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REVIEW

Multimodal and Interdisciplinary Interventions for the Treatment of Localized Provoked Vulvodynia: A Scoping Review of the Literature from 2010 to 2023

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Introduction: Localized provoked vulvodynia (LPV) is a chronic condition characterized by pain in the vulvar vestibule, which can be provoked by pressure or touch and which is not tied to a clear underlying cause. Research into the etiology of and most appropriate treatment strategy for LPV is still limited.

Methods: Using Arksey and O'Malley's model for scoping reviews, we evaluated the research question: what is the current evidence regarding the efficacy/effectiveness of multimodal or interdisciplinary interventions for the treatment of LPV? We collated and analyzed articles from 2010 to 2023 to capture the current research landscape.

Results: Our review identified 27 studies, which either compared treatments between classes (eg pharmacologic versus psychologic modalities) or described interdisciplinary treatment programs. We identify several trends in the literature. First, outcome measures are inconsistent between studies, often unvalidated, and may not adequately mirror patient concerns. Second, the absence of appropriate comparator groups in many studies restricts providers' ability to appraise which treatments may be most efficacious. Third, selection bias and demographic homogeneity limit generalizability. Finally, we highlight the need for head-to-head trials of vestibulectomy with other treatments considered first line for vulvodynia management.

Conclusion: There is insufficient evidence to suggest the superiority of one treatment modality for LPV relative to others or to recommend a particular interdisciplinary management strategy. Future research should use a head-to-head design where sham control is impossible, incorporate patient-centered outcome measures, and investigate impacts of treatment among diverse samples of LPV patients.

Keywords: multidisciplinary, interdisciplinary, multimodal, chronic pain, vulvodynia, dyspareunia

Introduction

Chronic pain is recognized as a significant public health burden that impacts the social, emotional, and physical functioning of those living with it.[1] Among a wide range of chronic pain conditions is vulvodynia, a vulvar pain condition of at least 3 months' duration unrelated to a clear underlying cause.[2] Vulvodynia may be generalized to the whole of the vulva, or localized to specific structures such as the clitoris and vestibule. It may be provoked by touch or vaginal insertion, or occur independent of provocative stimuli.[2] The most common form of vulvodynia is localized provoked vulvodynia, or LPV.[3] While the exact etiologies of each form of vulvodynia remain to be determined, LPV is the most well-studied given its relative prevalence.

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The Vulvodynia Guideline[4] and 2013 Vulvodynia Guideline Update[5] have played a pivotal role in influencing clinical care for LPV. These documents provide a treatment algorithm consisting of vulvar care measures, topical, oral and injectable medications, physiotherapy and biofeedback, dietary modifications, supplements, and psychological therapies, with vestibulectomy reserved as last-line management. In the absence of a professional society-endorsed guideline with recommendations graded by evidence, many clinicians derive their management strategies from these publications. The continued paucity of clear consensus recommendations for LPV treatment may contribute to the high variability of practice patterns among providers.[6]

The underlying mechanisms of pain in vulvodynia are not well understood. Allodynia of the vestibule, as demonstrated by cotton swab testing (CST) on examination, implies a neuropathic component. Pelvic tension myalgia is a frequent comorbidity and psychological and relationship distress often accompany physical symptoms. Given this constellation of symptoms and findings, multimodal therapy would seem to be an intuitive approach. However, many existing recommendations for multimodal management of LPV are extrapolated from findings in other chronic pain literature,[7] with limited evidence to propose how pain due to vulvodynia directly maps onto the mechanisms of other chronic pain conditions.[8] To evaluate multimodal interventions specifically directed towards management of vulvodynia, this scoping review aims to synthesize literature published since 2010 evaluating the efficacy of multimodal approaches to the management of LPV.

Methods

To identify, collate, and evaluate relevant literature that addresses the question of the effectiveness or efficacy of treatments and interventions in the management of LPV, this scoping review employs Arksey and O'Malley's five-stage framework.[9]

A team that included a health sciences librarian and content and methodology experts developed a search using controlled vocabulary and keyword terms relating to LPV management from 2010 to 2021. An updated search of the literature from 2021 to March 2023 was subsequently undertaken. The initial search was run in PubMed and translated into other subject-specific databases (Appendix 1). The start date was selected because the knowledge and nomenclature around vulvodynia has evolved with time, and we aim to capture contemporary findings and insights around LPV management.

There is no clear consensus as to terminology describing interventions that incorporate multiple treatment modalities into a single treatment program. Authors referred to these interventions as multidisciplinary (ie, work involving multiple separate disciplines) or interdisciplinary (ie, integrating treatment categories to create a synthesized whole). For clarity in our review, we refer to these publications as interdisciplinary. Studies of multimodal (ie, studies comparing interventions across classes not integrated into a single treatment program) management of LPV were also included in this review.[10] Appendix 2, outlines inclusion and exclusion criteria. Only primary studies were selected. Reviews and meta-analyses were excluded. Studies that did not include a clear diagnosis of LPV were excluded. Studies where treatments implied underlying pathology were excluded, as vulvodynia is defined as having no identifiable underlying cause.[11,12] Articles that focused on diagnosis or risk factors were also excluded. Studies focused on a single class of intervention (ie, pharmacological, psychological, and physical modalities) were separated out into multiple publications given the volume of studies and are reported elsewhere.[13] Studies of somatocognitive therapy[14,15] are described in the psychological therapies publication rather than here, as the emphasis of these interventions is on developing conscious bodily awareness and cognitive retraining to change movement and function. Somatocognitive therapy is a unique, psychologically oriented intervention delivered by a group of physiotherapists in Norway. While the practice combines cognitive psychotherapy with therapeutic principles of Mensendieck physiotherapy, the psychological component of intervention differentiates it from interdisciplinary programs, which incorporate both physiotherapy and psychological treatments as independent components of care.

Covidence, a literature review management tool, was used to store and screen all databases' search results. Title and abstract screening and full-text screening were completed by two reviewers. Consensus between two content experts (KB and MM) was used to resolve any disagreements around study inclusion at these stages. Data were extracted within

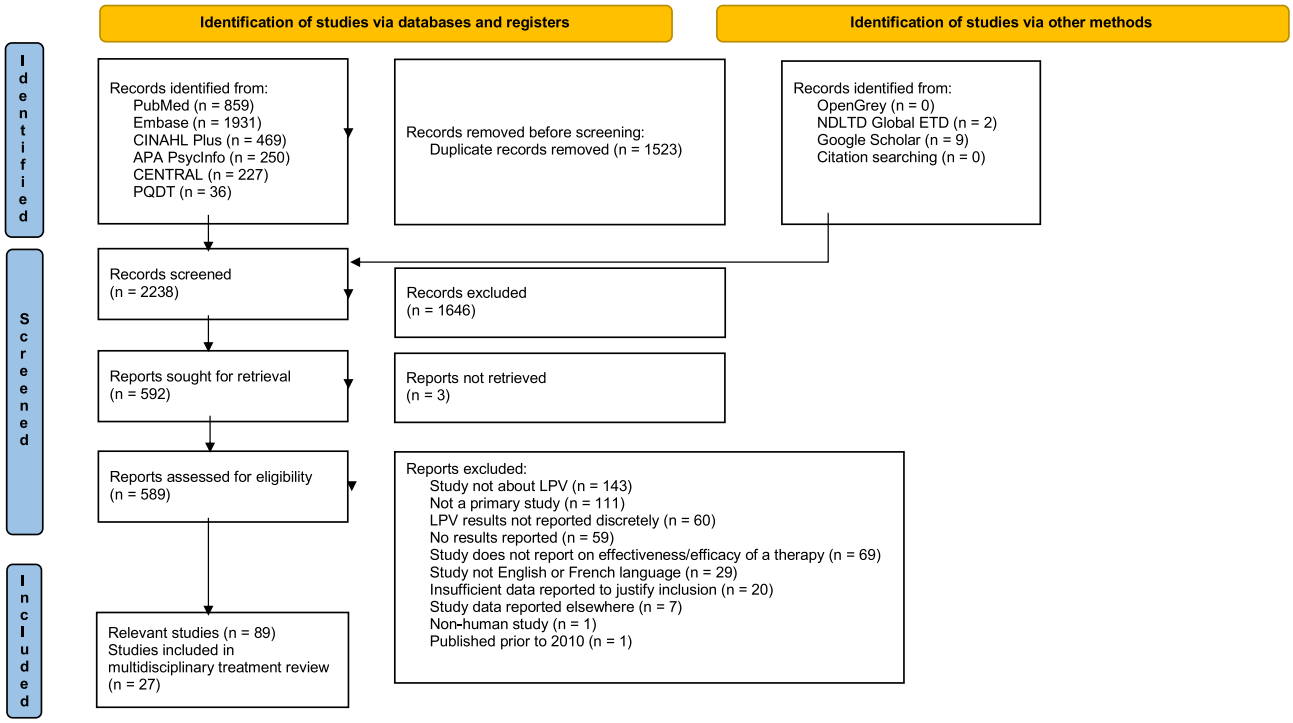

Figure 1 PRISMA 2020 Flow Diagram.
Notes: Adapted from Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ (Online). 2020;37: n71. doi:10.1136/bmj.n71.[16]
Abbreviations: PRISMA, preferred reporting items for systematic reviews and meta-analyses; LPV, localized provoked vulvodynia.

Covidence by one reviewer and confirmed by a second to ensure accuracy. A comprehensive narrative synthesis of study findings was compiled.

Results

The review produced 27 publications between 2010 and 2023 that compared treatments across modalities or applied multimodal/interdisciplinary approaches (see Figure 1 for PRISMA diagram[16]). Study details are summarized below and charted in Tables 1–2.

Physiotherapy versus Pharmacologic Interventions

One randomized treatment versus treatment trial by Morin et al produced three publications[17–19] comparing topical lidocaine 5% ointment applied to vestibule nightly versus weekly physiotherapy sessions, including manual techniques and education from a physical therapist. The first publication[17] followed 181 patients randomized to a 10-week course of either treatment. Both treatments showed improvements in pain and sexual distress, though only physiotherapy yielded improvements in sexual function and self-assessed improvement. The second publication[18] followed 201 participants (including the 181 from the 2015 study) randomized to the treatments discussed above. Findings were consistent with a prior study.[17] The third publication[19] followed the same cohort as the 2016 publication with 195 of the 201 participants assessed 6 months after the end of treatment. The study found that physical therapy had superior outcomes in pain with intercourse, pain quality, sexual function, sexual distress, satisfaction, and participants' impression of change both at post-treatment and at 6-month follow-up. Among the final sample, 1 participant dropped out due to a dermatitis reaction to lidocaine and 15 participants (15%) reported minor irritation. No other adverse events were reported.

Table 1 Multimodal Studies

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Morin 2015[17]	Canada	Randomized trial (treatment vs treatment)	181 (n=87 physiotherapy, n=94 lidocaine)	Nulliparous individuals with PVD, 18–45 years old	Weekly physiotherapy treatment including education, pelvic muscle exercises with biofeedback, manual therapy and insertion techniques	Topical lidocaine 5% ointment (50 mg/g) applied nightly	Diagnosis of PVD confirmed by a gynecologist based on a "standardized assessment"	Parity, age outside the range of 18–45 years
Morin 2016[18]	Canada	Randomized trial (treatment vs treatment)	212 recruited and randomized (n=105 physiotherapy, n=107 lidocaine), 201 completed posttreatment assessment	Nulliparous individuals with PVD, 18–45 years old	Weekly physiotherapy treatment including education, pelvic muscle exercises with biofeedback, manual therapy and insertion techniques	Topical lidocaine 5% ointment (50 mg/g) applied nightly	Diagnosis of PVD confirmed by a gynecologist based on a "standardized assessment"	Not described
Morin 2021[19]	Canada	Randomized trial (treatment vs treatment)	212 recruited and randomized (n=105 physiotherapy, n=107 lidocaine), 201 completed posttreatment assessment, 195 completed 6-month follow up (n=94 physiotherapy, n=101 lidocaine)	Nulliparous individuals with PVD between 18–45 years old reporting pain during sexual intercourse for >6 months with an average intensity of 5/10 on NRS; Age*: 22; 79–82% college educated or higher; 100% partnered	Weekly physiotherapy treatment including education, pelvic muscle exercises with biofeedback, manual therapy and insertion techniques plus a home exercise program incorporating pelvic floor contractions 5 times per week and stretching exercises using a dilator and vestibule tissue mobilization 3 times per week	Topical lidocaine 5% ointment (50 mg/g) applied nightly to the vestibule with continuous skin contact for at least 8 hours	Diagnosis of PVD confirmed by a gynecologist based on a "standardized assessment", positive CST	Other urogynecologic and vulvar pain conditions, any coexisting significant medical conditions that were likely to interfere with the study procedures

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
10 weeks[17]	Average intensity of pain during intercourse as assessed with NRS, questionnaires of pain quality (MPQ), sexual function (FSFI), sexual distress (FSDS), level of satisfaction (from 0–10) and Patient's Global Impression of Change (7-point scale: very much improved to very much worse)	Both interventions showed significant improvements from baseline to post-treatment ($p<0.01$) with greater reduction in pain and sexual distress and improvement in sexual function among those receiving physiotherapy. Physiotherapy resulted in increased satisfaction with treatment (8.8/10 (SD: 1.4)) compared to lidocaine (5.5/10 (SD: 3.2); $p<0.001$) and 77% of the physiotherapy group reported being very much or much improved compared to 38% in the lidocaine group ($p<0.001$).	One participant allergic to lidocaine	Methodological rigor and use of validated questionnaires	No placebo group, limited participant population	Not reported	
10 weeks[18]	Average intensity of pain during intercourse as assessed with NRS, questionnaires of sexual function (FSFI), sexual distress (FSDS), level of satisfaction (from 0 to 10) and Patient's Global Impression of Change (7-point scale: very much improved to very much worse)	Both interventions showed significant improvements from baseline to post-treatment ($p<0.01$) with greater reduction in all outcomes with physiotherapy. Physiotherapy resulted in increased satisfaction with treatment (8.8/10 (SD1.4)) compared to lidocaine (5.5/10 [SD3.2]; $p<0.001$) and 77% of the physiotherapy group reported being very much or much improved compared to 38% in the lidocaine group ($p<0.001$)	None reported	Methodological rigor and use of validated questionnaires	Findings from the same study as Morin 2015, similar limitations	Work not supported by industry	
10 weeks treatment, assessment of outcomes at baseline, posttreatment, and 6-month follow up[19]	Average intensity of pain during intercourse assessed with NRS, questionnaires of pain quality (MPQ), sexual function (FSFI), sexual distress (FSDS), level of satisfaction (from 0–10) and Patient's Global Impression of Change (7-point scale: very much improved to very much worse)	Multimodal physical therapy was more effective than lidocaine for reducing pain intensity during intercourse ($P<0.001$, mean group difference of 1.8), and results were maintained at 6-month follow-up (mean group difference of 1.8). The physical therapy group also had superior outcomes in pain quality, sexual function, sexual distress, satisfaction, and participants' impression of change at posttreatment and 6 months. 79% of individuals with PVD in the physical therapy group reported being very much or much improved compared with 39% in the lidocaine group ($P<0.001$)	No adverse events were reported in the physical therapy group. In the lidocaine group, 1 participant discontinued the study because of a dermatitis reaction and 15 individuals with PVD (15%) reported minor irritation	Methodological rigor and use of validated questionnaires, long-term follow up	No placebo group, limited participant population, use of multiple physical therapy modalities made determining which specific physical therapy intervention(s) contributed to improvement difficult	Canadian Institutes of Health Research	

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Bergeron 2021[20]	Canada	Randomized trial (treatment vs treatment)	108 couples randomized: 53 couples to CBCT and 55 to lidocaine; 95 couples completed treatment	Age of individuals with PVD: 27, of partners: 29; 97.2% of relationships were heterosexual; education level of those with PVD: 17 years, of partners: 16 years; relationship length: 5.43 years; no significant demographic differences between treatment groups	CBCT with a therapist following a written treatment manual involving 12 weekly, face-to-face, 75-minute sessions	Topical lidocaine 5% ointment (50 mg/g) applied nightly to the vestibule with continuous skin contact for at least 7–8 hours	Participants were at least 18 years of age; with PVD individual experiencing pain on at least 80% of vaginal penetration attempts in the last 6 months; pain limited to vaginal intercourse or other activities involving pressure to the vulvar vestibule; individuals having a confirmed diagnosis of PVD; history of attempted penetration at least once a month during the last three months; being in a couple relationship for at least 6 months, and cohabiting and/or having at least four in-person contacts per week with partner in the last 6 months	Individuals with PVD who were over 45 years of age and/or had started menopause; individuals actively receiving treatment for PVD; individuals with PVD with an active infection or dermatological condition; severe untreated medical or psychiatric condition in either partner; being pregnant or planning to be during the duration of the clinical trial; currently being in couple therapy; clinical levels of relationship distress based on the Couple Satisfaction Index; self-reported intimate partner violence
Rancourt 2022[21]	Canada	Randomized trial (treatment vs treatment)	108 individuals with PVD and their partners (3 women, 105 men): 53 couples randomized to CBCT; 55 randomized to topical lidocaine (same sample as Bergeron 2021)	Age of individuals with PVD: 27, of partners: 29; 97.2% of relationships heterosexual; education level of those with PVD: 17 years, of partners: 16 years; relationship length: 5.43 years; no significant demographic differences between treatment groups	CBCT with a therapist following a written treatment manual involving 12 weekly, face-to-face, 75-minute sessions	Topical lidocaine 5% ointment (50 mg/g) applied nightly to the vestibule with continuous skin contact for at least 7–8 hours	Participants were at least 18 years of age; with PVD individual experiencing pain on at least 80% of vaginal penetration attempts in the last 6 months; pain limited to vaginal intercourse or other activities involving pressure to the vulvar vestibule; individuals having a confirmed diagnosis of PVD; history of attempted penetration at least once a month during the last three months; being in a couple relationship for at least 6 months, and cohabiting and/or having at least four in-person contacts per week with partner in the last 6 months	Individuals with PVD who were over 45 years of age and/or had started menopause; those actively receiving treatment for PVD; individual with PVD with an active infection or dermatological condition; severe untreated medical or psychiatric condition in either partner; being pregnant or planning to be during the duration of the clinical trial; currently being in couple therapy; clinical levels of relationship distress based on the Couple Satisfaction Index; self-reported intimate partner violence

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
12 weeks treatment, assessment of outcomes post-treatment and at 6-month follow-up[20]	Pain during intercourse (NRS of pain intensity and unpleasantness), measures of pain anxiety (Pain Anxiety Symptoms Scale), both partners' sexual function (FSFI; International Index of Erectile Function), sexual distress (FSDS Revised), pain-related psychological distress (PCS), treatment satisfaction (scale from 0–10), and global ratings of improvements in pain and sexuality (scale from 0–6).	There was statistically significant improvement in PVD individuals' pain intensity and unpleasantness NRS scores ($p<0.001$) as well as sexual function, sexual distress and pain catastrophizing at post-treatment and 6-month follow-up ($p<0.001$) for both CBCT and overnight topical lidocaine, with no main effects for treatment condition for partners. LPV individuals and their partners in the CBCT group reported greater satisfaction with treatment than those in lidocaine group at post-treatment and 6 month follow-up. Those in the CBCT group showed greater improvements in pain anxiety and pain catastrophizing than the lidocaine group.	None reported	Randomized trial design, careful monitoring of treatment delivery, tested a novel couple intervention grounded in a body of evidence concerning the role of relationship factors in PVD, conducted assessments using a wide range of outcomes reflecting the multiple dimensions of PVD	No control for attention from health professional which may account for some outcomes, no control for continued use of Lidocaine or CBCT homework exercises during follow-up period	Canadian Institutes of Health Research grant (MOP 130298)	Regarding treatment adherence, couples in CBCT attended 10.6 out of 12 (SD = 3.53; 88.7%) sessions and PVD participants completed 67.7% of homework exercises, whereas partners completed 58.6% of homework exercises. PVD participants in the lidocaine arm applied the cream 79.4% of the nights during the treatment period.
12 weeks treatment, assessment of outcomes post-treatment and at 6-month follow-up[21]	SCP assessed using the Sexual Communication Patterns Questionnaire, sexual satisfaction assessed with the 5-item Global Measure of Sexual Satisfaction Pain (7-point bipolar scale), both partners' sexual function (FSFI; International Index of Erectile Function), sexual distress (FSDS Revised)	The effect of CBCT, but not lidocaine, on sexual satisfaction, sexual function, and sexual distress was mediated by improving collaborative communication reported by individuals with PVD. Collaborative communication improved equally in partners of LPV individuals in both conditions. In neither group did partners report reductions in negative SCPs.	None reported	Randomized trial design, careful monitoring of treatment delivery, tested a novel couple intervention grounded in a body of evidence concerning the role of relationship factors in PVD	Homogenous demographics, those with relational distress or not attempting vaginal intercourse were excluded, concern for social desirability bias with repeat questioning on SCPs	Canadian Institutes of Health Research grant (MOP 130298)	Regarding treatment adherence, couples in CBCT attended 10.6 out of 12 (SD = 3.53; 88.7%) sessions and individuals with PVD completed 67.7% of homework exercises, whereas partners completed 58.6% of homework exercises. PVD participants in the lidocaine arm applied the cream 79.4% of the nights during the treatment period.

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Rancourt 2017[22]	Canada	Randomized trial (treatment vs treatment)	84 couples: n=43 lidocaine, n=41 CBCT	Age of individuals with PVD: 27, of partners: 28; 96.4% of relationships were heterosexual; education level of those with PVD: 17 years, of partners: 16 years; relationship length: 5.54 years; pain duration: 6.42 years	CBCT with a therapist following a written treatment manual involving 12 weekly, face-to-face, 75-minute sessions. Therapist PhD-level student in clinical psychology or junior clinician	Topical lidocaine 5% ointment (50 mg/g) applied nightly to the vestibule with continuous skin contact overnight	Participant age 18 years and older; in a committed monogamous relationship with each other of at least six months duration; attempted vaginal penetration with one another at least once per month for the past three months; cohabiting and/or maintained at least four in-person contacts per week in the last six months; PVD pain, provoked by pressure to the vulvar vestibule, for a minimum of six months and on at least 80% of penetration attempts; PVD diagnosis from a collaborating gynecologist	Individuals with PVD who were over 45 years of age; PVD individual with active infection or dermatological condition; couples who were pregnant or planning a pregnancy; couples who were unable to stop other treatments for the study period; couples presently in couples therapy; couples where either partner had a major untreated medical or psychiatric disorder that might interfere with treatment; couples who met criteria for relational distress or self-reported intimate partner violence and/or systematic threat or manipulation within the couple
Bergeron 2016[23]	Canada	Randomized trial (treatment vs treatment)	97 randomized: n=52 GCBT, n=45 topical steroids	Age: 27; Pain duration: 5.58; education: 15.8 years; partnered: 83.5%	GCBT with a therapist involving 10 sessions over a 13-week period. GCBT was delivered by doctoral-level female clinical psychologists specialized in sex/couple therapy in 2-hour group sessions with seven to eight individuals with PVD per group	Twice daily application of 1% hydrocortisone cream (Cortate 1%) for 13 weeks; written education materials about PVD and its management, and the instruction to use a water-based lubricant for intercourse. Participants discontinued use of the cream after 8 weeks if they found no improvement	Pain during intercourse that is (i) subjectively distressing, (ii) occurs (or occurred) on most (75%) intercourse attempts, and (iii) has lasted for at least 6 months (individuals with PVD who stopped attempting intercourse as a result of the pain were included if the pain could be confirmed during the gynecological examination); pain limited to intercourse and other activities involving vestibular pressure; moderate to severe pain in one or more locations of the vestibule during the cotton-swab test (minimum average patient pain rating of at least 4 on a scale of 0–10)	Unprovoked pelvic or vulvar pain; deep dyspareunia; presence of one of the following: (i) major medical and/or psychiatric illness, (ii) active infection, (iii) dermatologic lesion, and (iv) vaginismus, as per DSM; ongoing treatment for dyspareunia; pregnancy; age less than 18 or greater than 45

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
12 weeks treatment, assessment of outcomes throughout the study[22]	SCP assessed using the Sexual Communication Patterns Questionnaire	For both individuals with PVD and their partners, collaborative SCP significantly increased over the course of CBCT, with no significant changes in collaborative SCP with lidocaine treatment. For both individuals with PVD and their partners, negative SCP significantly decreased over the course of CBCT. PVD individual's reported negative SCP were also found to significantly decrease with lidocaine treatment; there were no significant changes in partners' negative SCP in the lidocaine condition	None reported	Random assignment of couples to treatment condition, use of multiple measurement points to evaluate changes in PVD individuals' and partners' self-reported sexual communication patterns over the course of couples' treatments	Exclusive focus on couples who continued to attempt or engage in penetrative sexual activity; couples were ineligible if they were also experiencing significant relational distress or severe health problems	The Canadian Institutes for Health Research (CIHR; MOP-69063 and MOP-130298)	Thirty-six couples (88%) attended all 12 sessions of CBCT, whereas five couples dropped out over the course of therapy. Thirty-nine PVD individuals (91%) completed the full lidocaine protocol, whereas three withdrew from treatment.
13-weeks treatment, assessment of outcomes at baseline, posttreatment, and 6-month follow-up[23]	Pain during intercourse assessed with NRS, Present Pain Intensity scale of the MPQ; global pain ratings (scale of 1 [complete cure] to 6 [deterioration]); sexual function assessed with FSFI; PCS; Painful Intercourse Self-Efficacy Scale; global ratings of improvement and satisfaction, perception of treatment credibility assessed at first treatment session	GCBT and a topical steroid both yielded significant improvements in pain, psychological adjustment, and sexual functioning at posttreatment and 6-month follow-up for individuals with PVD. GCBT is significantly more successful in yielding decreased pain at 6-month follow-up and pain catastrophizing at posttreatment, as well as better treatment satisfaction and global pain and sexuality-related improvements. Both treatment modalities were successful in alleviating two main complaints: pain during intercourse and sexual dysfunction	None reported	Randomized trial design; intention-to-treat analyses; monitoring of treatment delivery	Use of steroids which are not considered an appropriate medical therapy for PVD; no placebo group	Fonds pour la recherche en santé du Québec grant	35 PVD participants in the GBCT group (67.3%) completed 6-month follow up; 29 PVD participants in the steroid group (64.4%) completed 6-month follow up. Participants in GCBT attended an average of 82% of therapy sessions and completed 62% of their homework exercises. Participants in the topical steroid arm completed an average of 88% of the 13-week treatment and applied the cream 75% of the time during those weeks.

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Desrochers 2010[24]	Canada	Randomized trial (treatment vs treatment)	97 randomized: n=46 GCBT, n=51 topical 1% hydrocortisone cream	Age: 26–27; education: 16 years; partnered: 83–84%; pain duration: 4.6–6.5 years	GCBT treatment consisted of ten 90-minute group sessions with 5–10 participants per group led by Ph.D. level psychotherapist	Twice daily application of 1% hydrocortisone cream applied to vulvar vestibule (Cortate 1%); written educational materials about PVD and its management, and the instruction to use a water-based lubricant for intercourse. Participants discontinued use of the cream after 8 weeks if they found no improvement.	Subjectively distressing dyspareunia on most (75%) intercourse attempts for at least 6 months; pain provoked by pressure; moderate to severe pain at one or more locations of the vestibule during CST, with a minimum mean NRS pain of at least 4/10; age between 18 and 45	Pelvic or vaginal pain not related to intercourse or pressure to the vestibular active infection, b) vaginismus, c) dermatological lesion, or d) deep dyspareunia; co-occurring treatment for vestibulodynia; pregnancy; insufficient fluency in written English or French
Goldfinger 2013[25]	Canada	Randomized trial (treatment vs treatment)	20 randomized: n=10 CBT, n=10 physiotherapy	Age 25–27 years; 60–90% caucasian; education: 16 years; 70% partnered; 40–60% primary LPV; pain duration 4–5 years, 4–5/10 NRS intercourse pain intensity	Eight 1.5-hour CBT sessions over 8–24 weeks (mean=14.19, SD= 3.90) which included standardized education, re-conceptualization of PVD as a multi-factorial pain condition, instruction to explore genitals at home, desensitization exercises involving observing photographs of women's genitals, stress/anxiety education, breathing and relaxation exercises, communication skills training, vaginal dilator teaching, cognitive restructuring techniques	Physiotherapy program: education, pelvic floor exercises (eg, contract-relax), manual techniques and biofeedback (ie physiotherapy), vaginal dilators, lower extremity stretches, deep breathing exercises, education around reducing genital pain including the application of a cold compress to the genital area following painful activities and attempting different sexual positions	Age ≥18 years, fluent in English, vulvar pain upon attempted vaginal penetration for ≥6 months, and meeting diagnostic criteria for PVD during the study gynecological examination	Other serious medical, psychiatric, or other pain conditions, generalized vulvodynia and/or significant vaginismus, pregnancy, breastfeeding, or <6 months postpartum, unwilling to abstain from other treatments for PVD pain during the course of the study

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
13 weeks treatment, assessment of outcomes at baseline, posttreatment, and 6-month follow-up[24]	Pain assessed with Pain "VAS" (NRS) and pain during intercourse assessed with the MPQ, FSFI, Spielberger State-Trait Anxiety Inventory, Pain Anxiety Symptoms Scale, PCS, Pain and Vigilance Awareness Questionnaire, Painful Intercourse Self-efficacy Scale	Both treatment groups reported pain reduction and improvement in global sexual functioning at post-treatment and six-month follow-up. Regression analyses of topical treatment showed that higher levels of baseline avoidance predicted worse pain and sexual functioning outcomes, and higher levels of self-efficacy predicted better outcomes. For GCBT, higher baseline fear of pain and catastrophizing contributed to higher pain intensity at follow-up, whereas higher levels of pain self-efficacy were associated with less pain	None reported	Randomized trial design; monitoring of treatment delivery	Offer of free treatment may have led to selection bias; data were collected from self-report measures, which may be impacted by social desirability, retrospective recall as well as shared method variance; difference on baseline fear of pain score between completers and non-completers was significant, potentially impacting results	Fonds pour la recherche en santé du Québec grant	31 PVD participants in the GBCT group (67.4%) completed 6-month follow up; 38 PVD participants in the steroid group (74.5%) completed 6-month follow up
Immediately post-treatment, and 6-months post-treatment[25]	NRS pain during intercourse, MPQ, CST, FSFI, PFM functioning (tone rated from −3 to +3), standardized questionnaires assessing emotional functioning, PCS, BDI, global impression of improvement (scales from 0–100 and 0–10 assessing improvement to pain, emotional functioning, and sexual functioning)	Physiotherapy and CBT led to equivalent improvements in pain that were maintained at 6 months post-treatment. There was no difference in percent of participants with at least a 30% or a 50% reduction in dyspareunia intensity from pre- to post-treatment between groups. CBT yielded improvements to sexual functioning at 6 months assessed by FSFI ($p=0.013$), while physiotherapy did not. Both CBT and physiotherapy yielded improvements in muscle relaxation capacity, while only physiotherapy reduced hypertonicity ($p=0.048$). Both CBT and physiotherapy improved some negative pain cognitions, while only CBT reduced ruminative thinking.	None reported	The current study was the first PVD treatment study at the time to consider the recommendations put forth by the IMMPACT team per authors, utilizes a biopsychosocial perspective	Education provided in response to individual participant questions about PVD may have resulted in educational variation. The sample size was very small, thus limiting power. Did not handle as per intent to treat. Due to technical difficulties one participant's data for both the questionnaires and CST were not properly retrieved and therefore these data were not included in the analyses. The FSFI items were not included in the missing values analysis because, based on each participant's sexual activities over the previous 4 weeks and the presence or absence of a sexual partner, many items are not applicable	Not reported	

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Hullender Rubin 2019[26]	United States	Randomized trial (treatment vs treatment)	19 randomized: n=10 TA, n=9 NTA	Age: 29–30; BMI 23–24; pain duration ~6 years; n=14 caucasian, 15 nulliparous, 8 primary LPV, 16 partnered, 11 engaging in intercourse. Almost all previously tried topical treatments particularly lidocaine, while a minority tried oral medication. Various other interventions mentioned, including surgery, counseling or dietary modifications, which occurred in the minority of patients, while the majority underwent physiotherapy. Baseline vulvodynia VAS by recall was 58 in TA group versus 72 in NTA.	TA: 18 intervention visits over 12 weeks involving prone treatments using 3–5 core points, mixed stimulation methods, and manual and mild intensity electroacupuncture of locations to treat pudendal nerve and genital pain. Participants also used 5% lidocaine four times daily	NTA: 18 intervention visits over 12 weeks involving prone treatments with superficial needling of 4 non-specific points with machine turned on, leads taped to the needles, but no electricity delivered. Participants also used 5% lidocaine four times daily	Premenopausal 18–45 years old; Friedrich's criteria for at least 3 months with CST at 1, 5, 7, and 11 o'clock positions; VAS and TT VAS ≥ 40/100	Pregnant/post-partum, vulvar diagnoses such as infection or dermatosis, non-menstrual pelvic/low abdominal pain >3 months, started/changed neuropathic medication in prior 6 months, acupuncture in prior 3 months
Davis 2013[27]	Canada	Prospective cohort, secondary data analysis	239	Age: 31, pain duration 5.5 years, pain intensity NRS 6.9/10 (called VAS by authors), relationship duration 6.9 years, all partnered at baseline, 91% still partnered at post-treatment, 95% high school graduates, 94% "Canadian or Quebequois"	Participants reported engagement with six intervention categories: PT n=98, sex therapy/ psychotherapy n=46, medical management n=45, "surgery" n=17, acupuncture n=6, other treatments n=20, multiple treatments n=61 and no treatment n=98. Only 2 surgical patients did not undergo other treatment.	N/A	PVD defined as distressing dyspareunia at least 80% of attempts, >1 year symptom duration, pain limited to intercourse or other activities involving pressure to the vulvar vestibule, CST positive (if recruited by gynecologist), partnered at least 6 months, age 18–45	Vulvar pain not clearly linked to intercourse or vestibular pressure, major medical or psychiatric illness, infection, deep dyspareunia, vaginismus, dermatosis, pregnancy

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
12 week (end of treatment phase) and 24 week (3-month post intervention follow-up) assessments[26]	TT and CST VAS pain, PROMIS questionnaires on quality of life, percent change in TT pain from baseline, participant expectation of treatment effectiveness	7 participants per group included in final analysis. 5/7 (71%) in each group had ≥ 50% reduction in TT pain at 12 weeks. At 24 weeks, this was maintained in 4/7 (57%) TA participants versus 5/7 (71%) NTA participants. VAS reduction in TT pain was 62% in TA and 47% in NTA at 12 weeks and 53% and 60%, respectively at 24 weeks. VAS reduction in CST pain was 36% for TA and 37% in NTA at 12 weeks and 28% and 45%, respectively at 24 weeks. All participants reported clinically meaningful improvements in global satisfaction with sex lives and vaginal discomfort, felt the treatment was "somewhat logical", that it might help and were "somewhat confident" in recommending the treatment. Participants expected a 61% to 63% reduction in pain and were highly compliant with treatment and study procedures. 43% of TA participants compared with 57% of NTA were satisfied with their pain relief	7 adverse events attributed to lidocaine and 5 to acupuncture. All acupuncture events considered mild. 2 withdrew due to lidocaine pain and none withdrew due to acupuncture	Rigorous diagnostic criteria for LPV, randomized design, as close to "sham" acupuncture as feasible, blinding of participants effective, use of standardized but adaptable treatment algorithm, longer treatment course than other studies reflects "real world" acupuncture treatment duration for chronic pain (per authors), use TT and CST to assess pain outcomes and validated PROMIS scales to assess pain and quality of life. Thorough description of demographics and interventions	Low recruitment and numerous dropouts led to very small sample size of 7 per group. Lack of true "sham" acupuncture may confound results, as does the use of concurrent lidocaine 5%	National Vulvodynia Association, Oregon Health & Science University Women's Health Research Unit, Council of College of Oriental Medicine, Oregon College of Oriental Medicine, and Oregon Clinical and Translational Research Institute (OCTRI), grant number (UL1TR000128) from the National Center for Advancing Translational Sciences (NCATS) at the National Institutes of Health (NIH). Data collection was completed with REDCap and funded by an Oregon Clinical and Translational Research Institute NIH NCATS grant (1UL1RR0 2414001). Acupuncture needles were provided by Golden Flower Chinese Herbs.	
T1=baseline, T2= 2 year follow-up[27]	NRS (called VAS by authors) to assess provoked vulvovaginal pain over past 1 month, Global Measure of Sexual Satisfaction, FSFI, BDI, Dyadic Adjustment Scale, number of sexual intercourse attempts over the past month	All participant groups except acupuncture experienced pain improvement, including those with no treatment. Physiotherapy also significantly improved sexual satisfaction and function and depression. Medical management improved sexual satisfaction and function. Surgery improved sexual function and depression. "Multiple treatments" improved depression. "Other" treatment improved sexual function. No treatment and psychological treatments improved only pain. No group had an increased number of intercourse attempts or improved relationship satisfaction. By "third step analysis" the only predictor of change in depressive symptoms was surgery. Despite decrease in pain, there was no significant increase in number of intercourse attempts. Only in the "other" treatment group did the FSFI score move into the normal range at T2	None reported	Relatively large cohort, relatively long duration of follow up. Corrected p-value for multiple comparisons. Included a no treatment group	All participants were partnered and heterosexual, and described as "women." Treatments were divided into broad categories and details and lengths of treatment were unknown. All treatment groups were offered compensation for participation by a 30-minute telephone consultation with a clinical sexologist along with information regarding health care professionals in their area at T1; there is no information regarding how many patients in each group availed of this. Additionally, all patients received "medical attention" via study participation. Inconsistent diagnostic criteria with some diagnosed by telephone alone	Not reported	Authors say "T1 variables" (potentially referencing demographic characteristics) accounted for more of the variance in the models of change than any of the treatments. Treatments only accounted for <5% of the variance in the models of change. They recommend keeping in mind the pain improvement with no treatment although "no treatment" did not improve psychosocial parameters when some treatments did. Therefore even if pain is improved, further therapy, tailored to the individual or couple, may be needed to affect these parameters. "Surgery" was not defined by the authors

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Aalto 2017,[28] 2019[29]	Finland	Retrospective cohort	66 participants; At two month follow-up, 16 reported vestibulectomy + conservative management, 50 conservative management only. At 36 month follow up, 13 reported vestibulectomy + conservative management and 23 reported conservative management only	Participants with data at point 1: 96% nulliparous, 99% premenopausal. Vestibulectomy patients were significantly older (31 vs 27). Demographics for those with data at point 2 (n=13 vestibulectomy, n= 23 conservative only) 86% nulliparous, 100% premenopausal, median age 29 years, 9 baseline NRS.	Conservative management: local treatment with topical lidocaine gel (concentration not specified) 30 minutes prior to intercourse and/or gabapentin 6% cream twice daily x 6–8 week, "mc TCA" amitriptyline 10–40 mg/d or pregabalin 150–300mg/d, PT (including TENS), sexual counselling, topical podophyllotoxin (5mg/mL) "to tender points" of the vestibule after 5% acetic acid solution followed with "mild estrogen cream" covered with gauze until the following day, local injections 2–4mL of 1:1 betamethasone and bupivacaine (concentration not specified) subcutaneous injection "to the tender site." For both groups, mc combination was topical medication + physiotherapy + sexual counseling	Conservative management + "modified posterior vestibulectomy", 10–2 o'clock, excised hymenal ring, performed by 3 "senior gynecologic surgeons"	Friedreich criteria or severe pain on vestibular touch or attempted vaginal entry and tenderness on localized pressure within the vulvar vestibule	Generalized or continuous vulvar pain, vulvar malignancy, ongoing inflammatory/ dermatologic vulvar conditions
Gungor Ugurlucan 2016[30]	Turkiye	Case report, presentation abstract	1	19-year-old female, comorbid vaginismus	Initial treatment with physiotherapy, then pregabalin 150mg and amitriptyline 25mg daily for 3 months, then physiotherapy again. After these interventions, patient underwent vestibulectomy, type not specified	N/A	No pathology on gynecologic exam, vaginismus resolved with physiotherapy prior to vestibulectomy, positive CST (authors seem to report VAS 49). Despite 3 months of oral medications, patient had persistent pain at the vestibule	N/A

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
Point 1: 2 months (surgical) 2–3 months (conservative) and Point 2: median 36 months[28,29]	CST NRS (0–10) pain or self-reported vulvar NRS pain intensity with touch before (recall) and after treatment, RAND-36 validated in Finnish	Response rate for Point 2 postal questionnaires was significantly higher in the surgical group (81% vs 46%). Median pre-intervention cotton swab NRS was 9 for both groups at point 1 but due to drop outs, median pre-intervention cotton swab NRS was significantly higher in vestibulectomy group (9) than conservative group (8) at point 2. Post-treatment median cotton swab NRS was significantly lower in vestibulectomy group (2 vs 7) at points 1 and 2, but data were only available for ~30% of the sample. At point 2, self-reported pre-treatment NRS was 8 for both groups (what type of pain, ie dyspareunia, is not specified). Post-treatment NRS was 2 vestibulectomy vs 4 conservative, not significantly different. Significantly fewer vestibulectomy patients still had sexual counselling at point 2. QoL was not different between the groups at Point 2. QoL was lower for conservatively managed participants than healthy controls	3/16 (19%) reported vestibulectomy complications. One readmission day 3 for post-operative pain. This patient required po gabapentin to control pain at 1 year. One readmission post-operative day 7 for partial wound dehiscence, healed by 2 months. One admission immediately post-op for severe pain, at 2 month follow-up "pain score was 0"	Validated questionnaire used to assess QoL. Long follow-up period (median 36 months), use of outcomes relevant to patient (self-reported NRS and RAND-36 multidimensional assessment)	Retrospective, non-randomized study. Non-blinded assessor of CST pain. QoL was not assessed pre-treatment for within group comparison post-treatment. Pre-treatment patient reported vulvar sensitivity to touch was collected by questionnaire at 36 months (possible recall bias). Total number of patients at 36 month follow-up was disproportionately low in conservatively managed group. Data for cotton swab NRS both before and after treatment available for only ~30% of the sample and for only 23% of the vestibulectomy group at point 2.	Competitive State Research Funding of the Expert Responsibility Area of Tampere University Hospital	While CST NRS pain was better in the surgical group at 2 and 36 months follow-up, this is not interpretable due to proportion of missing data. If and how much conservative management happened prior to vestibulectomy patients is unclear. It seems patients continued these treatments after vestibulectomy also. Authors concluded vestibulectomy was safe but the study was not powered to establish safety. Authors conclude that due to strong placebo effect of medical treatments, larger studies are warranted.
3 months[30]	Pain with dilator use, ability to have intercourse	No pain with largest dilator use, able to "perform intercourse" per patient	Post-operative course uneventful, no description of medication or physiotherapy side effects		Case report	Not reported	Sequence of interventions unclear. Seems she was first diagnosed and vaginismus and referred to physiotherapy. Vaginismus resolved with physiotherapy, but severe burning and itching persisted with dilator use. "Vulvar Vestibulitis score" was 49. It seems participant was then started on both medications simultaneously and after 3 months of meds tried physiotherapy again, but still had severe pain so then had vestibulectomy. The participant continued the oral medications "during the post-operative period." It is unclear if still taking them when the "final outcome" (no pain with dilator, able to "perform" intercourse at 3 month follow-up) was reported

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Belkin 2014[31]	Not reported	Retrospective cohort, presentation abstract	67 participants; n=44 vestibulectomy, n=23 conservative management	None reported	Vulvar vestibulectomy for PVD, type not specified	Continued conservative management	Individuals diagnosed with PVD who had failed conservative treatment and had been recommended for vulvar vestibulectomy	Not reported
Baggish 2012[32]	United States	Prospective cohort	502 participants: 98 "conservative" management; 234 "radical vestibulectomy" after conservative management; 170 "simple vestibulectomy" after conservative management	No demographics presented. 75 had urologic symptoms (urgency, frequency)	Conservative management defined as oral TCA or gabapentin, low-oxalate diet, calcium citrate 400 mg t.i.d or 1200 mg qd, abstinence from intercourse for 6 weeks, discontinuation of topical agents, biofeedback physiotherapy	Surgical intervention: "radical vestibulectomy" (included Bartholin-gland excision) or "simple vestibulectomy" (included para-urethral gland excision in ~70%). Both groups treated with topical and oral antibiotic, vaginal dilators and reverse Kegels post-operatively	Diagnosis of LPV determined through history and examination, normal exam except redness or pain limited to the vestibule, including areas overlying Bartholin and periurethral glands	Pain not confined to the vulvar vestibule

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
Not reported[31]	PVD symptoms, FSFI, frequency of intercourse	Individuals with PVD who did not have surgery were more likely to report persistent vulvar burning (92%) and cutting (39%) as compared to individuals with PVD who underwent vestibulectomy (25% and 12% respectively). Individuals with PVD who did not have the vestibulectomy had more sexual dysfunction as measure by the FSFI (26.92) as compared to those who underwent vestibulectomy (19.67) and those who did not have surgery have less episodes of intercourse each month (3.9) as compared to those who had surgery (6)	None reported	Presence of a comparator group	Unequal participant numbers in the two groups, retrospective study	Not reported	
At least 4 months initial conservative treatment for all groups. 2, 4, 6, and 8 week post-operative follow-up, then follow-up at 6 month intervals, for minimum of 12 months total follow-up[32]	Patient-reported absence of vestibular pain and ability to have pain-free intercourse, "tolerably low pain" during intercourse, CST, "no pain" during speculum or bimanual exam or insertion of "large vaginal form"	98 (19.5%) of 502 patients managed conservatively had "tolerably low pain" during intercourse. 33 (33%) of these had persistent pain on CST, ≤5-6/10 (presumably NRS). All of the remaining 404 (80.5%) participants went on to have vestibulectomy. Of those, 305/502 (61%) were able to have intercourse and 99/502 (20%) were not able to tolerate intercourse at all. 234/404 (58%) had "radical vestibulectomy. Of these, 228 (97%) had no pain with intercourse or CST. 6/234 (3%) were considered failures and went on to have excision of periurethral glands. Their outcomes were not reported. 170/404 (42%) had "simple vulvectomy." Of these, 161 (95%) had pain free intercourse and no pain on examination (CST, speculum/bimanual, "large" vaginal form). The remaining 9/170 (5%) were not discussed	For "radical vestibulectomy" 30/234 (13%) had pudendal neuralgia treated with amitriptyline/gabapentin then decadron injections every 2 months if not effective. Of these, 8 required ongoing decadron injections at 1 year. 1 readmission post-op for vulvar edema. For "simple vulvectomy", 9 (5%) had "mucous retention cysts" (Bartholin's gland cysts) prominent with sexual activity, "occasionally" uncomfortable. Excision of the cyst performed in 8. While the text reported no readmission in this group, the table reported 1 readmission for unspecified reason. No wound breakdowns reported. Neither procedure had blood loss >200mL or transfusion, or post-operative infection	1 year follow-up of relatively large sample, one provider delivering all treatments likely reduces variability in how procedure is performed	Lack of randomization. No demographic data reported. Efficacy of treatments not evaluated using standardized/validated measures and interval to reported outcomes not reported. Evaluator not blinded to group assignment. Reduced generalizability given single provider/center. No PRISMA diagram. Only patients included who had 1 year follow-up: possible source of bias	Not supported by industry	

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Tommola 2012[33]	Finland	Prospective cohort	66 participants; n=27 conservative management, n=39 "posterior vestibulectomy"	Age 24, nulliparous: 80–96%, on oral contraceptives: 61–73%, dyspareunia 4–5 years, primary "VVS" (LPV) (26–31%), baseline dyspareunia "VAS" 8–9 (likely NRS), discontinued oral contraceptives: 36% vestibulectomy, 71% conservative, physiotherapy: 33% vestibulectomy, 58% conservative, duration of conservative treatment 16 months among those who underwent vestibulectomy, average 18.5 months duration of conservative management alone	Conservative management treatment algorithm: vulvar care measures, withdraw oral contraceptive if possible, treat infection/ dermatosis, oral amitriptyline, ± podophyllotoxin 5mg/mL, physiotherapy biofeedback, sexual counselling and education	Conservative management followed by "modified posterior vulvectomy" for conservative management failures	Dyspareunia "VAS" (likely NRS) ≥7, symptom duration ≥12 months, equal "timing of treatment period" (presumably length of follow-up). Friedreich's Criteria for LPV diagnosis	Dyspareunia "VAS" <7 (likely NRS), symptom duration <12 months, vulvar dermatosis and vaginal infection

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
47 month follow-up for vestibulectomy (unspecified if mean or median), 77 months for conservative ($p<0.001$). Not concurrent- follow up occurred in 2005 and 2009 respectively.[33]	CST pain, with anterior (11–1 o'clock) and posterior (10–2 o'clock) vestibular pain measured separately, "VAS" dyspareunia (likely NRS), "structured questionnaire" at face-to-face interview, EuroQol-5-Dimension-VAS (0–100)(subjective general health), BDI, Medical Outcome Support Scale (validated in Finnish), modified McCoy questionnaire (sexual health), subjective assessment of treatment response (complete response/cure, partial response, no response/worse)	Median reduction in "VAS" dyspareunia was available in ~90% of the sample. Vestibulectomy "VAS" (likely NRS) reduction of 6 (66.7% reduction) versus conservative management reduction of 6.1 (78.1% reduction); not significantly different. "Significant" posterior tenderness cotton swab test less in surgical group (11%) than conservative (63%), a significant difference. There was no difference in "significant" anterior tenderness. "VAS" scores for dyspareunia decreased significantly in both groups from baseline, vestibulectomy from 9 to 3, conservative management from 8 to 2, with no significant difference between groups. Those with "significant" posterior tenderness on CST had "VAS" dyspareunia of 5.25 in vestibulectomy group and 2 in conservative management group (not significant). "Complete response" to treatment in 26–36%, partial 53–63%, no response 7–11%, worse 0–4% (no significant difference between groups). No differences in measures of sexual function. Use of lubricant for intercourse was more frequent in conservative management group. Participants were ready to choose vestibulectomy after a median of 9 months of conservative management and it took 16 months of conservative management to "render vulvectomy unnecessary"	3 participants in vestibulectomy group had "fissures" at follow-up exam, otherwise complications/side-effects not mentioned	Long follow-up (3.8–6.4 years), authors refer to standard treatment algorithm used for conservative management, varied outcome measures including interviews	Greater proportion of those eligible for participation in conservative management group declined participation than those eligible in the surgical group (23/50 conservative mgt declined vs 13/52)	Helsinki University Hospital Research Funds	Disproportionate desire to participate in study among those approached to participate (75% vestibulectomy, 46% conservative). They erroneously refer to their study design as case-control. But, participants are grouped by intervention ie those who did or did not have vestibulectomy and measuring the outcome of pain as a result of this intervention. Referred to VAS but more likely, they used NRS (severe VVS had score of 7). Authors refer to relatively small number (n=35 vestibulectomy n=24 conservative had CST but n=24/group required according to power analysis to detect 20% difference in primary outcome). Disproportionate follow up; for surgery group was in 2005 (44 months) and conservative management follow up was in 2009 (77 months)

(*Continued*)

Table 1 (Continued).

Citation	Country	Study Design	No. Patients	Sample Demographics	Intervention 1	Intervention 2	Inclusion Criteria	Exclusion Criteria
Lambert 2012[34]	Canada	Case series	61 participants, subgroup of 25 (n=9 with primary LPV, n=16 with secondary LPV)	Age 23 years (range 18–38), duration of pain 30.5 (4–84) months. In subgroups, Primary LPV mean age 21 (18–26), pain duration 41.3 (12–84) months. Secondary LPV mean age 24 (18–38), pain duration 24.4 (4–60) months	PT was administered for 10 weekly sessions prior to surgery. Cognitive-behavioral sex therapy consultation/ treatment occurred before surgery offered. Participants underwent posterior vestibulectomy combined with four supplementary weekly PT sessions with digital vaginal dilatation and use of plastic dilators from post-operative weeks 6–10. Transition to intercourse in "female" "superior position"	None	Posterior vestibular CST pain of at least 5/10 NRS, 10 weeks of physiotherapy prior to surgery, sex therapy consultation/ treatment prior to surgery	Negligible post-PT pain or rejection from study by sex therapist assessment (parameters for rejection not specified), disclosed pre-operative sexual abuse, vaginismus

Notes: *Where "Age" is referenced in the sample demographic column, mean age is implied unless otherwise stated. Authors' note: where studies describe race and ethnicity, the term used (eg Caucasian, white) mirrors the language used by each studies' authors.

Abbreviations: BDI, Beck Depression Inventory; CBCT, cognitive behavioral couple therapy; CBT, cognitive behavioral therapy (individual therapy unless otherwise stated); CST, cotton swab test; FSDS, Female Sexual Distress Scale; FSFI, Female Sexual Function Index; GCBT, group CBT; IMMPACT, Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials; LPV, localized provoked vulvodynia; MPQ, McGill Pain Questionnaire; MC, most common; N/A, not applicable; NRS, numeric rating scale; NTA, non-traditional acupuncture; PCS, Pain Catastrophizing Scale; PFM, pelvic floor muscle; PROMIS, Patient-Reported Outcomes Measure ment Information System; PT, physiotherapy/physical therapy; PVD, provoked vestibulodynia (another term for LPV, included in descriptions of studies where authors used this term); QoL, quality of life; SCP, sexual communication patterns; SD, standard deviation; TA, traditional acupuncture; TCA, tricyclic antidepressant; TENS, transcutaneous electrical nerve stimulation; TT, tampon test; VAS, visual analog scale; VVS, vulvar vestibulitis syndrome (another term for LPV, included in descriptions of studies where authors used this term).

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
Telephone interviews conducted 1–7 years after surgery[34]	Pain "VAS" (likely NRS), vaginal intercourse feasibility, intensity of coital pain, sexual satisfaction, and whether participants would recommend the surgery	All data points not available for entire n = 61, vaginal intercourse was possible in 36/40 (90%) participants post-procedure, with 31/40 (77.5%) obtaining sexual satisfaction and recommending the procedure. In the subgroup of n=25, pre-operative NRS "pain" (likely dyspareunia) was 6.9 ± 1.9 and post-operative was 3.7 ± 3.5 ($p < 0.001$). Primary LPV NRS pain reduction (likely dyspareunia) from 6.6 ± 2.6 to 5.2 ± 3.4 post-operative (listed as p= 0.200 by authors). Secondary LPV NRS pain (likely dyspareunia) reduction from 7.2 ± 1.3 to 2.9 ± 3.1 post-operative ($p<0.001$)	Not reported	Outcomes compared between primary and secondary vulvodynia patients, incorporation of multiple treatment modalities	Limited analysis, possible recall bias, unclear descriptions of statistical techniques and outcomes, limited information, lack of ethics board approval	No external funding	Not submitted for ethics board approval, "subgroup" of n=25 described as "matched patients" but matching parameters are not further explained. Patients failing vestibulectomy were offered "biweekly non coital-associated" 2% xylocaine cream and desipramine 25–100mg daily for 4–6 months

Table 2 Interdisciplinary Program Studies

Citation	Country	Study Design	No. Participants	Sample Demographics	Multidisciplinary Intervention	Inclusion Criteria	Exclusion Criteria
Close 2022[35]	Belgium	Case series	68 enrolled in study, 45 completed study	Age*: 31, primary vulvodynia: 58%	30-minute sessions involving desensitization of the painful area with lidocaine 2% gel combined with teaching the practice of self-massage at home, using vaginal dilators of increased diameters with breathing techniques, counselling about lifestyle and personal hygiene, and coaching about sexuality. Treatment length varied based on individual progress.	Positive CST data, vulvodynia persisting for >3 months (defined as experiencing pain on a daily basis), age 18–65 years of age.	Undergoing other therapeutic treatment, clinically significant dermatological disease, clinically significant neurolo gical disease such as pudendal neuralgia.
Ghizzani 2022[36]	Italy	Case series	3 women in heterosexual relationships and their romantic partners	Ages: 41, 50, and 47; All participants were heterosexual and partnered for at least 10 years; Baseline CST scores were 6, 14, and 18	Oral amitriptyline prescribed at 10 mg and uptitrated as tolerated, daily vestibular estrogen and hydrocortisone creams (percent concentrations not specified), vaginal dilators and sensate focus exercises at home and in biweekly behavioral sex therapy. Number of therapy sessions varied by couple.	Diagnosis of provoked vulvodynia by pain history, evaluator observation of vestibular mucosa, pain pressure test (CST with light pressure to the vestibule scored with a "VAS" of 1–5 for each of five vestibular sites)	Gynecologic or dermatologic conditions
Yee 2022[37]	United States	Case series	14	Age: 30, baseline CST mean pain score prior to treatment: 7.3/10	Application of 20% benzocaine + 8% lidocaine + 6% tetracaine, followed by "perineural" 5% dextrose injection at 6 locations encircling the 12:00 region (between urethral meatus and clitoris) of the vestibule (1mL each, 6 mL total) via 31-gauge needle followed by 3 minutes of compression, performed daily for 3 days followed by "complete vestibulectomy with vaginal advancement flap."	CST NRS pain >4/10 at 12:00 region of vestibule, scheduled for complete vestibulectomy, confirmed immunohistochemical excess mast cells/ nerves (intra-operative specimen)	Not discussed

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
Follow up varied by participant. Questionnaires were distributed at baseline and final visits. Follow-up was reported as such: average number of physiotherapy sessions was 9.67 for a duration of 30 min and a period of treatment of 2.78 months.[35]	Questionnaire comprised of items from the Medical Outcomes Study 36-item (SF-36), FSFI, and VAS. Vulvar pain was quantified using a 100 mm linear VAS (with 0 = no pain and 100 = maximum pain)	Significant improvement of all items (perceived general well-being and health, perceived vulvar pain, perceived sexual function, and perceived pain with vaginal penetration) (P<0.001). 24% of the sample answered that physical treatment was extremely helpful, 49% stated that it helped very much, and 22% felt it was moderately helpful.	None reported	Single therapist more likely providing equivalent treatments, authors account for qualitative feedback, treatment was patient-dependent according to the individual case	Single-therapist/center reduces generalizability, no comparator group, short follow-up period	Not reported	
Participant 1 had 16 sessions, Participant 2 had 7, and Participant 3 had 5. Most sessions occurred every two weeks. Participant 1's therapy was spaced to monthly intervals at session 14. Participant 2 had monthly sessions to allow for longer intervals to practice dilator use.[36]	No formal assessment of outcomes; results are presented as qualitative narratives.	Pain remission or improvement was seen in Participants 1 and 2. Participant 3 withdrew due to marital conflict but reported increased pain tolerance while in treatment.	None reported	Accounts for relationship dynamics as a factor influencing LPV treatment	Single therapist limits generalizability, no quantitative data presented as results, limited sample size	Not reported	
Immediately following injection series and 6 months post-vestibulectomy[37]	CST NRS pain at 12:00 (between urethral meatus and clitoris)	Baseline: CST NRS pain 7.3/10 (range 5–10). After 3 dextrose treatments: CST pain 2.8/10 (range 0–5). At 6 month follow-up in an unspecified number of patients CST pain 2.3/10 (range 0–4)	Mild bruising at injection site after 5% dextrose injection.	Novel treatment	Small case series with unknown numbers at follow-up, cannot attribute findings to dextrose injection this was combined with topical anesthetic mixture and compression. This problem is compounded at 6 month follow-up by addition of vestibulectomy also.	Not reported	

(*Continued*)

Table 2 (Continued).

Citation	Country	Study Design	No. Participants	Sample Demographics	Multidisciplinary Intervention	Inclusion Criteria	Exclusion Criteria
Brotto 2015[7]	Canada	Case series	132	Age 28; Romantically partnered: 49.6%; Relationship duration 4.9 years; Current sexual partner 82.9%; Heterosexual 96.4%; Ethnicity: Euro-Canadian 80.2%, East-Asian 7.8%, Indo-Canadian 7.8%, Latina 3.4%; Education 95% some college or university; Primary LPV 33.1%; Mean NRS pain intensity: 5.76/10	Standardized 10-week program with 2 group education sessions, 3 psychological skills training groups (CBT and mindfulness), 3 individual pelvic floor physiotherapy sessions. 2 follow-up sessions with program gynecologist to recommend medical co-treatments.	Diagnosis of PVD (program gynecologist exam with CST), reproductive age, dyspareunia for over 6 months, ability to participate in group sessions	Post-menopausal, largely unprovoked pain, chronic discomfort, due to another cause (lichen), could not participate in group (lack of English fluency, signs of group-interfering behaviors such as "hostility" during baseline session)
Brotto 2012[38]	Canada	Case series	121	Age: 29	Multidisciplinary program: standardized 10-week program with 2 group education sessions, 3 psychological skills training groups (CBT and mindfulness), 3 individual pelvic floor physiotherapy lessons. 2 follow-up sessions with program gynecologist to recommend medical co-treatments.	Not reported	Not reported

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
2–3 months; subsample 6 months[7]	FSFI; FSDS; Dyadic Adjustment scale (maximum score 151); pain NRS (labeled by authors as VAS)	Subjective change in symptoms: 53.8% reported improvement, 41.2% no change, 5% increased pain; FSFI pain: 3.75 (p=0.001, n=41); NRS pain with penetration 5.53/10 (p <0.001); less intimacy avoidance (17.9% vs 38.1% at baseline, p<0.001); no improvement from post-treatment to 2–3 month follow-up period on sex-related distress, any FSFI subscales, dyadic adjustment or NRS. At six-month subsample follow-up, authors reported 10.5 unit reduction in sex-related distress (n=77; p<0.001), increase sexual desire FSFI 4.73 units (p=0.01 n=76), improved sexual satisfaction 9.24 pts (p<0.001; n = 50); dyspareunia NRS 3.18/10 (p=0.05; n=22); Linear regression pre-treatment to immediately post-treatment showed that PVD individuals with lower baseline dyspareunia, higher baseline function and those with primary/ lifelong PVD had more improvement with program participation.	None reported, authors do not account for drop outs	Validated scales, longer-term follow-up; feasibility of group-based multidisciplinary program (may be more cost-effective)	Inclusion bias: exclusion of those who demonstrated hostility. Non-participants had better functioning in pain subscale (participants may have been more motivated for improvements); No comparison group; patients attended with the expectation of receiving care. Could not test which components contributed to improvement vs improvement from sense of validation and support of group experience (regardless of the content of the education provided). Generalizability - population overall educated, metropolitan. Only minority of partners attended discharge appointment thus could not account for this as confounder for improvements.	Not reported	
2–3 months[38]	Self-reports on validated scales of pain with intercourse, pain vigilance, pain catastrophizing, sexual functioning and distress, symptoms of depression compared at pre-treatment versus post-treatment versus 2–3 months follow-up	Less pain with intercourse, less pain vigilance and catastrophizing, less sex-related distress, and better sexual functioning at follow-up than at baseline (p<0.01).	None reported	See Brotto (2015) for strengths.	See Brotto (2015) for limitations.	Not reported	

(*Continued*)

Table 2 (Continued).

Citation	Country	Study Design	No. Participants	Sample Demographics	Multidisciplinary Intervention	Inclusion Criteria	Exclusion Criteria
Sadownik 2012[39]	Canada	Retrospective case series, qualitative	19 (46 completed program; 30 agree to interview; 19 recordings of sufficient quality to be transcribed and analyzed)	Participants from 4 program cohorts. Age range: 20–54, mean age: 31; 79% common law/ married; 68% nulligravida; 58% "Caucasian", 32% South Asian, 10% Middle Eastern. Pain during sexual occasions reported 70–100% (mean 95.3%) of the time.	Multidisciplinary program as described by Brotto 2015 - all those who completed program invited to in-person or telephone "exit interview" by assistant not involved in the multidisciplinary program in semi-structured interview format. Questions included "What has been the most/least helpful", "what was the most helpful for understanding or managing your vestibulodynia", and "what changes would you make to this program to make it better suited to meet your needs". Interviews lasted 15 minutes - 1 hour. Transcriptions were analyzed independently by three authors for impressions and highlighting themes. Dominant themes identified by the 3 authors together to develop coding framework. Transcripts then re-read and coded by all authors. Representative excerpts cut and pasted.	Individuals with PVD who participated in the multidisciplinary program from December 2008 - September 2009 (see Brotto 2015)	See Brotto 2015
Yong 2015[40]	Canada	Case series	150	Age: 29; Nulligravid 78.5%; Sexual orientation: heterosexual 96.2%, bisexual 3.1%, 0.8% lesbian; Marital status: single 44.3%, married 30.2%, common-law 22.1%, separated 2%, divorced 1.3%; Mean relationship duration 5.2 years; Ethnicity: Caucasian 77.8%, East Asian 10.4%, Indo-Canadian 6.9%, Hispanic 2.8%, Persian 1.4% African Canadian 0.7%; Mean duration of symptoms 58.4 months	Standardized 10-week program with 2 group education sessions, 3 psychological skills training groups (CBT and mindfulness), 3 individual pelvic floor physiotherapy sessions. 2 follow-up sessions with program gynecologist to recommend medical co-treatments.	History of superficial dyspareunia, positive CST and desire to complete the entire program; Sadowink 2012 used as reference for inclusion criteria.	Postmenopausal, superficial dyspa reunia due to cause other than LPV (ie atrophy, vulvovaginitis or primary vaginismus), poor candidate for group format (severe anxiety or depression) or patients in whom deep dyspareunia was the main symptom rather than superficial dyspareunia.

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
Participants completed "exit interviews" within a month of completing the program[39]	Qualitative responses	Themes identified were 1) Increased knowledge - little accurate information prior, value of information from qualified expert; 2) Gained tools/skills - increased coping that translated into emotional well-being, able to regain control; 3) perceived improved mood/ psychological well-being - sense of normalcy, optimism, hope, relief and reduction in anxiety; 4) Sense of validation and support - support from health care providers, validating in having dx could understand as well as listening to others experiences, support from each other; 5) enhanced sense of empowerment, skills/ tool increased confidence, sense of control over health. Authors conclude perceived benefits correlate with outcome measures. Benefit from formal education sessions held separately from their medical appointments.	None reported	Qualitative data that captures nuances and utilizes the participants' experiences as a valid outcome as opposed to scale that attempts to quantify that which is not entirely quantifiable	Participation bias/ generalizability - multidisciplinary program participants (given option of medical vs non-medical therapies; individuals with LPV found to have biases against non-medical therapies, ie participants who agreed may be more likely to accept non-medical therapies); Selection bias - nonparticipants may have not had a positive experience with the program.	Not reported	
6 months[40]	Dyspareunia NRS pain (0–10), other pain condition, State-trait anxiety inventory (20–80; state anxiety, trait anxiety), Beck Depression Inventory (0–63), Pain Catastrophizing Scale (0–52), FSDS	Patient characteristics between those with concurrent deep-superficial dyspareunia where $p>0.05$: higher dyspareunia NRS (0–10) pain 6.3 vs 5.2 OR 1.19: diagnosis of endometriosis 18.2% vs 4.8% OR 4.3: diagnosis of bladder problems 24.2% vs 8.3% OR 3.84: higher BDI 13.0 vs 8.9 OR 1.07; Both groups show improvement over time (post-treatment and 6 months) in dyspareunia NRS pain (immediately post-treatment 4.7 vs 5.3, 6 months post-treatment 4.5 vs 4.5), FSDS (baseline 32.7 vs 29.6, immediate post-treatment 32.5 vs 28.4, 6 months post-treatment 24.2 vs 21.4) with no difference between groups	None reported	Use of quantitative scales, length of follow-up, attempts to find predictors of success of participating in the program	May not be generalizable as tertiary program, self-reported co-morbidities, cannot isolate confounding chronic pelvic pain from concurrent deep dyspareunia, low follow-up rate to 6 months (15/66 [23%] and 22/88 [25%] with pain data; 29/66 [44%] and 34/84 [40%] with FSDS data)	Not reported	

(*Continued*)

Table 2 (Continued).

Citation	Country	Study Design	No. Participants	Sample Demographics	Multidisciplinary Intervention	Inclusion Criteria	Exclusion Criteria
Smith 2019[41]	Canada	Case series	316	Age: 29; Marital status: partnered 48%, not partnered 51%, missing 1%; Sexual orientation: heterosexual 94%, other 4%, missing 3%; Relationship length: median 48 months (25–84 months); Education: High school or less 6%, some college 19%, 2 year college 13%, 4 year college 33%, postgraduate degree 28%, missing 1%	10–12 week program. 1-hour group educational seminar by gynecologist (pathophysiology of PVD, overview of medical, behavioral and surgical treatments); 1 hour educational seminar by gynecologist or psychologist (circular sexual response cycle, impact of genital pain on arousal, desire and satisfaction). Individual appointment after education session with gynecologist to discuss issues during the previous sessions. Three 2-hour sessions led by counsellor or psychologist on psychoeducation, support, in-session teaching and practice of psychological skills. Skills included mindfulness, identifying irrational thoughts, use of thought records to document impact of thoughts and emotions on pain. Daily homework. Three 1-hour sessions with pelvic floor physiotherapist focusing on education on role of muscles in LPV pain. Instruction on biofeedback, pelvic floor relaxation, use of vaginal "accommodators." No manual release techniques to address hypertonicity. Encouraged to continue exercises and see community-based physiotherapist after the program. Final discharge appointment with gynecologist to discuss acquisition of skills and how to use them after end of the program and identification of need for further medical, physiotherapy, sexual and/or psychological support.	Over age of 18, premenopausal, geographic access to program, vulvar pain of ≥6 months, diagnosis of PVD by program gynecologist using CST	Vulvar pain not due to LPV, recent childbirth without resumption of menses, report of largely unprovoked vulvar pain (however, participants could still participate if they also had LPV)

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
Baseline to post-treatment; post-treatment to 18 months[41]	FSFI, FSDS	Relationship length was significantly longer in participants who were not sexually active. FSDS scores improved from baseline (n=311) 31.54 to post-treatment (n= 251) 24.24, 6-month follow-up (n=145) 22.38, and 18 month follow-up (n=76) 18.29 ($p<0.05$ from baseline to each follow-up time point). Sexual functioning scores on the FSFI improved from baseline (n=167) 2.12 to post-treatment (n= 92) 3.13, 6 month follow up (n=62) 3.24, and 18 month follow up (n=28) 3.47 ($p<0.05$ from baseline to each follow-up time point).	None reported	Validated questionnaires, relatively long follow-up.	311 participants were included in baseline data but only 167 with baseline data for one of the outcome measures (FSFI - pain). Dropouts are not explained. Unclear if improvements to FSFI/FSDS over time were due to program versus placebo treatment versus spontaneous resolution. No reporting on additional treatments used ie medication. Unclear if transferrable ie implementing the program with different providers/different location. No data on attendance or adherence to program recommendations. No data on dropouts as unsatisfied with program ie a side-effect of participation.	Not reported	Unclear if same data sample as J Sex Med 2015; this paper primarily focused on predictors of multidisciplinary program success.

(*Continued*)

Table 2 (Continued).

Citation	Country	Study Design	No. Participants	Sample Demographics	Multidisciplinary Intervention	Inclusion Criteria	Exclusion Criteria
Spoelstra 2011[42]	Netherlands	Retrospective cohort	64 (70 eligible individuals with PVD; 6 dropouts)	Age 29; Duration of symptoms <2 years 14%, 3–5 years 47%, 6–10 years 23%, >10 years 16%; Primary 59% vs secondary 41% LPV; Civil status: Married 36%, Single 13%, living together 45%, relationship but not living together 6%; Highest education: university 18%, higher education 38%	Participants completed interventions 1–9 and had the option to select from interventions 10–12: 1) history 2) educative gyneco-sexological exam 3) provided information regarding PVD, natural course, treatment options and plan 4) involve partner and patient in decisions regarding treatment options 5) prescription of inert cream (eye ointment) to protect skin and encourage mucosal desensitization via self-touch 6) Vaginal EMG biofeedback, pelvic physiotherapy with the aim of alleviating hypertonia 7) homework of self-exploration and biofeedback with touch, dilators and lubricants with temporary coitus prohibition 8) vulvar hygiene protocol (no douching or liners) 9) normalizing, reframing and encouraging sexual activity without penetration to avoid feelings of guilt 10) individual sexological counselling 11) sexological partner-relation therapy 12) surgical intervention (vestibulectomy) for persistent symptoms	Sexually active without penetration or abstinent, i) self-reported superficial vulvar pain at attempted vaginal entry ii) tenderness at vestibule with light touch or CST iii) ≥ 6 consecutive months of symptoms	All other causes of acquired superficial dyspareunia

Notes: *Where "Age" is referenced in the sample demographic column, mean age is implied unless otherwise stated. Authors' note: where studies describe race and ethnicity, the term used (eg Caucasian, white) mirrors the language used by each studies' authors.

Abbreviations: CBT, cognitive behavioral therapy (individual therapy unless otherwise stated); CST, cotton swab test; FSDS, Female Sexual Distress Scale; FSFI, Female Sexual Function Index; NRS, numeric rating scale; NRV, Dutch Relationship Questionnaire; PVD, provoked vestibulodynia (another term for LPV, included in descriptions of studies where authors used this term); VAS, visual analog scale.

Length of Follow-Up	Outcome Measures	Reported Results	Treatment Side Effects	Study Strengths	Study Limitations	Funding	Additional Notes
3–7 years after treatment (mean 5 years)[42]	Self-reports on validated scales: FSFI, FSDS, Dutch relationship questionnaire (NRV), NRS pain at follow-up	42% of participants underwent optional psychotherapy and 23% underwent surgery. Mean duration of treatment was 148 weeks (3 years). Average NRS (0–10) dyspareunia decreased from 7.4 to 3.8 ($p < 0.0001$). 81% reported decrease in intercourse pain, 11% reported no change, 8% reported increase. 80% resumed intercourse. FSFI, FSDS and NRV: all significantly lower than population mean. 80% reported that they would recommend the program to others.	None reported	Account for drop-outs: 4 reported questions too intimate, 2 reported lack of motivation; use of age-matched controls	Recall bias - pre-treatment scores appear to be as reported by patient 3–7 years later for NRS; population comparator for other measures ie no pre-treatment measures	Not reported	

Psychotherapy versus Pharmacologic Interventions

Three randomized treatment versus treatment trials compared 12 weeks of cognitive-behavioral couple therapy (CBCT) sessions with participants and their partners with topical 5% lidocaine ointment applied to the vestibule nightly. Two publications[20,21] followed the same 108 participants. The third publication[22] followed 84. One report[20] found improvements in sexual function, sexual distress, and pain catastrophizing at post-treatment and 6-month follow-up among both groups, though those in the CBCT group experienced greater satisfaction with treatment and had greater improvements in anxiety and pain catastrophizing. Other publications[21,22] examined sexual communication patterns (SCP), which may be associated with relational and sexual satisfaction, between participants and their partners throughout the course of treatment. A 2022 study[21] reported that improved collaborative communication mediated the effect of CBCT, but not lidocaine, on sexual satisfaction, function, and distress. This study also found that neither group of partners reported improvement to negative SCP with time.[21] A 2017 study reported that collaborative SCP increased with CBCT but not lidocaine.[22] Contrary to a 2022 study, they found that negative SCP significantly decreased for participants and their partners over the course of CBCT, with participants in the lidocaine group also reporting decreased negative SCP.

These studies had a randomized design and close participant monitoring, but there was no control for attention from a health professional, which the authors felt may have accounted for some outcomes. There was also no control for continued use of lidocaine or CBCT homework exercises during the follow-up period. Exclusion criteria prohibited the engagement of those not attempting penetrative sexual activity or who experienced significant relational distress or health problems. Regarding treatment adherence, two studies[20,21] found that couples in CBCT attended an average of 10.6 out of 12 sessions and completed 63% of homework exercises, while participants in the lidocaine arm applied the cream 79.4% of nights in the treatment period. Five couples assigned to CBCT in the 2017 study[22] dropped out over the course of therapy, and three participants withdrew from lidocaine treatment.

Two randomized studies compared a ten-session group CBT (GCBT) program with topical 1% hydrocortisone cream applied twice daily to the vulvar vestibule for the same period. The first followed 97 participants, 52 of whom received GCBT, and 45 who received hydrocortisone.[23] The second followed 97 participants, 46 of whom received GCBT and 51 who used hydrocortisone.[24] The first study reported improved pain during intercourse and sexual dysfunction in both groups, with GCBT producing greater decreases in pain and pain catastrophizing, increased treatment satisfaction, and improved global pain.[23] The other found improvements in pain and sexual function at post-treatment and 6-month follow-up in both groups, with greater effects in the GCBT group.[24] Neither study had a placebo group and each only offered one medical management option.

Psychotherapy versus Physiotherapy

One study[25] compared individual CBT (ICBT) to pelvic floor physiotherapy. Twenty women were randomly assigned to one of the eight-session treatment programs. Outcome measures related to pain and sexual functioning were assessed pre- and post-treatment, and at 6-months post-treatment. Both treatment groups showed improvement in pain with intercourse that persisted up to 6 months with no statistically significant differences between treatment groups. Furthermore, ICBT resulted in improved sexual functioning and physiotherapy resulted in reduced pelvic floor muscle tone. Underpowering and the absence of a control group may limit interpretation of findings. The author concluded that women with LPV who present with pelvic hypertonicity may be better suited for pelvic floor rehabilitation, whereas women with high pain rumination or sexual functioning problems may be better suited for ICBT.

Multimodal Treatment versus Multimodal Treatment

One study[26] recruited 19 (of an intended 30) LPV participants randomized to either "traditional acupuncture" (TA) or "non-traditional acupuncture" (NTA) for 18 treatments over 12 weeks. Both groups also used vestibular lidocaine 5% ointment four times daily. Authors did not consider NTA to be a "sham" procedure as they state that acupuncture needle insertion affects circulating endogenous opioids and their receptors. Outcomes were assessed post-treatment and 3 months later. While ten were randomized to TA and nine to NTA, only seven participants per group were included in the final analysis, precluding statistical comparisons. Almost all had tried medication and physiotherapy, although it was

unclear if use was ongoing. Baseline vulvar VAS pain by participant recall was higher in the NTA group. While some pain outcomes were comparable or favored TA at 12 weeks, 24-week outcomes favored NTA. Participants expected a 60% pain reduction, and tampon test and CST pain VAS improved from 30% to 60%. More NTA participants were satisfied with their pain relief. Participant blinding was effective, with only 2 (14%) correctly guessing group assignment. Participants were highly compliant. Five adverse events attributed to acupuncture were considered mild and two dropouts were attributed to lidocaine. Authors concluded that acupuncture for LPV was acceptable, well tolerated, and warrants further investigation.

Descriptive Studies Involving Multiple Interventions/Interdisciplinary Classes

A case series[35] evaluated a combination of pelvic muscle floor therapy (PMFT) and lidocaine 2% gel without a comparator. This study evaluated general wellbeing and health, perceived vulvar pain, sexual function, and pain with vaginal penetration among 45 participants. Participants underwent 30-min sessions with a physiotherapist, which involved vulvar desensitization with lidocaine as well as education, use of vaginal dilators, lifestyle counseling, and sexuality coaching. Duration of treatment varied based on individual progress, lasting 4–20 sessions. Authors reported improvements in all measures but acknowledge that no RCTs exist which study this intervention more rigorously.

Another case series[36] evaluated three partnered patients who were treated with oral amitriptyline, vestibular estrogen and hydrocortisone creams, and biweekly behavioral sex therapy, which involved use of vaginal dilators and sensate focus exercises (engaging in non-penetrative forms of physical intimacy with a partner). Duration of treatment spanned from 5 to 16 sessions with a behavioral sex therapist. While partners were encouraged to join therapy sessions, only one of the three participants' partners attended these sessions consistently. Authors reported this participant experienced "gratifying" intimacy and minimal pain with intercourse and another reported successful resumption of spontaneous intercourse with her partner and that the final participant withdrew due to relationship issues. Authors concluded that pain improved in scenarios where couples were motivated to follow the treatment protocol, but acknowledged that general conclusions could not be made based on the small number of cases.

A case series[37] examined the efficacy of 5% dextrose injections administered after application of a multi-agent topical anesthetic followed by 3 min of compression daily for 3 days prior to "central core excision" of the 12 o'clock region of the vestibule in patients who had failed posterior vestibulectomy. This intervention was offered to participants with >4/10 NRS pain with CST. Fourteen participants had mean age 30 and mean NRS pain 7.3/10 had pain reduction to 2.8/10 after three days of injection, prior to the excision. An undisclosed number presented 6 months post-procedure with a mean pain score of 2.3/10. It is difficult to attribute the improvement to the anesthetic cocktail, dextrose injection, ischemic compression, the surgical procedure or the combination as there were no comparison groups.

In a series of papers and an abstract,[7,38–41] authors outlined an interdisciplinary group program for LPV and impact in terms of pain and functioning. In a 10–12-week program, participants were placed in cohorts, given an information binder, and moved through structured interdisciplinary educational sessions on LPV, sexuality, mindfulness, and CBT. Individual physiotherapy (PT) sessions included instruction on biofeedback, pelvic floor relaxation, and the use of "accommodators." LPV diagnosis was based on history and examination, including the CST, by a program gynecologist. Validated questionnaires were used to establish pre-participation, immediate post-participation, and longer term (up to 6 months) outcome measures. A subgroup also participated in a qualitative narrative study regarding their experiences and perceived program benefits.

Although limited by participation and reporting bias, the participants in a qualitative study[39] (n=19) reported the program increased their knowledge regarding LPV and gave them useful tools and skills. There was a sense of validation and support through the use of a group setting led by specialists knowledgeable in the condition. Participants felt empowered with improved mood/psychological wellbeing. At immediate post-treatment assessment 53.8% reported decreased pain and 41.2% reported no change and the remaining 5% reported an increase.

On quantitative measures (n=132;[7] n=311[41]), Female Sexual Distress Scale (FSDS) decreased immediately post-treatment and pain on the Female Sexual Function Index (FSFI)-pain subscale improved. A substantial number of outcome measures were missing for participants, even though most completed the program. On 2–18-month follow-ups, improvements in sex-related distress, FSFI-pain, sexual satisfaction, and desire were sustained, although pain showed

lesser improvement. The authors acknowledge they could not account for other medication use, placebo effect, or the natural course of the disease whereby there is spontaneous improvement in symptoms without intervention in a subset of individuals. These studies provided long-term follow-up, although none accounted for the high numbers of dropouts over time. This is a common phenomenon in longitudinal studies, however if the conclusion is additive benefits over time, participation bias should be accounted for. In other words, persons who saw benefits were more likely to continue to participate in the study as opposed to those who did not, thus inflating the benefits of participation.

In a retrospective case series,[42] researcher asked participants of their interdisciplinary program to complete pain and sexual functioning scales 3–7 years post participation to be compared to their recollection of pre-program pain and population controls for function. The program consisted of 12 structured steps, whereby all participants completed steps 1–9 and if appropriate completed steps 10–12 (see Table 1). Seventy participants completed the program and 64 agreed to take part in the study. Following completion of the 9-step program, 42% of participants had also received psychotherapy and 23% had undergone surgery. From their recollection, pain had decreased by 3.6 points on the NRS, however all participants continued to have significantly impaired function based on the FSFI, FSDS, and NRV-SE (Dutch Relationship Questionnaire) compared to the population means. The program had some perceived benefit and was tolerated by patients with 81% of participants reporting a reduction in their pain and 80% were inclined to recommend the program to other participants with PVD. While 11% reported no change in pain and 8% reported an increase, it did not describe which additional steps of the program these participants had completed (ie, vestibulectomy). Demographic characteristics and concomitant therapy use (ie, medications) were also unreported among these participants.

Multimodal/Interdisciplinary Management Followed by Vestibulectomy versus Continued Multimodal/Interdisciplinary Management

There were five cohort studies of patients choosing surgical intervention after multimodal/interdisciplinary management compared with those who continued multimodal/interdisciplinary management.[27–29,31–33] Two incorrectly identified their studies as case-control.[31,33] There was also a single case report of a 19-year-old female unable to have sexual intercourse who underwent vestibulectomy after incomplete resolution of symptoms with physical therapy and medical management,[30] and a case series of posterior vestibulectomy after 10 weeks of physical therapy and cognitive-behavioral sex therapy consultation among 61 patients.[34]

Mainly, participants choosing vestibulectomy were compared with those who chose continued multimodal/interdisciplinary management: 16 versus 50,[29] 44 versus 23,[31] and 39 versus 27,[33] respectively. In the study by Davis et al, 17 of 239 had "surgery", but the surgical procedure was unspecified.[27] The study by Baggish compared 234 participants undergoing vestibulectomy combined with Bartholin-gland excision, called "radical vestibulectomy", 170 participants undergoing vestibulectomy combined with paraurethral gland excision, called "simple vestibulectomy", and 98 continuing multimodal/interdisciplinary management.[32] Vestibulectomy obstructs the Bartholin gland duct; therefore, gland excision may have been used to prevent cyst formation, a reported postoperative complication. However, there was a high rate of pudendal neuralgia with gland excision, so this was discontinued. Conversely, some patients required reoperation for persistent periurethral pain.[32] Tommola et al performed "posterior vestibulectomy."[33] Patients chose surgery after 4–9 months of multimodal/interdisciplinary management.[32,33] Patients were diagnosed by physician assessment and/or by long-term symptom duration. Two studies did not report meaningful demographics.[31,32] Otherwise, participants were mainly young and nulliparous with about 5 years symptom duration, and baseline NRS pain intensity of 7–9/10.[27,29,33] The follow-up period after vestibulectomy ranged from 1 year[32] to over 3 years.[33] Of note, in Tommola et al, median follow-up time was significantly shorter in the vestibulectomy group (3.9 years) versus in those conservatively managed (6.4 years).[33]

Baggish was the only investigator to find vestibulectomy clearly superior to conservative management for dyspareunia.[32] Vestibulectomy was superior for CST pain in three out of five of the studies[29,32,33] and vulvar pain in one.[31] One found no difference in vulvar sensitivity.[29] CST pain was incongruent with dyspareunia in two studies.[29,33] Baggish found a negative CST in those who had radical vestibulectomy and pain-free intercourse, while a third of those conservatively managed who reported "tolerably low" dyspareunia had positive CST with NRS pain of 5–6/10.[32]

Lambert et al reported that NRS pain decreased from 6.9/10 pre-procedure to 3.7/10 post-procedure, though interviews were conducted retrospectively, 1–7 years after surgery.[34] Vestibulectomy was found to be effective in secondary LPV but not primary LPV. Belkin at al. were the only investigators who found vestibulectomy superior to improved sexual function compared with conservative management.[31] Gungor Ugurlucan reported pain-free dilator use and improved ability to have intercourse after treatment. She also found that vestibulectomy resulted in increased frequency of intercourse in the treated individual.[30] Lambert et al reported that 90% of patients found intercourse possible after surgery.[34] In contrast, Davis et al found that, although many other outcomes improved, attempts at intercourse did not.[27] Overall, vestibulectomy was not superior to other treatments for quality of life. Davis et al found that the only treatment category that predicted superior outcomes was "surgery", but only for depressive symptoms. They also found that LPV symptoms tend to improve over time, even without treatment.[27]

In terms of limitations, duration of follow-up was unspecified by Belkin et al.[31] Missing follow-up data were disproportionately higher in the conservatively managed groups in two studies.[29,31] One reported that participants estimated their baseline vulvar sensitivity retrospectively at 36-month follow-up.[29] Davis et al diagnosed some participants via telephone alone.[27] Also, after baseline questionnaires, all participants were offered a 30-min telephone conversation with a clinical sexologist and information on resources in their area, which may have confounded results. Additionally, outcome improvement was reported for each group, but not compared between groups. In all study categories, the outcome assessor was generally not blinded to group assignment. All but two vestibulectomy patients first tried conservative management, also potentially confounding results. Whether participants continued some form of conservative management was generally not reported.

Among adverse events after vestibulectomy, most concerning was pudendal neuralgia related to radical vestibulectomy described by Baggish.[32] However, this appeared attributable to excision of the Bartholin gland, which was abandoned in favor of a simple vestibulectomy. Among patients undergoing a typical vestibulectomy, other adverse events were fissures, described in 8% of participants in one study[33] and Bartholin gland cysts in 5% described by another.[32] Aside from Baggish,[32] only one other study reported one patient who had persistent pain at 1 year follow-up, treated with gabapentin.[29] Baggish found all vestibulectomy patients complained of dryness post-operatively,[32] while Tommola et al found the use of lubricant for coitus to be higher in those conservatively managed.[33]

Discussion

This scoping review analyzed 27 peer-reviewed, primary study publications of LPV management using interdisciplinary and multimodal approaches. Given the lack of quality head-to-head trials, there is still insufficient evidence to recommend one class of intervention above others or to support interdisciplinary management specific to LPV.

Studies were primarily published in Canada, the United States, and Europe. In general, participants were young, with most studies reporting average ages in the 20s. Most were partnered, highly educated, nulliparous, and had a pain duration of 3–7 years. The study by Spoelstra et al was unique in that two-thirds of participants were parous.[42] Of the studies that reported the gender of participants' partners, the vast majority were in heterosexual relationships. Demographic data around race and ethnicity were largely underreported. The Vancouver-based group's interdisciplinary program papers[7,38–41] did include demographics; however, the majority of participants (60–80%) were "Caucasian"/Euro-Canadian. Diagnosis of LPV was often made through a gynecologist's assessment or using CST. Several studies also limited participation to individuals reporting dyspareunia during the majority of intercourse attempts. Although scores on CST have been shown to correlate with other pain measures such as dyspareunia,[43] our review of pharmacologic management for LPV[13] demonstrated that improvement in CST did not always coincide with improvement in dyspareunia. Results of this review are consistent with this finding.

Randomized studies included comparisons of pharmacologic treatments for LPV with other treatment modalities, such as physiotherapy and psychotherapy. Broadly speaking, these studies described superior outcomes for non-pharmacologic treatments. However, many employed only one medication as pharmacotherapy and did not control for educational sessions or empathetic attention when accounting for some improvements associated with other treatment modalities. Furthermore, medications used included either topical lidocaine 5% or hydrocortisone 1%, which may not

treat LPV as effectively as other pharmacologic therapies. As hydrocortisone is not indicated for vulvodynia medical management, it is possible that treatment benefit stemmed from moisturizing effects, rather than the active ingredient.[5]

All but one study of structured program-based interdisciplinary management for LPV arose from a single study group.[42] These studies are all large observational case series and likely include overlapping participants. The consistent structure and data collection support the program, but efficacy is uncertain due to participation bias, which may inflate improvement in pain among participants. Additionally, one publication states patients are more likely to accept pharmacological treatments over non-pharmacological ones.[39] The magnitude of improvement in participants may be because patients who expected pharmacological treatment chose not to participate and/or those that agreed to participate were more open to improvement with non-pharmacological treatments. Participants were also excluded if deemed "hostile" or "anxious." Although the numbers at follow-up were significantly less, and the researchers do not account for the dropouts, it is encouraging that participants report long-lasting and perhaps continued improvements at 6-months follow-up. However, it is unclear whether participants continued receiving treatment during the follow-up period. A significant proportion of potential participants declined assessment due to scheduling conflicts and inability to commute.[7] This limits generalizability. There is, however, promising research in virtual delivery of vulvar pain programs making programs, if effective, more accessible.[44,45]

One study randomized participants to traditional versus non-traditional acupuncture.[26] While the small sample size, use of topical lidocaine and lack of a true placebo group precluded the authors from drawing conclusions regarding treatment effectiveness, there were valuable lessons regarding study design. The addition of topical lidocaine 5% contributed to drop-outs and may have confounded effects of acupuncture. Also, a placebo arm for acupuncture is difficult to achieve, though authors compared traditional and non-traditional techniques, postulating that any penetration with acupuncture needles would affect endogenous opioids. Indeed, 24-week pain outcomes were superior with non-traditional acupuncture. Another study comparing acupuncture with other treatments found that while all other groups, including those with no treatment, had improvement in pain, acupuncture did not.[27] However, only 6 of the 239 participants underwent this therapy. At present, there is a lack of well-powered studies of acupuncture for LPV.

A number of studies evaluated outcomes of vestibulectomy compared to conservative management. One cohort study had over four hundred vestibulectomy patients with a follow-up duration of 1 year.[32] The longest duration of follow-up was of 39 vestibulectomy patients followed for approximately 6 years,[33] exceeding follow-up durations prior to 2010.[8] Among all studies, all but two patients undergoing vestibulectomy had prior multimodal treatment, and some also continued afterwards. Some vestibulectomy studies demonstrated superior CST results; however, improvements in dyspareunia were most often comparable to conservative management. Two studies followed similar procedures for both conservative and surgical management with 35 combined vestibulectomy patients and follow-up duration of 3 to 6 years.[29,33] Unfortunately, missing data make it difficult to draw conclusions from one study.[29] While Tommola et al found less severe posterior vestibular pain on CST in the posterior vestibulectomy group, this did not translate into clinical outcomes.[33] Equal reductions in dyspareunia and treatment response were seen between groups. The exception to this pattern was the cohort study by Baggish,[32] which showed dramatically superior success rates, defined as absent or minimal pain with intercourse, for vestibulectomy compared to conservative management. However, the only patients included were those with one-year follow-up data and no information was provided on dropouts, a potential source of bias. There was also no systematic outcome evaluation using validated measures, and the assessor was not blinded to group assignment.

Vestibulectomy studies had generally reassuring low complication rates. One study[32] was the outlier, with a 13% rate of pudendal neuralgia. However, this was clearly associated with the degree of dissection required for Bartholin's gland excision and was abandoned for that reason. Once this was omitted, there were no further reports of pudendal neuralgia.

Constructing adequate comparator groups was a challenge reported in several studies. Blinding is difficult with vestibulectomy, acupuncture, psychologically oriented interventions, and structured interdisciplinary programs due to lack of realistic "sham" procedures. Therefore, at a minimum, the assessor of subjective outcomes should be blinded to group assignment, although this too may be difficult for vestibulectomy due to possible evidence of surgical scar. In addition, only one study[27] included a no-treatment arm to analyze possible spontaneous improvements to LPV with time.

However, in this study, researchers did not compare treatments to each other, but rather analyzed which treatments yielded desired outcomes.

Heterogeneity and inaccuracy in outcome measures makes comparisons challenging and efforts should be made to standardize this in the literature. For example, Numeric Rating Scale (NRS) for dyspareunia was often used, though it was often incorrectly labeled as Visual Analogue Scales (VAS). VAS, a validated measure through which patients indicate pain severity,[43] uses a 100 mm, unmarked, continuous line. NRS, which has not received the same validation as VAS, asks patients to choose an integer from 0 to 10 indicating pain severity. Other outcome measures included questionnaires such as the FSFI, FSDS, and the McGill pain questionnaire, and a wide array of measures were used to assess quality of life, sexual functioning, patient satisfaction, and impression of change. Several studies comparing psychological interventions to other treatments used outcomes such as catastrophizing, self-efficacy, anxiety, and sexual communication. Although LPV pain improvement may yield psychosocial benefits, the choice of these measures may have skewed the results in favor of psychological interventions. In several studies of interdisciplinary programs, authors noted that provider attention and educational components of treatment may have influenced participant satisfaction. Participants identified education and validation of their complaints as legitimate positively impacted psychological wellbeing, consistent with other studies of vulvar pain.[39,46,47]

While many studies showed improvements in psychological wellbeing and decreased pain, it was often emphasized that participants did not engage or attempt intercourse more often, which highlights the problematic phallocentricity that underlies many studies of vulvar pain. The definition of LPV does not include dyspareunia and, while this is a common symptom, focusing on dyspareunia propagates penetrative intercourse as the "gold standard", undermining the validity of other forms of sexual activity. Additionally, it excludes patients for whom sexual activity holds lower value over other measures of wellbeing, such as comfort with clothing or menstrual products. Other studies discuss in more detail phallocentricity and restrictive cultural norms of sexual activity.[47–49]

Our findings support head-to-head studies of vestibulectomy as a first-line treatment compared to other active treatments. Reassuringly low complication rates, including studies, which comprehensively report complications,[33] coupled with long-term follow-up, support vestibulectomy as a potential first-line treatment for LPV. Traditionally, vestibulectomy has been reserved as a last-line treatment, despite evidence of efficacy.[4,5] It is worth noting that more "conservative" treatments are not without adverse events such as pain and medication side effects. Improvement may require long-term use prior to benefit. There is also a substantive population of patients for whom vestibulectomy may be the preferred or only treatment option as physiotherapy or interdisciplinary programs may not be feasible due to time constraints, availability and financial considerations. With appropriate informed consent regarding what is known regarding complication rates, and uncertainty of effectiveness in a population that has not already failed other management options, patients may indeed choose to participate in randomized trials of vestibulectomy for potentially equivalent treatment effectiveness. Researchers should review the literature on demographic characteristics associated with favorable outcomes of vestibulectomy in selecting appropriate candidates for whom this may be offered as a first-line treatment.

There is concern regarding adverse events of vestibulectomy as there is a general lack of consistency, transparency and confidence regarding comprehensive assessment and reporting. Future reporting of adverse events should include lack of improvement, worsening of pain (detailing severity and duration), incidence of postoperative Bartholin's gland or inclusion cysts, wound dehiscence/infection, readmission for postoperative pain management, and vaginal/introital dryness. In addition, researchers should report on perceived etiology and outcomes of complication management. By establishing more transparent reporting practices, vestibulectomy can be better evaluated both in terms of its effectiveness and side effect profile.

Future research should compare treatments from various modalities using well-designed randomized studies. Attention should be paid to using standard-of-care treatments from each therapeutic arm and non-treatment arms where appropriate to evaluate effects of the natural course of LPV. Authors should use validated outcome measures such as VAS and tools such as the Vulvovaginal Symptoms Questionnaire to measure psychosocial outcomes associated with LPV.[50] Research should also include more diverse participants from various races, ethnicities, age ranges, sexual orientations, and gender identities to enhance generalizability of findings and improve recommendation quality for

clinical practice. Similarly, expanding educational programming across the gender/sexuality spectrum will better mirror the diverse attitudes and practices of those living with LPV.

Strengths and Limitations

This scoping review is a thorough description of the recent literature around LPV management relating specifically to interventions across modalities and interdisciplinary interventions. This paper details the breadth of current research in the field. Given our search design was a scoping review rather than a systematic review or meta-analysis, our aim was not to address one specific clinical question nor to direct clinical practice.[51] However, we have highlighted several outstanding questions and future opportunities for researchers evaluating multimodal/interdisciplinary management strategies for LPV.

As our scoping review was limited to contemporary management of LPV, we excluded studies published prior to 2010, though these continue to carry weight in clinical practice. These are outlined in several exceptional articles including a review by Andrews.[8] We also recognize that this paper only details interventions that are compared across treatment modalities or that integrate an interdisciplinary approach to management. Our original goal was to include all peer-reviewed publications on treatment effectiveness. However, given the breadth of the literature, we opted to publish several papers based on treatment category. This paper focuses on multimodal and interdisciplinary comparisons, while our other manuscripts address pharmacological, physical, and psychological interventions. As was the case in our review of pharmacotherapy,[13] interventions that implied underlying pathology of vulvar pain were excluded, which is consistent with the clinical definition of vulvodynia.[2]

Conclusions

This scoping review identified a lack of convincing head-to-head trials of different treatment modalities for LPV as well as a lack of well-designed studies of multimodal interventions. Shortcomings highlighted by researchers include a) suboptimal pharmacologic choices in head-to-head trials; b) an absence of studies rigorously comparing multimodal interventions, vestibulectomy, and acupuncture with other established treatments for LPV; c) possible participation bias related to engagement with intensive treatment protocols; and d) the use of unvalidated or inappropriate measures to gauge treatment efficacy. We also noted that interdisciplinary program studies had e) significant participation and recall bias. We recommend that future studies include appropriate comparator groups or involve blinded assessors, especially when creating a sham or placebo is not feasible for a given intervention. As such, head-to-head trials may represent the most promising avenue for comparing treatment options. Outcome measures should include those which are validated and patient-oriented, that is, those which appropriately mirror LPV patients' concerns and goals.

Regarding participant selection, studies of LPV continue to underreport demographic data and, when reported, appear to include a disproportionate number of white, highly educated, partnered, heterosexual women. Researchers are encouraged to diversify their participant sample to improve generalizability of their findings.

This is only one portion of a larger scoping review analyzing an array of LPV treatments. The breadth and variability of management strategies for LPV expose the need for GRADE-structured evidence-based consensus guidelines and recommendations for appropriate outcome measures and reporting of adverse events.

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Disclosure

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