APTA Pelvic Health℠
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Pregnancy Related Abdominal Wall Neuropathy (PRAWN): An Alternative Theory For Round Ligament Pain

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Webinar Objectives

- Discuss differential diagnoses for abdominal pain in pregnancy
- Define round ligament pain and analyze the current body of evidence as it relates to etiology and treatment
- Define Pregnancy-Related Abdominal Wall Neuropathy (PRAWN) and analyze the current body of evidence as it relates to etiology and treatment
- Compare and contrast objective information as it relates to abdominal wall neuropathy
- Propose alternative diagnoses and rehabilitative treatment strategies for abdominal wall neuropathies in pregnancy

Abdominal Pain During Pregnancy

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Abdominal Pain During Pregnancy

Unexplained Abdominal Pain Evidence

- Unexplained abdominal pain (UAP) during pregnancy can be caused by a wide variety of diseases and disorders[1]
- UAP is responsible for 2% of emergency room visits in the general population[2]
- Non-visceral abdominal pain should also be considered during provider evaluation in pregnancy[2]

TABLE 1: Causes of Abdominal Pain in Pregnant Women by Organ System

Organ System	Cause
Obstetric	Abortion
	Ectopic pregnancy
	Preterm labor
	Placental abruption
	Uterine rupture
Gynecologic	Adnexal mass or ovarian cyst
	Adnexal torsion
	Uterine leiomyoma
	Endometriosis
	Pelvic inflammatory disease
Gastrointestinal	Appendicitis
	Inflammatory bowel disease
	Intestinal obstruction
	Gastroesophageal reflux
	Peptic ulcer disease
Hepatobiliary	HELLP syndrome
	Acute fatty liver of pregnancy
	Cholelithiasis or choledocholithiasis
	Acute cholecystitis
	Acute pancreatitis
	Hepatitis
Genitourinary	Hydronephrosis of pregnancy
	Urolithiasis
	Pyelonephritis
	Cystitis
Vascular	Gonadal vein thrombosis
	Mesenteric vein thrombosis
	Gonadal vein syndrome
	Aneurysm rupture
	Vasculitis

Note—HELLP = hemolysis, elevated liver enzymes, low platelet count.

Abdominal Pain During Pregnancy

Table 1. Diagnoses to Consider as the Source of Torso Wall Pain

I. Chest or abdominal wall pain
- Cutaneous nerve entrapment syndrome, one of the most common conditions leading to this symptom
- Fibromyalgia, widespread musculoskeletal pain and tenderness, associated with depression and anxiety
- Herpes zoster neuralgia, more often with cutaneous clusters of vesicles
- Focal induration, panniculitis, fasciitis
- Nodular lesion, leiomyoma, glomangioma, metastatic carcinoma

II. Chest wall pain
- Costochondritis, multiple areas, usually in the upper costal cartilages there is no swelling
- Slipped rib syndromes, typically costal margin region
- Tietze's syndrome, costosternal, sternoclavicular, or costochondral joints, most often involving the second and third ribs, swelling usually apparent
- Sternalis syndrome, localized tenderness directly over the sternum or overlying sternalis muscle
- Inflammatory disease: rheumatoid arthritis, psoriatic arthritis, systemic lupus erythematosus, relapsing polychondritis, each usually involve additional body regions
- Xiphoidynia, typically over midline: sternal/epigastric region
- Fractures: stress, usually sports injuries from extreme biomechanical load
  Pathological, associated with metastatic infiltration
  Osteoporotic, may be associated with chronic corticosteroid use
- Infection, post-thoracotomy and sternotomy osteomyelitis or fistulae, septic arthritis of chest wall
- Sternoclavicular hyperostosis, swelling may be noted in designated region
- Spontaneous sternoclavicular subluxation, specifically over the sternoclavicular joint

III. Abdominal wall pain
- ○ Abdominal wall defects:
  - Abdominal wall hernias, epigastric, Spigelian, or umbilical
  - Surgical scars, full laparotomy or trocar insertion sites after laparoscopic surgery
- ○ Referred pain:
  - Thoracic nerve radiculopathy, disease in the T7 to T12 nerve roots
  - Thoracic spinal conditions disc prolapse or spinal cord tumors.
  - Pain generated from the ribcage and chest wall, source actually more superior anatomical sites
- ○ Infiltration of abdominal wall
  - rectus sheath hematoma, especially suspected when under anticoagulant therapy
  - abdominal wall endometriosis
- ○ Mechanical:
  - ribs on pelvis syndrome, mechanical friction more common with old and frail in subject with low body mass index.

Round Ligament Pain (RLP)

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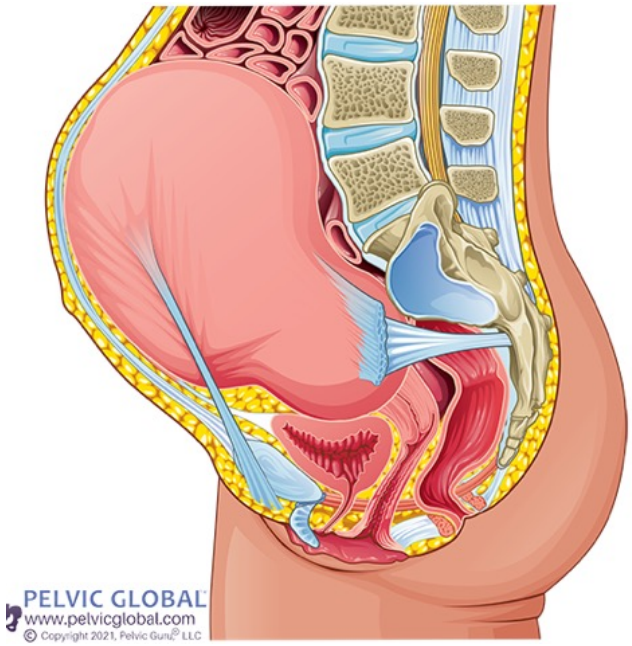
Round Ligament Pain (RLP)

Definitions and Etiology

- There is no literature examining the etiology or definition of round ligament pain[3]
- Popularly described as one of the commonest ailments of pregnancy[4]
- Traditionally attributed to the stretching of the uterine round ligaments during pregnancy[5]



Round Ligament Pain (RLP)

"Unless supportive evidence can be found, medical carers should stop referring to RLP"

Twidale *et al* (2022)[3]

- 203 pregnant patients surveyed with median age of 32.1 years old
- UAP reported by 68.5% of participants
- 43.9% of those were informed of RLP from a medical provider, compared to 7.8% of participants without pain, producing an odds ratio of 95%

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

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Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

Definition

- Abdominal wall pain condition rising from irritation or entrapment of the thoracic and anterior cutaneous nerve(s)[3,6]
- Subgroup of Anterior Cutaneous Neuropathy/Anterior Cutaneous Nerve Entrapment Syndrome (ACNES) which is a subgroup of Abdominal Wall Pain (AWP)[3,6,7]
- Under-recognized and underdiagnosed clinical entity[6,8,9]

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

Etiology

- Thoracic and anterior cutaneous nerves make a 90 degree turn through the abdominal wall fascia in fibrous rings to provide cutaneous sensation to the abdomen[3,8,9]
- Pregnancy is a known risk factor due to mechanical changes and displacement of the abdominal wall ventrally[6,8]

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

Mechanical Stress and Strain[10-12]

- Functional changes in the field of a stretched nerve depend on the magnitude of the deforming force
- Stretching of a mixed nerve sometimes results in the loss of all functions but never motor disability in the absence of sensory defects
- Sensory and motor disturbances may extend beyond the field of the affected nerve

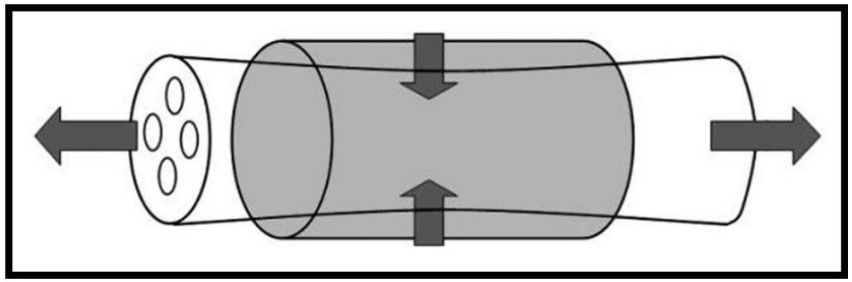

Figure 4.
Physical stresses placed on peripheral nerve. Tensile stress applied longitudinally to peripheral nerve creates an elongation of the nerve (an increase in strain). The transverse contraction that occurs during this elongation is greatest at the middle of the section undergoing tensile stress.

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

"Physical therapists with an understanding of the adaptive responses of nerves to specific physical stresses will be better prepared to provide reasonable interventions to modify specific aspects of the stresses."

Topp *et al* (2006)[12]

- Under normal physiological conditions, nerves are exposed to various mechanical stresses
- Tensile, compressive and/or shear stresses impact the nervous system
- Repetitive application of a consistent tensile stress will result in a progressive increase in nerve strain

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

Tensile Stress and Compression in Pregnancy

- Tensile stress secondary to ventral displacement of abdominal wall tissues[6,8]
- Compression potential due to anatomic pathway of intercostal nerves[9]
  - Run between IO and TA until they reach the RA
  - 90 degree turn to enter rectus channels
  - Muscle contraction contributes to further compression

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

Diagnostics[9]

- Locoregional pain at the abdominal wall
- Tender spot/TrP at the abdominal wall
- Positive Carnett's test
- Positive skin pinch test and/or altered skin perception to light touch and/or cold at the area of most intense pain
- Normal lab findings and negative imaging
- Temporary positive pain relief with local anesthetic at the TrP

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

Treatment Approaches

- Multimodal approach encouraged, however the best approach is yet to be defined[9]
- Wet needle therapy[2,3,6-9]
- Physical Therapy[12]
- Activity modification
- Patient education

Pregnancy-Related Abdominal Wall Neuropathy (PRAWN)

"We propose that PRAWN exists, is easily diagnosed and can be treated…Our long term hypothesis is that the so called 'Round Ligament Pain' is actually PRAWN."

Halpin *et al* (2021)[6]

Questions & Answers

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Thank You

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