, etc.

Coccydynia Causes: "Rule-outs"

Beyond musculoskeletal pathology…
Consider:

Important "Red Flags":

- fever, chills,
- unexplained weight loss,
- blood loss,
- prior cancers (especially pelvic), etc
- prior work-up, etc.

Pilonidal Cyst (came to Dr. Foye)

- Sent by primary doctor who never looked

Perianal Abscess

- A perianal abscess is apparent as an erythematous, fluctuant bulge with surrounding edema.
- Courtesy of David A Schwartz, MD and Maurits J Wiersema, MD.
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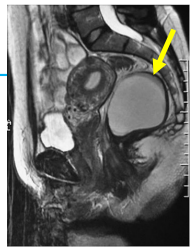
Tailgut cyst



- Above image is a "retro-rectal cystic hamartoma"
  - = Tailgut Cyst, a rare congenital pre-sacral lesion believed to arise from the persistent remnants of the post-anal gut.
  - characterized by multiple cysts lined with a gastrointestinal type of epithelium
- Lopez Cano, 2006, Retrorectal tumors in Adults: 5 cases.

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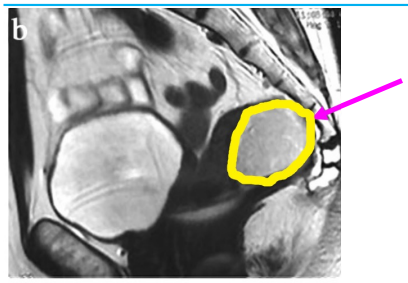
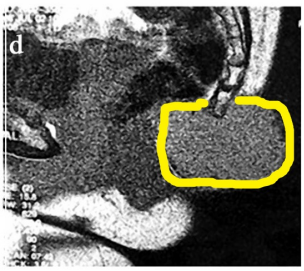
Tailgut cyst



- 2008, Mentes, Retrorectal tumors case series, Turk J of Gastroenterol

Epidermoid cyst

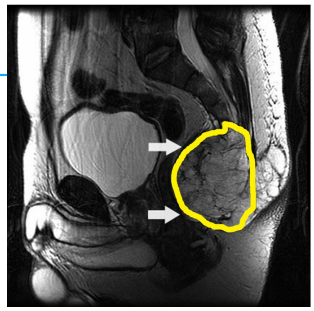


- 2008, Mentes, Retrorectal tumors case series, Turk J of Gastroenterol

Chordoma

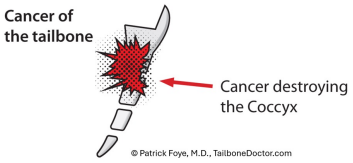
- ***Figure 47.*** *T1-weighted image shows chordoma in the sacrum.*
- http://www.medcyclopaedia.com/library/radiology/chapter12/12_5.aspx

Chordoma



- Chordoma (patient had failed to respond to antibiotics to treat a presumed pilonidal cyst, so ortho was consulted and ordered this MRI… showed chordoma).
- http://www.pathologyoutlines.com/caseofweek/case2008110.htm

Chordoma



- Chordoma = usually at sacrum/coccyx
- Chordoma is usually ***FATAL*** within a few years of diagnosis
- Imaging (MRI) = crucial!

MUST collaborate with other Drs.

- **GI, Colorectal surgeons**
  - colonoscopy, rectal cancers
- **GU:** prostate, etc.
- **OB/GYN:**
- **Radiologists:**
  - addendums to prior readings, etc.
- **Pain Management: meds, injections**
- **Spine or ortho. surgeons:**
  - Bone biopsies, coccygectomies, osteomyelitis, etc.

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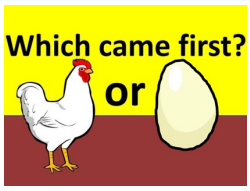
Collaboration (continued)…

- Pelvic Physical Therapists

physical therapist (PT) 110, 113, 133–34, 142, 173, 180, 204

- **"Patients with substantial pelvic floor dysfunction should strongly consider seeing a physical therapist who has special training in this area."**
- **For "symptoms throughout the pelvic floor, then it is certainly worthwhile to try to find a pelvic floor physical therapist in the patient's locality."**
- **"Pelvic floor abnormalities are most commonly evaluated by obstetrician/gynecologists and specially trained physical therapists."**

Pelvic Floor: Chicken and Egg

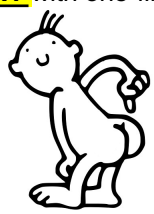


- "Which came first, the chicken or the egg?"
- Which came first, the pelvic floor muscle pain or the coccyx pain?
- Which do you treat first? Either or both.

Let's move on to PHYSICAL EXAM

Physical Exam

- The FIRST thing I do is:
- **ASK THE PATIENT to POINT** with one-finger to where the pain is worst.
- Amazingly simple yet amazingly helpful.
- Midline.
- Posterior.
- Far lower than lumbar pain
- Slightly above the anus.



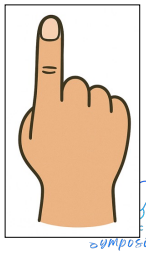
Physical Exam: Non-coccyx

- Lumbar: ~Normal unless *extra* pathology
- Neurologic exam: normal strength, reflexes, sensation, SLR.
- Sacroiliac (S.I.) Joints
- Lumbar Facet (zygapophyseal) Joints
- Hip joints and Trochanters
- Piriformis muscle pain vs. Piriformis syndrome
- Ischial bursae
- Rectal exam?
- Pelvic Floor? (Other lectures)

Physical Exam: Coccyx

Be a Clinician who will TOUCH the Coccyx!

- **MANY coccyx pain patients tell me that their Doctors NEVER EVEN EXAMINED (touched / palpated) their coccyx.**
- **This happens all the time! It's *BIZARRE!***
- **IMAGINE someone treating your thumb without ever examining it. Unthinkable!**
- **Clinicians (primary care, pain or musculoskeletal specialists, P.T.'s, etc.) should *EVALUATE THE SITE OF PAIN!***
- **Patients *DESERVE* proper evaluations.**



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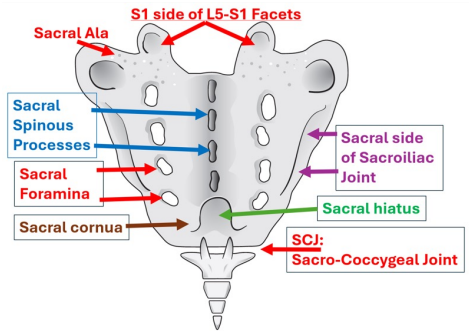
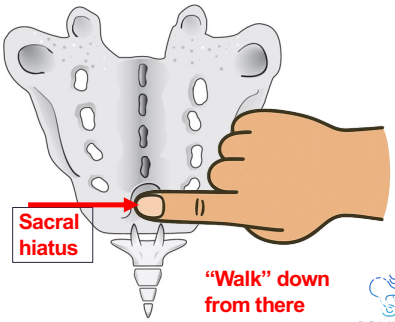
Anatomy: SACRUM and coccyx



Palpation Landmark: Sacral Hiatus

Between the sacral cornua.

Like un upside-down horse-shoe or letter "U"



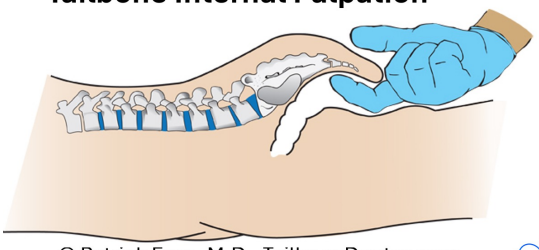
"Walk" down from there

Physical Exam: Coccyx

- Palpation
  - **Focal tenderness at the coccyx.**
  - May be severe.
  - Notice if the tenderness is upper vs. lower
  - Notice abnormal position or movement?
  - Palpate for a distal coccyx bone spur.
  - +/- associated tenderness of adjacent muscles.
  - Consider rectal approach
  - Consider vaginal approach?
  - Pelvic Floor? (Other lectures)

Physical Exam: Coccyx

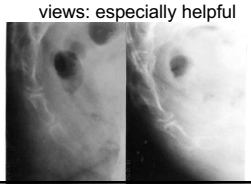
Tailbone Internal Palpation

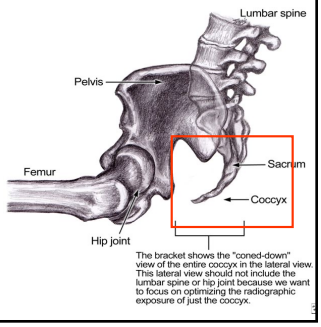


Let's move on to Imaging Tests

Diagnostic Imaging: X-rays

- **X-rays:**
  - Fractures, dislocations
  - Espec. need x-rays if:
    - "Red flags",
    - Medical-legal,
    - pre-procedure
  - Coned-down lateral views: especially helpful





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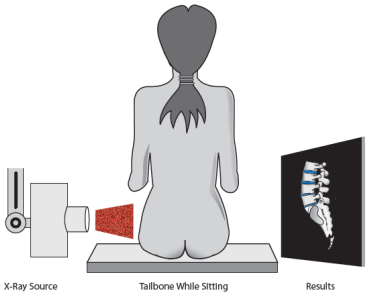
Collimation = Coned-Down Views

- Less x-ray radiation exposure to the patient.
- Avoids including lumbar spine, hip joints, etc.
- Focused on the area of interest (coccyx!)
- Much more clear coccyx x-rays (more clearly see individual coccygeal bones, joints, spurs).
- Not all x-ray centers have this. Technically more challenging for the x-ray tech (needs good aim).

Diagnostic Imaging: *Seated* X-rays



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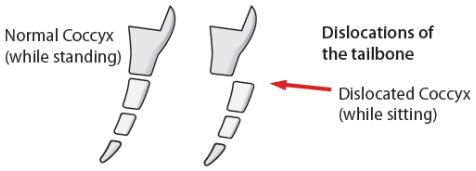
Diagnostic Imaging: *Seated* X-rays



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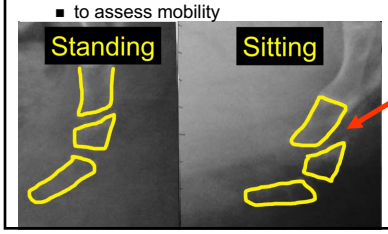
Diagnostic Imaging: *Seated* X-rays

- Dynamic instability
- Dynamic dislocations
- "Dynamic":
  - standing vs. sitting
  - to assess mobility

Dr. Maigne, http://www.sofmmoo.com/english_section/7_coccyx/coccyx_photos/luxpost/luxpost-2.htm



Dislocation that would have never been seen without seated x-rays

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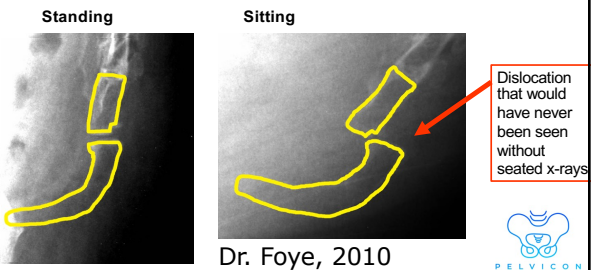
Diagnostic Imaging: *Seated* X-rays

- **Dynamic instability, dislocations, hyper-mobility**



Dislocation that would have never been seen without seated x-rays

Dr. Foye, 2010

I have seen ~ thousands of these

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Dynamic x-rays: Sitting vs. standing

- Dr. Maigne's recommended position to X-ray the coccyx in a sitting posture.
- Is the stool safe?

J.Y. Maigne, PM&R/Rheumatology, Paris

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Dynamic x-rays: Sitting vs. standing

- Have patients sit on sturdy, radiolucent blocks.
- Some x-ray machines go low enough.


Coccyx Motion while sitting

Interpreting sitting-versus-standing coccyx x-rays:
Look at the DIFFERENCE in angles, positions.

- **Flexion < 5** degrees = abnormal = Hyp**O**mobility
- **Flexion 5-19** degrees = **normal**
- **Flexion ≥ 20** degrees = abnormal = **Hyper**mobility
- **Extension** = abnormal = Hypermobility
- **Listhesis** > 25% of vertebral body width = abnormal = Hypermobility

Diagnostic Imaging: Decision Tree

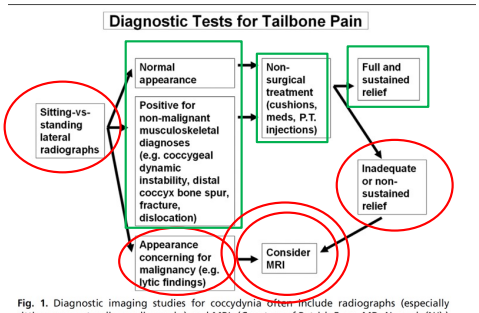


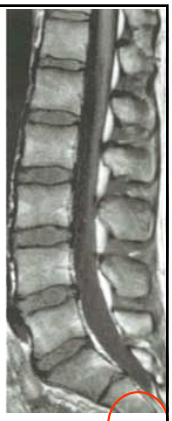
Fig. 1. Diagnostic imaging studies for coccydynia often include radiographs (especially sitting-versus-standing radiographs) and MRI. (*Courtesy of* Patrick Foye, MD, Newark (NJ).)

Other Diagnostic Imaging

- **MRI**
  - "Lumbosacral" MRI ~ does NOT include the coccyx
  - "Sacrum-Coccyx" MRI: explicitly ask for full coccyx
    - Thin slices. Sagittal T1, T2, fat-suppressed.
  - Pelvic MRI: visualize coccyx, plus intra-pelvic organs
- **CT scan**
  - Pelvic CT scan: particularly for bony pathology
    - Add thin sagittal views to best show the coccyx.
- **Nuclear Medicine Bone scan:**
  - e.g. for metastatic disease,
  - fracture [medicolegal]

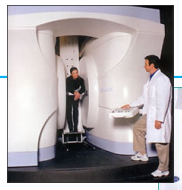
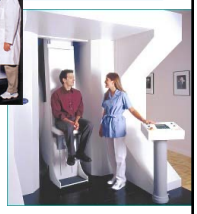
"Lumbar" MRI

does *NOT* show the coccyx

Anatomy MRI

"Seated" MRI

- Dynamic MRI
- Positional MRI
- Stand-up MRI
- Sit-down MRI
- Not the same as "Open" MRI
- Downside: lower strength magnets
  - results in lower quality images

- **Foye PM.** A New Diagnostic Test for Coccyx Pain (Tailbone Pain): Seated MRI. Am J Phys Med Rehabil. 2008 Mar;87(3): S36.

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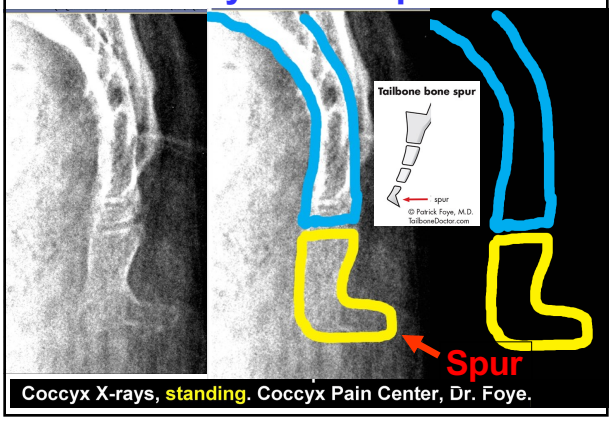
LOOK at the Radiology *Report*!

- Was it LUMBAR instead of sacrum/coccyx?
- Does it even mention the coccyx?
- Does it just say “unremarkable pelvis”?

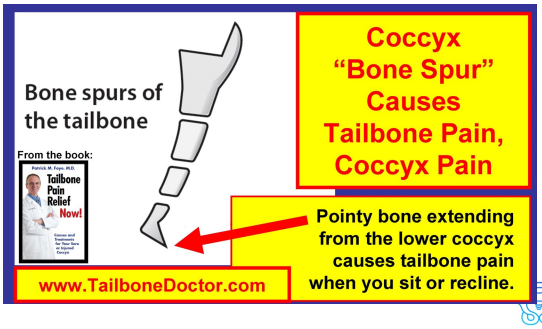
LOOK at your patient’s *images*!

- Did it even include the coccyx?
- Did x-rays include coned-in views?
- Did x-rays include seated views?
- Did MRI go low enough to even include the coccyx?

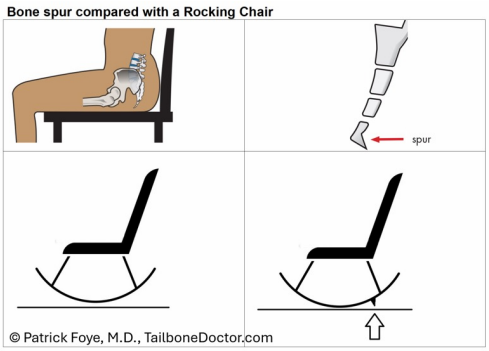
Distal coccyx bone spur



Distal coccyx bone spur



Distal coccyx bone spur



Most Common Diagnoses (1)

Underlying cause(s):

- **HYPER-MOBILITY:**
- **Listhesis (luxation) = “sliding”**
- **Flexion**
- **Extension**
- **Joint Collapse**
- **Distal bone SPUR**
- **Distal Pseudo-Spur**
- **Arthritis**

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Most Common Diagnoses (2)

- **Straight coccyx**
- **HYPO-mobility**
- **Fused coccyx**
- **Dislocation of coccyx**
- **Fracture of coccyx**
- **Diffuse regional pain**
- **Sympathetic nervous system hyperactivity**
- **Pelvic Floor Pain**
- **S/p Coccygectomy**

Let's move on from Diagnosis

- to **TREATMENT**

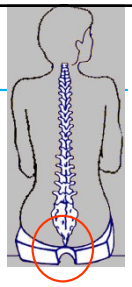
Coccydynia Treatment Ladder

- **Ladder:**
- start at bottom and climb only as high as needed to get good relief.

Coccydynia Treatment

- **Conservative**
  - Avoid exacerbating factors
  - Cushions: wedge cushion > donut cushion
  - Analgesics: NSAIDs, (opioids?), adjuvant meds.
  - Therapy:
    - Modalities, Manual, Massage, Education
- **Injections:** Local (anesthetic vs. steroid), ganglion Impar (sympathetic block), caudal epidural?, other?
- **Manipulation:** e.g. PT, osteopathic, chiropractic
- **Surgical:** coccygectomy (excision= amputation)

Cushions



Wedge is usually better than donut

Cushions

- Foye PM, Sanderson SO, Smith JA,
- **Coccyx Cushions for Tailbone Pain: Donut Cushions Versus Wedge Cushions.**
- Am J Phys Med Rehabil. 2009 Mar;88(3): S56.

- Coccydynia patients prefer **WEDGE** cushions. **5:1**

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Manual Treatment ~ Manipulation

- Maigne, Spine, 2001
- Levator ani massage or stretch, joint mobilization,
- Satisfactory Results
  - 25% at 6 months
  - 24% at 2 years

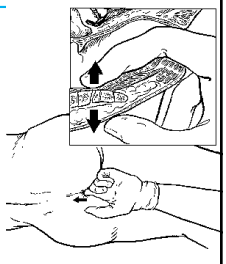
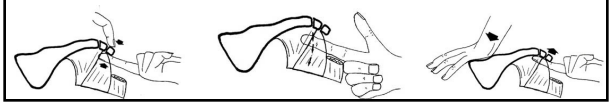


Table 3. Outcome at 6 Months as a Function of the Manual Treatment Used

Group	Failure n (%)	Satisfactory Outcome n (%)
Massage (n = 24)	17 (70.8)	7 (29.2)
Mobilization (n = 25)	21 (84)	4 (16)
Stretching (n = 25)	17 (68)	8 (32)
Total (n = 74)	55 (74.3)	19 (25.7)

P = 0.4



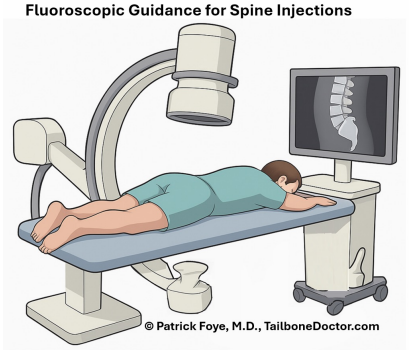
Injections

- **Posterior and distal tip injections:**
  - Local anesthetic and steroid
  - "Blind" vs. Fluoroscopy

- **Low caudal epidural??**
- **Ganglion Impar: sympathetic nerve block**
- **Ablation:** chemical vs. cryo. vs. RFA

Fluoroscopy for Needle Placement

Fluoroscopic Guidance for Spine Injections



Avoid BLIND injections

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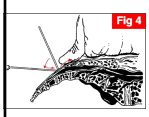
Epidural is NOT the same as Impar

Caudal Epidural vs. Impar



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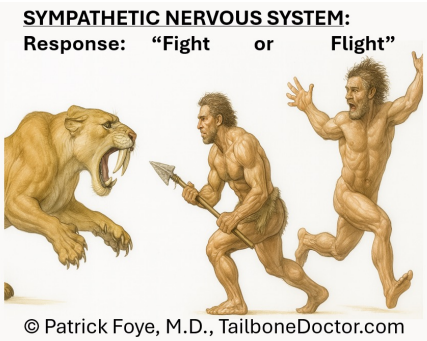
"Sympathetic Nervous System"

SYMPATHETIC NERVOUS SYSTEM:
Response: "Fight or Flight"



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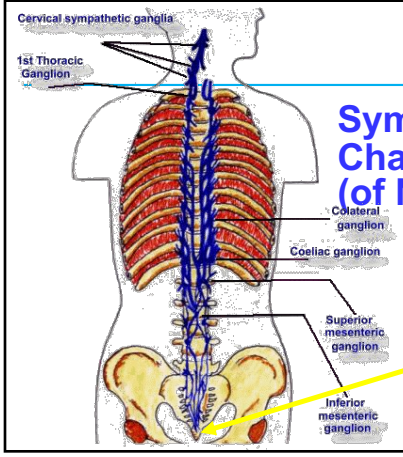
Sympathetic Chain (of Nerves)



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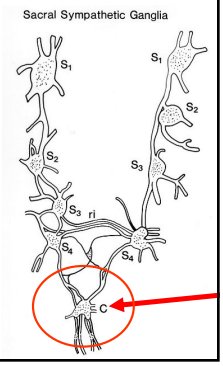
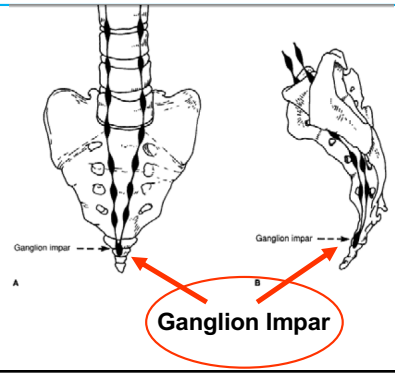
Ganglion Impar (Ganglion Walther)

- Impar = unpaired (solitary)
- Retroperitoneal, retro-rectal
- sympathetic ganglion
- It is the termination of the paired paravertebral sympathetic chains
- Sympathetic innervation of perineum and coccyx

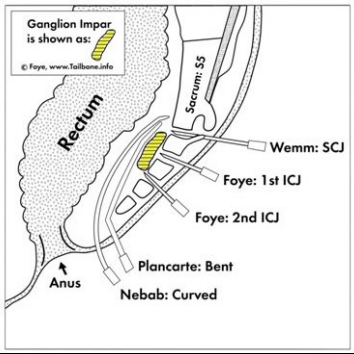


Sympathetic Chain (of Nerves)



Ganglion Impar

Ganglion Impar Injections



Surgery: Coccygectomy (excision)

Coccygectomy: Surgical Tailbone Amputation / Removal

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Surgery: Coccygectomy (excision)

- Jon Miles: physicist
- lives near Oxford, England
- Treated with Coccygectomy
- Has a website for coccyx pain

Surgery: Coccygectomy (excision)

Eisenstein, JBJS-British, **2000**

- 18 patients. Ages: 15-67 years
- Intractable coccyx pain

- Treated with Coccygectomy
- 12 "cured" and 6 unimproved
  - Thus, **1/3 unimproved even after surgery.**

- Unrelated to gender, age, duration of pain, nature of onset

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Surgery: Coccygectomy (excision)

- Doursounian L, Maigne JY, Faure F, Chatellier G. Int Orthop. **2004** Jun;28(3):176-9.
- 61 patients with instability-related coccygodynia
- In all cases, the unstable portion was removed through a limited incision directly over the coccyx. (Partial coccygectomy by one surgeon)
- Outcome ratings:
  - Excellent or good in 53 (87%)
  - Fair in one (~2%).
  - Poor in 7 (11.5%).
- 9 (15%) had infection requiring further surgery!!

Surgery: Coccygectomy (excision)

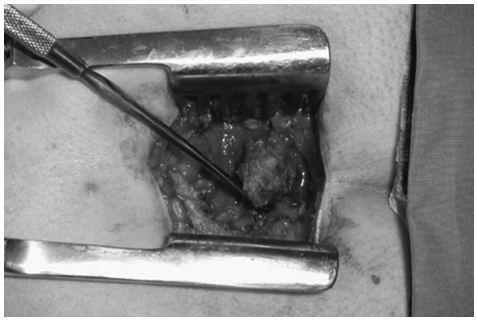
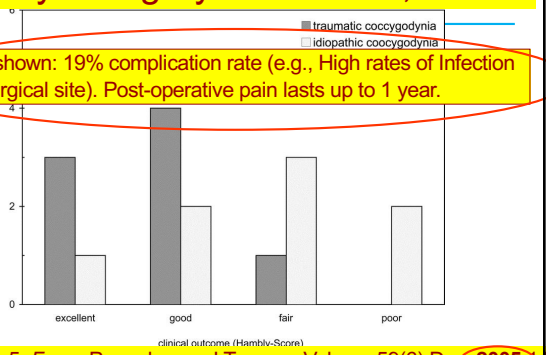


Fig. 4. *From:* **Pennekamp**: J Trauma, Volume 59(6). December **2005**.1414-1419

Coccyx Surgery: Outcomes, 2005

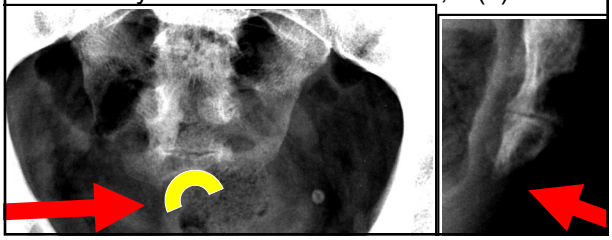


Not shown: 19% complication rate (e.g., High rates of Infection at surgical site). Post-operative pain lasts up to 1 year.

Fig. 5. *From:* Pennekamp: J Trauma, Volume 59(6).Dec. **2005**.14

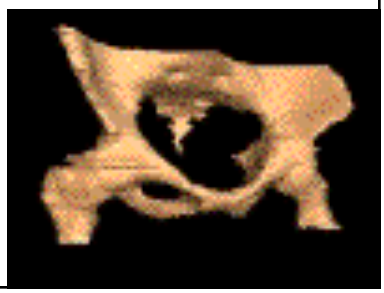
Retained Coccygeal Fragment

- Foye PM, et al.
- **Cookie-Bite Coccyx: Retained Coccygeal Fragment after Coccygectomy.**
- Am J Phys med Rehabil. 2009 Mar;88(3): S56.



Summary… almost done…

- What we have covered:
  - History, symptoms
  - Physical exam
  - Diagnostics
  - Treatments



CHALLENGES in Treating Tailbone pain

***Medical* Challenges**

- Difficulty getting good **imaging** studies
  - Sit-to-stand X-rays = crucial
  - MRI to actually include coccyx in images, report on it, etc
- **Co-morbidities:** Gyn, GI, GU, Cancers, etc.
- **Medical liability:** cancers, cancers, cancers…

CHALLENGES in Treating Tailbone pain

***Administrative* Challenges**

- **Insurance** problems…. Headaches!
  - No CPT code for seated X-rays
  - No CPT code for coccyx MRI
  - No CPT code for ganglion Impar injections
  - Insurance Denials based on LUMBAR criteria (e.g. coccyx pain with no radiculopathy pain down the leg)
  - Often No In-Network Doctors with expertise in coccyx pain
  - Insurance plans with no Out-of-Network benefits
  - Insurance plans with high Out-of-Pocket deductibles
  - My University: We accept Medicare, Medicaid, Charity Care, etc. but Medicaid does not cover out-of-state.

CHALLENGES in Treating Tailbone pain

***Administrative* Challenges**

- Difficulty treating patients from **far** away
  - Meds prescriptions, imaging review, call local doctors.
  - Patient may have limited ability to follow-up
- **Time** intensive:
  - YEARS of images, injections, etc., to review.
- **Limited #** of patients?
  - (LBP is ~10-20k x more common)

Take home messages

- **Do a thorough history and physical exam.**
- **Use diagnostic tests wisely**
  - seated (most painful position) x-rays = crucial!
  - Image the site of reported pain! (coccyx, not lumbar)
- Almost all cases (except cancers) makes sense to **try non-surgical treatments** (e.g. cushions, PT, injections) prior to considering surgery.

Follow Dr. Foye online: Handles

- Website: TailboneDoctor.com
- Twitter: TailboneDoctor
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- YouTube: TailbonePainDoctor
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- Get the Tailbone Pain book on Amazon: https://www.amazon.com/dp/0996453504/
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Thank you!

- Patrick Foye, M.D.
- Director, Coccyx Pain Center,
- Professor
- Physical Medicine and Rehabilitation
- New Jersey Medical School

- www.TailboneDoctor.com

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Coccydynia: Pain Management Perspective

John Vogel DO, MSCP, IF, CIPS
Marietta, GA

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1

John Vogel DO, MSCP, IF, CIPS

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About Me

- Family Medicine/Women's Health to Pain Management
- Career Army Officer
- Main clinical practice is pelvic and sexual pain, trauma
- Values
  - Patient-centered care
  - Trauma informed
  - Collaboration

2

Disclosures

- I have no financial conflicts

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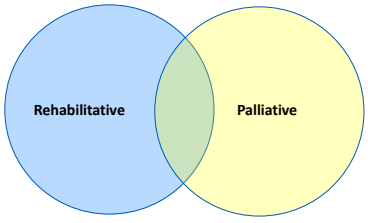
3

What Can a Pain Specialist Offer?

- Another set of eyes
- Collaboration
- Facilitation of PT
- Palliation

4

The Coccydynia Patient: Physiotherapy vs. Pain Management



5

My View of the Coccyx

6

Connections Galore

- The anterior surface has three or four fusion grooves serves for attachment of levator ani muscle and sacro-coccygeal ligaments.
- Lateral surface provides attachment to sacrospinous and sacrotuberous ligaments and fibers of gluteus maximus muscle.
- The terminal bony segment provides attachment to the iliococcygeus muscle which provides support to the pelvic floor and contributes to voluntary bowel continence mechanism.

Garg, B et al. *J Clin Orthop Trauma* 2020 24;12(1):123–129.

7

Coccyx Sensory Innervation

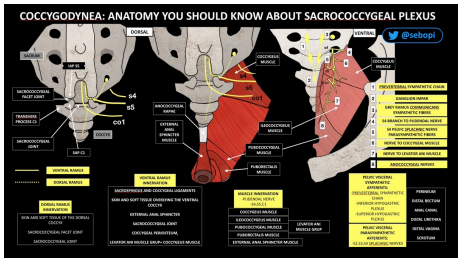


Image Courtesy of Dr. Sergi Boada Pie

8

Reasons for Coccydynia

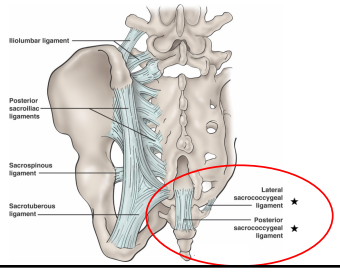
- 50-65% have history of direct trauma, external or internal
- Falls, childbirth (difficult/with instrumentation)
  - Injury to sacrococcygeal ligaments
  - Fracture of coccyx segments
  - Injury to attaching myofascial structures
  - Minor trauma from prolonged sitting, especially on hard narrow surfaces
- Ligamentous incompetence (alteration of biotensegrity)
  - Hereditary connective tissue abnormalities (eg. EDS)
  - Persistent post-partum effects of relaxin
- Excessive tensioning from muscular hypertonus/scar tissue

Maigne J.Y. et al. Spine. 1994;19(8):930–934.
Pennekamp, PH et al. *J Trauma* 2005; 59(6):1414–1419.

9

Ligamentous Incompetence

- Pelvic Girdle Instability
  - Posterior SI Complex
  - Pubic Symphysis
- Ligamentous hypermobility
  - Coccyx blunt trauma
  - Collagen abnormalities



10

Coccyx Mobility: The Goldilocks Principle

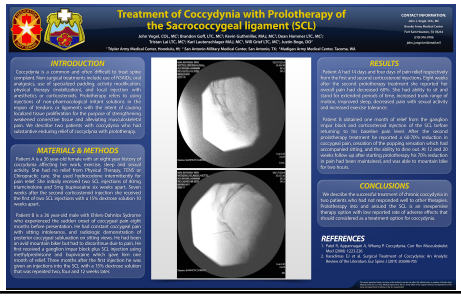
- "Too hot" Hypermobile: >25 degrees of flexion with axial forces (sitting)
- "Too cold" Hypomobile: < 5 degrees of flexion with sitting
- "Just right": 5-25 degrees of flexion with sitting

11

Reparative Therapies

12

My Transition to Reparative Strategies



13

Spectrum of Reparative Treatments

- Injection of substances to achieve focal stimulation of tissue repair (new collagen synthesis) through inflammatory signaling and elaboration of growth factors and chemotaxis
- Prolotherapy
  - 15% dextrose solution
- Platelet Rich Plasma (PRP)
- Pluripotential cells
  - Micronized fat graft
  - Bone Marrow Aspirate

14

Sacrococcygeal Ultrasound

15

Case Study of Reparative Therapy

- A 26-year-old active-duty Army female fell onto her sacrococcygeal region while hiking.
- No immediate pain, but the next day she could not get out of bed. Her pain was constant, instantaneously made worse with sitting and going from a seated to standing position.
- Plain films demonstrating lucency in Cy1, a "nondisplaced fracture".
- Treatment: activity restrictions and NSAIDs.
- Over 28 weeks, she was unable to resume her previous physical activities, especially doing sit ups and running. She carried a doughnut with her everywhere to sit on.
- No pain with defecation, but consistent pain following sexual intercourse for several hours, especially when she was in side-lying or quadruped position.
- Repeat X-rays X-rays at 27 weeks demonstrated periosteal reaction but no bridging of the fracture.
- Orthopedics, declined the consultation "no treatment for the injury". 29 weeks after the fall, she was referred to pain management.

16

Treatment of Cy1 Fracture Non-union

- At 36 weeks, she had a ganglion impar block and fluoroscopically guided injection of 40 mg of amniotic membrane proteins (AmnioFix®) into the Cy1 fracture, and the sacrococcygeal ligaments adjacent to the fracture.

----------Outcome----------

- 5 weeks after the procedure, she had no improvement in pain.
- 7 weeks post-procedure she had elimination of her constant background pain and was able to sit for an hour without pain. She assessed a 50% overall reduction in pain.
- 13 weeks post-procedure she only had pain with sitting > 1 hour on hard surfaces. She was able to use a treadmill or elliptical machine without pain. She assessed an overall 80-90% reduction in pain. Repeat imaging demonstrated complete healing of the Cy1 fracture.
- 27 weeks post-procedure she had no pain with any activities other than sit-ups, which was "tolerable".

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Palliative Therapies

Targeting Nerves Innervating the Coccyx

18

Nerve Blocks for Coccydynia

Diagnostic or therapeutic

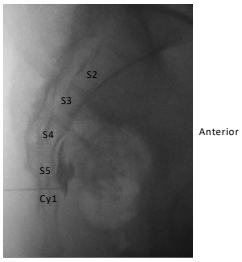
- Coccygeal nerve blocks
  - Ultrasound guided
- Ganglion Impar blocks
  - Fluoroscopically guided
- Possible outcomes
  - Non-diagnostic: Lack of anesthesia
  - Positive: anesthesia and >50-80% pain reduction
  - Negative: anesthesia but no pain reduction

Sagir, O et al. *BMC Anesthesiol* 20, 110 (2020)

19

Ganglion Impar Block

- Ganglion Impar block = terminal sympathetic ganglion.
- Treatment options
  - Local anesthetic, corticosteroid, Botox
  - Pulsed Radiofrequency
  - Cryoablation
  - Chemical ablation



Hong, DG et al. *Medicine* 2021,100:30
Swain, BP et al. *Cureus* 2023 18;15(1):e33911.
Foye, PM et al. *Korean J Pain* 2020; 33(4): 400-401

20

Ablative Treatments for Coccydynia

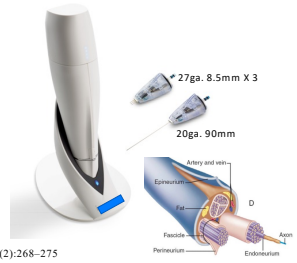
- Cryoneurolysis/Cryoablation (freezing nerves)
- Chemical Neurolysis (chemical destruction of nerves)
  - Ethanol
  - Phenol

Prologo, JD et al. Skeletal Radiol 2015; 44(5); 709-714
Gregory, NS et al. Pain Medicine *2020;* 21 Suppl 1: S51–S55

21

Cryoneurolysis

- Circulation of N_2O through needle tips at -80°C.
- Disruption of the outer layers of nerve, endoneurium preservation
- Can be used on sensory or mixed sensory-motor nerves
- Transient sensory loss
- Effective duration 4+ months



Hsu, M et al. *Muscle Nerve* 2015 51(2):268–275
Prologo, JD et al. *Skeletal Radiol* 2015 44(5):709-714

22

Neuromodulation Methods

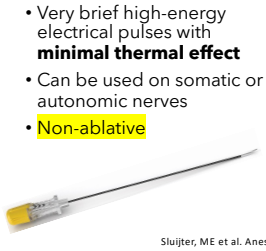
- Can be applied to sensory or autonomic nerves
- Nerve blocks- single or serial
  - Local anesthetic + low dose corticosteroid
- Radiofrequency (RF) energy (Pulsed)
  - Intermittent (pulsed) energy
  - Better durability than local anesthetic + steroid injection
- Perineural botulinum toxin injection
- Peripheral nerve stimulation (PNS)
- Acupuncture (with or without electrical stimulation)

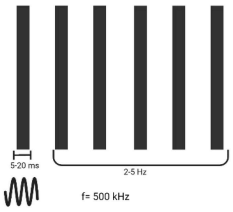
Sir, E et al. Turk J Med Sci 2019 24;49(5):1555–1559
Kim, JY et al. Chin Med J (Engl) 2021;134(10):1221–1223

23

Pulsed Radiofrequency (PRF) Treatment

- Very brief high-energy electrical pulses with **minimal thermal effect**
- Can be used on somatic or autonomic nerves
- Non-ablative





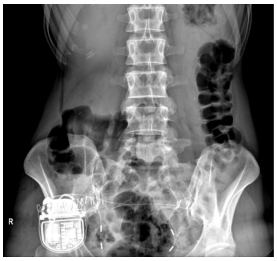
Sluijter, ME et al. Anesth. Pain Med 2013 2(4): 139–141
Sir, E et al. Turk J Med Sci 2019 24;49(5):1555–1559

24

Peripheral Nerve Stimulation (PNS)

25

Implanted PNS for Refractory Coccydynia



Tokas G, et al. 2025 Folia Medica 67(1): e127238.

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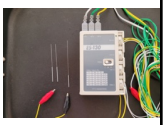
Addressing Pelvic Hypertonus

27

Procedures for Pelvic Floor Hypertonus



- Dry needling with acupuncture needles
- Electroacupuncture: 2+ needle technique
- Pelvic floor intramuscular injection
  - Landmark/palpation-guided
  - Ultrasound-guided
    - Direct visualization of target tissue and injection, avoidance of needle contact with neurovascular structures
  - Lidocaine with 5% dextrose
    - No intramuscular steroids
  - Botulinum toxin

Morrissey D, El-Khawand D, et al. Female Pelvic Med Reconstr Surg 2015;21:277-82.
Kim, MY et al. J Korean Acad Rehab Med 1997;21(5):967-973.
Bautista A, et al. J Anesth Clin Care 2020; 7(3): 059 DOI: 10.24966/ACC-8879/100059

28

Botulinum Toxin

- Presynaptic inhibition of acetylcholine release at the neuromuscular junction
  - Creates partial muscle paralysis
- Modulation of sensory pathways through inhibition of release of Substance P and calcium gene-related peptide in the dorsal root ganglion
  - Small studies also show benefit for neuropathic pain

Romito, S et al. Gynecol Obstet Invest 2004; 58:164-167
Dystra, DD et al. J Reprod Med 2006; 51: 467-470
Park, J Chung, ME Toxins (Basel) 2018 Jun; 10(6): 224

29

Widening The Lens

- "In conceptualizing the overactive pelvic floor (OPF), practitioners must move beyond the view of the pelvic floor as a mere anatomical location. OPF is connected to a complex interaction of psychological, mechanical, functional, and multi-systemic influences".

Padoa A. & Rosenbaum T. Y. (2016). The overactive pelvic floor: Female sexual functioning. In Padoa A. & Rosenbaum T. Y. (Eds.), *The overactive pelvic floor* (Preface p.v).

30

What Else May Drive Resistant Hypertonus?

- High pain levels from other conditions
- Unaddressed psychological factors/trauma
- Adverse Childhood Experiences (ACE)
  - Widespread pain
  - Central sensitization
    - Facilitation in the spinal cord
    - Altered CNS processing and remodeling
- Importance of universal trauma-informed care

Jackson, WC *Practical Pain Management* 2020; 20(3): 24-28
Mills, SEE et al *British J Anesthes.* 2016: 13(5) Suppl 1: S38-S39

31

Considering Effects of Trauma

- Features of trauma response
  - Hyperarousal (recognizing need for "down-regulation")
  - Avoidance Behaviors ("flight")
  - Inactivity (kinesiophobia)
- Excessive sympathetic nervous system tone may affect
  - Peripheral and central pain sensitization
  - Greater perceived pain intensity through thalamic and limbic modulation
  - An "over-protective state" of the pelvic floor impairing relaxation
- Consider the role of personal history of non-physical trauma and psychological factors influencing coccyx pain

Jenewein, J. et al. *J Pain* 2016; 17(12): 1325
Sigveland, J et al. *Front Psychiatry* 2017; 8:104

32

Resetting Central Sympathetic Tone

- The cervical sympathetic ganglions have extensive neuronal connections to the hypothalamus and amygdala, and to the infralimbic, insular, and ventromedial temporal cortical regions
- Injecting local anesthetic next to the stellate and superior cervical ganglions rapidly lowers CNS sympathetic nervous system activity
- Beneficial effects for months or longer
- Synergistic with other forms of therapy

Westerhaus MJ, Loewy AD. Brain Res. 2001;903:117–127.
Olmstead, KLR. et al. JAMA Psychiatry 2020; 77(2):130-138
https://www.youtube.com/watch?v=nC2fBe6U7Ig

33

Cervicothoracic Sympathetic Ganglia

- Stellate ("star-shaped") ganglion
  - Fusion of the inferior cervical & upper thoracic sympathetic ganglia near C7-T1
- Superior cervical ganglion
  - Located cranial to the carotid bifurcation (C4)

34

Anterior Cervical Sonoanatomy

35

Final Thought

- "Last but not the least we must adopt a holistic approach in the management of chronic pelvic pain [coccydynia], ensuring that the most important clinical interventions are empathy, hope, and ongoing support"

Saxena, AK et al. Indian J Pain 2021 35(3): 195-202

36

Thanks for Attending!
See You at Pelvicon 2025

Innovative Pain Care
Marietta, GA
john@drjohnvogel.com
(M) 210.528.0155

Sacral Spine Tarlov Cysts: A Missed Diagnosis for Perineal and Pelvic Pain

PelviCon Symposium 2025

Frank Feigenbaum, MD, FAANS, FACS
Feigenbaum Neurosurgery
Dallas, Texas, USA
AIMIS, Nicosia, Cyprus

1

Lecture Objectives

- Become familiar with:
  - The symptoms and physical findings of sacral meningeal cysts
  - How they produce symptoms relevant to pelvic floor medical management
  - The most common types of sacral spinal meningeal cysts encountered
  - Which imaging studies and diagnostic tests are appropriate for their diagnosis

2


Daily Mail, Tuesday, September 9, 20

Good Health

By GRACE McCANN

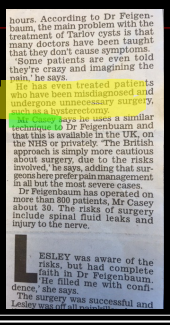
Could your back pain be caused by tiny cysts on your spine?

TRY THESE

HOW TO BEAT BACK AND JOINT PAIN

FREE magazine inside next Saturday's Mail

3


hours. According to Dr Feigenbaum, the main problem with the treatment of Tarlov cysts is that many doctors have been taught that they don't cause symptoms.

'Some patients are even told they're crazy and imagining the pain,' he says.

He has even treated patients who have been misdiagnosed and undergone unnecessary surgery, such as a hysterectomy.

Mr Casey says he uses a similar technique to Dr Feigenbaum and that this is available in the UK, on the NHS or privately. 'The British approach is simply more cautious about surgery, due to the risks involved,' he says, adding that surgeons here prefer pain management in all but the most severe cases.

Dr Feigenbaum has operated on more than 800 patients, Mr Casey about 30. The risks of surgery include spinal fluid leaks and injury to the nerve.

LESLEY was aware of the risks, but had complete faith in Dr Feigenbaum. 'He filled me with confidence,' she says.

The surgery was successful and

4


Good Health

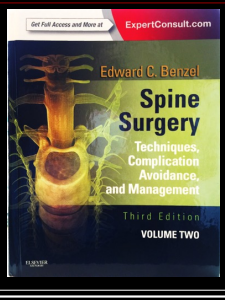
The experts who fear general anaesthetics harm young children

2%

The proportion of infants who require admission related to anaesthetic problems

5

Publication




CHAPTER 115

Tarlov Cysts

Frank Feigenbaum | Jean-Marc Voyadzis | Fraser C. Henderson

Epidemiology and Histology

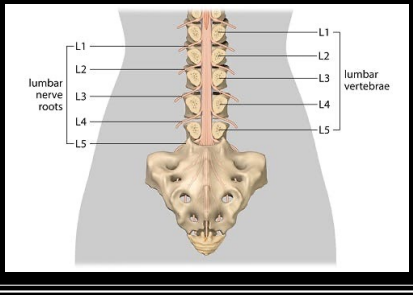
6

Pubmed search: Talov cyst Pelvic

- Neurogenic Pelvic Pain ***Phys Med Rehabil Clin N Am***. Elkins N, et al 2017 Aug;28(3):551-569.
- Sacral Tarlov cysts: Neurophysiology abnormalities and correlation with pelvic sensory and visceral symptoms ***Eur J Neurol***. Hentzen C 2023 Sep;30(9):2838-2848.
- Evaluating the discordant relationship between Tarlov cysts and symptoms of pudendal neuralgia ***Am J Obstet Gynecol***. Lim VM., et al 2020 Jan;222(1):70.e1-70.e6.
- Pelvic occupation: The challenges of treating a symptomatic Tarlov cyst ***Br J Neurosurg***. Khan A., et al 2019 Jun;33(3):255-257.
- Pelvic Pain from a giant presacral Tarlov cyst successfully obliterated using aneurysm clips in a patient with Marfan's syndrome ***J Neurosurg Spine***. Wang B, et al 2014 Nov;21(5):833-6.

7

Dorsal Sacral Anatomy



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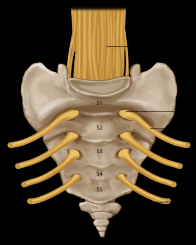
Ventral Sacral Anatomy



9

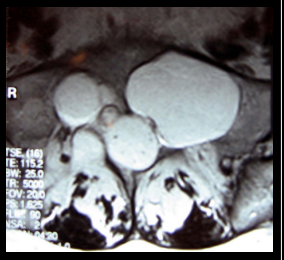
Meningeal Cyst Refresher

- Cranial
- Spinal
  - Intradural
    - Arachnoid cyst
  - Extradural
    - Perineurial (Tarlov) cyst
    - Intrasacral meningocele (MD)
    - Ectatic spinal sac cyst

10

Epidemiology

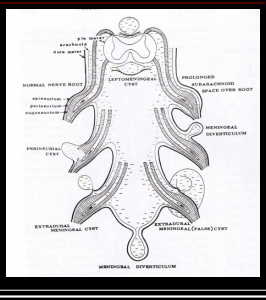
- Extradural spinal meningeal cysts
  - Most are **not** symptomatic
  - More commonly lumbosacral
  - (Paulsen, et.al., 1994) 5% of 500 patients undergoing lumbar MRI had one or more meningeal cysts
  - In 1-5% of those 5% the cyst was symptomatic



11

Extradural Spinal Meningeal Cyst Classification: Lumbosacral Spine

- Not all are "Tarlov cysts" actually are
- Numerous types
  - Perineurial Cyst
  - Meningeal Diverticulum
  - Ectatic Spinal Sac Cyst



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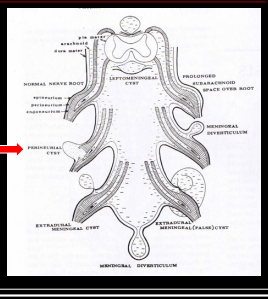
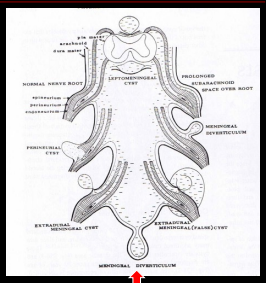
  - Meningeal Diverticulum/Intrasacral Meningocele
  - Ectatic Spinal Sac Cyst



13

Spinal Meningeal Cyst Classification: Lumbosacral Spine

- Not all are "Tarlov cysts" actually are
- Numerous types
  - Perineurial Cyst
  - Meningeal Diverticulum/Intra-sacral meningocele
  - Ectatic Spinal Sac Cyst



14

Spinal Meningeal Cyst Classification: Lumbosacral Spine

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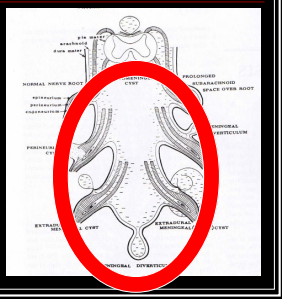

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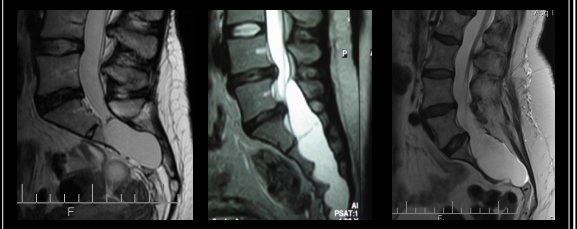
Extradural Spinal Meningeal Cysts: Lumbosacral Spine



Tarlov Cyst | Intrasacral Meningocele (Meningeal Diverticulum) | Ectatic Spinal Sac Cyst

16

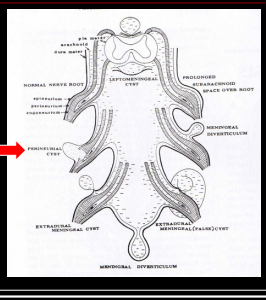
Extradural Spinal Meningeal Cysts: Lumbosacral Spine

- Any one of these can cause sacral nerve root compression and sacral radiculopathy
- Any one of these has the potential to extend out of the spine into the retroperitoneal pelvis
  - Via a nerve root foramen
  - Via direct erosion through ventral sacrum

17

Perineurial "Tarlov" Cyst

- a.k.a.
  - Tarlov's cyst
  - Perineural
- I.M. Tarlov's definition in 1938
  - Perineurial dilatations which develop between the endoneurium and perineurium, typically of the S2 or 3 nerves, at the junction of the dorsal root ganglion and nerve root



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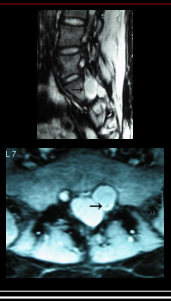
Perineurial "Tarlov" cyst

- Translation
  - The cyst is a spinal nerve root
  - It contains spinal fluid and nerve root fascicles
  - Arise laterally
  - In communication with the thecal sac



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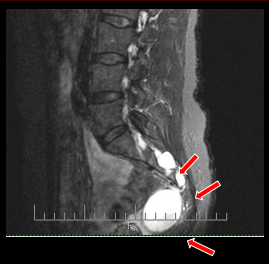
Perineural "Tarlov" Cyst

- Term applied to more than one type of cyst
- Can arise anywhere along the course of a spinal nerve root
  - Sacral spinal canal (most common)
  - Intraforamenal
  - Intrapelvic / retroperitoneal



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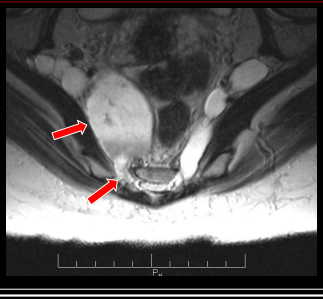
Intraforamenal and Intrapelvic Tarlov Cysts



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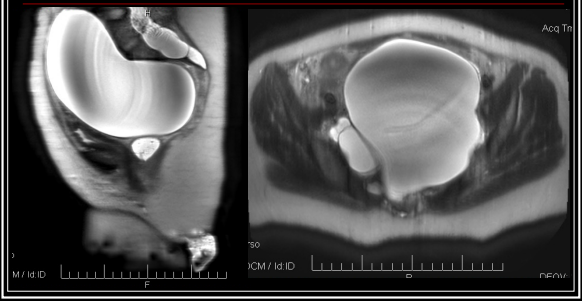
Intrapelvic Tarlov cysts can sometimes be impressively large



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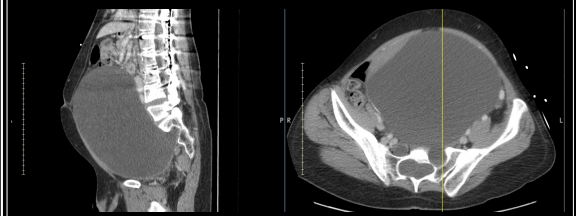

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Patient Demographics

- 553 patients sacral cysts only
- Age. Range: 15 – 84 years. Mean= 50 yo
- Sex. Female=90%. Male=10%
- # of cysts. Range: 1-10. Median= 3 cysts

24

Tarlov Cyst

- Can affect any spinal nerve root
  - Cervical
  - Thoracic
  - Lumbar
  - Sacral

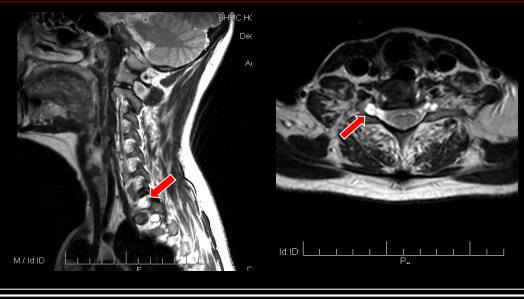
25

Patient Demographics

- Number of surgeries by spinal region
  - Cervical spine 9
  - Thoracic spine 23
  - Lumbar + Sacral spine 593

26

Right C8 Tarlov Cyst



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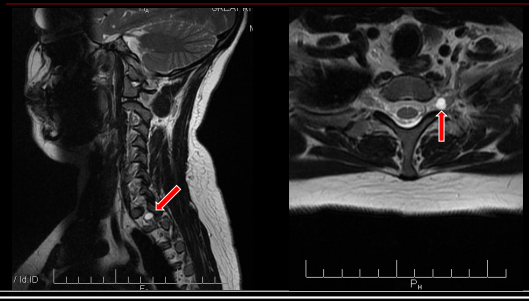
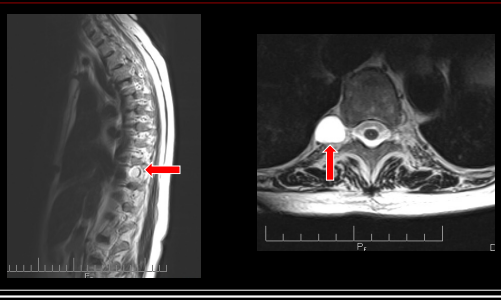
Left T1 Tarlov Cyst



28

Right T10 Tarlov Cyst



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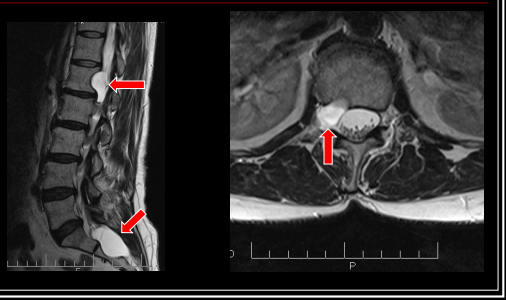
Right L1 and S1-2 Tarlov Cysts



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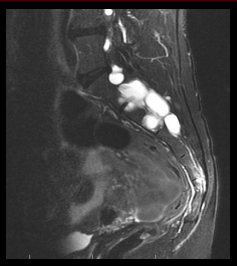
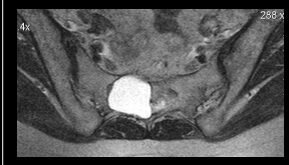
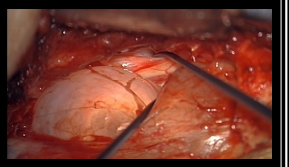
Multiple Sacral Tarlov Cyst




31

Intrasacral Tarlov Cyst (most common)

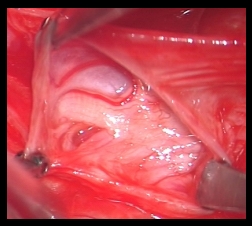
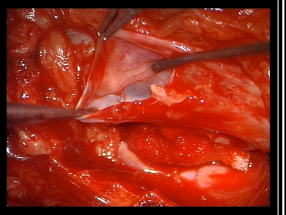
32

Symptoms

- Caused by the cyst compressing adjacent nerve root
- Due to the nerve root being a cyst
- Sacral insufficiency fractures

33

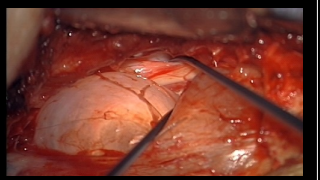
Symptoms: Due to fascicle splaying

34

Symptoms

- Radiculopathy based on cyst size and location
- Example: Sacral cyst
  - S2
  - S3
  - S4



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Problem

- Most of us have no idea what an S2, S3 or S4 radiculopathy looks like
  - Presenting symptoms
  - Physical findings

Most spine surgeons weren't taught what an S2, S3 or S4 radiculopathy looks like, ?Physical Therapists, Rehab MDs?

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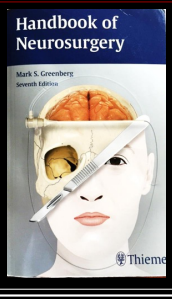
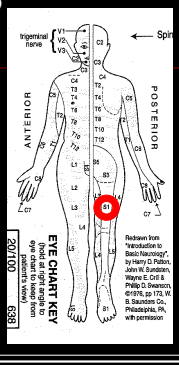
Sacral dermatome info varies





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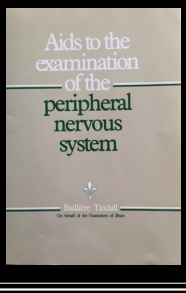
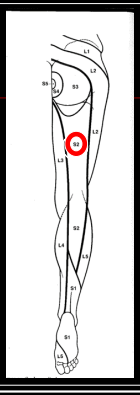
Sacral dermatome info varies





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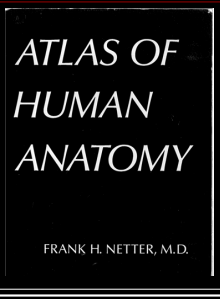
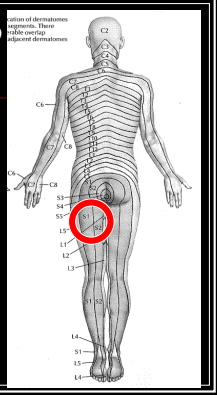
Sacral dermatome info varies





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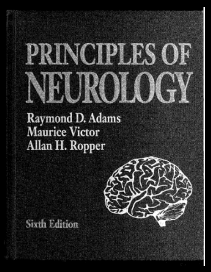
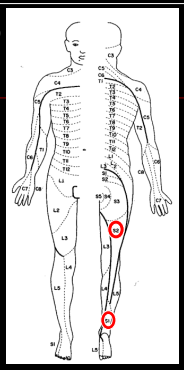
Sacral dermatome info varies





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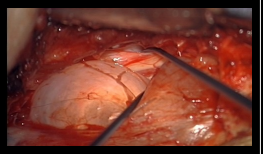
Sacral Radiculopathy Symptoms

- Sacral pain radiating down the back of the leg to the bottom of the foot
- Numbness in a similar distribution
- Plantar flexion weakness
- Pain and numbness in the perineum
- Pelvic pain
- Neurogenic bladder and bowel
- Dyspareunia
- Positional symptoms made worse by sitting and standing and made better by lying down



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Sacral Radiculopathy Symptoms (cont.)

- Feeling of sitting on a “rock” or on a “poker”
- Can’t sit, constantly squirming due to perineal, pelvic or sacral pain
- Avoid sitting related activities
  - School
  - Movies
  - Restaurant, can’t sit long enough to eat a meal
  - Church sitting on a wooden pew
  - Sporting events with bleachers

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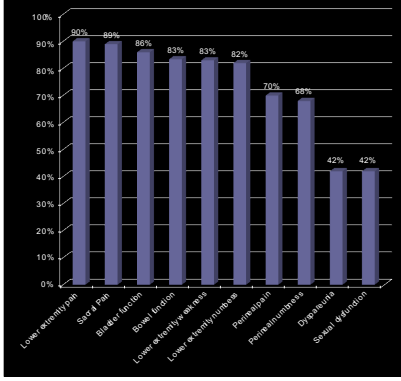
Presenting Symptoms



Feigenbaum Tarlov Cyst Patient Survey: Preoperative Symptoms

- This chart shows the percentage of patients (of 247) who reported each symptom prior to surgery.

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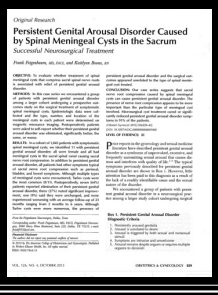
Sacral Radiculopathy Symptoms (cont.)

- Symptoms can start spontaneously or after a traumatic event
  - Fall
  - Car accident
  - Childbirth
- 86% described progressive symptoms after initial onset

44

Sacral Radiculopathy Symptoms (cont):
Persistent Genital Arousal Disorder (PGAD)


Original Research

Persistent Genital Arousal Disorder Caused by Spinal Meningeal Cysts in the Sacrum

Successful Neurosurgical Treatment

45

PGAD

- In 2010 began noticing a subset of patients with unique perineal/sexual symptoms
- Theorized due to sacral nerve root compression by spinal meningeal cysts

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PGAD Definition

- Symptoms are intrusive and unwelcome
- Persistently aroused genitalia
- Arousal unrelated to desire
- Arousal triggered by both sexual and non-sexual stimuli
- Arousal remains despite intercourse

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PGAD

Patient No.	Age (y)	Meningeal Cyst Type and No. Treated	Symptoms Present S	B	P	Bl	Bo	Dys	Duration of Symptoms Before Surgery (y)	PGAD Symptoms After Surgery	Duration of Follow-up (mo)
1	33	Tcx2	X			X		X	7	Same	7
2	41	Md	X		X	X	X		6	Gone	72
3	44	Tcx3	X	X	X	X	X	X	8	Gone	8
4	47	Tcx4	X	X	X	X	X		1	Gone	15
5	48	Tcx4	X	X	X	X	X	X	6	Gone	60
6	51	Tcx3	X	X	X	X	X	X	5	Gone	13
7	53	EC	X	X			X	X	22	Gone	18
8	55	Tcx3	X		X	X	X	X	4	Better	32
9	55	Md	X	X	X	X	X	X	41	Gone	11
10	62	Tcx1	X	X	X		X	X	5	Gone	2
11	69	Tcx3	X	X	X	X	X	X	8	Better	18

S, sacral symptoms; B, buttock symptoms; P, perineal symptoms; Bl, bladder dysfunction; Bo, bowel dysfunction; Dys, dyspareunia; PGAD, persistent genital arousal disorder.

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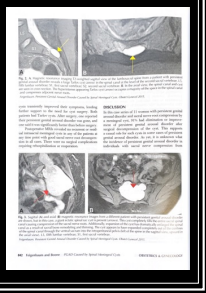
PGAD

Patient No.	Age (y)	Meningeal Cyst Type and No. Treated	Symptoms Present S	B	P	Bl	Bo	Dys	Duration of Symptoms Before Surgery (y)	PGAD Symptoms After Surgery	Duration of Follow-up (mo)
1	33	Tcx2	X		X			X	7	Same	7
2	44	Tcx1		X	X	X	X		8	Gone	72
3	44	Tcx4	X	X	X	X	X	X	8	Gone	8
4	47	Tcx4	X	X	X	X			6	Gone	16
5	48	Tcx4	X	X	X	X	X		6	Gone	60
6	51	Tcx3	X	X	X	X	X		5	Gone	13
7	53	IC	X	X			X		22	Gone	18
8	55	Tcx3	X		X	X	X		4	Better	32
9	55	Md	X	X	X	X	X		41	Gone	11
10	62	Tcx1	X	X	X		X		5	Gone	2
11	69	Tcx3	X	X	X	X	X		8	Better	18

S, sacral symptoms; B, buttock symptoms; P, perineal symptoms; Bl, bladder dysfunction; Bo, bowel dysfunction; Dys, dyspareunia; PGAD, persistent genital arousal disorder.



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PGAD 2022

- Women with Persistent Genital Arousal Disorder who have undergone surgical treatment for Tarlov Cysts: Experience through 2022

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PGAD 2022

- In the last 5 years: 36 women
- Average age: 52 years, (range 26 – 71 years)
- On average: 4 cysts, (range 1 – 8 cysts)
- All cysts were sacral

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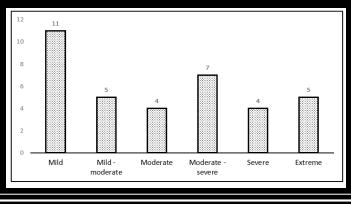
PGAD 2022
Preoperative symptom severity

- Patient self-reported symptoms
- Survey data
- 70% moderate to extreme



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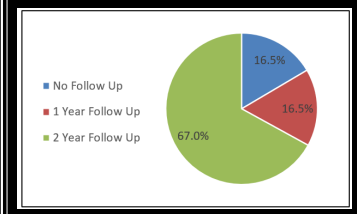
PGAD 2022
Postoperative Follow-Up



- 2 year follow up on 2/3 of patients

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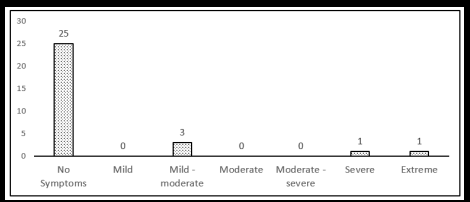
PGAD 2022
Patient Reported Symptoms at Last Follow-up

✓Consider the 30 patients with follow-up
✓69.4% (25/30) reported no PGAD symptoms at last follow-up



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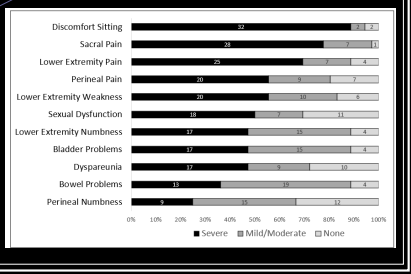
PGAD 2022
Preoperative Co-Occurring Symptoms

- 88.9% (32/36) of patients reported severe discomfort sitting
- 5.6% (2/36) reported mild/moderate discomfort
- 5/6% (2/36) reported no discomfort sitting



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Sacral Radiculopathy Symptoms
Sitting Strategies: "Tarlov sitting"

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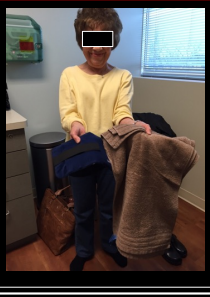
Symptoms (cont)
Strategies for sitting: Improvised cushion



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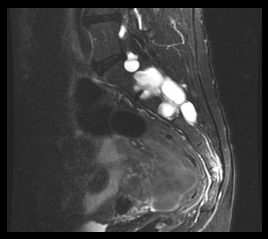
Strategies for sitting: Improvised cushion



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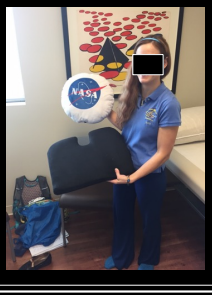
Strategies for sitting: Custom-made cushion



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Strategies for sitting: Custom double cushion

60

Strategies for sitting: Contralateral lean


61

Strategies for sitting: Contralateral lean


62

Strategies for sitting: Raising legs


63

Strategies for sitting: Hanging cheek, sitting on leg or hands


64

Strategies for lying down


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Interconnected patients

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Interconnected patients

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How to get in trouble with a Tarlov cyst

- Incorrect diagnosis based on symptoms
  - Failure to diagnose Tarlov cyst as the source of the symptoms
- Incorrect diagnosis based on imaging
  - Misdiagnose an intrapelvic Tarlov cyst as:
    - Adnexal lesion
    - Uterine lesion

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Misdiagnosis based on symptoms

- Common diagnoses for pelvic and perineal pain (endless)
  - Endometriosis
  - Pelvic floor dysfunction
  - Vulvodynia
  - Interstitial cystitis
  - UTI
  - Uterine fibroids
  - Polycystic ovarian syndrome

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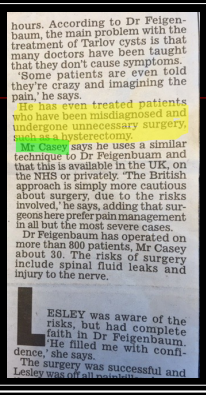
Misdiagnosis based on symptoms

- Therapies directed at incorrect diagnosis
  - Repeated UTI treatment
  - Pelvic floor therapy
  - Hormone therapy, Lupron
- Surgical procedure for incorrect diagnosis
  - Hysterectomy
  - Ex-lap for endometriosis
  - Urologic procedures, bladder sling

70

Hysterectomy

- Unpublished data
  - Reviewed 553 patients who underwent surgery for symptomatic sacral Tarlov cysts
  - 90% female
  - Average age 50
  - Hysterectomy rate in my patients was 34%
  - Average US hysterectomy rate age 50 in 2018 was 31% (CDC)



hours. According to Dr Feigenbaum, the main problem with the treatment of Tarlov cysts is that many doctors have been taught that they don't cause symptoms.

'Some patients are even told they're crazy and imagining the pain,' he says.

He has even treated patients who have been misdiagnosed and undergone unnecessary surgery, such as a hysterectomy.

Mr Casey says he uses a similar technique to Dr Feigenbuam and that this is available in the UK, on the NHS or privately. 'The British approach is simply more cautious about surgery, due to the risks involved,' he says, adding that surgeons here prefer pain management in all but the most severe cases.

Dr Feigenbaum has operated on more than 800 patients, Mr Casey about 30. The risks of surgery include spinal fluid leaks and injury to the nerve.

LESLEY was aware of the risks, but had complete faith in Dr Feigenbaum. 'He filled me with confidence,' she says.

The surgery was successful and Lesley was

71

Misdiagnosis: Spine surgeons

- Misdiagnosis (none alone explains the constellation of symptoms)
  - Neuro/Ortho spine related ailments
    - Discogenic pain
    - Spinal stenosis
    - Spinal cord tethering
    - SI joint dysfunction
    - Pelvic nerve syndromes (pyriformis syndrome, pudendal nerve entrapment)
    - Coccydynia

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Misdiagnosis: Spine surgeons

- Relegation to endless:
  - Pain clinic management
    - Oral pain meds
    - Injection procedures
  - Physical therapy
  - Pelvic floor therapy
- Wrong spinal surgery
  - Lumbar decompression, disc fusion and instrumentation, SI joint fusion, pyriformis syndrome surgery, pudendal nerve release, spinal cord detethering, etc.

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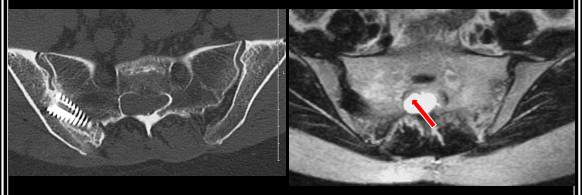
Misdiagnosed Sacral Symptoms



CT MRI

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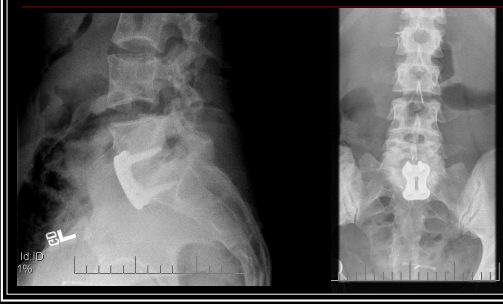
Misdiagnosed Sacral Symptoms



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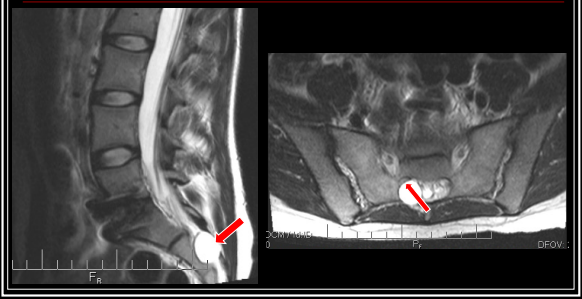
Misdiagnosed Sacral Symptoms



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Misdiagnosed Sacral Symptoms

- July 2012
  - L3-S1 laminectomy
- May 2013
  - Ant/post L3-S1 fusion
- October 2013
  - Spinal stimulator

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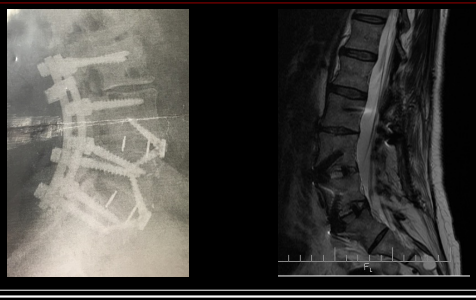
Misdiagnosed Sacral Symptoms



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Misdiagnosis: Spine surgeons

- Most common reason for misdiagnosis
  - Don't know questions to identify sacral radiculopathy
  - Spine surgeons feel awkward asking questions about the perineum, pelvic symptoms, and sex
  - Patient embarrassed to volunteer info about intimate areas and sexual function
  - Discard Tarlov cysts as a diagnosis
  - We are a hammer and the patient is a nail: maybe it really is that small disc bulge (or pyriformis syndrome)

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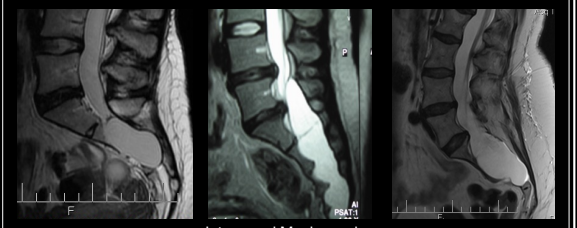
Misdiagnosis based on imaging



Tarlov Cyst | Intrasacral Meningocele (Meningeal Diverticulum) | Ectatic Spinal Sac Cyst

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Misdiagnosis based on imaging

- Any one of these has the potential to extend out of the spine into the retroperitoneal pelvis
  - Via a nerve root foramen
  - Via direct erosion through ventral sacrum
- Misdiagnose as adnexal or uterine lesion
  - Transferred case

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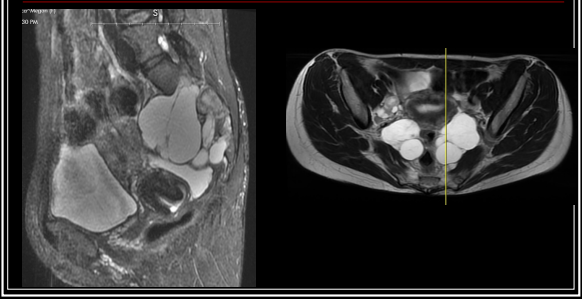
Transferred Case Following GYN Surgery



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Advice

- Watch out for the classic constellation of sacral radiculopathy symptoms in addition to pelvic pain
- Consider MRI, not just CT or ultrasound
- Image the sacral nerves completely
- Consider getting an opinion from a surgeon with Tarlov cyst treatment experience

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Some Recent Publications

- Surgical intervention is associated with improvement in health-related quality of life outcomes in patients with symptomatic sacral Tarlov cysts: Results from a prospective longitudinal cohort study. ***World Neurosurgery***, 2024.
- Health-related quality of life outcomes in surgical patients with sacral Tarlov cysts: A 2-year prospective study**.** ***Neurosurgery***, 2025. (just accepted)
- Prospective validation of a quality-of-life measure for women undergoing surgical intervention for symptomatic sacral Tarlov cysts: The Tarlov cyst quality of life scale. ***World Neurosurgery***, 2022.
- A validation of the Tarlov cyst quality-of-life survey in men surgically treated for symptomatic Tarlov cysts. ***Operative Neurosurgery***, 2025.

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Tarlov cyst surgery: 2-year study Therapies attempted

Preoperative Treatments	
Physical Therapy	262 (62.8%)
Injections	178 (42.7%)
Diagnostic Nerve Root Block	68 (16.3%)
Nerve ablation	9 (2.2%)
Oral Medications	383 (91.8%)
Hysterectomy (n=380 females)	128 (33.7%)

85

Tarlov cyst surgery: 2-year study

Item	Preoperative	3 months postoperative	6 months postoperative	1 year postoperative	2 years postoperative
Sacral pain	4.6 ± 1.8	2.5 ± 2.0	2.3 ± 1.9	2.1 ± 2.0	1.9 ±2.1
Perineal pain	2.6 ± 2.2	1.5 ± 2.0	1.3 ± 1.8	1.2 ± 1.8	1.1 ± 1.8
Perineal numbness	1.5 ± 2.0	1.3 ± 1.7	1.1 ± 1.6	.9 ± 1.6	.9 ± 1.7
Persistent genital arousal disorder	.6 ± 1.7	.5 ± 1.4	.4 ± 1.2	.3 ± 1.0	.4 ±1.1
Lower extremity pain	4.0 ± 2.0	2.3 ± 2.1	2.0 ± 2.0	2.0 ± 2.0	2.0 ±2.1
Lower extremity weakness	3.1 ± 2.2	1.6 ± 1.9	1.4 ± 1.8	1.3 ± 1.9	1.5 ± 2.0
Lower extremity numbness	2.8 ± 2.2	1.5 ± 1.8	1.2 ± 1.6	1.3 ± 1.7	1.5 ± 1.9
Bladder function	2.7 ± 2.2	1.2 ± 1.6	1.1 ± 1.6	1.1 ± 1.5	1.2 ± 1.7
Bowel function	2.6 ± 2.2	1.3 ± 1.8	1.2 ± 1.7	1.1 ± 1.8	1.3 ± 1.8
Dyspareunia	2.3 ± 2.4	1.4 ± 1.8	1.0 ± 1.8	1.1 ± 1.8	1.1 ± 1.9
Discomfort while sitting	5.3 ± 1.4	3.2 ± 2.0	2.9 ± 2.0	2.6 ± 2.1	2.7 ± 2.1

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Tarlov cyst surgery: 2-year study

- 417 patients average age 52
- 91% female
- Single cyst 11%, multiple cysts 89%
- Improv. in TC quality of life survey, all P<.001
- Improv. In VAS at rest and with activity P<.001
- Improv. in ODI P<.001
- Improv. in 7 of 8 SF36 short form P<.001, general health P=.663
- Increase medial tolerated sitting time from 15 min preop to 45 minutes at 2 years
- Patients using narcotics preop 51%, postop 23%

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USA patients

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Global Patients

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Get to the Bottom of It:
Treating Coccydynia with Confidence

Nicole Cozean PT, DPT, WCS
& Jessica Reale PT, DPT, WCS

PELVICON Symposium

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Jessica Reale PT, DPT, WCS

PELVICON Symposium

About Dr. Jessica Reale

- Doctor of Physical Therapy (DPT) from Duke University
- Board-Certified Specialist (WCS) in pelvic health
- Founder of Southern Pelvic Health
  - Cash-based pelvic PT practice in Atlanta, GA
  - SPH for Pros
- Educator in pelvic health coursework, participating in the training of thousands of physical therapists and other health care providers across the world
- Co-founder of PelviCon
- Guest lecturer at Mercer University, Emory University, Georgia State University and the University of South Carolina, and more

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Nicole Cozean PT, DPT, WCS

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About Dr. Nicole Cozean

- Doctor of Physical Therapy (DPT); Board-Certified Pelvic Health Specialist (WCS)
- Founder of PelvicSanity
  - Cash-based clinic in Orange County California
- Founder of Pelvic PT Rising
  - Business Coaching: coached more than 700 pelvic health rehab business owners
  - Clinical Courses: educating 2000+ clinicians
- Host of The Pelvic PT Rising Podcast
  - 1M downloads and counting!
- Expert speaker: CSM, POGP, PelviCon
- Author of *The Interstitial Cystitis Solution*
- Co-Founder of PelviCon

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Disclosures

- We have no relevant financial disclosures

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Objectives

By the end of this session, participants will be able to:

- Identify differential diagnoses for tailbone pain and recognize potential contributing anatomical factors to symptoms
- Recognize best practice and current evidence for medical and rehabilitation evaluation and treatment approaches
- Target and prioritize treatment interventions to improve outcomes for people with pelvic pain.
- Tailor treatment approach based on patient response
- Have confidence and proficiency in treatment strategies in a variety of patient and examiner positions

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Overview

- In the literature, the exact prevalence of coccydynia (coccyx pain) is unknown

BUT...

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Overview

We know that:

- **Chronic pelvic pain affects 26% of world's female population** and accounts for 40% of laparoscopies in the absence of organ pathology, 12% of hysterectomies. (Lamvu et al., 2021)
- In individuals with **low back pain**, 95% had some form of pelvic floor dysfunction, **71% with pelvic floor tenderness** (Dufour et al., 2018)
- About **50% of women seeking pelvic floor physical therapy** for pelvic pain had coexisting coccydynia (Neville

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Goals for Initial Examination

As the pelvic rehab provider, it is your job to decide:

1. Is the coccyx the *primary driver* for this person's pain?

2. Is the coccyx a *bystander* in this person's pain?

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Considerations for Coccyx Pain Exam

Primary Driver	Bystander
Acute onset	Chronic
Pointed pain at the coccyx itself	Multiple coexisting musculoskeletal dysfunctions
Recent injury directly involving coccyx with specific cause (fall, fracture, childbirth, cycling/sitting)	Nerve symptoms
	Pelvic floor comorbidity prior to onset of pain

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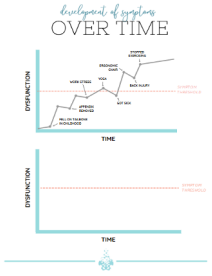
Clues from the Subjective Examination

What is the patient's timeline?

- History (chronic vs acute, trauma, prior MSK injury, etc)
- Medical management
- Prior fall on tailbone?

Creating a thorough story helps both the patient and YOU!



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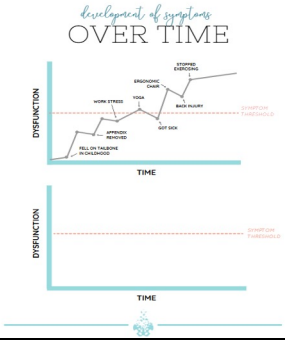

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Clues from the Subjective Examination

What happened **<u>at the onset</u>** of symptoms? What has transpired **<u>since the onset</u>** of symptoms?

- Musculoskeletal
- Neuromuscular
- Pelvic floor -related
  - Bowel dysfunction (ie constipation)
  - Pelvic organ prolapse
  - Urinary dysfunction (ie incontinence, frequency/urgency)
  - Sexual dysfunction

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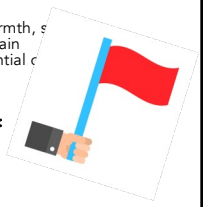
Red Flag Screening

- **Red-flag screening:**
  - History of decubitus ulcer, fistula, redness/warmth, s
    immunocompromised, cancer history, night pain
  - Consider prior mentioned red flags and potential c
  - Are you unable to make sense of their pain?
- **Signs & Symptoms of Cauda Equina Syndrome:**
  - Urinary/fecal incontinence
  - Urinary retention
  - Saddle anesthesia
  - Low back and leg pain
  - LE weakness
  - Sexual dysfunction
  - Sensitivity and specificity highest for (Zusman et al., 2022): bulbocavernosus reflex, rectal tone, post void residual, perianal sensation



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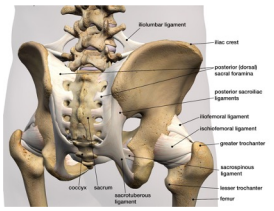
What Attaches to the Coccyx?

- Muscles:
  - Pubococcygeus via anococcygeal ligament
  - Iliococcygeus
  - External Anal Sphincter
  - Coccygeus
  - Gluteus maximus
- Ligaments
  - Posterior and anterior coccygeal ligament
  - Sacrococcygeal ligament
  - Sacrospinous ligament
  - Anococcygeal ligament



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What Refers to the Coccyx?

- Obturator internus
- Coccygeus
- Puborectalis
- Iliococcygeus
- SIJ
- L5/S1 dysfunction
- Gluteus maximus
- Piriformis
- Adductors (especially adductor magnus)
- Hamstrings

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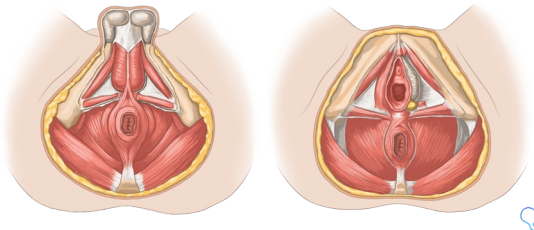
Pelvic Floor Muscles



Images courtesy of Pelvic PT Rising

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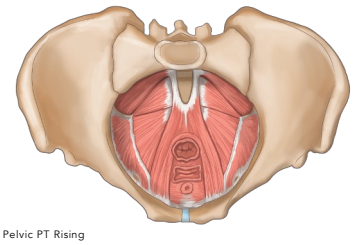
Pelvic Floor Muscles, OI, & Attaching Structures



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Nervous System Considerations

- Local Considerations:
  - Pudendal Nerve
  - Sacral Nerve Roots
  - Posterior Femoral Cutaneous Nerve
  - Sciatic Nerve
- Lumbar spine
- SIJ
- Dura
- Central Sensitization

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Fascial Interconnections

- Pelvic floor forms the bottom part of the trunk portion of the deep front line (DFL)
- Lower posterior track of the DFL
  - coccygeus and iliococcygeus to the coccyx → fascia over anterior sacrum → blends with anterior longitudinal ligament → up anterior spine and rejoins lower anterior track at the junction between the psoas and diaphragmatic crura

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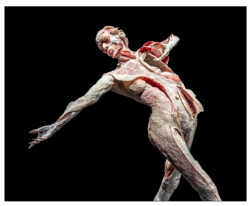
Fascial Interconnections

- Lower posterior track also contains:
  - glutes
  - deep lateral rotators
  - hamstrings
  - adductor magnus
  - popliteus
  - tibialis posterior
  - soleus
  - flexor hallucis longus
  - flexor digitorum longus
- All of which could be argued to affect the coccyx fascially



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Examination and Assessment Considerations for Coccydynia

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Examination Considerations

- Are you simply building a problem list or building a narrative?
- Timeline of symptom onset
  - Pelvic health symptoms?
  - Emotional state?
- **Is coccyx the driver or the bystander?**

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Standing Exam

- Global movement screen
- Body mechanics
  - Posture
  - Standing mechanics
  - Problematic or symptomatic movements/positions
- Upper quarter or lower quarter screen if indicated
- Special Tests:
  - SI static or dynamic tests
  - Single leg stance/Marcher's test

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Sitting Exam

- Posture
- Sitting mechanics
- Weight shift
- Pelvic mobility (A/P tilt, lateral shift)
- Palpation coccyx position static and dynamic, external pelvic floor muscles medial to ischial tuberosity, coccygeus
- Slump sit test
- MMT

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Sitting Exam

- Posture
- Sitting mechanics
- Wei
- Pelv
- Palp
  external pelvic floor muscles medial to ischial tuberosity, coccygeus
- Slump sit test
- MMT

Wait… why is a sitting exam so important?

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Sitting Exam Considerations

- Why the sitting exam
  - Weightbearing—but removes LE involvement
  - Coccyx presentation may be different in different positions
  - Patient buy-in
- Who benefits?
  - Anyone who has pain related to sitting
- Considerations:
  - Clothing on vs. off
  - Gloves?
  - Chair, mat, etc.
- Explanation of exam language

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Sitting Examination Video

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Supine Exam Considerations

- Why the supine exam
  - Weightbearing out of the picture
  - IAP decreased
  - Allows examination of contributing anterior structures
- Who benefits?
  - All patients
- Considerations:
  - Patient hip positioning
- Explanation of exam language

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Supine Exam

- Breathing
- Abdominal wall
- Fascia/connective tissue mobility
- Ribcage mobility
- Hip screening
- Active straight leg raise
- Palpation
  - Adductors
  - Ischiorectal fossa
  - Bony landmarks
- Straight leg raise
- Vaginal examination of pelvic floor muscles
- Rectal examination of pelvic floor muscles

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Prone Exam Considerations

- Why the prone exam
  - Weightbearing out of the picture
  - IAP decreased
  - Allows examination of contributing posterior structures
  - Allows direct palpation of coccyx and attachments
- Who benefits?
  - All patients
- Considerations:
  - Patient hip, lumbar and cervical positioning
  - Communication with patient prone
- Explanation of exam language

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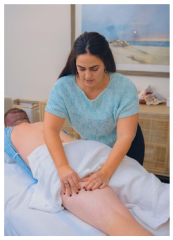
Prone Exam

- Thoracic and lumbar spine
- Ribcage mobility
- Bony landmark palpation
- Coccyx attachments:
  - Ligaments
  - Muscles
- Ischiorectal fossa/ Alcock's canal
- Fascia/connective tissue mobility
  - Lumbar spine, buttocks, lower extremity
- Hip mobility
- Internal rectal examination of pelvic floor muscles
- Internal rectal examination of coccyx



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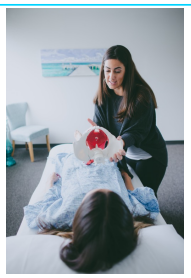
Internal Exam Considerations

- When do you go rectal first? Vaginal? Postpone exam?
- Considerations:
  - Timeline
  - Patient comfort
  - Patient rapport
  - Prior healthcare experiences of patient
  - Severity of symptoms



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"Association of coccygodynia with pelvic floor symptoms in women with pelvic pain" Neville, Carubba & Chen, 2022

- 127 women with "pelvic pain" presenting for outpatient pelvic floor physical therapy
- 49% presented with coccydynia
- Patients with coccydynia had:
  - Higher rates of muscle spasm and VAS pain scores
  - Higher rates of outlet dysfunction
  - Higher rates of fibromyalgia
- Upon examination, women with coccydynia had:
  - more sacrococcygeal joint hypomobility
  - coccygeus muscle spasm (in 78%) and EAS pain/spasm
  - anococcygeal ligament pain
  - Impaired pelvic floor coordination

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Specific Coccyx Examination

- Aim to determine if coccyx mobility is:
  - Normal
  - Hypomobile
  - Hypermobile
- Consider:
  - Asymmetrical pulls on the coccyx
    - External myofascial structures
    - Pelvic floor muscles
  - Symmetrical pulls on the coccyx
    - Global overactivity
    - Positioning
  - Irritability

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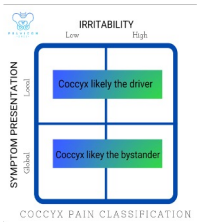
Summary of Coccydynia Assessment

- What is the patient's story?
  - Outside → In?
  - Inside → Out?
- Consider:
  - Common denominators
  - Timeline
  - Is coccyx primary driver or bystander?
    - This will determine where you START treatment!



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Coccydynia Treatment Strategies

We have done a thorough musculoskeletal and neuromuscular assessment …

NOW WHAT?

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Treatment Overview- Behavioral Education

- Bowel/Bladder habits
  - higher rates of outlet dysfunction, EAS and puborectalis pain/spasm and anococcygeal ligament pain in people with coccydynia (Neville et al., 2022)
  - Defecatory mechanics
- Prolonged postures, body mechanics
- Cushions (& the surface it's on)
- Sexual health

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Treatment Overview- Orthopedic

Should we just treat what we find?

Could include:
- Address spinal and pelvic mobility, stability, alignment
- Optimize hip mobility and strength
- Retrain motor control and load transfer
- Consider influences of feet, gait, weight shift

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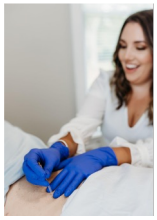
Treatment Overview- Myofascial

- Fascial mobilization
- Visceral mobilization
- Soft tissue techniques (skin rolling, scar mobilization)
- Tender/trigger point techniques (direct, indirect, cross-friction)
- Tool-assisted (cupping, dry needling, IASTM)

Keep in mind… what are we actually doing?



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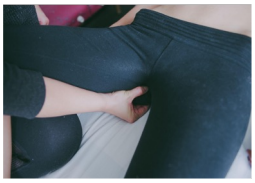
Treatment Overview- Pelvic Floor Muscles

- Internal vaginal treatment
  - Limitations & benefits
  - Can address:
    - Anococcygeal ligament
    - Pubococcygeus/puborectalis
    - OI
    - Coccygeus
    - Pudendal nerve
  - Cannot access:
    - EAS
    - Puborectalis comprehensively
    - Coccyx



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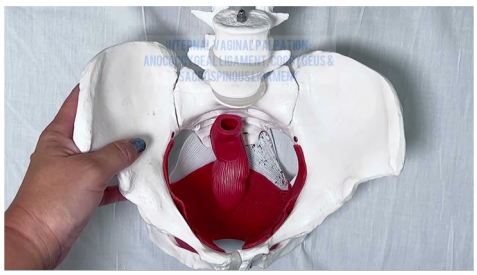
Examining Posterior Structures Vaginally



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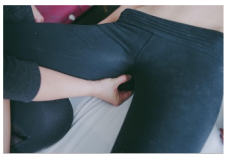
Treatment Overview- Pelvic Floor Muscles

- Internal rectal treatment
  - Can address:
    - EAS
    - Puborectalis
    - Coccygeus
    - OI
    - Coccyx mobility
    - Pudendal nerve
    - Anococcygeal ligament
  - Cannot address:
    - Superficial muscles of urogenital triangle



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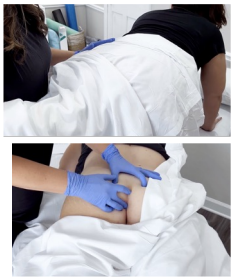
Positioning Options

- Supine
- Sidelying
- Prone
- Quadruped
- Child's Pose
- … more?



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Internal Manual Therapy Strategies

- Do we have to cause pain to treat pain?
- Is deeper always better?
- Options for soft tissue treatment:
  - Fascial slackening strategies
  - Hip distraction, sacral decompression
  - Contract/relax
  - Nervous system approaches
    - Diaphragmatic breathing
    - Meditation
  - Adding movement
  - Wands/dilators/etc.

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Treatment Overview

- Nervous System Downtraining/Pain Neuroscience
  - Vagus nerve stimulation
  - Visceral mobilization
  - Meditation/mindfulness
  - Graded motor imagery
  - Therapeutic pain neuroscience education
  - Graded exposure to sitting, positions, movement
  - Breathing techniques (diaphragmatic, square, alternating nostril)

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Treatment Overview

- Movement/Exercise
  - Global
    - Walking, swimming
    - Interval training
  - Specific impairment-based movement/exercise
    - Stretch for ROM gain
    - Specific muscle activation pattern (ie glute/hip strengthening)
  - Exploratory movement with tension modulation and pain science considerations
    - ie. cat-cow and child's pose
  - Core stabilization
    - Diaphragm, transverse abdominis, pelvic floor muscles, multifidus
  - Pelvic floor retraining
  - Retraining posterior pelvic floor tension

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Exercise & Movement Progression

- General progression often includes:
  - Movement exploration, graded tension exercises
  - Motor patterning (ie PNF patterns, fascial lines)
  - Specific exercises aimed toward lengthening, inhibition, activation
  - Goal-specific exercises/movements
- Considerations:
  - Pain-inhibition can mimic weakness, but requires different approach
  - Initiating strengthening of muscles that refer to tailbone too quickly can exacerbate symptoms
  - Positive and comfortable movement experiences can create safety
  - Movements targeting contributors in the thorax may impact

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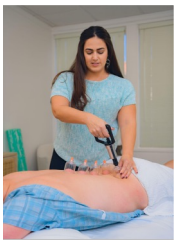
Additional Treatment Enhancements

- Static or dynamic cupping
- Dry needling
- Taping
  - McConnell or Kinesio Tape
  - Consider goal with taping
- SI Belt
- Modalities
  - TENS
  - Cold/Heat
  - Shockwave



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Coccyx Pain Classification

Classifying coccyx pain in your patients will:

- Help to determine if coccyx is a driver of symptoms or an innocent bystander to a larger pain process
- Help to determine where to start treatment
- Help to educate patient on the "why" behind their coccyx symptoms

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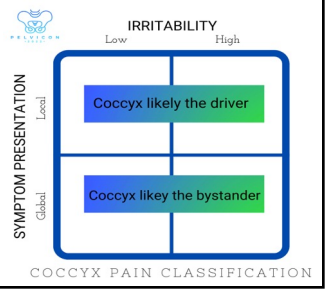
Coccyx Pain Classification

Question: Is the coccyx the driver or the bystander?

Start by assessing your patient for

- Symptom Presentation
  - Global
  - Local



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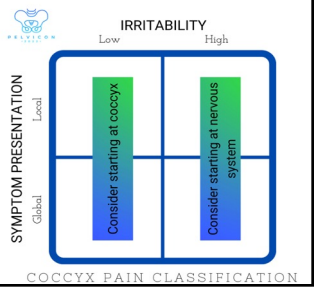
Coccyx Pain Classification

Question: Where should I start treatment?

Start by assessing your patient for:

- Irritability
  - Low
  - High



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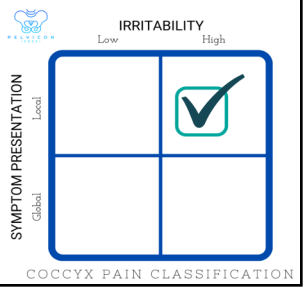
Coccyx Pain Classification

- Combine the two assessments to determine treatment strategies
  - Irritability
  - Symptom presentation
- Categorize your patient
  - Low irritability, local symptoms
  - High irritability, local symptoms
  - Low irritability, global symptoms
  - High irritability, global symptoms



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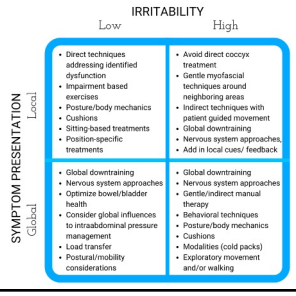
Coccyx Pain Classification



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Rehab Framework - The Don'ts

- Don't immediately jump to direct coccyx mobilization/traction simply because the patient has coccyx pain.
- Don't assume people need "core stabilization" immediately. Consider co-activation patterns.
- Don't ignore bowel, bladder and sexual health– even if the patient does not directly complain of problems.
- Don't assume the coccyx is to blame without actually examining the area.
- Don't be afraid to bring up the potential for rectal treatment sooner rather than later.

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If I'm not sure… where do I start?

Tip #1: If the patient has any signs and symptoms of constipation, treat the constipation.

Tip #2: If you're treating rectally, sometimes starting deeper can be more comfortable than starting superficially.

Tip #3: If the patient has a vagina, starting vaginally can be helpful… BUT

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If I'm not sure… where do I start?

Tip #4: Decisions regarding which orifice to treat into should be based on patient presentation rather than clinician comfort.

Tip #5: If you are nervous about causing your patient pain, stack calming treatments around more assertive techniques.

Tip #6: Assume posterior pelvic floor muscles are overactive until proven otherwise.

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Treatment: Putting It All Together!

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"The treatment of coccydynia and postcoccygectomy pain with pelvic floor physical therapy." (Scott et al., 2017)

- 124 patients with coccydynia (17 had undergone coccygectomy)
- Individualized pelvic floor physical therapy including:
  - Diaphragmatic breathing
  - Perineal bulges
  - Stretching
  - Postural retraining
  - Vaginal/anal dilators or wand
  - Internal manual therapy
  - Manual therapy to spine/pelvis
  - **No kegels, no mobilization to tailbone
- Mean improvement of 71%, completing 9 treatment sessions

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Two Recent Reviews on Rehab Interventions

"Physiotherapy approaches for coccydynia: evaluating effectiveness and clinical outcomes" (Ahal et al., 2020)

- Evaluated 9 RCTs with 532 participants
- Results: ESWT demonstrated significant reductions in pain and improved functional outcomes; Manual therapy was particularly effective in recent-onset coccydynia; KT improved pain perception with limited impact on disability

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Two Recent Reviews on Rehab Interventions

"Effectiveness of physical therapy interventions for coccydynia: a systematic review with a narrative synthesis" (Sidiq et al., 2025)

- 10 studies included with 515 adults
- Interventions including "ESWT, kinesiotaping plus exercise, levator ani stretching or massage, manipulation alone or manipulation plus electrotherapy or exercise, and muscle energy techniques" showed improvements in pain and function short term
- Manipulation alone and levator ani stretching or massage improved pain and manipulation improved function the intermediate term
- Levator ani massage or stretching showed sustained improvement in pain long term

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Multidisciplinary Management

- Collaborating Medical Providers:
  - Physiatrist
  - Orthopedist
  - Colorectal Surgeon
  - Pain Management
  - Interventional Radiologist
- Additional Collaborating Providers:
  - Mental health therapists
  - Nutritionists
  - Yoga therapists
  - Orthopedic PT

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Multidisciplinary Management

- When to refer
  - Severe pain → what is your goal?
  - Plateau in treatment
  - Identified cause that needs addressing
- If pelvic floor muscles stay overactive/tender, consider referring for:
  - Oral medication or suppositories (ie Valium/Baclofen)
  - Trigger point injections
  - Botox injections
- If nerves are likely involved, consider referring for:
  - Nerve blocks (Pudendal, Caudal, Sacral)
  - Nervous system targeting medication (ie Cymbalta, Gabapentin)

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Key Takeaways

1. A thorough neuromuscular and musculoskeletal differential diagnosis is necessary for anyone presenting with tailbone pain.
2. It is crucial to determine if the coccyx is a primary driver of the patient's pain vs. a bystander to a larger neuromuscular or musculoskeletal process.
3. Tailoring your evaluation and treatment with intentional patient positioning can improve the quality of the treatment you provide.

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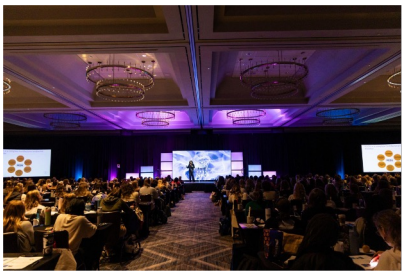
Questions



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Exercise Considerations for Coccydynia

Anna Hammond PT, DPT, CSCS

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Anna Hammond

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About Me

- Background in various orthopedic physical therapy clinic settings since 2009
- In 2017, after my first pregnancy, I began the transition to women's health focus and working for Core Exercise Solutions
- Movement history of competitive women's ultimate frisbee, yoga, weight lifting, cycling, and running

Why Is the Coccyx Unhappy?

- Hypermobile vs hypomobile?
- Tight pelvic floor (PF)?
- Balanced PF contraction?
- Poor breathing mechanics?
- Scars and incisions?
- Clenching, guarding, trauma (physical or emotional)?
- Imbalances in the pelvis?
  - Overactive and tight deep hip rotators or adductors?
  - Weak adductors or glutes?
  - Imbalances between each hip?

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Considerations From Trauma

- When did the injury occur?
- What type of trauma?
- Fracture or dislocation?
- Bruising, tenderness, or guarding?
- Don't force end range
- Decrease load
- Might need more support from other areas

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Pelvic Biomechanics: Relative Movement

- Need relative movement between the sacrum and ilium
- Need reciprocal movement between one side and the other for walking
- Creates balance in dynamic muscular support for the pelvis

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Pelvic Biomechanics: Relative Movement

- If the ability to get equal relative movement is lacking, this not only affects movement, but also the resting tone and position of muscles that attach to the pelvis

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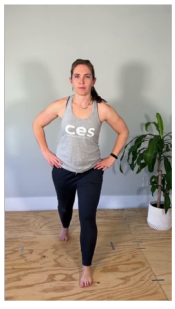
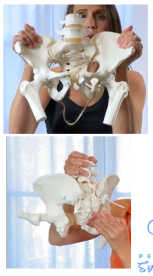


Pelvic Biomechanics: Inlet External Rotation (ER)

- Position for push-off
- Top of the pelvis (inlet) widens, bottom (outlet) narrows
- Front of the pelvis widens, back compresses
- Goes with sacral counternutation
- Pelvic floor sling is positionally slackened, allowing it to drop



Pelvic Biomechanics: Inlet Internal Rotation (IR)

- Position for loading the pelvis
- Top of the pelvis (inlet) narrows while the bottom (outlet) widens
- Front of the pelvis narrows, the back widens
- Goes with sacral nutation
- Pelvic floor sling is positionally tensioned, creating a lift

Stuck in ER, Posterior Pelvic Tilt, or Lacking Relative Motion?

Segmental Cat Cow

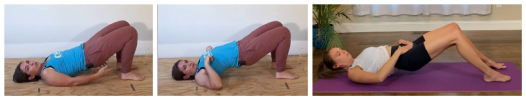
- Restoring spinal and pelvic positioning in the sagittal plane
- Can they move each segment into extension?
- Can they move each segment into flexion?

How to Achieve Relative Motion?

- Now that they've moved fully through the sagittal plane in their spine and pelvis, can they maintain a neutral position to drive relative movement at the pelvis instead of driving movement from the spine?
- Inlet ER→Inlet IR→Inlet ER

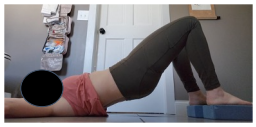
Pelvic vs Spinal Movement: Hip Extension and Inlet ER

- Hip extension vs knee extension?
- Can they get into full hip extension?



Pelvic vs Spinal Movement: Hip Extension and Inlet ER

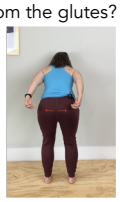
- Can they get into full hip extension?
- Can they get a full glute max contraction?
- Add a block squeeze?

Pelvic vs Spinal Movement: Hip Flexion and Inlet IR

- Initiate movement from knees or back instead of hips?
- Change of orientation of entire pelvis (APT vs PPT) instead of relative movement (inlet IR)?
- Pull from the hip flexors vs lengthen from the glutes?



Rockbacks

- Helps teach inlet IR movement
- Progress to squats and hip hinges
- Great position to address superficial PF and deep core function
- Need to assess and address asymmetries further?

Creating Sacral Nutation With Proximal Hamstrings

- Decreases tension in posterior PF and inferior glutes
- Helps to decrease glute clenching for stability
- Achieves inlet IR (especially if adduction is added)

A Stuck Drawer

- Pelvic rocking with hamstrings in 90-90 over a towel
- Pelvic rocking with hamstrings on forearms and knees



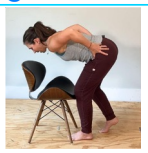
Getting Upright: Squat

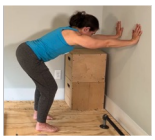
- Frontal plane isometrics
- Heels elevated
- Goblet hold
- Use the breath




Getting Upright: Hip Hinge

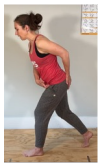
- Knee chair reference
- Frontal plane isometrics
- Heels elevated
- Push hands into the wall
- Use the breath





Getting Upright: Split Squat

- Can explore hip asymmetries
- Make sure hips are level and stay level throughout
- Maintain slight hinge
- Add inlet IR
- Add adduction or abduction isometric

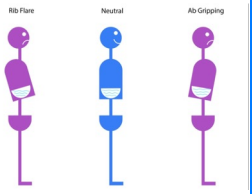


Getting Upright: Coming Back Up

- How you lower affects how you come back up
- Hips stay square to the front?
- Shove hips forward, excessively tuck, lean back, lack full hip extension?
- Knee extension before hip extension?
- Knee turning in?

Getting Upright: Still Stuck?

- Address squat vs hip hinge vs split stance
- Change load
- Address and work more in transverse and frontal planes first
- Work on the feet, rib cage, or shoulders



Addressing the Thoracic Spine and Rib Cage

- Helps with core function for improved pelvic stability
- Improves diaphragm function to support the PF
- Affects the autonomic nervous system?

Addressing Rib Cage and Thoracic Spine

Elevated Thread the Needle

- Works on cross-connection in abs and back-body expansion with thoracic rotation

Rib Cage Smash

- Positionally improves rib cage position and relative mobility
- Soft tissue release

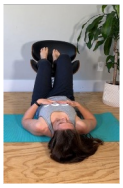
Addressing Inlet IR/ER Asymmetries

- Look at both inlet IR and inlet ER on each side
- Allows for reciprocal movement in the pelvis between one side and the other, and between sacrum and ilium
- Limitations on one side can affect movement on the other side

Passive Inlet IR

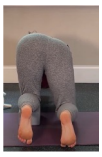
- Supine Positional Hip Shift





Passive Inlet IR

- Inverted Hip Shift With Lateral Hip Distraction
- Side-Lying Hip Shifts



Active Inlet IR/ER

Iliacus Pullback

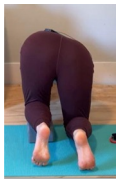
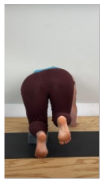
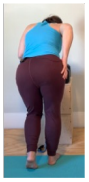
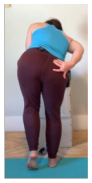
- Inlet IR on the top leg
- Great exercise to further connect with the front pelvic floor

Positional Clamshell

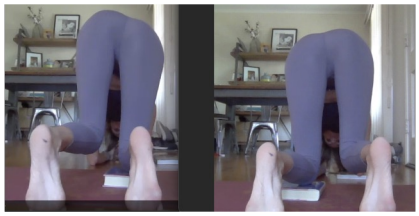
- Inlet ER on the top leg
- Inlet IR on the bottom leg

Full Range Inlet IR/ER

- Dynamic Inverted Hip Shifts
- Standing Hip Shifts

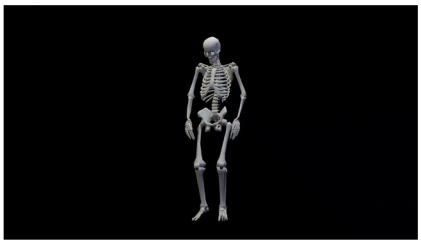
Full Range Inlet IR/ER



Full Range Inlet IR/ER

- Dynamic Inverted Hip Shifts
- Standing Hip Shifts

Happy Hips and Pelvis



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Coccydynia: A Pain Science Approach

Adriaan Louw

PELVICON Symposium

1

Adriaan Louw

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About Me

- Physical therapist
- Pain scientist
- Author
- Lecturer – Evidence in Motion and University of Nevada Las Vegas

2

Disclosures

- I receive royalties for patient and healthcare provider books from OPTP
- I receive royalties from Medbridge for lectures
- I am a shareholder of Evidence in Motion
- Our research is self-funded

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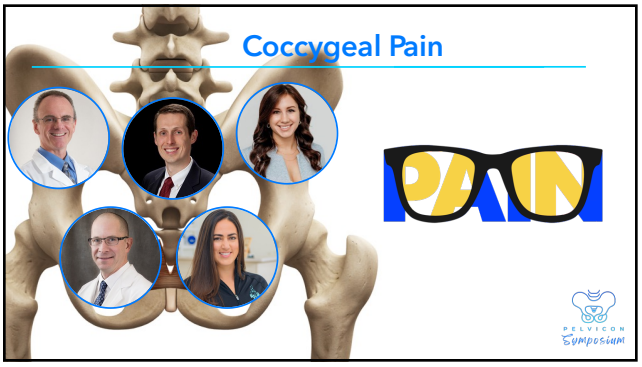
Coccygeal Pain



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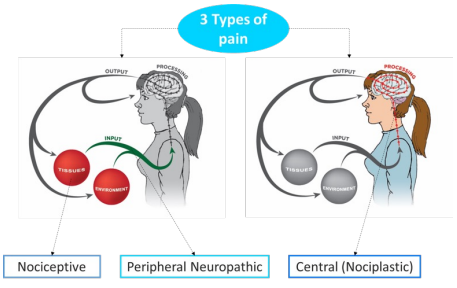
Pain Phenotypes



Nijs, J., et. al 2024
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Smart KM, et. al 2012b
Smart KM, et. al 2012c
Smart KM, et. al 2009
Hodges, P. W. 2019
Shraim, M. A., et al. 2020

5

Pain Phenotypes

Nociceptive	Peripheral Neuropathic	Central (Nociplastic)
• Pain localized to the area of injury or dysfunction, +/- somatic referral • Clear, proportionate mechanical or anatomical nature to aggravations and eases • Usually intermittent and sharp with movement or mechanical provocation; may be a more constant dull ache or throb at rest • Absence of: • Pain with other dysesthesias • Night pain or disturbed sleep • Antalgic postures or movement • Pain variously described as burning, shooting, or electric-shock like	• Pain referred in a dermatomal or cutaneous nerve distribution • History of nerve injury, pathology, or mechanical compromise • Pain/symptom provocation with mechanical testing which move, load, or compress neural tissue (e.g. active, passive, or neurodynamic tests)	• Disproportionate, non-mechanical, unpredictable pattern of pain provocation in response to multiple or non-specific aggravating/easing factors • Pain disproportionate to the nature and extent of injury or pathology • Diffuse/non-anatomic areas of pain/tenderness on palpation • Strong association with maladaptive psychosocial factors (e.g. negative emotions, poor self-efficacy, maladaptive beliefs and pain behaviors)
Sensitivity: 90.9% Specificity: 91.0% **Dx odds ratio: 100.67**	Sensitivity: 86.3% Specificity: 96.0% **Dx odds ratio: 150.9**	Sensitivity: 91.8% Specificity: 97.7% **Dx odds ratio: 486.56**

Smart KM, et. al 2012a; Smart KM, et. al 2012b; Smart KM, et. al 2012c

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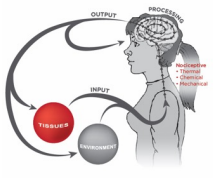
1. Nociceptive (driven) Pain

Symptom and exam cluster: 100x more likely

- ✓ Proportionate pain
- ✓ Aggravating and easing factors
- ✓ Intermittent sharp, dull ache or throb at rest
- ✓ No night pain, dysesthesia, burning, shooting or electric



Smart KM, et. al 2012a; Smart KM, et. al 2012b; Smart KM, et. al 2012c

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Nociceptive (driven) Coccygeal Pain

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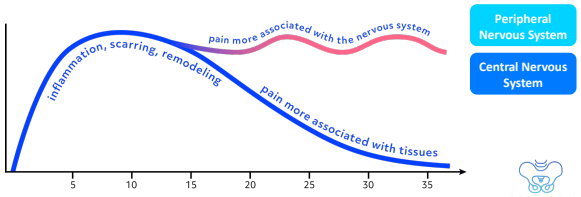
Persistent/Complex Coccygeal Pain



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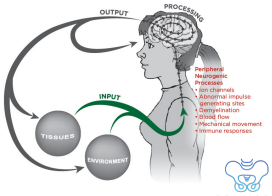
2. Peripheral Neuropathic (driven) Pain

Symptom and exam cluster: 150x more likely

- ✓ Pain in dermatomal or cutaneous distribution
- ✓ Positive neurodynamic and palpation (mechanical tests)
- ✓ History of nerve pathology or compromise



Smart KM, et. al 2012a; Smart KM, et. al 2012b; Smart KM, et. al 2012c

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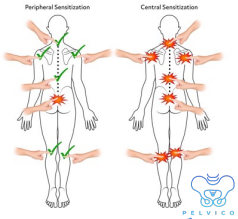
3. Nociplastic Pain (Central Sensitization)

Symptom and exam cluster: 486x more likely

- ✓ Disproportionate pain
- ✓ Disproportionate aggravating and easing factors
- ✓ Diffuse palpation tenderness
- ✓ Psychosocial issues
  - Pain Catastrophizing
  - Depression
  - Fear-avoidance*



Smart KM, et. al 2012a; Smart KM, et. al 2012b; Smart KM, et. al 2012c

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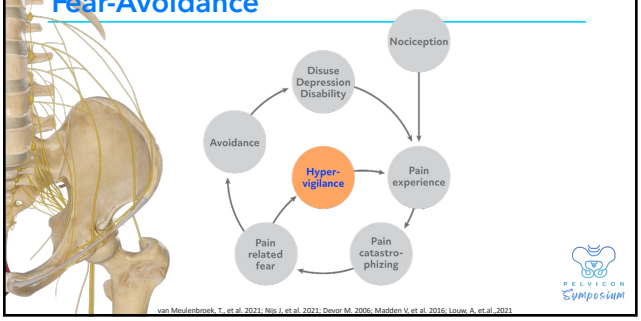
Fear-Avoidance



van Meulenbroek, T., et al. 2021; Nijs J, et al. 2021; Devor M. 2006; Madden V, et al. 2016; Louw, A, et al. 2021

12

What you should ask today

How should I examine:
- A sensitized **peripheral** nervous system?

How should I treat:
- A sensitized **peripheral** nervous system?*

How should I examine:
- A sensitized **central** nervous system?

How should I treat:
- A sensitized **central** nervous system?*

*** non-pharmacologically**

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Testing Peripheral Neuropathic Pain

Standard battery of surveys

- Self-reported pain:
  - Numeric Pain Rating Scale
  - Visual Analogue Scale, etc.
- Disability:
  - Oswestry Disability Index
  - Roland Morris Disability Questionnaire, etc.
- Demographics
- Medical screening/Review of systems

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Testing Peripheral Neuropathic Pain

Pain Science additional screening tools

- Fear-Avoidance:
  - Fear Avoidance Beliefs Questionnaire
- Depression:
  - Patient Health Questionnaire – 2
- Neurological:
  - LANSS: Leeds Assessment of Neuropathic Symptoms and Signs
  - painDETECT

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Testing Peripheral Neuropathic Pain

Standard "Maitland"-style questions:

- Type of disorder – pain, disability, etc.
- History, duration and progression
- Location, description
  - Pain drawing
- Behavior: Aggravating and easing factors
- Safety screening

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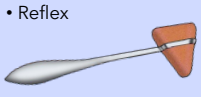
Testing Peripheral Neuropathic Pain

Physical Examination

Conduction

- Neurological screen
  - Strength
  - Sensation
  - Reflex



Mechanosensitivity

- Neurodynamic tests
- Lumbo-sacral plexus
  - Straight leg raise
  - Slump test
    - Active
    - Passive
  - Nerve Palpation
  - Pressure algometry

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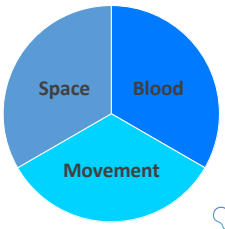
Treating Peripheral Neuropathic Pain

Neurobiologically and neurophysiologically, the nervous system needs 3 basic requirements to function optimally



Cook, C.E., et. al. 2023
Louw A, et. al 2009
Nee RJ and Butler D, S 2006

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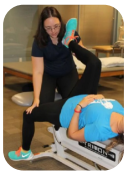
Treating Peripheral Neuropathic Pain

- Manual therapy
- Soft tissue treatment
- Stretches
- Scar tissue mobilization
- Positioning
- Unloading
- Etc.



Cook, C.E., et. al. 2023
Louw A, et. al 2009
Nee RJ and Butler D, S 2006

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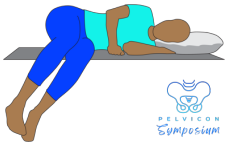
Treating Peripheral Neuropathic Pain

Intervertebral foramen opening position

- Emergency room/acute care
- Acute lumbar radiculopathy
- Moderate or large disc hernias on MRI
- 75% had neurological deficits
- At discharge, patients in experimental group were significantly better ($p < 0.05$) than controls in all outcomes
- Patients in the experimental group consumed less medication than control patients (21% versus 79%), including less than half the opioids (tramadol)



Shacklock, M., et al. (2022).

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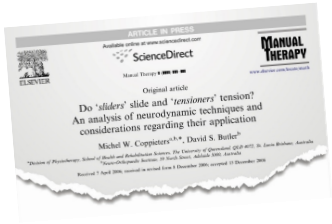
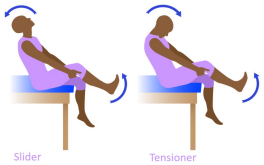
Treating Peripheral Neuropathic Pain





Coppieters MW and Butler DS 2008

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Treating Peripheral Neuropathic Pain

Systematic reviews and meta-analysis1980–2024:

Diagnoses:	Effects:
✓Low back pain	✓Self-reported pain intensity
✓Lumbar radiculopathy	✓Disability
✓Neck pain	✓Range of motion
✓Cervical radiculopathy	✓Mechanosensitivity
✓Carpal tunnel syndrome	✓Nerve conduction
✓Hamstring injury	✓Spasticity
✓Chronic pain	

Basson A, et. al 2017; Jimenez-Del-Barrio, S., et al. 2022; Nunez de Arenas-Arroyo, S., et al. 2021; Lopez Lopez, L., et al. 2019; Varangot-Reille, C., et al. 2022; Gonzalez-Matilla, R., et al. 2022; Cuenca-Martinez, F., et al. 2022

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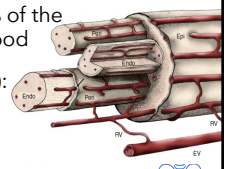
Treating Peripheral Neuropathic Pain

The brain, spinal cord and peripheral nerves are estimated to only account for 2-3% of the total body mass, yet they consume 20-25% of the available oxygen in the circulating blood

- If a nerve is "lengthened" (stretched):
  - 6-8%: Slow blood flow
  - 15%: Stop blood flow



Dommisse GF 1994; Lundborg G and Rydevik B 1973; Ogata K and Naito 1986

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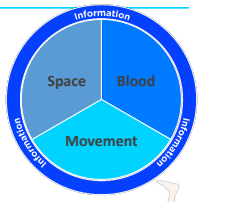
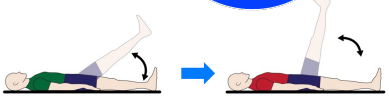
Treating Peripheral Neuropathic Pain

Pain Neuroscience Education

Positive shifts in:

- Pressure pain thresholds
- Neurodynamic movement - SLR
- Fear-avoidance
- Pain catastrophization
- Movement
- Self-reported pain





Louw A, et al 2011; Louw A, et al 2016; Wood, L. and P. A. Hendrick 2019; Watson, J. A., et al. 2019; Malfliet, A., et al. 2018

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What you should ask today

How should I examine:
- A sensitized **peripheral** nervous system?

How should I treat:
- A sensitized **peripheral** nervous system?*

How should I examine:
A sensitized **central** nervous system?

How should I treat:
A sensitized **central** nervous system?*

*** non-pharmacologically**

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Testing Nociplastic Pain

Standard "Maitland"-style questions:

- Type of disorder – pain, disability, etc.
- History, duration and progression
- Location, description
  - Pain drawing
- Behavior: Aggravating and easing factors
- Safety screening

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Testing Nociplastic Pain

Pain Science additional screening tools

- Fear-Avoidance:
  - Fear Avoidance Beliefs Questionnaire
- Pain Catastrophizing:
  - Pain Catastrophization Scale
- Depression:
  - Patient Health Questionnaire – 9
- Anxiety:
  - Generalized Anxiety Disorder – 7

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Testing Nociplastic Pain

Central Sensitization Inventory: ≥40

One in 5 patients attending OP PT score ≥40

1. I feel tired and unrefreshed when I wake from sleeping.
2. My muscles feel stiff and achy
3. I have anxiety attacks
4. I grind or clench my teeth
5. I have problems with diarrhea and or constipation
6. I need help in performing my ADLs
7. I am sensitive to bright lights
8. I get tired very easily with physical activity
9. I feel pain all over my body
10. I have headaches
11. I feel discomfort in my bladder
12. I do not sleep well
13. I have difficulty concentrating
14. I have skin problems (dry, itchy, rashes)
15. Stress makes my physical symptoms worse
16. I feel sad or depressed
17. I have low energy
18. I have tension in my muscles
19. I have pain in my jaw
20. Certain smells make me dizzy/nauseated
21. I have to urinate frequently
22. My legs feel uncomfortable and restless at night
23. I have difficulty remembering things
24. I suffered trauma as a child
25. I have pain in my pelvic area

Scoring:
Never = 0
Rarely = 1
Sometimes = 2
Often = 3
Always = 4
Total = 0 - 100

Louw A, et. al 2021; Nijs J. et. al. 2010; Mayer TG et al. 2012

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Testing Nociplastic Pain

Physical Examination

- Low tech, functional movement examination
  - Functional strength vs. specific manual muscle tests
  - Large, physiological and functional movements
  - Observe transfers, mat mobility
  - Balance screen
  - TUG or 1-minute sit/stand
- Thorough neurologic screen
- Look for evidence of sensitized nervous system

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Treating Nociplastic Pain

1. Cognitive: Change how they think
2. Movement
3. Calm the hypervigilant nervous system

Louw A and Riera-Gilley V. 2024; Louw A, et. al. 2018; Agarwal, V., et al. 2020; Nijs J et. al. 2023; Zimney K, et. al. 2023

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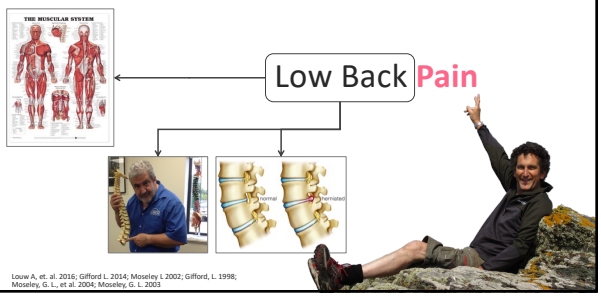
Pain Neuroscience Education



Louw A, et. al. 2016; Gifford L. 2014; Moseley L 2002; Gifford, L. 1998; Moseley, G. L., et al. 2004; Moseley, G. L. 2003

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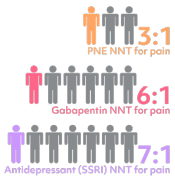
Pain Neuroscience Education

> 3 Dozen systematic reviews/meta-analyses

- Self reported pain ratings
- Pain knowledge
- Disability
- Pain catastrophizing
- Fear-avoidance
- Attitudes, beliefs and behaviors regarding pain
- Physical movement
- Healthcare utilization/cost
- Superior NNT to gold-standard medication



Nunez-Cortes, R., et al. 2024; Lin, L. H., et al. 2024; Salazar-Mendez, J., et al. 2023; Watson, J. A., et al. 2019; Romm, M. J., et al. 2021; Siddall, B., et al. 2021; Suso-Martí, L., et al. 2022; Ordonez-Mora, L. T., et al. 2022; Saracoglu, I., et al. 2022; Moore RA, et. al. 2011; Lynch ME and Watson CP 2006; Moseley L. 2002

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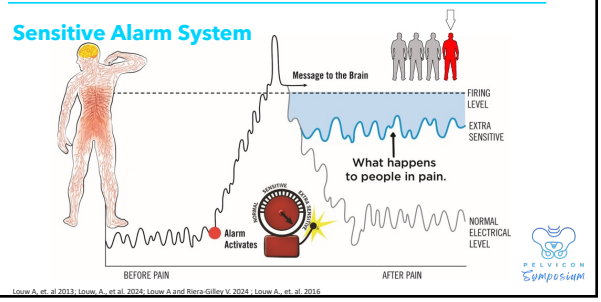
Pain Neuroscience Education

Sensitive Alarm System



Louw A, et. al 2013; Louw, A., et al. 2024; Louw A and Riera-Gilley V. 2024 ; Louw A., et. al. 2016

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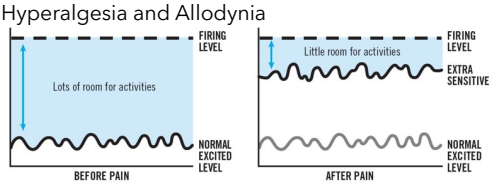
Pain Neuroscience Education

Metaphor:

- Central and Peripheral Sensitization
- Hyperalgesia and Allodynia



Louw A, et. al 2013; Louw, A., et al. 2024; Louw A and Riera-Gilley V. 2024; Louw A., et. al. 2016

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How do you know this?
- ✓ You told us: "used to could"
- ✓ Your Dr. told us: medicine
- ✓ Your tests told us: palpation, pressure pain thresholds, neurodynamic tests

Why did it stay up there?
- ✓ Psychosocial yellow flags

How do I turn it down?
1. Education/knowledge
2. Movement
3. Strategies to calm down the extra sensitive alarm
   - ✓ Breathing
   - ✓ Sleep hygiene
   - ✓ MBSR
   - ✓ Relaxation
   - ✓ Nutrition
   - ✓ Graded Motor Imagery
   - ✓ Etc.

Louw A, et. al 2013; Louw, A., et al. 2024; Louw A and Riera-Gilley V. 2024; Louw A., et. al. 2016

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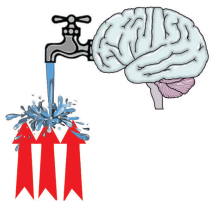
Movement and Pain

Target endogenous analgesia via PNE, Pacing and Graded Exposure:

- Aerobic exercise
  - Heart rate > 120 bpm > 10 min
- Isometric exercises
  - 50% maximum voluntary contraction
  - Longer is better
- Light weight resistance exercises
- Yoga



Naugle KM, et. al. 2012; Hoffman MD, et. al. 2005; Janal MN, et. al. 1984; Brosseau L, et al. 2008

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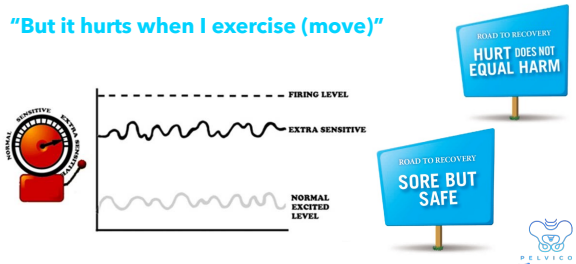
Movement and Pain

"But it hurts when I exercise (move)"



Louw A, et. al 2013; Louw, A., et al. 2024; Louw A and Riera-Gilley V. 2024; Louw A., et. al. 2016

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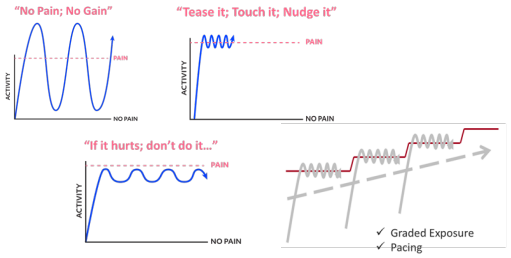
Movement, Pain and PNE



Louw A, et. al 2018

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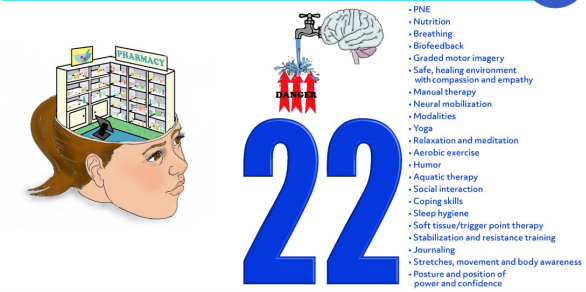
Calming the Nervous System

Calming the Nervous System



- PNE
- Nutrition
- Breathing
- Biofeedback
- Graded motor imagery
- Safe, healing environment with compassion and empathy
- Manual therapy
- Neural mobilization
- Modalities
- Yoga
- Relaxation and meditation
- Aerobic exercise
- Humor
- Aquatic therapy
- Social interaction
- Coping skills
- Sleep hygiene
- Soft tissue/trigger point therapy
- Stabilization and resistance training
- Journaling
- Stretches, movement and body awareness
- Posture and position of power and confidence

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Sleep Hygiene

Calming the Nervous System

✓ Educate patients about the importance of sleep
✓ Check off ones being done
✓ Plan to add others over time

Below is a list of strategies to help you develop a healthy sleeping pattern. Choose one every day, and over time you will see the benefit. Use this as your sleep checklist:

- ☐ Set a time to go to bed — before 11pm.
- ☐ Quiet the house by turning off the computer and the TV.
- ☐ Reduce fluid intake in the evening.
- ☐ Reduce alcoholic beverages in the late evening.
- ☐ Darken and cool the bedroom.
- ☐ Remove kids and pets from your bed (no bed buddies).
- ☐ Park your ideas. Place a notepad and pen next to your bed.
- ☐ Relax, meditate or read a book before bed.
- ☐ Avoid checking e-mails or messages before bed.
- ☐ Stay in bed. If you cannot sleep, close your eyes and relax.
- ☐ Set a wake time, and stay in bed until then.
- ☐ Eliminate naps. If naps are needed, limit them to power naps of fewer than 20 minutes.
- ☐ Avoid caffeine in the late afternoons or evenings.
- ☐ Exercise during the day.

Louw A, et. al. 2018.

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Mindfulness-based Stress Reduction

Calming the Nervous System

Body Scan

- Practice that deliberately brings mindful awareness to your body in a systematic order
- Great for beginning meditators
- Sit, stand or lie down
  - Start at one end of your body and work up or down
  - Bring your attention to your feet, calves, your knees, your butt and so on
  - Approach with openness and a sense of curiosity. What do you feel?
  - Every time your mind wanders, gently bring it back

Zeidan F, et al. 2011; Brown CA and Jones AKP. 2010; Rosenberg MD, et al. 2015

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Relaxation and Meditation

Calming the Nervous System

Other forms of relaxation - reduce stress level by:

- 68% reading a book
  - In 6 mins, slow down heart rate
- 61% listening to music
- 54% drinking tea or coffee
- 42% going for a walk
- 21% playing video games

Hassett AL and Gevirtz RN 2009; Charalambous A, et. al. 2015; Theadom A, et. al. 2015; Williams AM and Cano A. 2014; Lewis, D. 2009

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Breathing

Calming the Nervous System

4-7-8 Breathing

- Place the tip of your tongue against the ridge of tissue just behind your upper front teeth
- Close your mouth and inhale quietly through your nose for a count of four
- Hold your breath for a count of seven
- Exhale completely through your mouth, making a whoosh sound to a count of eight
- Complete 4 cycles

Engage PNS
(1:2 ratio)
3 in, 6 out

Cherubini JM, et. al. 2021; Vierra J, et. al. 2022

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How should I treat:
A sensitized **central** nervous system?*

* non-pharmacologically

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Adriaan Louw

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Thank You

adriaan@eimpt.com

Free resource: whyyouhurt.com

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