Pelvic Pain and the Use of Extracorporeal Shock Wave Therapy (ESWT)

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Abstract

Chronic pelvic pain (CPP) is a heterogeneous condition affecting individuals of both sexes and may originate from urological, gynecological, gastroenterological, musculoskeletal, and neurological structures. Over the past three years (2023–2025), multiple clinical studies, reviews, and meta-analyses have evaluated the use of focused extracorporeal shock waves treatment (ESWT), low-intensity shock waves (Li-ESWT) and radial pressure waves (RPW), on specific CPP subtypes, particularly chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS), pelvic floor myofascial pain, and vulvodynia/vestibulodynia. Recent evidence suggests benefits in pain reduction and functional improvement in the short and medium term, with a favorable safety profile; however, methodological limitations and protocol heterogeneity persist.

Keywords: Chronic pelvic pain syndrome; Shock waves; Pelvic floor myofascial pain; Chronic prostatitis; Vulvodynia; Vestibulodynia.

Introduction

This review compiles and synthesizes evidence published between December 2022 and December 2025 regarding the use of shock wave and radial pressure wave therapy in pelvic pain. It includes a review of relevant pathophysiology, treatment modalities, proposed mechanisms of action, a summary of recent clinical evidence (trials and reviews), safety considerations, limitations, and practical recommendations. A comparative table of recent studies and practical examples of protocols reported in the literature is also included.

Definition and relevant clinical subtypes

Chronic pelvic pain (CPP): pain located in the pelvic region lasting ≥3 months, associated with functional impairment and reduced quality of life. [1]

Chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS) in males: perineal, scrotal, suprapubic, or urethral pain without demonstrable bacterial infection; commonly assessed using the NIH Chronic Prostatitis Symptom Index (NIH-CPSI). [1,2]

Pelvic floor myofascial pain: trigger points and spasm of the levator ani and perineal muscles.

Vulvodynia (provoked or generalized): chronic vulvar pain, often associated with a myofascial component and peripheral/central sensitization.

Types of mechanical waves and technical parameters

Focused shock wave treatment (fESWT): energy concentrated at a focal point, allowing greater tissue penetration; indicated for deeper structures.

Low-intensity shock wave therapy (Li-ESWT): protocols using low energy per pulse over multiple sessions; widely applied in CP/CPPS and functional urology. [2]

Radial pressure wave (RPW) therapy: more dispersed and superficial energy; frequently used over muscular trigger points and superficial pelvic floor tissues.

Parameters reported in the literature

- Energy flux density (mJ/mm^2) or pressure (bar), depending on the device.
- Number of pulses per session: typically 1,000–3,000 in musculoskeletal studies; 1,500–3,000 in CP/CPPS.
- Treatment frequency: from one to three sessions per week.
- Number of sessions: ranging from 4 to 12, depending on the protocol.

Note: Parameter heterogeneity represents a major limitation, hindering direct comparisons between studies.

Proposed mechanisms of action

- Modulation of local inflammation: reduction of pro-inflammatory mediators and stimulation of reparative processes.
- Angiogenic stimulation and microvascular improvement: enhanced tissue perfusion that may promote recovery.
- Effects on trigger points and muscle tone: mechanical disruption or neuromuscular reprogramming leading to reduced muscle spasm.
- Neuromodulation: alteration of peripheral nociceptive transmission and potential reduction of central sensitization. [2,3]

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Table 1: summarizes representative studies; protocol details and PMIDs are provided in the reference section.

Year	First Author	Design	Population	ESWT Protocol (Summary)	Main Outcomes
2023	Skaudickas D.[1]	Prospective series / 48-week follow-up	Men with CP/CPPS	Li-ESWT, multiple sessions	Sustained improvement in NIH-CPSI up to 48 weeks
2024	Hur KJ.[2]	Prospective trial (PMC)	CP/CPPS	ESWT for 8 weeks	Efficacy and safety at 8 weeks; pain and symptom reduction
2024	Wang YR.[4]	Review / safety (PMC)	Prostatitis	Li-ESWT review	Favorable safety profile; need for standardization
2024	Hegazy M.[6]	RCT (Nature-affiliated)	Postoperative bladder symptoms	Li-SWT, controlled trial	Improved bladder function (angiogenic/neuromodulatory mechanisms)
2025	Ogbeivor C.[7]	RCT (musculoskeletal)	Myofascial pain syndrome	Radial pressure waves vs placebo	Short-term effectiveness for MPS; relevance to pelvic myofascial pain

RCT: Randomized controlled trials, MPS: Myofascial pain syndrome, ESWT: Extracorporeal shock wave therapy, NIH-CPSI: NIH Chronic prostatitis symptom index, CP: Chronic pelvic, CPPS: Chronic pelvic pain syndrome, Li-ESWT: Low-intensity shock wave therapy

Clinical evidence (Summary 2023–2025)

The following summarizes key findings from clinical trials, prospective series, and systematic reviews published between 2023 and 2025:

CP/CPPS (males): multiple trials and prospective series report significant pain reduction and improvement in NIH-CPSI scores following fESWT, Li-ESWT and RPW protocols, with some studies demonstrating sustained effects up to 6 months. [4]

Pelvic floor myofascial pain: studies using fESWT and RPW applied to trigger points show short-term pain reduction and functional improvement, comparable or superior to placebo in some randomized controlled trials (RCTs).

Vulvodynia / vestibulodynia: recent studies and reviews indicate promising results with Li-ESWT for localized vestibulodynia, including improvements in pain and dyspareunia; however, evidence remains heterogeneous and derived from small sample sizes.

Systematic reviews / meta-analyses (2023–2025): conclude that ESWT shows signals of short-term analgesic efficacy for CPP subgroups, while emphasizing the need for larger and longer-term RCTs. [5]

Safety and Adverse Effects

Adverse events reported in recent studies are generally mild and transient, including local pain, erythema, bruising sensation, or post-procedural discomfort. No frequent serious complications have been reported in the recent literature when appropriate protocols are applied. [7]

Limitations and Methodological Considerations

- Heterogeneity of parameters (energy, number of pulses, session frequency).
- Small sample sizes and limited multicenter trials.
- Short follow-up durations in many RCTs (rarely exceeding 12 months).
- Variable clinical definitions across studies.

Practical Recommendations (Evidence-Based Proposal)

- Consider fESWT/Li-ESWT as an adjuvant therapy in patients refractory to conservative management (physiotherapy, analgesics, multimodal therapy), particularly in CP/CPPS and pelvic floor myofascial pain.
- Individualize the choice of shock wave modality: RPW for superficial myofascial components; fESWT or Li-ESWT for deeper targets, depending on equipment availability and clinical expertise.
- Monitor outcomes using validated scales (e.g., VAS, NIH-CPSI, sexual function questionnaires) and document adverse events.
- Inform patients about short- to medium-term benefits and uncertainty regarding long-term durability. [4,6,8]

Example Protocols (Based on Recent Literature)

Protocols should be adapted to the device and patient characteristics. Examples derived from the literature include:

- Protocol A (Li-ESWT for CP/CPPS): 1,500–3,000 pulses per session, 0.09–0.25 mJ/mm^2 (device-dependent), 1 session/week for 4–8 weeks.
- Protocol B (RPW for pelvic floor myofascial pain): 1,000–2,000 pulses per session applied to identified trigger points, 1–2 sessions/week for 4–6 weeks.
- Protocol C (focused ESWT for vestibulodynia): 3000 pulses once a week for four consecutive weeks). Energy flux density used was 0.25 mJ/mm2, frequency 4 Hz, focus penetration depth 0 – 30 mm. Six access areas were sufficient to cover the whole vulva and perineum. [8]

Future Research Directions

- Multicenter randomized trials with standardized protocols and ≥12-month follow-up.
- Mechanistic studies correlating biomarkers, tissue perfusion, and imaging with clinical response.
- Direct comparisons with other physical therapies and cost-effectiveness analyses.

Conclusion

Between 2023 and 2025, the literature supports extracorporeal shock wave therapy (fESWT, Li-ESWT and RPW) as a promising and safe option for certain subtypes of chronic pelvic pain, particularly CP/CPPS and pelvic floor myofascial pain. Evidence in vulvodynia is encouraging but remains limited. Mechanical waves are

recommended as an adjuvant modality within a multimodal management approach, with systematic documentation and preferably within standardized protocols or clinical studies.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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