Pelvic Pain

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Northwell Health®

Learning Objectives

- Describe the common overlapping symptoms associated with chronic pelvic pain
- Create a comprehensive, multidisciplinary treatment plan for a patient with chronic pelvic pain
- Describe pelvic floor physical therapy and explain its role in the treatment of chronic pelvic pain
- Explain why pelvic pain may be associated with a high failure rate with DCS

I visited my GP numerous times throughout childhood and teenage years with pelvic pain. My pain was put down to heavy periods and a contraceptive pill was prescribed. I remember being frustrated about this . . . .but did not know enough . . . . to know that the pain could be caused by something else. At 20 years old, I became sexually active and my pain increased significantly. I visited a different GP . . .and, for the first time, they examined me . . . . They wondered whether I had . . . .endometriosis. I was referred for an . . . ultrasound but did not report anything of note. Voicing my frustrations of having no answers to my pain, a further ultrasound at the hospital was arranged . . . . They found . . .adenomyosis and referred me . . . .a gynaecologist. . . who suggested that the pain could be caused by pelvic floor dysfunction. My appointment with [the gynaecologist] was the first time I had spoken to a health professional who made me feel as though my pain was valid and my frustrations were understandable and that finally, I would be able to resolve the issue.

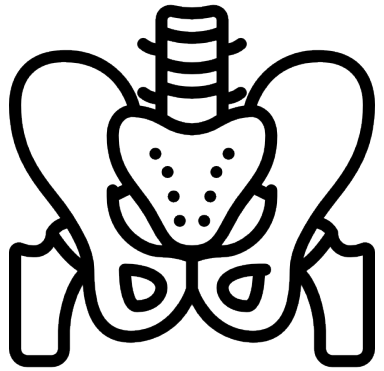
Vincent K, Evans E. An update on the management of chronic pelvic pain in women. *Anaesthesia*. 2021.

Overview

Common syndromes

Screening

Treatment



Chronic pelvic pain (CPP)

-Pain from pelvic structures ≥ 3 months

Constellation of overlapping syndromes

-48% of women with CPP have both endometriosis and IBS

*Tirlapur et al. The 'evil twin syndrome' in chronic pelvic pain: a systematic review of prevalence studies of bladder pain syndrome and endometriosis. Int J Surg 2013.

Epidemiology of CPP

~26% global prevalence among women

~15% prevalence in the U.S. population – all gender

2:1 F:M

~50% of women with CPP never receive a formal diagnosis

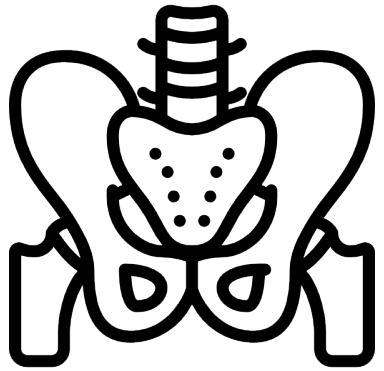


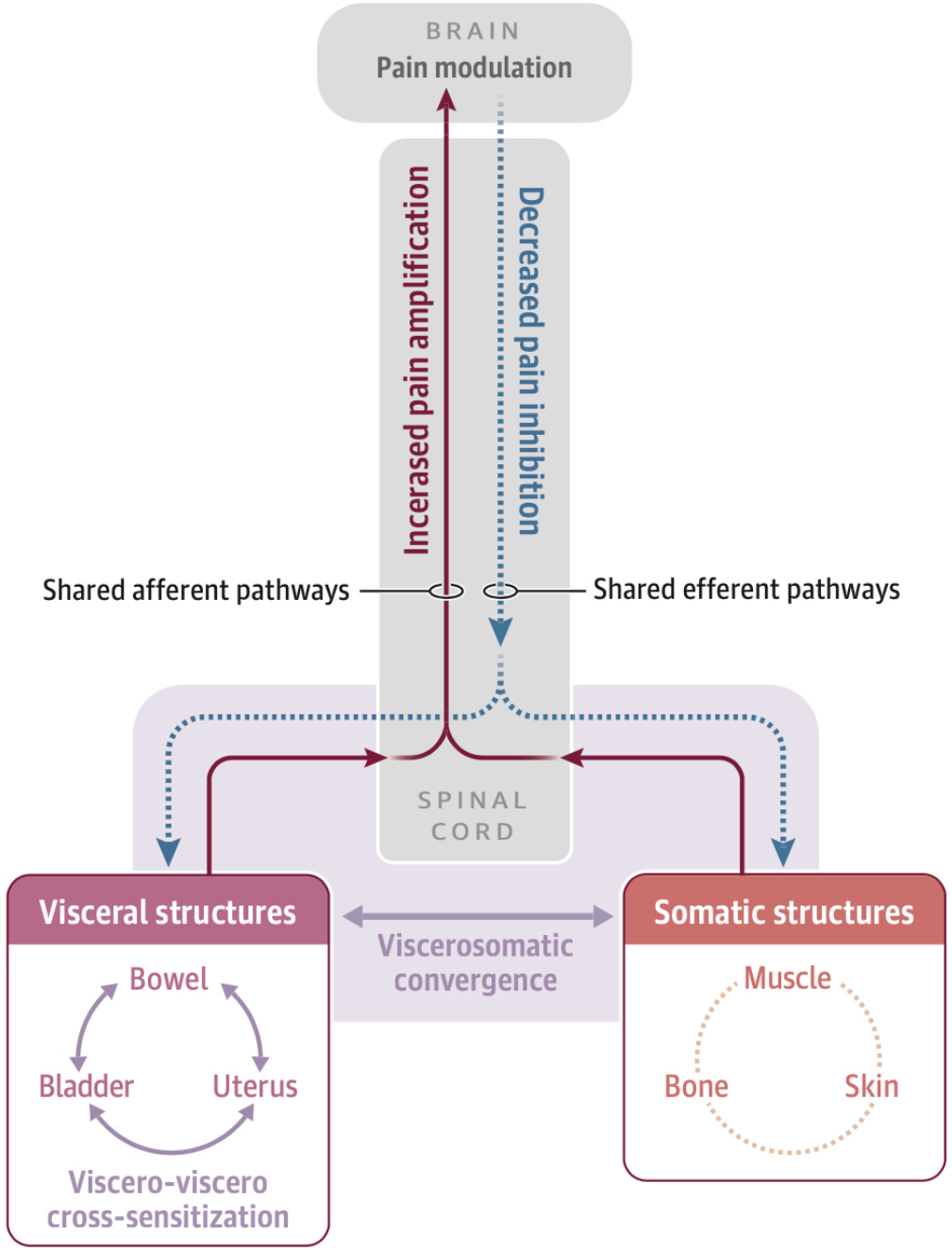
Table 2 The 'three Ps' model for chronic pelvic pain

Predisposing	Precipitating	Perpetuating
Genetics[a]	Acute pain episode	Endometriosis/adenomyosis[a]
Epigenetics	Inflammatory event e.g. appendicitis, acute PID	Dysmenorrhoea[a]
Adverse childhood experiences[a]	Trauma – physical or psychological	Comorbid chronic pain[a]
Socio-economic background[a]	Surgery	Musculoskeletal factors[a]
Cultural background/beliefs[a]	Menarche	Central nervous system factors[a]
Dysmenorrhoea[a]	Coitarche	Psychosexual factors[a]
Endometriosis/adenomyosis[a]	Stress	Toileting behaviour
Repeated episodes of urogenital infection, for example, UTI, candida[a]		Sleep disorders[a]
Other chronic pain condition[a]		Dietary factors[a]
Heavy menstrual bleeding[a]		Opioid use
Musculoskeletal factors		Stress[a]
Obesity		Physical activity[a]
Low BMI[a]		High pain catastrophising[a]
Physical activity[a]		Depression[a]
Central nervous system factors[a]		Obesity
Hormonal factors[a]		Anxiety[a]
High pain catastrophising		Shame
Depression		Poor pacing
Anxiety		Low pain self-efficacy
Stress		Low pain acceptance
Sleep disorders		Cultural background/beliefs[a]

PID, pelvic inflammatory disease; UTI, urinary tract infection.
[a]Those with supporting evidence in chronic pelvic pain.

Vincent K, Evans E. An update on the management of chronic pelvic pain in women. *Anaesthesia*. 2021.

Figure 1. Viscero-Viscero Cross-Sensitization and Viscerosomatic Convergence Pathways



Lamvu G, et al. Chronic Pelvic Pain in Women: A Review. *JAMA* – 2021.

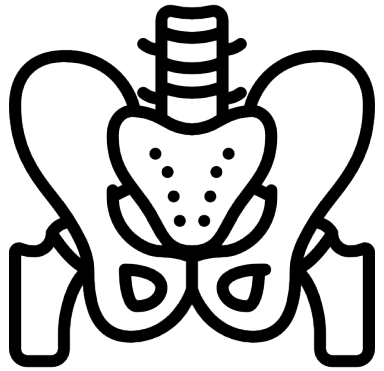
Outline

Definitions

Common syndromes

Diagnosis

Treatment



Endometriosis

50-80% prevalence in women with CPP

Surgical diagnosis → Medical diagnosis & treatment

A systemic inflammatory disease

Cyclic pelvic pain, progressive dysmenorrhea, dyspareunia, bowel & urinary symptoms
-fatigue, depression, anxiety

Infetility (6x more likely)

	Treatment types	Available drug treatments	Clinical considerations
First-line therapy	Combined oral contraceptive with NSAIDs (continuous dosing to prevent dysmenorrhoea) or progestins with NSAIDs	Combined oral contraceptives: ethinylestradiol 20 µg with drospirenone 3 mg; ethinylestradiol 20 µg with norethindrone 1 mg, ethinylestradiol 20 µg with levonorgestrel 0·01 mg, ethinylestradiol 15 µg with gestodene 0·06 mg, or estradiol hemihydrate 1·5 mg with nomegestrol 2·5 mg; progestins: medroxyprogesterone 10–60 mg daily, dienogest 2 mg daily; depot medroxyprogesterone 150 mg every 3 months (injection), norethindrone 2·5–15 mg daily, or cyproterone 2–5 mg daily	Screen patients for contraindications for combined oral contraceptives (eg, deep vein thrombosis) and assess for patient compliance
Second-line therapy	GnRH analogues with progestin, aromatase inhibitor with progestin, androgen analogue	GnRH agonists: leuprolide 3·75 mg monthly or 11·25 mg every 3 months (intramuscular injection), nafarelin 200 µg twice daily (nasal spray), or goserelin 3·6 mg every 4 weeks (subcutaneous injection); GnRH antagonists*: elagolix 150 mg daily (for moderate to severe pain), 200 mg twice daily (if absence of response with lower dose or dyspareunia is present); add-back therapy for use with GnRH analogues: norethisterone 5 mg daily†, CEE 0·625 mg with medroxyprogesterone 2·5 mg daily, estradiol 1 mg with norethisterone 0·5 mg, or CEE 0·45 mg with bazedoxifene 20 mg daily; aromatase inhibitors: letrozole 2·5–7·5 mg daily (add a daily progestin, such as medroxyprogesterone, to prevent ovarian stimulation); androgen analogue: danazol 200–800 mg daily	Recommended in patients not responding to progestin-based therapy; initiate monthly dosing and then convert to a 3 month dosing if tolerating well; start add-back therapy at initiation of GnRH agonist therapy; ovulation can still occur with GnRH antagonists; if contraception is needed, progestin-only oral contraceptives or intrauterine devices are acceptable; consider add-back therapy* for 200 mg twice daily dosing on the basis of lower estradiol concentrations
Third-line therapy	Surgical excision and ablation with post-operative medical therapy	Combined oral contraceptives, progestins, GnRH analogues, aromatase inhibitors, or anti-androgens	If the patient was on medical therapy, after a surgery a trial of an alternative agent is recommended
Fourth-line (definitive) therapy	Hysterectomy with or without bilateral salpingo-oophorectomy	If undergoing oophorectomy, menopausal hormonal therapy is recommended: CEE 0·625 mg with medroxyprogesterone 2·5 mg daily, CEE 0·45 mg with bazedoxifene 20 mg daily, or estradiol 1 mg with norethisterone 0·5 mg daily	Despite the absence of a uterus, combination hormonal therapy to prevent reactivation of endometriosis is recommended

NSAIDs=non-steroidal anti-inflammatory drugs. GnRH=gonadotropin-releasing hormone. CEE=conjugated equine oestrogen. *Lower dose is approved for 2 years and higher dose is only approved for 6 months without add-back therapy. †Only add-back therapy approved by the US Food and Drug Administration.

Table: **Medical and surgical treatment options for endometriosis**

Taylor (2021)

Primary Bladder Pain Syndrome

No longer called IC

F:M 5-10:1

Pressure/discomfort from bladder + 1 urinary symptom (frequency, urgency)

Pathophysiology: glycosaminoglycan layer, mast cells, neurogenic inflammation

Treatment	Comment
Lifestyle	Avoidance of certain foods and drink may reduce symptoms
Neuromodulators	Amitriptyline is effective for pain and related symptoms
Pentosan polysulphate	Oral treatment is effective for pain and related symptoms
	Oral treatment may be enhanced by intravesical pentosan polysulphate
Intravesical treatment	Intravesical lidocaine plus sodium bicarbonate is effective in the short term
	Intravesical chondroitin sulphate may be effective
Neuromodulation	Sacral neuromodulation may be effective in PBPS
	Pudendal nerve stimulation is superior to sacral nerve modulation
Botulinum toxin A injection	Limited evidence for benefit
	Consider botulinum toxin injections if intravesical instillation therapies have failed
Surgery	Transurethral resection/fulguration may be effective in PBPS type 3 C
	Major surgery is last resort – if considered, it should be undertaken in a specialist centre with a multidisciplinary team approach

See EAU guidelines for more details.

Parsons BA et al. Management of chronic primary pelvic pain syndromes. *BJU Int*. 2021.

Table 2 Standard dosages for commonly used treatments for BPS/IC

Medication	Initial dose, taper regimen	Key side effects
Pentosan polysulfate	100 mg TID orally	Hair loss, GI upset
Tricyclic antidepressants[a] Nortriptyline, amitriptyline, imipramine, desipramine	10–25 mg orally once at night, gradually increase every 4–7 d by the same dose to 100–150 mg at night	Sedation, dizziness, dry mouth, constipation, arrhythmias (consider checking blood metabolite level upon exceeding 100 mg daily), may lower seizure threshold in combination with tramadol
Antiepileptics[a] Gabapentin Pregabalin	100–300 mg orally qhs gradually taper every 4–7 d up to 900–1,200 mg three times a day 75 mg BID, gradually taper up every week to a max. of 450 mg/d divided	Sedation, dizziness, ataxia, mood changes, easy bruising
Hydroxyzine	25 mg qhs orally	Sedation
Cimetidine	200 mg TID orally	Dizziness, headache, diarrhea, B12 deficiency (persistent use), watch for confusion in the elderly
Bladder instillations Marcaine, Kenalog, heparin Buffered lidocaine DMSO	M (30 mL) K (40 mg), H (40,000 units), 2 × /wk for 6 wk L (30 mL) + NaHC03 (10 mL) 2 × /wk for 6 wk 50 mL weekly for 6 wk	Urethral irritation, urinary retention (rare), UTI, central effects of local anesthetics (lightheadedness, tongue numbness) *Similar* Worsened pain, garlic odor

Marcu et al. Interstitial Cystitis/Bladder Pain Syndrome. *Semin Reprod Med*. 2018.

Table 4 Treatments for IC/BPS

Treatment	Grade of recommendation (level of evidence)	Suggested doses† or indication
Conservative treatment		
Behavior modification§	B (4)	
Stress reduction	B (2)	
Dietary modification	B (2)	
Physiotherapy§	B (2)	
Medical treatment		
Pentosan polysulfate	C (2, 2)‡	300 mg/day
Amitriptyline§	B (2, 2)	10–75 mg/day
Hydroxyzine§	C (4)	25–75 mg/day
Suplatast tosilate§	C (4)	300–600 mg/day
Cyclosporine A	C (2)	3 mg/kg BW/day
Steroid (prednisolone)§	C (4)	5–25 mg/day
Cimetidine§	C (2)	600 mg/day
Antibacterial agent	D (4, 2)	
L-arginine§	D (4, 2)	
Citrate§	C (4)	853 mg/day
Duloxetine	D (4)	
Gabapentin	C (4)	300–2100 mg/day
Montelukast	C (4)	10 mg/day
NSAIDs (piroxicam)	C (4)	40 mg/day
Sildenafil	C (2)	25 mg/day
Adalimumab	C (2)	40–80 mg/every 2 weeks, for 12 weeks, s.c.
Tacrolimus	C (5)	3 mg/day
Certolizumab pegol	C (2)	400 mg at weeks 0, 2, 4, and 8, s.c.
Intravesical instillation or bladder wall injection		
DMSO	B (2)	50 mL of 50% solution
Heparin§	C (3)	10 000 units
Hyaluronic acid§	C (3)	40 mg
Chondroitin sulfate	C (2, 2)	0.2–2%
Pentosan polysulfate§	C (3)	300 mg
Oxybutynin§	C (3)	0.01%
Lidocaine§	C (2)	4%
Resiniferatoxin§	C (4, 2)	10–100 nM
Botulinum toxin	B (3)	100–200 IU
Steroid	C (4)	40 mg/mL 10 mL
BCG§	D (2, 2)	
Hydrodistension	B/C (4)	
Other treatments		
Electrostimulation	B/C (2/3)	
Acupuncture	C (3, 3)	
Hyperbaric oxygen§	C (4, 2)	
Transurethral fulguration	B (3)	HIC only
Cystectomy or augmentation	C (4)	Last resort

†Only for the treatments with grade of recommendation B and C. ‡(level of evidence for efficacy, level of evidence for non-efficacy). §Refer to previous guidelines for detail (no major progresses in the past 4 years).

Homma et al. Clinical guidelines for interstitial cystitis/bladder pain syndrome. *Int J Urol*. 2020.

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Irritable Bowel Syndrome

Abdominal pain/discomfort w/ altered bowel habits absent other causes

1.5-2:1 F:M

Prevalence decreases w/ age

Pathophysiology complex

Rule out celiac disease, IBD

Irritable Bowel Syndrome - Treatment

IBS – D

Exercise

Diet – FODMAP

Medications:

Soluble fiber (psyllium)

TCAs

Peppermint oil (antispasmodic)

Alosetron (5-HT3 antagonist)

Rifaximin

*no probiotics

IBS – C

Exercise

Diet – FODMAP

Medications:

Soluble fiber (psyllium)

TCAs

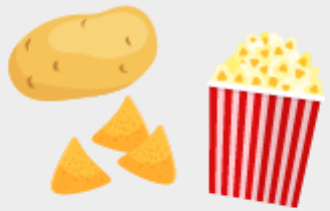
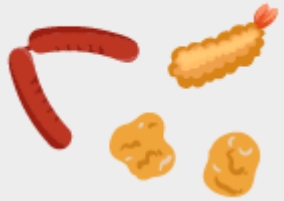
Fiber

Linactolide/Lubiprostone (prosecretory)

Tegaserod (5-HT4 agonist)

*no probiotics

LOW FODMAP DIET

FOOD	VEGETABLES	FRUITS	PROTEINS	FATS	STARCHES, CEREALS & GRAINS
EAT	 lettuce, carrot, cucumber	 strawberries, pineapples, grapes	 chicken, eggs, tofu	 oils, butter, peanuts	 potatoes, tortilla chips, popcorn
AVOID	 garlic, beans, onion	 blackberries, watermelon, peaches	 sausage, battered fish, breaded meats	 almonds, avocado, pistachio	 beans, gluten-based bread, muffins

Tricyclic Antidepressants for IBS

Name	Subtype	Recommended daily doses (mg)	Most common side effects
Amitriptyline: available in 10-, 25-, 50-, 75-, and 100-mg tablets	Tertiary amine	50–100	Dry mouth, urinary retention, sedation, cardiac arrhythmias, sexual dysfunction, constipation, weight gain, and blurry vision
Imipramine: available in 10-, 25-, 50-, 75-, and 100-mg tablets	Tertiary amine	50–100	Dry mouth, urinary retention, sedation, cardiac arrhythmias, sexual dysfunction, constipation, weight gain, and blurry vision
Desipramine: available in 10-, 25-, 50-, 75-, and 100-mg tablets	Secondary amine	25–100	Dry mouth, blurry vision, urinary retention, cardiac arrhythmias, weight gain, dizziness, nausea, and headache
Nortriptyline: available in 10-, 25-, 50-, and 75-mg tablets	Secondary amine	25–75	Dry mouth, blurry vision, urinary retention, cardiac arrhythmias, weight gain, dizziness, nausea, and headache

Lacy et al. ACG Clinical Guideline: Management of Irritable Bowel Syndrome. *Am J Gastroenterol*. 2021.

Primary Prostate Pain Syndrome

aka Chronic Prostatitis

Urinary symptoms (retention, dysuria, hematuria), postejaculatory pain, back pain, myofascial pelvic floor tenderness (51%)

-bowel disturbances, depression

Altered bacterial flora

Prostate Pain Syndrome Treatment

Medications:

-antibiotics (fluoroquinolones, macrolides)

-NSAIDs

-neuropathic agents

-α blockers (terazosin)

Pelvic floor physical therapy

CBT

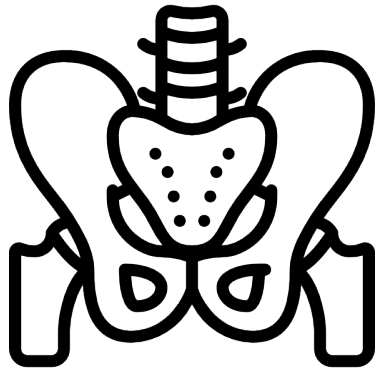
Polackwich et al. Chronic prostatitis/chronic pelvic pain syndrome: a review of evaluation and therapy. *Prostate Cancer Prostatic Dis*. 2016.

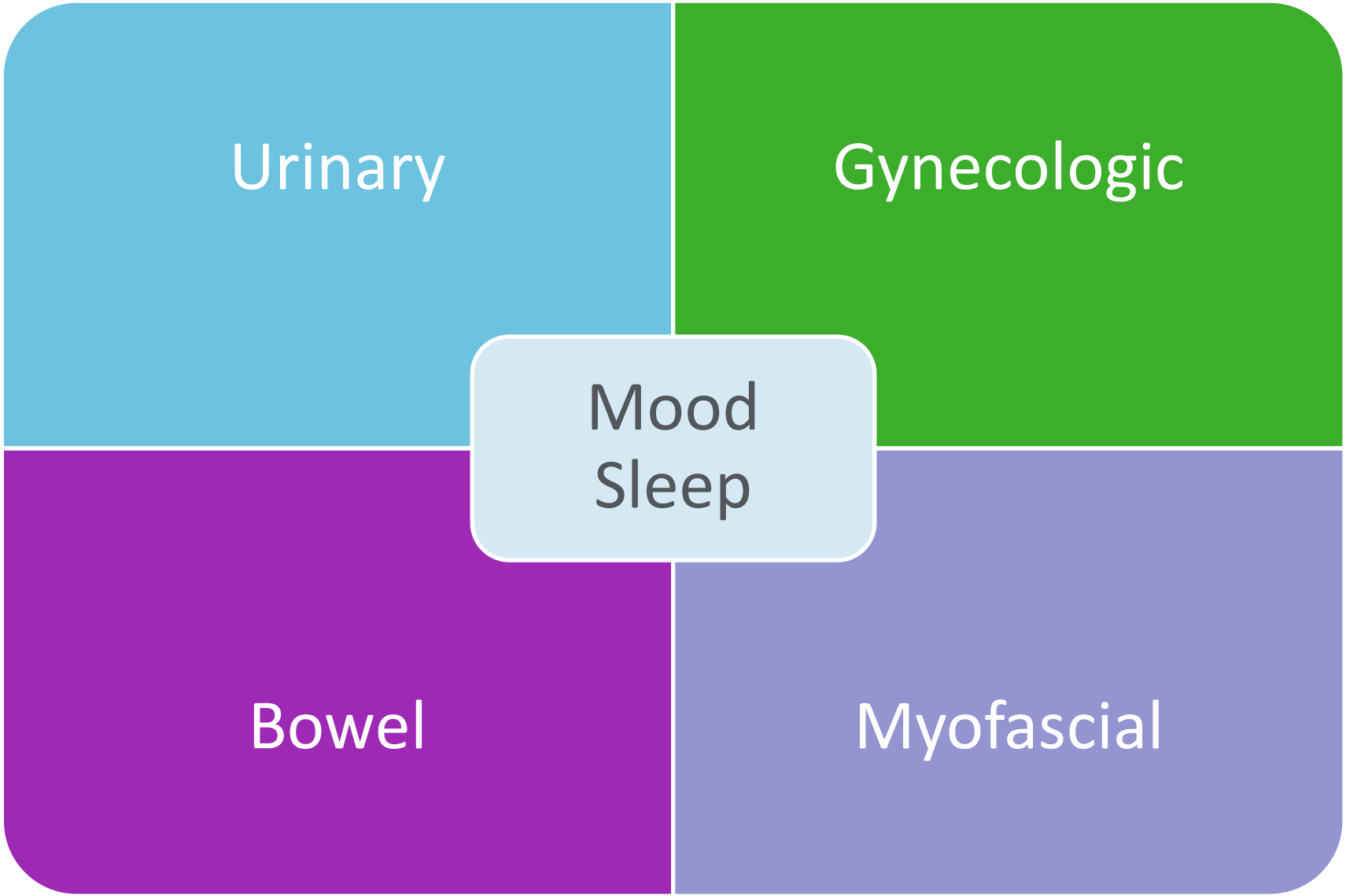
Overview

Common syndromes

Screening

Treatment




Urinary
Gynecologic
Mood
Sleep
Bowel
Myofascial

Identify central sensitization symptoms (generalized pain, sleep and mood disturbances) and social/environmental stressors

Identify musculoskeletal and neuropathic pain

Identify gynecologic and non-gynecologic causes (IBS, Bladder Pain Syndrome, Chronic Prostate Pain Syndrome)

Lamvu G, et al. Chronic Pelvic Pain in Women: A Review. *JAMA* – 2021.

Red Flags

Weight Loss

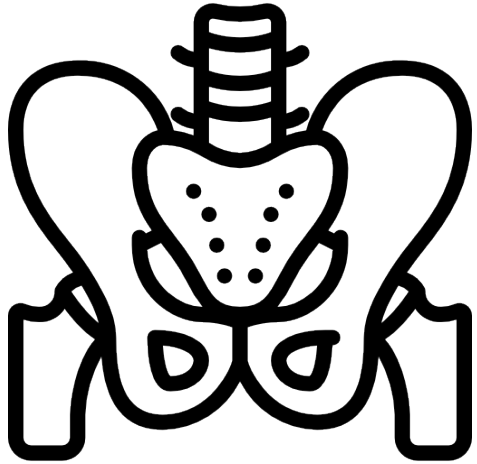
Fever

Bleeding, anemia

Palpable masses

Family history

Late onset



Psychological comorbidities

Study of 175 CPP patients (Bryant 2016) in Melbourne showed:

53% moderate-severe anxiety

27% moderate-severe depression

Study of 656 CPP patients (Yosef 2016) in Vancouver showed:

42% scored high on catastrophizing scale

The Temporal Relation Between Pain and Depression: Results From the Longitudinal Aging Study Amsterdam

Peter H. Hilderink, MD, Huibert Burger, PhD, Dorly J. Deeg, PhD, Aartjan T. Beekman, PhD, and Richard C. Oude Voshaar, PhD

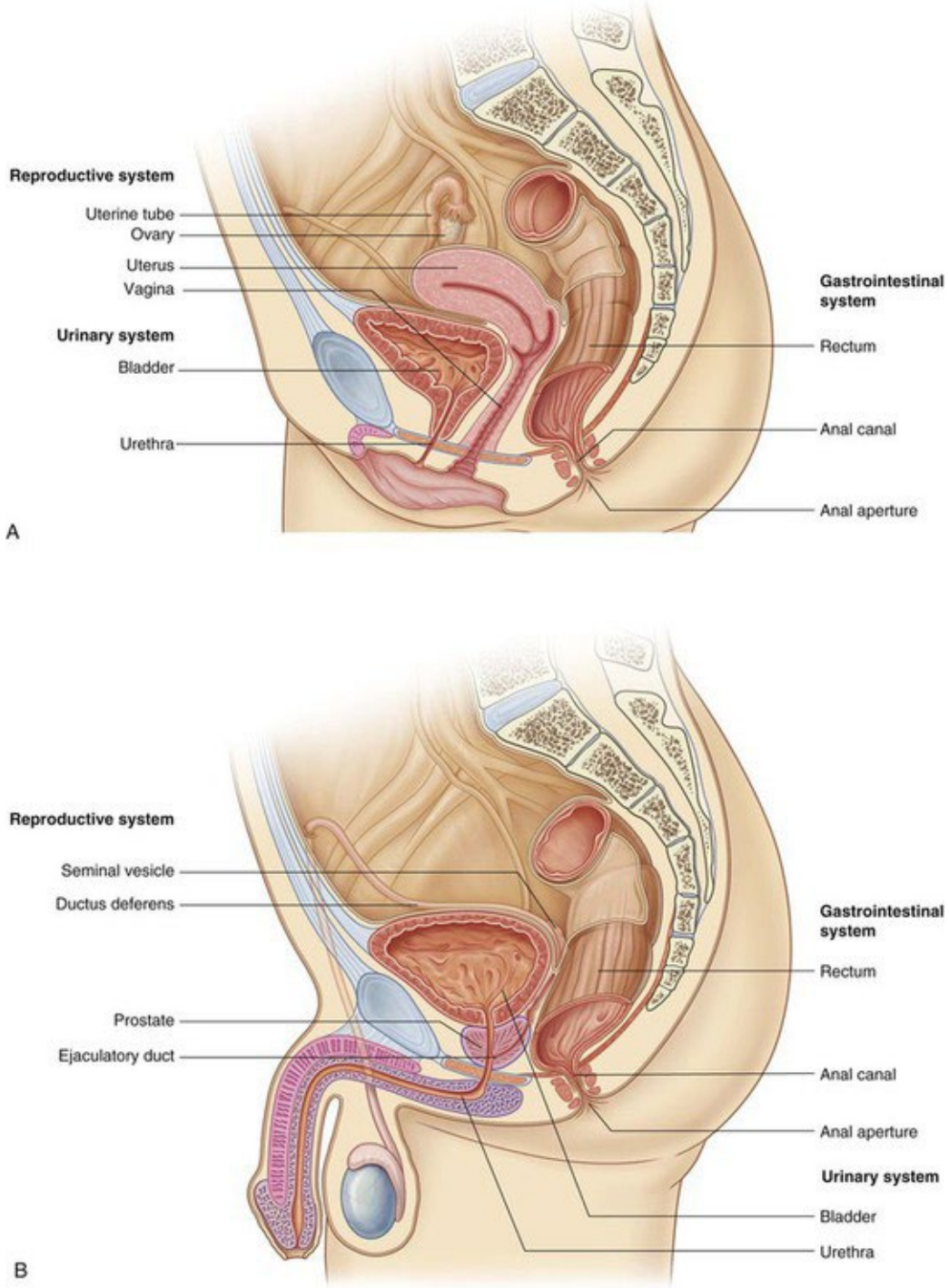
Objective: Pain and depression are both common in old age, but their (long-term) temporal relationship remains unknown. This study is designed to determine whether pain predicts the onset of depression and vice versa. **Methods:** This is a prospective, population-based cohort study with 12-year follow-up and 3-year intervals in the Netherlands (Longitudinal Aging Study Amsterdam). At baseline, participants were aged 55 to 85 years ($n = 2028$). Main measurements outcomes were incident depression defined as crossing the cutoff of 16 and showing a relevant change (≥5 points) on the Center for Epidemiological Studies–Depression Scale among nondepressed participants and incident pain defined as a score of 2 or higher on the pain scale of the 5-item Nottingham Health Profile in pain-free participants. Multiple imputations were adopted to estimate missing values. **Results:** In nondepressed participants ($n = 1769$), a higher level of pain was predictive of incident depression in multiple extended Cox regression analyses (hazard rate [HR] = 1.13 [95% confidence interval {CI}: 1.05–1.22], $p = .001$), which all remained significant after correction for sociodemographic characteristics, life-style characteristics, functional limitations, and chronic diseases (HR = 1.09 [95% CI = 1.01–1.18], $p = .035$). In the pain-free participants ($n = 1420$), depressive symptoms at baseline predicted incident pain (HR = 1.02 [95% CI: 1.01–1.04], $p = .006$). This depression measure did not independently predicted the onset of pain in the fully adjusted models. **Conclusions:** As pain precedes the onset of depression, strategies to prevent depression in chronic pain patients are warranted. In contrast, no effects of depression on the development of subsequent pain were found when adjusting for covariates. **Key words:** depression, chronic pain, pain, aged and aged, 80 years and older.

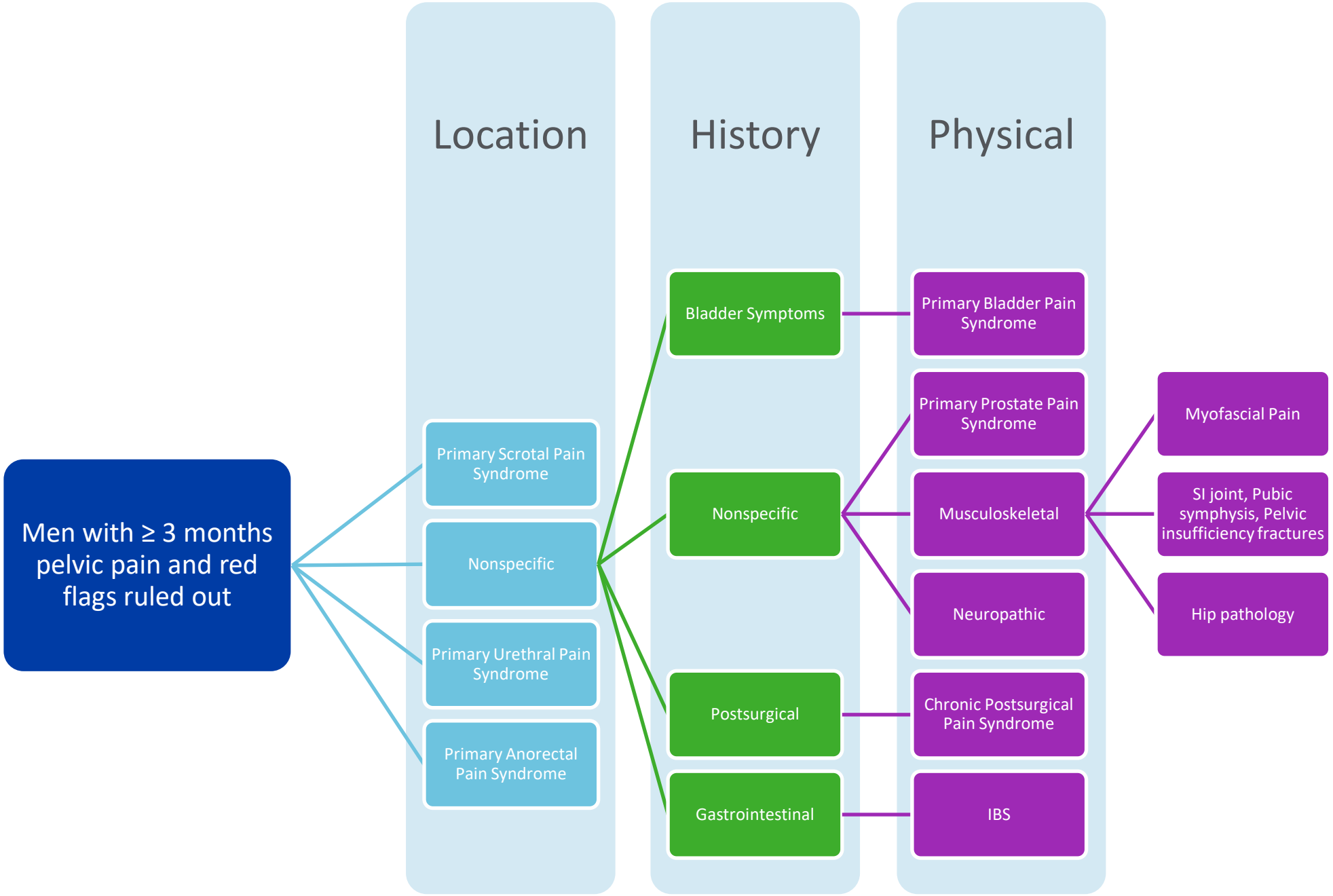
Chronic pain → depression

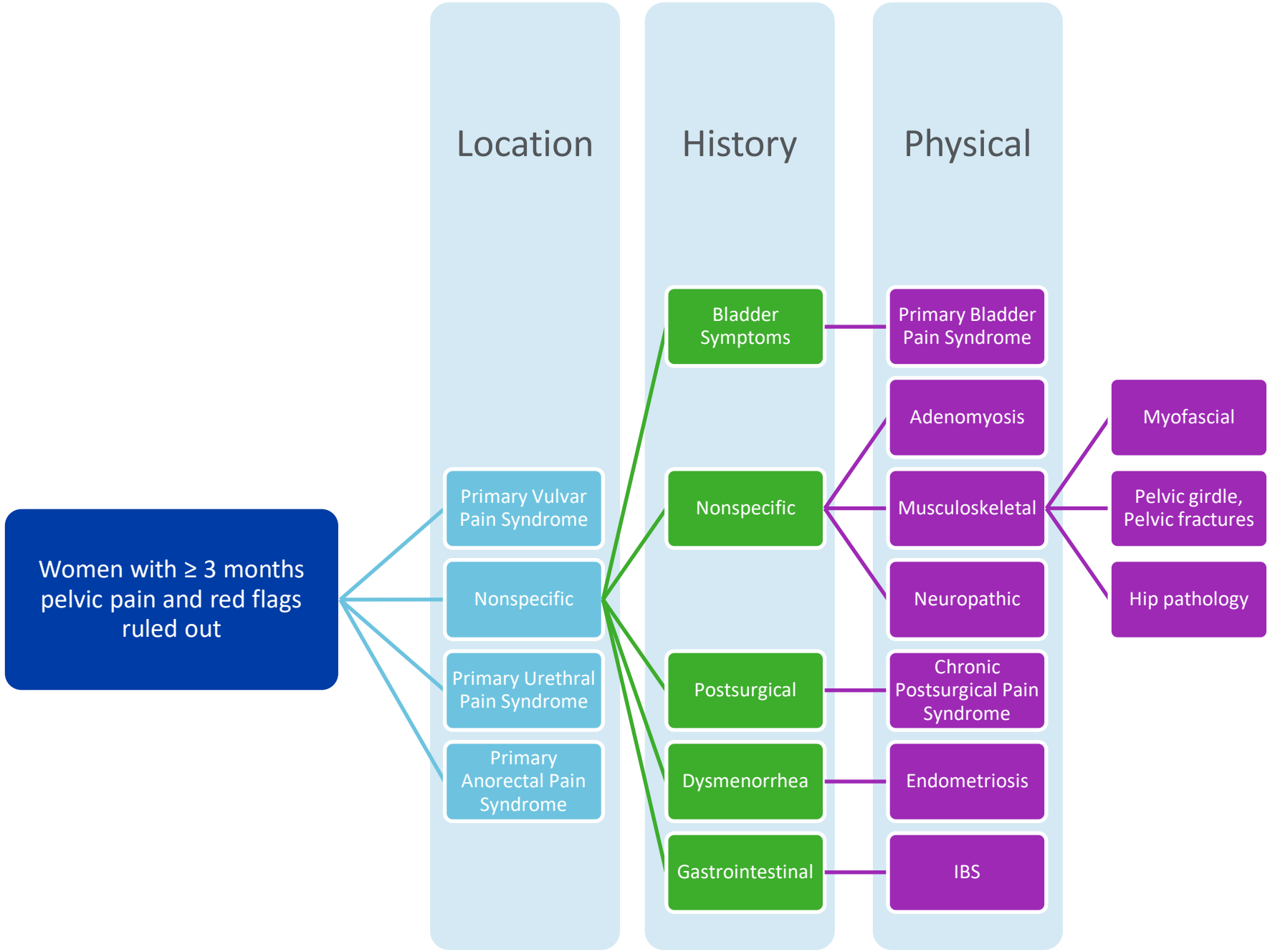
-robust predictor

Depression → pain

-not predictive


Reproductive system
Uterine tube
Ovary
Uterus
Vagina
Urinary system
Bladder
Urethra
Gastrointestinal system
Rectum
Anal canal
Anal aperture
A
Reproductive system
Seminal vesicle
Ductus deferens
Prostate
Ejaculatory duct
Gastrointestinal system
Rectum
Anal canal
Anal aperture
Urinary system
Bladder
Urethra
B


Location
History
Physical
Men with ≥ 3 months pelvic pain and red flags ruled out
Primary Scrotal Pain Syndrome
Nonspecific
Primary Urethral Pain Syndrome
Primary Anorectal Pain Syndrome
Bladder Symptoms
Nonspecific
Postsurgical
Gastrointestinal
Primary Bladder Pain Syndrome
Primary Prostate Pain Syndrome
Musculoskeletal
Neuropathic
Chronic Postsurgical Pain Syndrome
IBS
Myofascial Pain
SI joint, Pubic symphysis, Pelvic insufficiency fractures
Hip pathology


Location
History
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Women with ≥ 3 months pelvic pain and red flags ruled out
Primary Vulvar Pain Syndrome
Nonspecific
Primary Urethral Pain Syndrome
Primary Anorectal Pain Syndrome
Bladder Symptoms
Nonspecific
Postsurgical
Dysmenorrhea
Gastrointestinal
Primary Bladder Pain Syndrome
Adenomyosis
Musculoskeletal
Neuropathic
Chronic Postsurgical Pain Syndrome
Endometriosis
IBS
Myofascial
Pelvic girdle, Pelvic fractures
Hip pathology

Physical exam

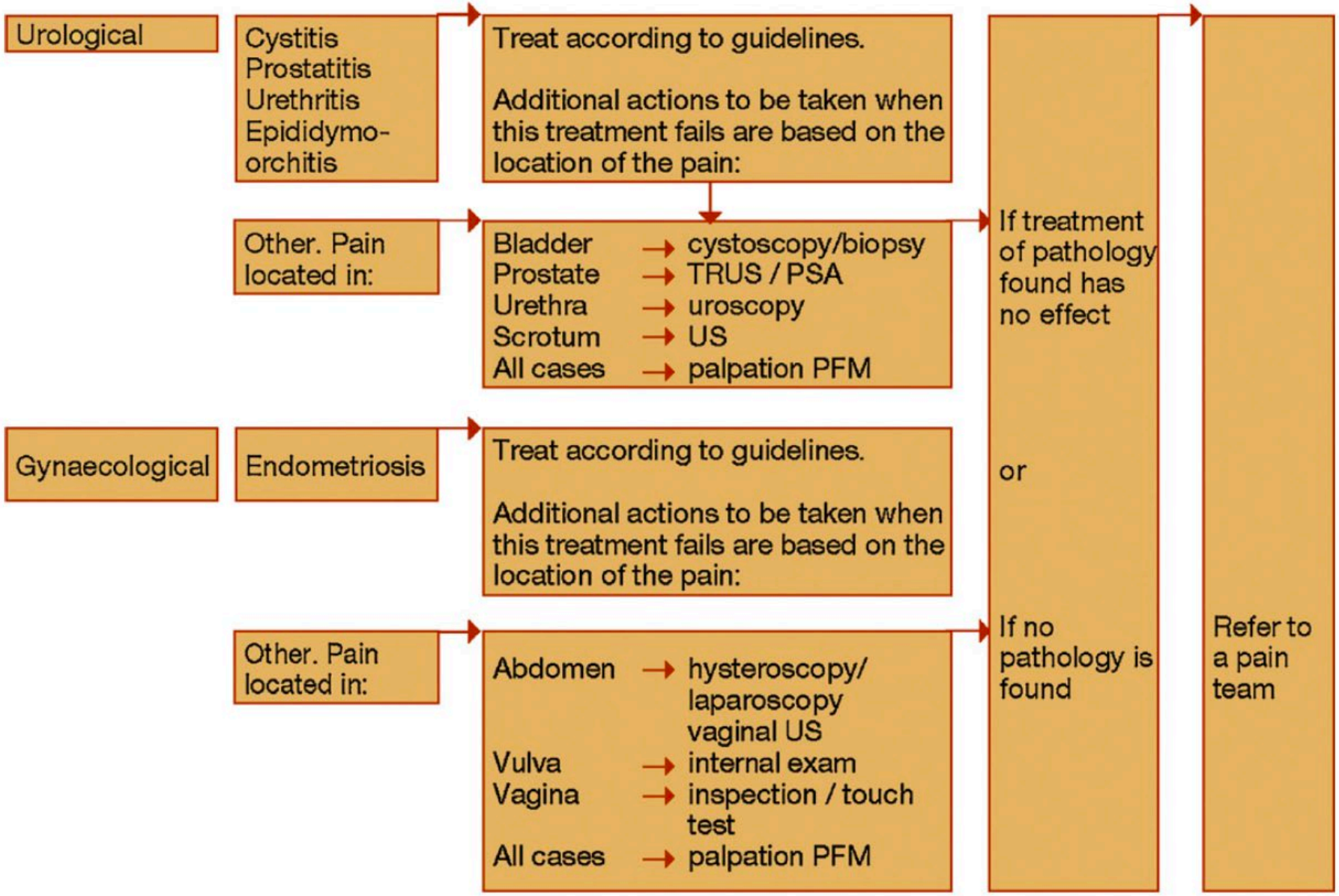
Posture, gait

Lumbosacral spine

Pelvic girdle

Pelvic floor muscles

Allodynia



Fall et al. EAU guidelines on chronic pelvic pain. *Eur Urol*. 2010.

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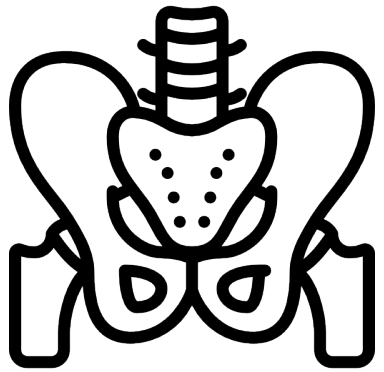


Treatment for CPP

Interdisciplinary (Urology, Gyn, GI, Pain, PCP, Psych)

Sleep, mood, fatigue, sexual dysfunction

Pelvic floor physical therapy

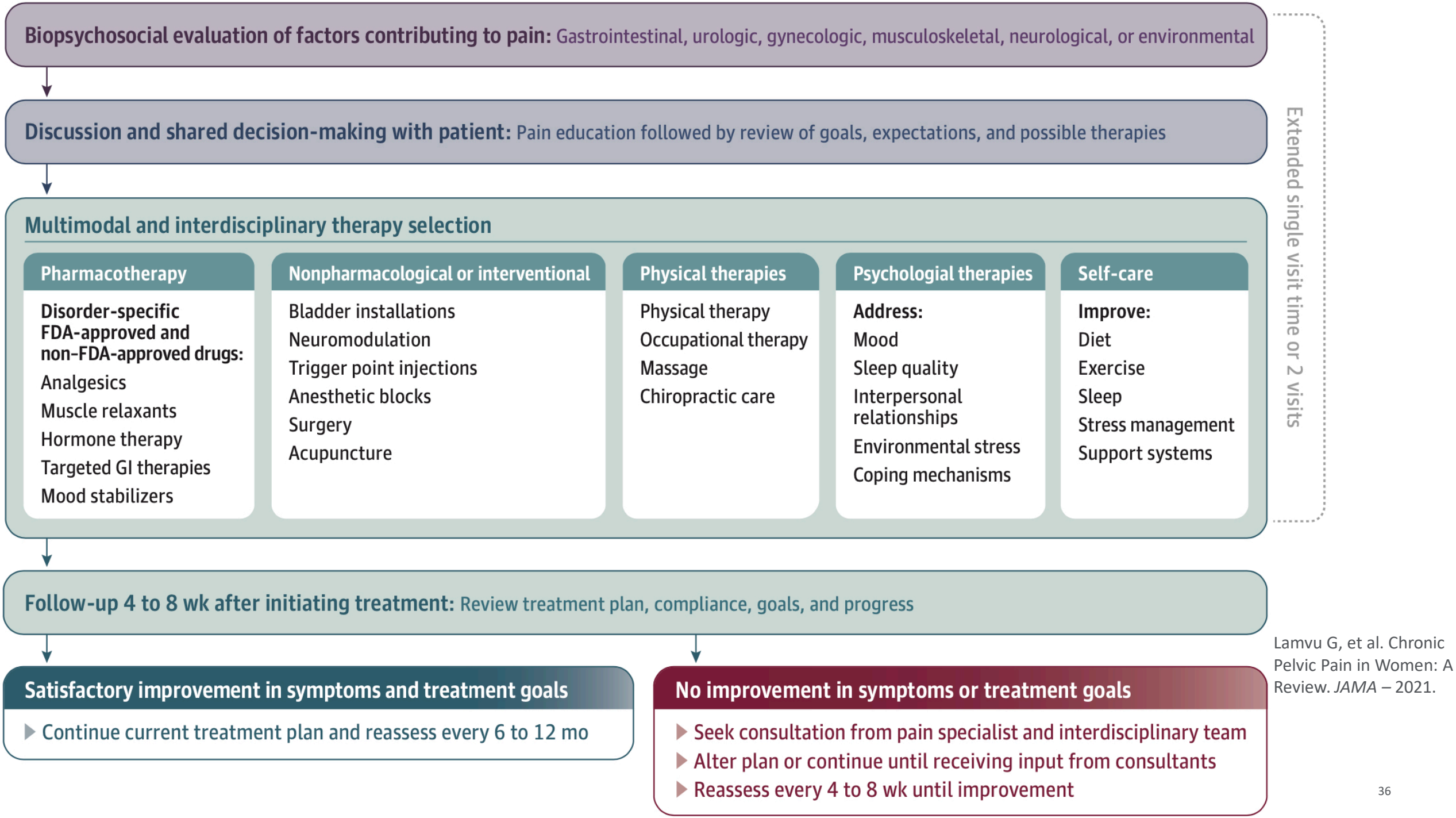
ACOG Guidelines for CPP Treatment (2020)

Pelvic floor PT, sex therapy, CPT

SNRIs, gabapentin/pregabalin

Opioids not recommended

Trigger point injections



Lamvu G, et al. Chronic Pelvic Pain in Women: A Review. *JAMA* – 2021.

Pelvic Floor Physical Therapy

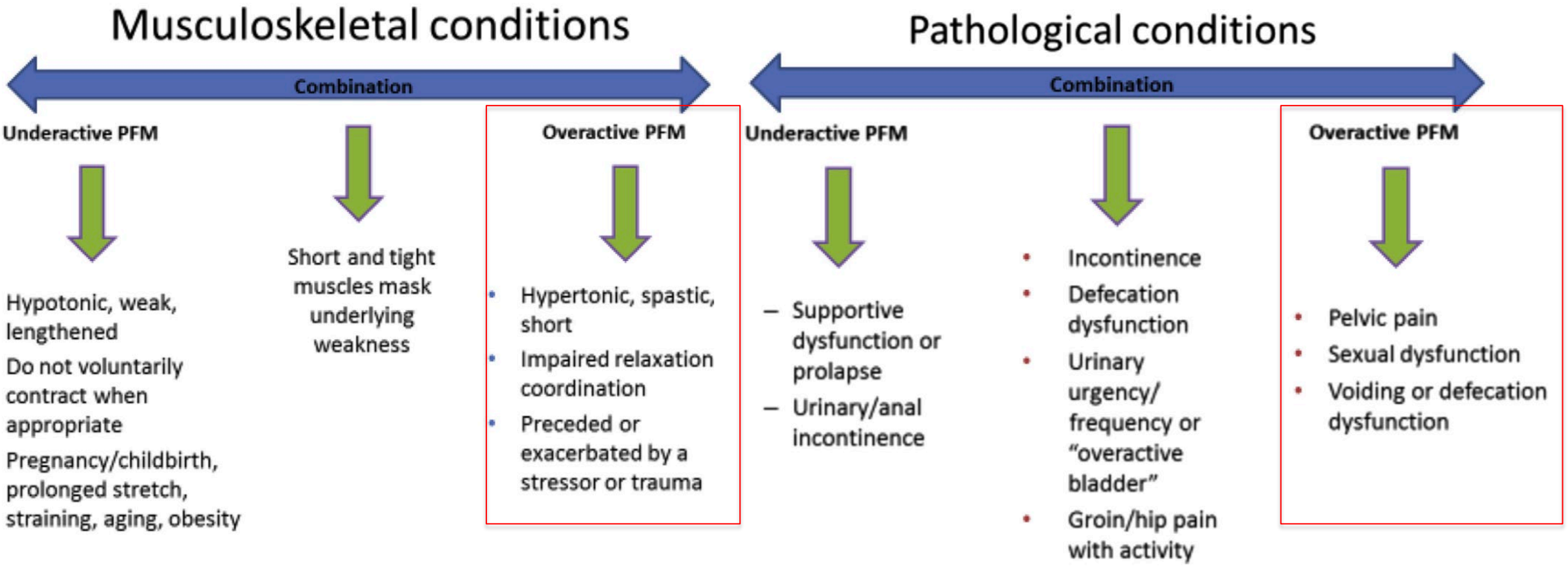
Chronic pelvic pain typically results in hyperactive, contracted muscles

Decreased tone/spasm, promote relaxation, restore length:

-Postural correction

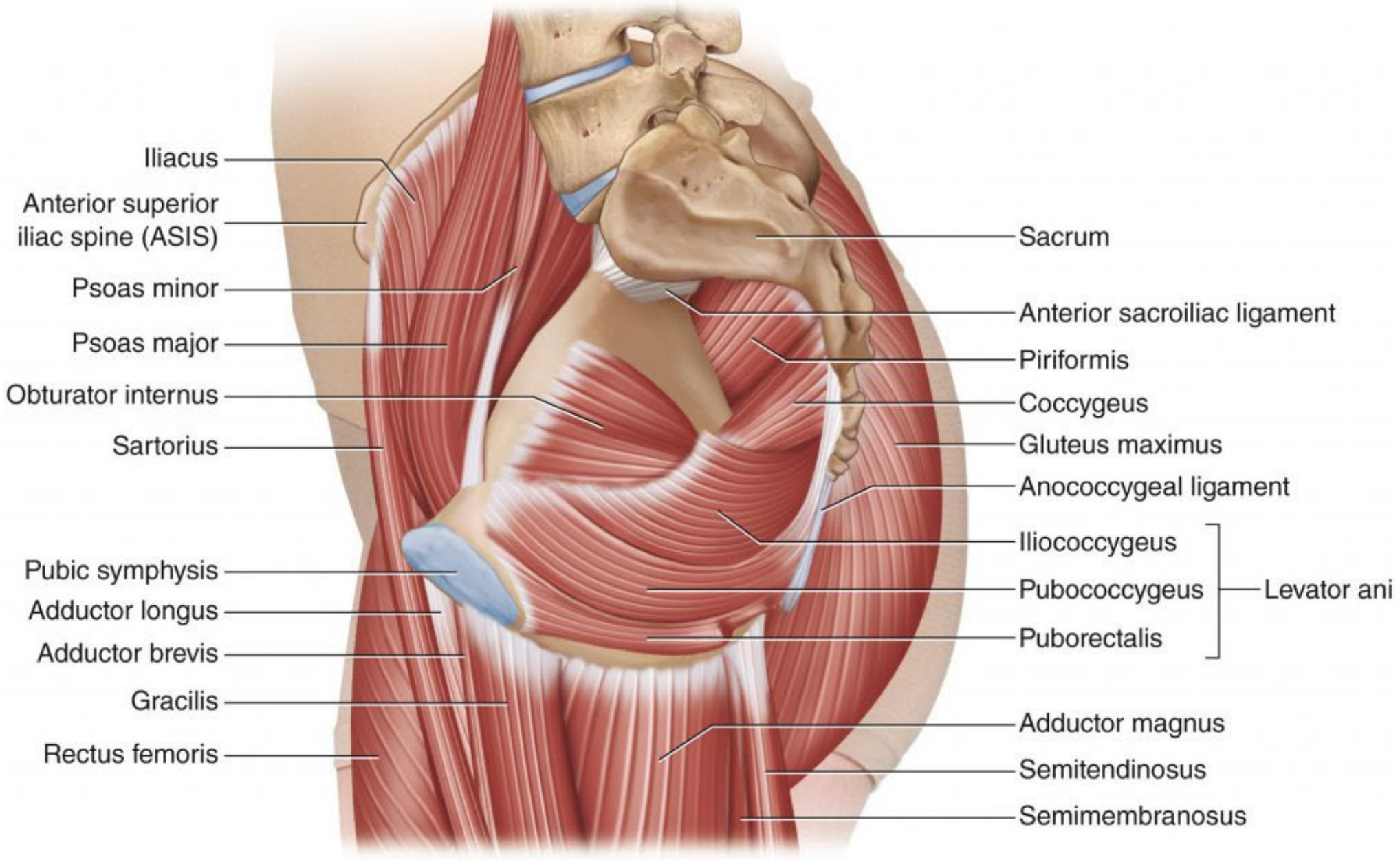
-Biofeedback (e.g. surface EMG)

-Manual therapy



Northwell Health

Bradley et al. Physical Therapy Treatment of Pelvic Pain. *Phys Med Rehabil Clin N Am*. 2017.



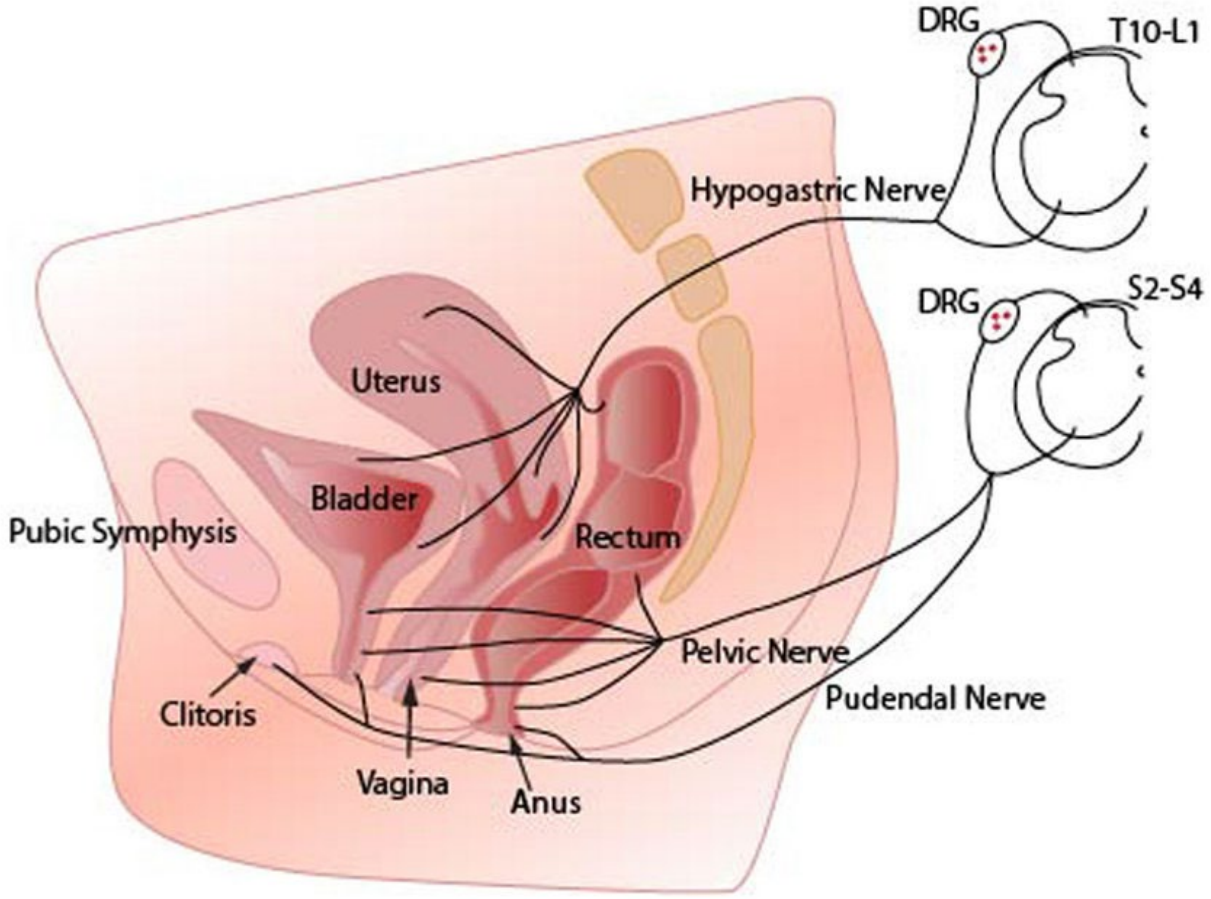
A

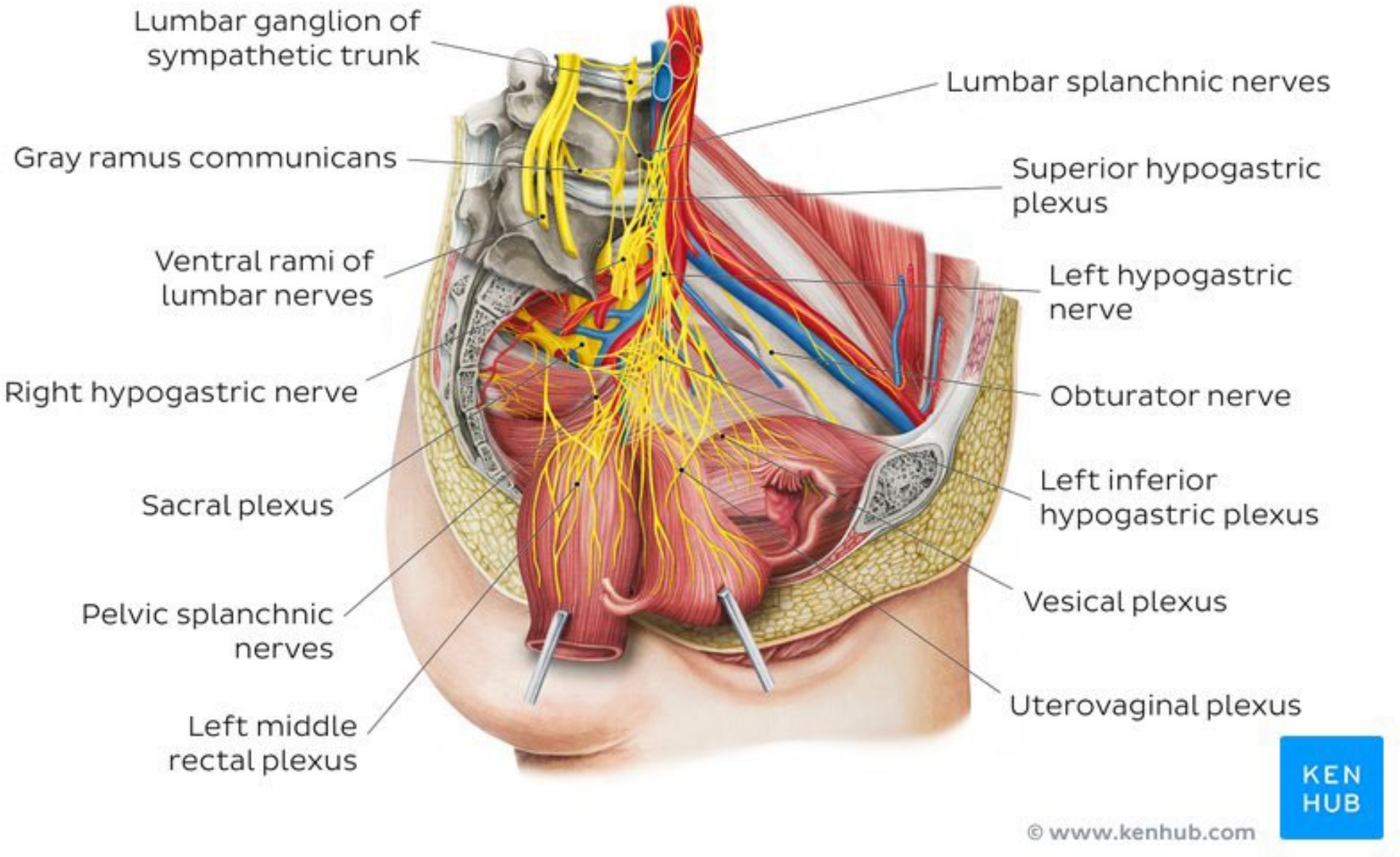
Pelvic innervation – Targets for block/neurolysis

Superior hypogastric plexus – bladder, urethra, vagina, vulva, ovaries, prostate, penis, testicles, uterus, ureter, pelvic floor (perineum), descending colon, and rectum

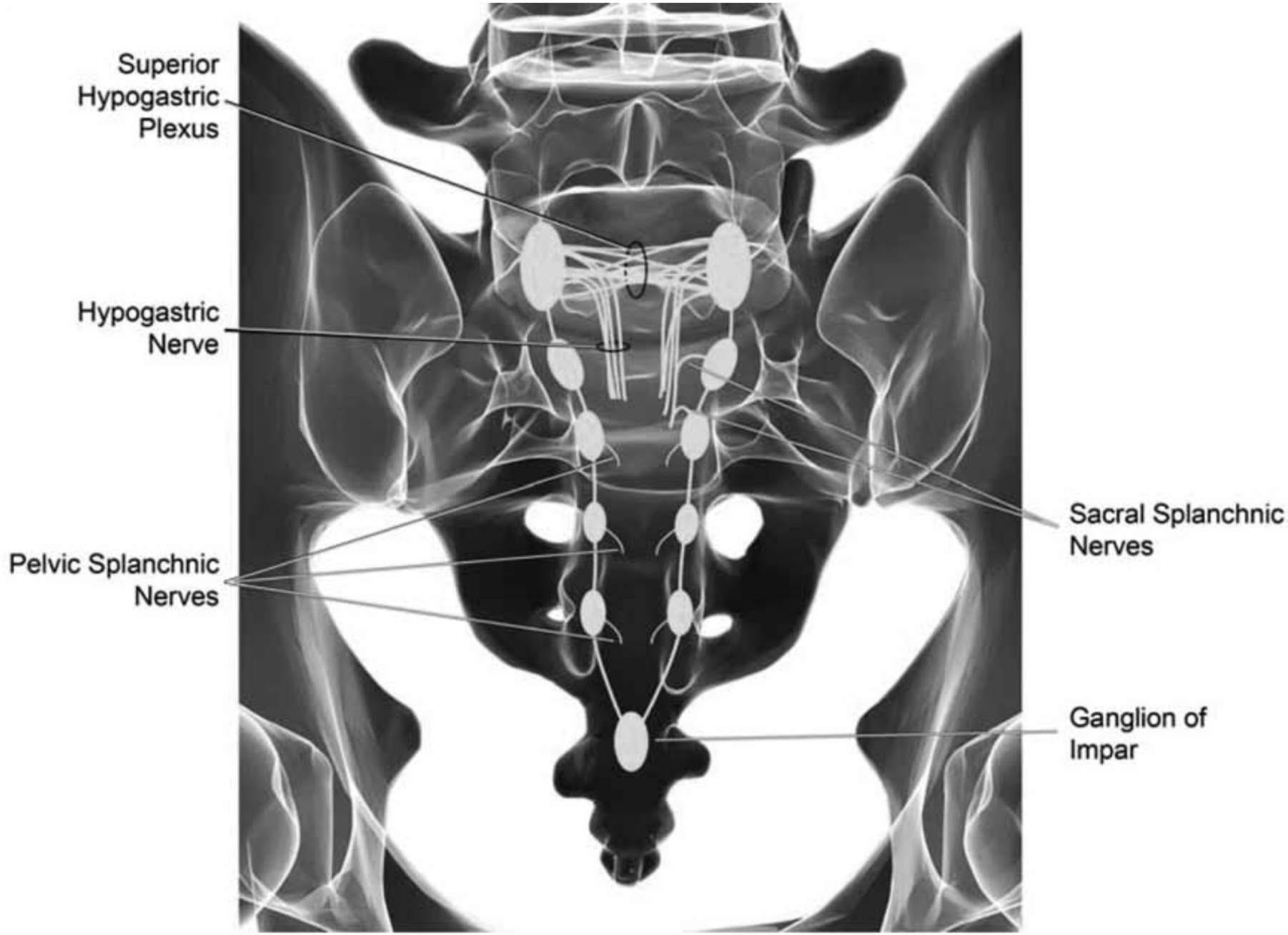
Ganglion Impar – perineum, distal rectum, anus, distal urethra, distal vagina, vulva, coccyx, and scrotum

Pudendal nerve – external genitalia of both men and women (sympathetic to penis), as well as the bladder, rectum, pelvic floor muscles, the skin and muscles of the perineum, the external urethral sphincter, and the ex- ternal anal sphincter





Vaskovic J. Pelvis and perineum.

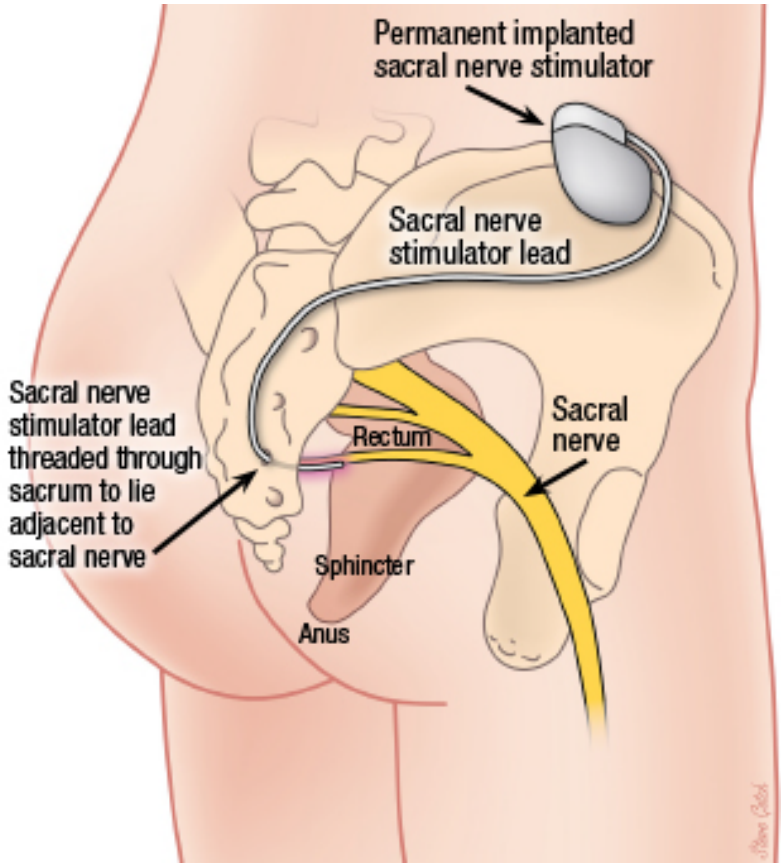


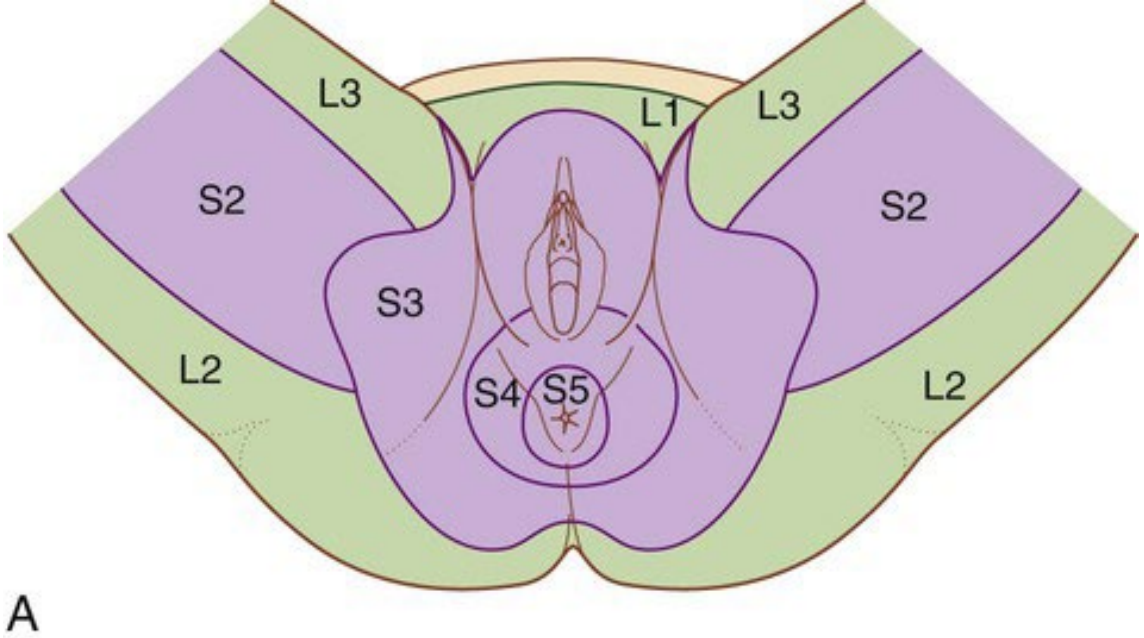
Hunter et al. Anatomy, pathophysiology and interventional therapies for chronic pelvic pain: A review. *Pain Physician*. 2018.

Neuromodulation for chronic pelvic pain

Diagnosis w/ highest rate of DCS explant (33%; Hayek 2015)

Study of 93 patients (Donon 2014) undergoing sacral stimulation showed 49% revision or explant rate at 38 months





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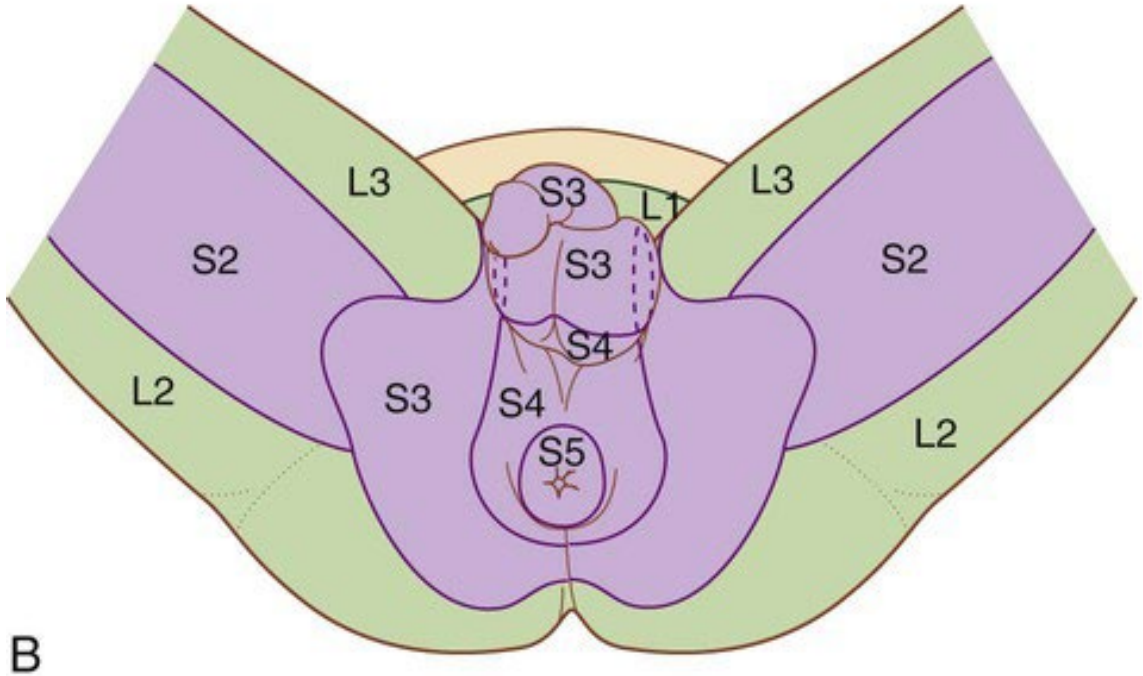


B

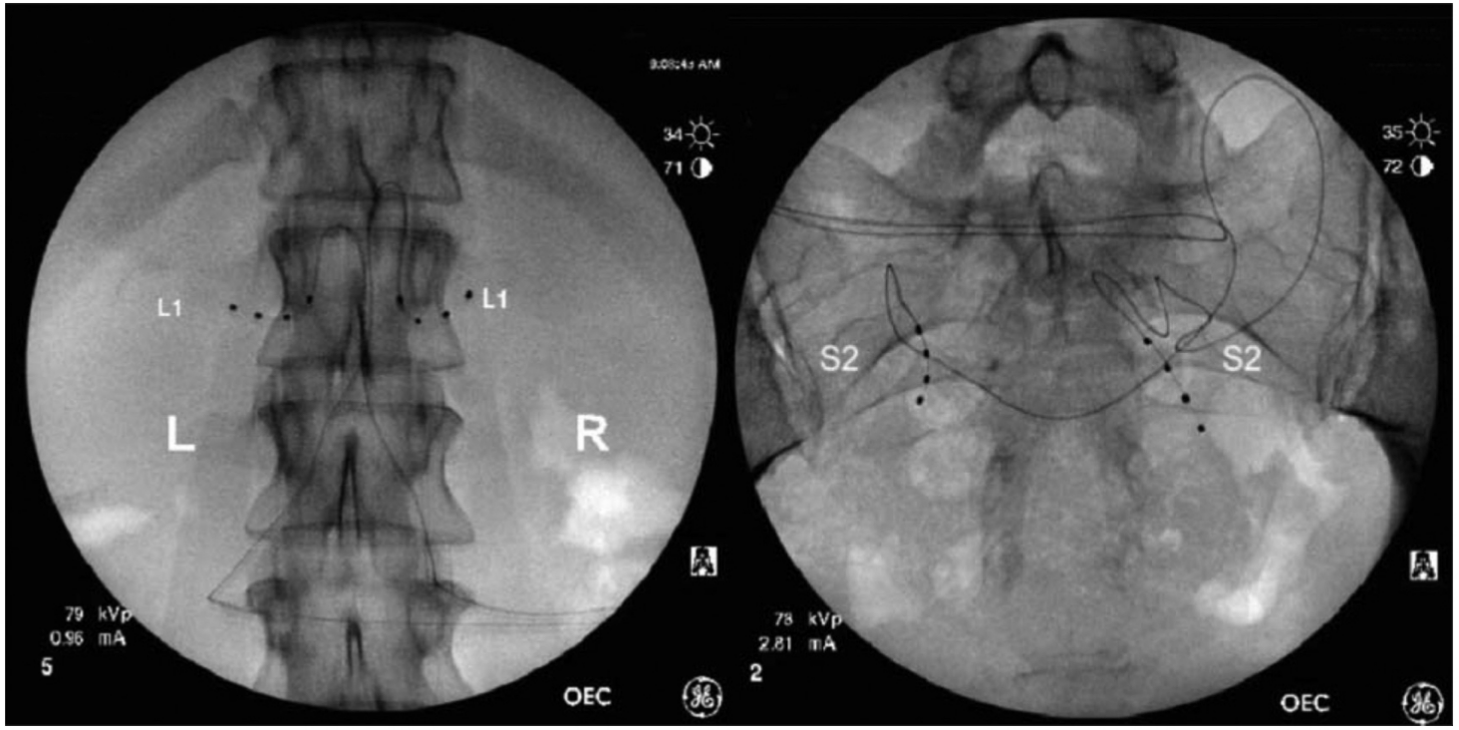
Hayek et al. Treatment-limiting complications of percutaneous spinal cord stimulator implants: A review of eight years of experience from an academic center database. *Neuromodulation*. 2015.

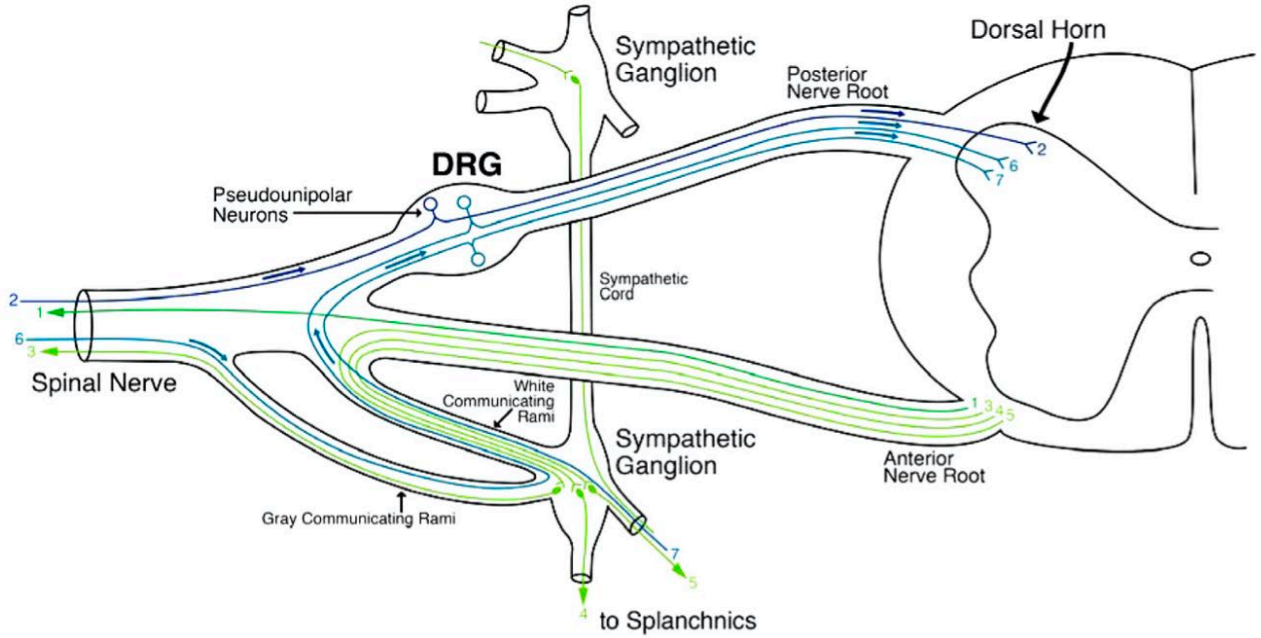
DRG targets

Table 3. *Nerves of the pelvic region and the spinal segments from which they receive innervation.*

Nerve	T12	L1	L2	L3	L4	S1	S2	S3	S4	S5
Iliohypogastric										
Ilioinguinal										
Genitofemoral										
Obturator										
Posterior Femoral Cutaneous										
Inferior Rectal										
Pudendal										
Coccygeal										

Hunter et al. Anatomy, pathophysiology and interventional therapies for chronic pelvic pain: A review. *Pain Physician*. 2018.



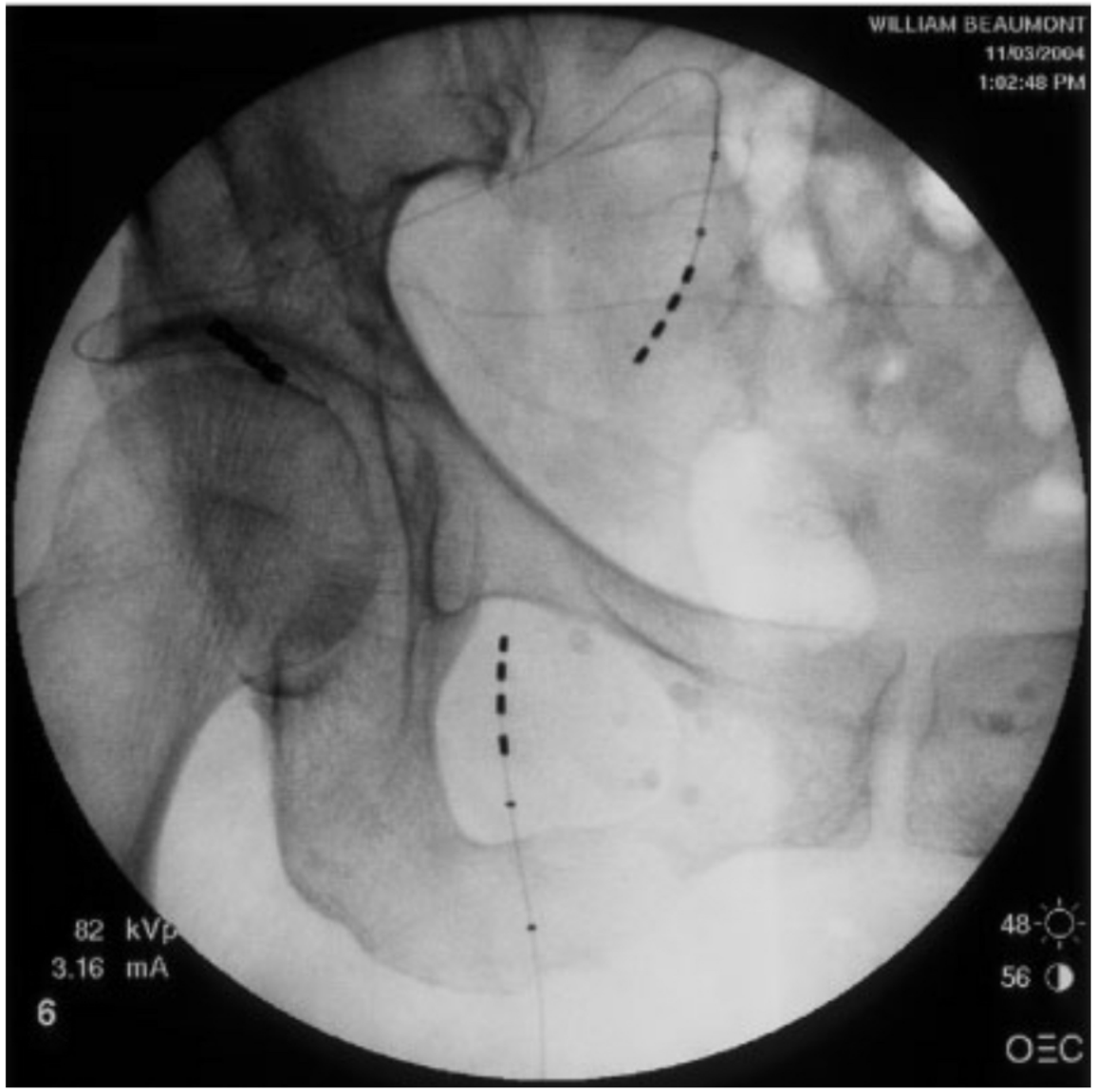


Hunter et al. Dorsal Root Ganglion Stimulation for Chronic Pelvic Pain: A Case Series and Technical Report on a Novel Lead Configuration. *Neuromodulation*. 2019.

Pudendal nerve stimulation

Pudendal nerve stimulation – 19 patient pilot study (Peters 2015)

5 (26%) were explanted at a mean of 2.94 years



Patient reported treatment efficacy

TABLE 2. GRA survey responses indicating changes in pudendal pain after treatments

Treatment	Markedly worse *n*	Moderately worse *n*	Mildly worse *n*	Same *n*	Slightly improved *n*	Moderately improved *n*	Markedly improved *n*
Sacral or pudendal neuromodulation	–	–	–	3	4	1	2
Pudendal block	1	—	1	3	2	—	—
Pudendal nerve release	—	—	—	—	1	—	—
Other nerve injections	—	—	—	2	—	—	—
Pain medications	—	—	—	2	1	—	6
Antidepressants	—	—	1	5	2	—	—
Muscle relaxants	—	—	—	4	2	1	—
Pelvic floor physical therapy	—	1	1	3	1	—	2
Pelvic floor "trigger point" injections	2	—	1	1	—	1	—
Acupuncture	—	—	—	4	—	—	—

Peters et al. Pilot study exploring chronic pudendal neuromodulation as a treatment option for pain associated with pudendal neuralgia. *Low Urin. Tract Symptoms* **2015.**

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Neuromodulation Technique	Description	Indications	Advantages	Disadvantages	References
Percutaneous posterior tibial nerve stimulation	Placement of a fine needle into the posterior tibial nerve approximately 5 cm cephalad to the medial malleolus	Bladder pain syndrome (BPS), Chronic pelvic pain/Chronic prostatitis (CPP/CP)	Minimally invasive, low-risk, easier to perform, relatively cost-effective, no long-term follow-up needed	Need for patients to attend clinic weekly for 12 weeks to complete treatment. Minor side effects including mild pain and bleeding.	[37–45]
Implantable peripheral nerve stimulation devices	Implantation of insulated wire connected to implantable pulse generator to stimulate selected nerve (e.g., pudendal nerve)	Pudendal nerve (BPS, CPP/CP, pudendal neuralgia) genitofemoral, ilioinguinal, iliohypogastric (groin/genital pain)	Good specificity of effect	Requires technical skill, risk of infection, lead migration, and need for long-term follow-up	[46–50]
Sacral neuromodulation	Stimulation of sacral nerve roots by an electric current via an implanted insulated lead wire placed usually along the S3 sacral nerve root	CPP/CP, BPS, groin pain	Relatively widely used, so good evidence base to guide treatment.	Infection, lead migration or malfunction of the pulse generator or pain at the pulse generator site. Challenges in electrode placement.	[17,51–57]
Dorsal root ganglion stimulation	Implantation of an electrode connected to implantable pulse generator over the dorsal root ganglion	Pelvic girdle pain, groin pain	Long-term analgesic effects and specific anatomical targeting of the pain relief, as well as fewer changes in analgesic effect with changes in body posture	Requires technical skill, risk of infection, lead migration, and need for long-term follow up. Fewer large well-conducted trials into DRG stimulation for pelvic pain due to the fact that it is relatively new as a technique for this indication	[58–60]
Spinal cord stimulation	Implantation of an electrode over the dorsal spinal cord in the epidural space	CPP/CP, particularly pudendal neuralgia	Good efficacy in limited number of reported cases	Small number of studies carried out.	[61–66]
Motor cortex stimulation	Stimulation of motor cortex by placement of electrode in epidural space	CPP	May be an option in patients for whom peripheral or spinal neuromodulation was unsuccessful or contraindicated	Limited evidence	[67]
Deep brain stimulation	Stimulation of specific intracranial target by stereotactically placed electrodes	N/A	May be an option in patients for whom peripheral or spinal neuromodulation was unsuccessful or contraindicated	Limited evidence	[68]

Northwell Health

Roy et al. Neuromodulation for pelvic and urogenital pain. *Brain Sci*. 2018.

FDA Approved Indications for Interstim®

Symptoms of overactive bladder

-Urge incontinence

-Urinary frequency

Urinary retention

Chronic fecal incontinence

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Thank You