Pelvic Physical Therapy Distance Journal Club
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[4]*Are pelvic pain and increased pelvic floor muscle tone associated in women with persistent noncancer pelvic pain? A systematic review and meta-analysis. Kadah S, Soh SE, Morin M, et al. J of Sex Med 2023;20:1206-1221. Doi.org/10.1093/jsxmed/qdad089.*

INTRODUCTION

Article abbreviations

PNCPP persistent noncancer pelvic pain
PFM pelvic floor muscles

- Terminology used: persistent noncancer pelvic pain, persistent pelvic pain (**reviewer note**: when using PNCPP and PPP terminology the article references articles 1-4 that refer to chronic pelvic pain (CPP), this continues throughout the article and most references are to paper describing CPP)
    - Pelvic Pain
        - >3 months
        - 20% gynecologic visits
        - Hypothesized to be related to increased PFM tone

AIMS

1. synthesize evidence related to the association between pelvic pain and PFM tone in women with pelvic pain
    -strength of the association between pain and tone
    -linear association between pain and tone

METHODS

- Followed PRISMA guidelines
- Registered in PROSPERO (CRD42020139584)

Eligibility

- women
- ≥18 years
- data on PNCPP and PFM tone
- All study designs (except case reports and reviews)

Exclusions

- neurologic conditions
- medications that could affect muscle tone

Data extraction

- year and country of study, study design, sample size, pelvic pain diagnosis, participant age, nulliparous proportion, menopausal status, body mass index, pelvic pain measure, duration of pelvic pain, mean pain intensity, and PFM tone measure

- If there were multiple data collection time points, only the baseline measure was extracted
- Odds ratio (OR) values extracted or calculated where possible
- OR was calculated:

  $$\frac{\text{Odds of event in pain group } (a/b)}{\text{Odds of even in control } (c/d)}$$
- In studies that assessed PFM tone with a rating scale, any values scored as normal or low tone were categorized as normal tone, while any values scored as greater than normal PFM tone were categorized as increased PFM tone
- Pearson (r)or Spearman(ρ) correlation coefficients were extracted or calculated where possible to investigate the linear association between pelvic pain and PFM tone

Data items

Pelvic pain (patient-reported outcome measures)
- self-reported pelvic pain (dichotomous: yes/no)
- Numeric rating scale (NRS) or visual analog scale (VAS) at rest (unprovoked), provoked (eg, intercourse, cotton swab test)
- patient questionnaires (eg, McGill Pain Questionnaire)

Pelvic pain (clinician reported outcome measures)
- algometry (pressure pain threshold and intensity)
- cotton swab test of vulvar vestibule
- digital palpation (intensity)

Tone
- digital palpation
- sEMG
- dynamometry
- pressure manometry
- US
- strain elastography
- pressure myotonography

Quality

The National Heart, Lung and Blood Institute's Quality Assessment Tools for Observational Cohort and Cross-sectional Studies

RESULTS

Studies: 24, (16 cross-sectional, 5 prospective cohort, 1 retrospective cohort, 1 case-control, 1 randomized controlled trial)

Participants:
- 7-529 participants
- 23-74 years
- nulliparous and premenopausal (n=11)

Conditions: vulvodynia (n=10 studies), endometriosis (n=5), IC/BPS (n=2), not-defined (n=4), dyspareunia (n=1)
Reviewer note: some of these conditions are not "persistent" as defined by the ICS Standard for Terminology in chronic pelvic pain syndromes (2017)[5], they are either cyclical or episodic/recurrent.
Characteristics:

- pain duration (mean: 2-10 years, 12 studies did not report)
- pain intensity-unprovoked pain (mean: 4.5-5.6/10, 2 studies-no report, 4 studies-median: 0.4-5/10, 1 study-VAS scale 0-100 mean: 45/100).
- Pain intensity-provoked pain-intercourse (mean: 4.4-7.8/10, 3 studies-no report, 1 study-VAS scale 0-100 mean: 54/100).
- Pain intensity-provoked pain-cotton swab test (mean vulvar pain: NRS 3.8-5.5/10, 1 study-median: 3/10)
- Pain intensity-provoked pain-digital palpation or algometry pressure (mean: NRS 3.6-5.9/10, 1 study-VAS scale 0-100 mean: 16.3/100)

Study quality:
Score: mean 8/10 (range 5-10)
Sample size: calculated in 12 studies
Blinding of assessors: 13 studies
Measures: 17 studies had objective assessment tools
Synthesis of results:
Pelvic pain assessment (Supplementary data 2)

- Patient-reported outcome: 17 studies
- Clinician reported outcome measures: 4 studies
- Both: 3 studies

Meta-analysis results, Associations:
DIGITAL PALPATION
Pelvic pain and tone-digital palpation/resistance
6 studies (Hellman, Thibault-Gagnon, Fraga, Dos Bispo, Loving, Cameron [50% in Worman review, none provide convincing evidence, digital palpation is not a valid measure) assessed tone with digital palpation: 4 different tone scales
4 studies examined association between pain and tone: clinical outcome measures, pain intensity during cotton swab test, algometry, patient-reported outcome (pain during intercourse)

- Pain significantly associated with greater tone in women with endometriosis (n=190), pelvic pain (n=47), dyspareunia (n=90), provoked vestibulodynia (n=38), IC/BPS (n=23)

Pelvic pain intensity and tone-digital palpation/resistance
3 studies (Fraga, Hellman, Lev-Sagie)

- Weak, nonsignificant association (r=0.11; 95% CI, –0.43 to 0.65).

Vulvar pain intensity and tone-digital palpation/resistance
2 studies (Thibault-Gagnon, Lev-Sagie)

- Nonsignificant association (*r*=0.08; 95% CI, -010-0.27)

Pelvic pain intensity and tone-digital palpation/flexibility
1 study (Hellman)

- Negative, weak, and nonsignificant associations (pelvic pain: *r*=0.13; 95% CI, –0.58 to 0.32; IC/PBS: r =−0.02; 95% CI, –0.47 to 0.43)

Pelvic pain intensity and tone-digital palpation/relaxation
1 study

- Negative, weak and nonsignificant associations (pain: r=-0.27-0.18; 95% CI, -0.72; IC/PBS (r=-0.08; 95% CI, -0.53-0.37)

Pelvic pain threshold and tone-digital palpation/resistance
2 studies

- Negative, weak and nonsignificant association (*r* =−0.19; 95% CI, –0.63 to 0.25)

EMG
Pelvic pain and tone-EMG
4 studies (3 included in meta-analysis: Morin, Naess, Dias)

- Negligible and nonsignificant association (r =0.05; 95% CI, –0.21 to 0.32)

DYNAMOMETRY
Pelvic pain and tone-dynamometry/intercourse
3 studies (Fontaine, Benoit-Piau, Morin 2017)

- No correlation between passive resistance (initial: dynamometry branches closed [10mm]; maximal: branches moved to tolerance) or passive elastic stiffness (change in forces/change in vaginal aperture N/mm at minimal, maximal and common [15mm] apertures)
- Negative, weak and significant association between flexibility (maximal aperture) (r=-0.29; 95% CI, -0.42 to -0.17)

MANOMETRY
Pelvic pain intensity and tone-Manometry
3 studies (Naess, Tennfjord, Nesbitt-Hawes)

- Negligible and nonsignificant association for resting pressure in dyspareunia, pelvic pain or provoked vestibulodynia (r=0.03; 95%CI, -0.13 to 0.20)

ULTRASOUND

Pelvic pain and tone-ultrasound

7 studies: Levator hiatus area: (**Provoked**: Del Forno, Fontaine, Thibault-Gagnon, Nesbitt-Hawes, Morin); Levator hiatus area (**Unprovoked**: Carmo, Del Forno, Nesbitt-Hawes)

- Negative, negligible and nonsignificant association (r=-0.02; 95% CI, -0.14 to 0.07)

5 studies: Levator hiatus-AP (**Provoked:** Fontaine, Nesbitt-Hawes, Thibault-Gagnon, Morin; **Unprovoked**: Carmo, Nesbitt-Hawes)

- Negative, negligible, and nonsignificant (r =−0.03; 95% CI, –0.10 to 0.07)

5 studies: LH-LR (**Provoked:** Fontaine, Nesbitt-Hawes, Thibault-Gagnon, Morin; **Unprovoked:** Carmo, Nesbitt-Hawes)

- Negative, negligible, and nonsignificant association (r =−0.03; 95% CI, – 0.20 to 0.26)

2 studies: ARA (**Provoked:** Fontaine, Mclean, Morin)

- Negative, weak, and nonsignificant association (r =−0.11; 95% CI, –0.30 to 0.08)

STRAIN ELASTOGRAPHY

1 study: (Abe-Takahashi)

- Weak and nonsignificant association between pain (McGill Pain Questionnaire or VAS) (r = 0.12; 95% CI, –0.39 to 0.63) and tone (r =0.18; 95% CI, –0.33 to 0.69)

MYOTONOGRAPHY

1 study: (Davidson-abstract)

- Negative, weak, and nonsignificant association between vulvar pain intensity (NRS-CST) in and stiffness (r =−0.26; 95% CI, –0.61 to provoked 0.09).
- Negative, weak, and a nonsignificant association pain severity (McGill Pain Questionnaire) (unprovoked pelvic pain) and PFM stiffness (r =−0.15; 95% CI, –0.50 to 0.20)

DISCUSSION

- Significant and positive association between pelvic pain and increased tone assessed with digital palpation
    - Should be interpreted with caution as digital palpation is not a robust measure
    - Consider that association from odds ratios are different to correlation coefficient
        - OR compares odds of women with pain experiencing tone, quantifying strength of association between 2 variables
        - Correlation is a linear association between pain and tone
        - Wide confidence intervals around the studies were observed, reducing certainty of associations

        - More objective assessment methods are required to assess the associations to reduce bias and increase measurement precision
- Weak, significant but negative association was found between pelvic pain and flexibility with dynamometry
    - Weak association with dynamometry may be explained by pain provocation
- Associations were not observed between pain and tone for other tools (EMG, manometry, ultrasound, strain elastography and myotonometry
    - One explanation for not detecting linear association using other measures is that it may not exist
    - Or that higher tone may not be problematic
    - Tone may vary among individuals
        - May have greater tone due to stronger muscles
    - Tone may not may not be related to pain
- Association may not appear until certain levels of pain intensity are reached or plateau beyond certain levels of pain
- Studies included women with low to moderate pain in some studies
    - Only 5 studies prespecified a level of >3 on NRS
        - Weak to moderate associations
        - May be no association with low to moderate pain
            - Suggest future work should recruit moderate to high pain

CLINICAL IMPLICATIONS

Pelvic pain is complex and may have biologic, psychologic and social factors

- Consider: bio, psycho and social factors (pain catastrophizing, partner support, flexibility, strength, etc.)

LIMITATIONS

Unable to perform meta-analysis due to:

- Variability of methods
- Low number of studies

Nonlinear association and impact of biopsychosocial factors on the association between pain and tone were not assessed

(**Reviewer Comment:** study is limited to adults and females)

CONCLUSION/SUMMARY

- Pelvic pain may be significantly associated with greater tone (digital palpation) and decreased flexibility (dynamometry)
- Review did not find linear associations between pelvic pain with other tools
- Future research: use valid and reliable assessment method to determine associations and investigate other factors:
    - Pain severity

    - Pain duration
    - Different pain conditions
- More work is needed to evaluate the influence of these factors in treatment planning for women with pelvic pain

REVIEWER COMMENTS

The authors have chosen an over-arching term, "persistent non-cancerous pelvic pain" for the article, however, not all topics in the article are persistent. They do separate the persistent (unprovoked) from the non-persistent (provoked) throughout the article. The phrasing "persistent" is problematic, especially in pelvic health where conditions such as dyspareunia and provoked vestibulodynia that are recurrent/episodic in nature and conditions such as endometriosis and dysmenorrhea that are very cyclical in nature. The non-synonymous swap from chronic to persistent seems to have stemmed from the NOI group and Diarmuid Denney /Physio Pain Association work in the UK with the idea that "chronic" has terminal implications that may be driving the psychophysiologic factors preventing a patient from thinking they can overcome a condition, despite the fact that the word chronic comes from the Greek "time," and indicates the time since onset of the symptoms. However, there is very little evidence or consensus to support this change nor is there qualitative evidence inviting patients to decide what they prefer. In other words, there is no indication that it actually has terminal meaning to patients. And yet, we have made a non-synonymous swap of these terms. An article by Kennedy in 2014 highlights that the semantic distinction between chronic and persistent drastically changes the prevalence when conducting a survey.[6] In other words, you won't pick up all the cases on a survey depending on the word you use because people classify themselves. Most adults with conditions such as arthritis, carpal tunnel, back or joint pain do not describe their pain as persistent. Of the people who do report persistent pain, 67.2% state that it is constantly present, further highlighting why persistent is not the better overarching term in many pelvic health conditions. The "standard for terminology in chronic pelvic pain syndromes: A report from the chronic pelvic pain working group of the international continence society" also suggest that chronic pain may be further characterized by it's modality as either persistent and/or continuous, recurrent and/or episodic and/or cyclic. Therefore, persistent is a characterization of chronic pain, it is not equivalent to chronic pain.[5] These distinctions are important in pelvic health. Further, the International Association for the Study of Pain (IASP) has suggested that pain be classified more broadly as nociceptive, nociplastic or neuropathic[7,8], moving away from timeline terminology in pain and this would be especially important in pelvic pain.

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"E. Chronic Pelvic Pain—Chronic pelvic pain is characterized by persistent pain lasting longer than 6 months or recurrent episodes of abdominal/pelvic pain, hypersensitivity or discomfort often associated with elimination changes, and sexual dysfunction often in the absence of organic etiology.20"[5]

"H. Characteristics
a. Duration of pain: Six months or more of persistent pain.FN4
b. Location of pain: Pelvis, lower abdomen, low back, medial aspect of thigh, inguinal area, perineum.
c. Perception of pain: Patients may describe the pain as sharp, burning, aching, shooting, stabbing, pressure or discomfort, sexual pain (dyspareunia).22 FN5
d. Modality of pain (7): Persistent and/or continuous, recurrent and/or episodic and/or cyclic (related to menstrual cycle)."[5]

Kadah 2023-2 Parameter, Author, Year	**Cond**	**Worman 2022** Included	**Worman 2022 Convincing** -Yes, No, **NC (no comparison)**	**Control**
Abe-Takahashi (2021)				
Benoit-Piau (2018)		✓	No	No
Cameron (2019)				
Carmo (2021)				
Davidson (2015)				
Del Forno (2021)				
Del Forno (2020)		✓		
Dias (2020)		✓		
Dos Bispo (2016)		✓	No	No
Fontaine (2018)		✓	No	No
Fraga (2021)				
Hellman (2015)	CPP, IC/BPS			Yes (Digital palpation)
Jantos (2008)				
Lev-Sagie (2020)		✓	No	No

Loving (2014)		✓	No	Yes (Digital palpation)
Mabrouk (2020)		✓	No	Yes (Ultrasound)
McLean (2016)				
Morin (2017)		✓	Yes	Yes (Dynamometry)
Morin (2014)		✓	No	Yes (Ultrasound)
Naess (2015)		✓	Yes	Yes (Manometry)
Nesbitt-Hawes (2013)	Pelvic pain: dysmenorrhea, dyspareunia, dyschesia, non-menstrual pelvic pain	✓	No	No
Nesbitt-Hawes (2018)				
Tennfjord (2014)				
Thibault-Gagnon (2018)		✓	No	Yes (Digital Palpation)

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