



Pelvic Floor Physical Therapy in Tethered Cord Syndrome

Pelvic Floor Symptoms, Examination & Treatment Strategies

Scope of This Talk

Our focus for today

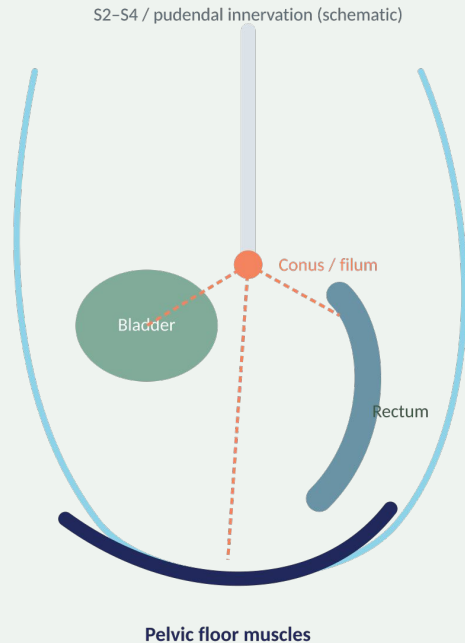


Our Focus Today

- Pelvic floor symptoms: bladder, bowel, sexual function, pain/tone
- Pelvic floor examination — subjective & objective
- Treatment strategies & clinical decision-making
- Precautions & signs of retethering

Why the Pelvic Floor Is Affected

A quick sacral neuroanatomy refresher



- The conus medullaris and cauda equina give rise to sacral nerve roots S2–S4, plus the pudendal nerve.
- These roots innervate the bladder detrusor & sphincters, the rectum/anal sphincters, and the pelvic floor musculature.
- An abnormally low conus or fixed filum places traction on this exact neural segment as the spine flexes, extends, and grows.
- Result: pelvic floor dysfunction is a direct, expected consequence of sacral nerve traction — not an incidental finding.

Pelvic Floor Symptom Patterns in TCS

Four overlapping domains — often present together



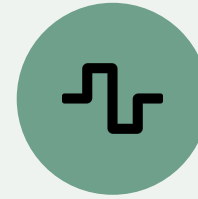
Bladder

Retention,
urgency/frequency,
incontinence, incomplete
emptying



Bowel

Neurogenic constipation,
dyssynergic defecation,
fecal incontinence



Sexual Function

Decreased sensation,
dyspareunia,
arousal/orgasm changes



Pain & Tone

Hypertonicity or
hypotonicity, coccydynia,
pelvic/perineal pain

Bladder Dysfunction

Neurogenic patterns seen in sacral nerve traction



- Storage symptoms: urgency, frequency, nocturia
- Voiding symptoms: hesitancy, weak stream, incomplete emptying, retention
- Incontinence: stress, urge, or mixed patterns; may reflect sphincter or detrusor involvement
- Detrusor-sphincter dyssynergia may be present — flags need for urodynamic work-up
- Recurrent UTIs from incomplete emptying are common and worth screening for

Bowel Dysfunction

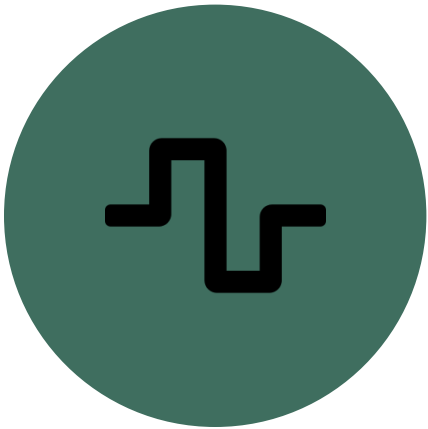
Neurogenic bowel patterns in TCS



- Neurogenic constipation: delayed colonic transit, reduced rectal sensation
- Dyssynergic defecation: paradoxical puborectalis/sphincter contraction with straining
- Fecal incontinence or seepage, especially with overflow past impaction
- Reduced urge sensation — patients may not perceive rectal filling normally
- Bristol Stool Chart & bowel diary help characterize the pattern before treatment

Sexual Dysfunction & Pelvic Pain

Often under-reported unless directly screened for



- Decreased genital sensation or altered perineal sensation (S2–S4 distribution)
- Dyspareunia, often linked to pelvic floor hypertonicity or guarding
- Difficulty with arousal or orgasm; erectile or ejaculatory changes in males
- Coccydynia, perineal pain, or generalized pelvic pain — may be myofascial or neuropathic
- Ask directly — these symptoms are rarely volunteered without specific questions

Muscle Tone Presentations

Two distinct clinical pictures — same diagnosis



Hypertonic / Overactive

- Guarding, difficulty relaxing on exam
- Pain-dominant: dyspareunia, coccydynia
- Constipation from paradoxical contraction
- Urinary hesitancy / incomplete emptying
- Difficulty reaching orgasm



Hypotonic / Underactive

- Reduced tone & contraction on exam
- Weakness-dominant: leakage, prolapse sensation
- Reduced rectal/urethral sensation
- Fecal or urinary incontinence, seepage
- Erectile dysfunction and reduced orgasm intensity

Examination: History & Outcome Measures

Building the subjective picture before hands-on assessment

Subjective & History



Direct questions on bladder, bowel, sexual function & pain — don't wait for volunteering

Diaries



3-day bladder diary

- Fluid and food intake, amount voided, urgency, amount of and activity with leakage

Bristol Stool Chart-based bowel diary

- Fluid and food intake, fiber intake, Bristol Stool #, urgency, amount of and activity with leakage

Validated Tools



- PFDI-20 and PFIQ - bowel, bladder, pain
- ICIQ - urinary incontinence
- NIH-CPSI (Chronic Prostatitis Symptom Index) - men's health (pain, bladder)
- Wexner Score - fecal incontinence
- Central Sensitization Inventory (CSI) - pain

Surgical & Symptom Timeline



Onset relative to surgery, symptom trajectory, prior imaging, urodynamics, post-void residual

Examination: Objective Assessment

Neurological screen + pelvic floor muscle assessment



Sacral Neuro Screen

- Dermatomes S2–S5 (perianal & saddle region)
- Anal wink reflex (S4–S5)
- Lower extremity strength, tone & gait screen
- Deep tendon reflexes (Achilles, patellar)



Pelvic Floor Muscle Exam

- External observation: resting tone, symmetry, scarring
- Internal exam (vaginal/rectal, as appropriate): tone, strength (Modified Oxford Scale 0–5), coordination
- Surface EMG or manometry biofeedback for objective baseline
- Coordination testing: contract, relax, and bear down on command, reflexive contraction with cough

Spinal alignment and movement screening consistent with a standard physical therapy examination should also be included.

Precautions & Red Flags

When to pause, modify, or refer back to the surgical team



New or progressive neurological changes always take priority over the pelvic floor plan of care — pause and communicate with the surgical team.

- Possible re-tethering signs: new/worsening leg weakness, sensory change, back pain, or a decline in previously improved bowel/bladder control
- Post-operative activity precautions: follow surgeon-specific restrictions on spinal flexion, lifting, and log-rolling in early recovery
- Avoid aggressive internal work or biofeedback intensity increases in the immediate post-op window without surgeon clearance
- Document and communicate changes promptly — pelvic floor PT is part of a coordinated, multidisciplinary loop
- Pediatric note: symptoms can emerge or worsen during growth spurts as the spinal cord is stretched further — reassess with any rapid growth phase

A General Pelvic Floor PT Protocol

A flexible framework, individualized to presentation — not a fixed recipe

1. Assessment & Education



Characterize the presentation (hypertonic vs. hypotonic); explain the sacral nerve–pelvic floor connection so the plan makes sense to the patient.

2. Manual Therapy & Down-Training



Address guarding, tension, and trigger points before loading — abdominal massage, myofascial release, breath work as indicated.

3. Motor Re-Education & Strengthening



Coordination, strength, and endurance work matched to the presentation — up-training where weak, down-training where tight.

4. Functional Integration & Home Program



Carry the gains into bladder/bowel habits, posture, and daily activity; build a sustainable home program.

Frequency and duration are individualized to presentation, response, and the surgical timeline — typically progressing over several weeks to months with regular reassessment.

Manual Therapy Techniques

Hands-on work to address tension, guarding & motility



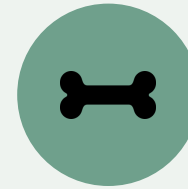
Abdominal Massage

Clockwise strokes following the colon's path (ascending → transverse → descending) to support motility — a core component of PFR protocols for neurogenic bowel/bladder (Özdemir Ayla et al. 2025).



Pelvic Floor Trigger Point Release

Internal/external release of obturator internus, piriformis, and levator ani for hypertonic or guarding presentations.



Abdominal Wall Trigger Point Release

Rectus abdominis and oblique trigger points can refer pain to the pelvis and contribute to guarding patterns — worth screening and treating directly.

Stretching Exercises

Lengthening & down-training for hypertonic presentations

- **Diaphragmatic breathing:** “360°” breath cues reflexive PF lengthening on inhale (“balloon belly” for kids)
- **Child's pose hold:** passive PF lengthening
- **Happy baby stretch:** hip external rotation & PF release
- **Deep squat hold:** gravity-assisted PF lengthening

- **Piriformis / figure-4 stretch:** eases tension in deep hip rotators, including obturator internus
- **Hip flexor stretch:** half-kneeling or Thomas
- **Cat-cow:** breath-linked spinal mobility
- **Reclined butterfly stretch:** gentle adductor/PF release; calming

Strengthening Exercises

Motor re-education & loading for hypotonic presentations

- **Standard PF contractions:** near-maximal holds + quick flicks for strength/endurance
- **The Knack:** pre-contract before cough/sneeze/lift (Miller et al. 2008)
- **Bridge with PF coactivation:** functional strength, glutes + pelvic floor together
- **Plank (standard, high plank, or modified on knees):** deep core + PF co-contraction

- **Side plank:** obliques & lateral hip stability
- **Clamshells:** hip external rotators — obturator internus, piriformis — support PF function
- **Bird dog:** core-hip integration & contralateral stability
- **Sit-to-stand or Squat:** functional loading pattern for daily carryover

The connection: the pelvic floor works with the deep core (transversus abdominis) and hip external rotators like obturator internus — muscles that share fascial connections and function best trained together, not in isolation.

A pilot RCT compared resisted hip external rotation training against traditional pelvic floor muscle training in women with stress urinary incontinence — both groups saw comparable improvement in SUI symptoms (Jordre & Schweinle, 2014).

Patient Education: Daily Habits That Support Pelvic Health

General targets that scale naturally across children & adults

- **Toileting posture:** feet flat (floor or footstool), knees at/above hip height, lean slightly forward, abdomen & pelvic floor relaxed
- **Normal bladder habits:** void roughly every 2–4 hours (6-8 times) while awake, minimal trips overnight(0-2 times), no straining
- **Normal bowel habits:** anywhere from 3x/day to 3x/week is normal — aim for Bristol Type 4 (soft, smooth, easy to pass)
- **Fluid intake:** about half your body weight in ounces per day (e.g., 100 lb ≈ 50 oz), adjusted for activity & climate
- **Fiber intake:** ~14 g fiber per 1,000 kcal consumed (USDA guideline) — scales naturally with age & caloric needs
- **Healthy habits:** don't rush or strain; don't hold bladder/bowel urges too long — respond in a timely, unhurried way

Urge Suppression Techniques

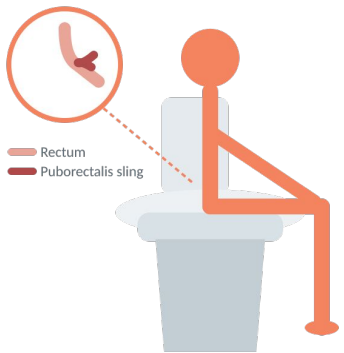
- Pause and stay still — don't rush to the bathroom, which increases pressure and can trigger leakage
- Take slow, deep breaths and relax the body
- Do 5 strong pelvic floor squeezes to help calm the bladder urge
- Use mental distraction — count backward or focus on something else
- Once the urge eases, walk calmly (don't run) to the bathroom

Specific Techniques: Defecation & Bowel Training

Posture and habit-based strategies with evidence behind them

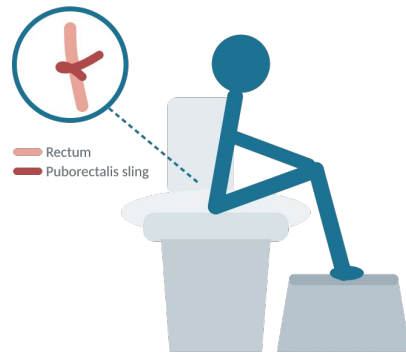
Optimized Defecation Mechanics

Sitting (feet flat)



Muscle taut — rectum kinked, harder to empty

Squatty Potty (lower stool)



Muscle relaxed — rectum straightened, easier to empty

Raising the feet relaxes the puborectalis sling and straightens the anorectal angle (Sikirov 2003; Sakakibara et al.)

- Time-to-empty dropped from ~130 to ~51 sec with footstool posture vs. sitting flat, $p < 0.0001$ (Sikirov, Dig Dis Sci 2003)
- Add diaphragmatic breathing during attempts to reduce reliance on Valsalva straining



Habit & Adjunct Training

- Timed toileting: attempt 20–30 min after meals to leverage the gastrocolic reflex
- Abdominal self-massage (clockwise, along the colon's path) as an adjunct for slow-transit constipation (perform 5-10 minutes before toilet sits)
- Simulated defecation rehearsal: coordinate abdominal push with anal relaxation without straining (perform with sEMG or manometry)
- Fluid & fiber review

Key Takeaways



Pelvic floor symptoms (bladder, bowel, sexual, pain/tone) stem directly from sacral nerve traction in TCS.



A thorough exam pairs a sacral neuro screen with a standard pelvic floor muscle assessment (along with a standard physical therapy assessment).



Treatment direction depends on presentation: down-train hypertonic, up-train hypotonic — both use biofeedback and retraining.



Neurologic changes always override the pelvic floor plan — stay closely looped in with the surgical team.