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Research article

Transcutaneous electrical nerve stimulation in the treatment of women with genito-pelvic pain penetration disorders: a systematic review

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Abstract: Background: Genito-pelvic pain penetration disorders involve a variety of sexual disorders associated with persistent pelvic pain, among which vulvodynia/vestibulodynia, dyspareunia, and vaginismus are usually found. The purpose of the current systematic review is to examine the efficacy of Transcutaneous Electrical Nerve Stimulation in women with genito-pelvic pain penetration disorders. **Methods:** A wide search of the literature was performed for articles indexed on PubMed, Scopus, Web of Science, and Science Direct. This systematic review was registered on the International Prospective Register of Systematic Reviews (PROSPERO) database (RD42023443931). It was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis standards. **Results:** A total of five studies with 208 women with genito-pelvic pain penetration disorders were included. Transcutaneous Electrical Nerve Stimulation was applied either isolated or combined with other treatments, such as manual intravaginal techniques, pelvic floor muscle exercises, or pharmacological treatments. The number of sessions of the treatment ranged from 8 to 24 sessions, and the duration of the applied stimulus varied from 20 min to 30 min. After the intervention, pain, dyspareunia severity, the strength and endurance of pelvic floor muscles, and sexual function significantly improved in the experimental group, and at the 3 months follow-up. **Conclusions:** Transcutaneous Electrical Nerve Stimulation improved the pain, dyspareunia severity, strength and endurance of pelvic floor muscles, and sexual function at the end of the intervention and at the 3 months follow up in patients with genito-pelvic pain penetration disorders. The use of additional treatments or techniques could also be beneficial in the treatment of these women due to the multifactorial origin of the disorder.

Keywords: transcutaneous electrical nerve stimulation; TENS; genito-pelvic pain penetration disorders; dyspareunia; vestibulodynia; vulvodynia; vaginismus

1. Introduction

Female Sexual Dysfunction (FSD) is a frequent problem that has a huge impact in normal sexual function, thereby having repercussions in the psychological, social, and physical areas of the individuals who suffer from it and their partners [1].

According to the latest Diagnostic and Statistical Manual of Mental Disorders-5 criteria [2], FSD is classified into three types of disorders: sexual desire/excitement, female orgasm dysfunction, and genito-pelvic pain/penetration disorder (GPPPD). GPPPD involves a variety of sexual disorders associated with persistent pelvic pain, among which vulvodynia/vestibulodynia, dyspareunia, and vaginismus are usually found [3].

Vulvodynia is characterized by the presence of persistent pain in the vulvar area for more than three months. Localized provoked vulvodynia at the vestibule, known as vestibulodynia, is the most common manifestation of the disease [4]. This vulvar pain includes a patient experiencing a discomfort often described as persistent burning pain; moreover, it seems to have no clear identifiable causes, but may have potential associated factors such as genetic and/or immune factors, hormonal factors, and inflammation and neuropathic changes [5].

On the other hand, dyspareunia and vaginismus are characterized by persistent and recurrent problems with vaginal penetration. In dyspareunia, the central issue is pain during sexual intercourse, while in vaginismus, the key symptom is the inability to allow vaginal penetration [6].

GPPPD has a negative impact in all areas of female health: cognitive, emotional, behavioral, and sexual. This is why the scientific community and health professionals have suggested a biopsychosocial approach that addresses the different factors involved and responds to the individual needs of women [1,7,8].

In the treatment of GGPD, a physiotherapist can offer anatomical and physiological education, cognitive-behavioral interventions, instructions for the use of vaginal dilators, relaxation exercises, and palliative treatment modalities to decrease pain and improve tissue mobility [9]. In addition, other treatments currently available include manual therapy techniques (such as myofascial release or the intra-vaginal massage technique), pelvic floor muscle exercises with or without biofeedback, and other modalities such as Transcutaneous Electrical Nerve Stimulation (TENS) [10].

In a recent systematic review with the aim of evaluating the effectiveness of physical therapy interventions for the treatment of female dyspareunia, it has been concluded that the application of TENS is one of the most important aspects in the treatment of GGPD [11].

TENS is used throughout the world for the symptomatic relief of pain, supported by physiological evidence that TENS inhibits the activity and excitability of central nociceptive transmission neurons, irrespective of the diagnosis [12].

Several meta-analyses have shown the effectiveness of TENS in chronic pain or other [12] chronic conditions [13,14].

Plaza-Manzano et al. (2020) carried out a systematic review with the aim of evaluating the effects of percutaneous electrical stimulation (PENS) in chronic pelvic pain. They included seventeen studies

with heterogeneous musculoskeletal conditions. Their conclusion was that there was a low level of evidence that suggested the effects of PENS alone or in combination for pain [13].

To the best of our knowledge, there have been no previous reviews that analyzed the effects of TENS in women with GPPPD. Thus, the purpose of the current review is to examine the efficacy of TENS in women with GPPPD.

2. Methods

2.1. Study registration

This systematic review was registered on the International Prospective Register of Systematic Reviews (PROSPERO) database (RD42023443931). It was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) standards [15].

2.2. Search strategy

A wide search of the literature was performed for articles indexed on MEDLINE via PubMed, Scopus, Web of Science, and Science Direct from its inception to May 2023. The search strategy in MEDLINE involved the following steps: (1) developing keywords by analyzing pertinent terms employed in existing systematic reviews; (2) a comprehensive exploration of the MeSH Database pertaining to terms such as "transcutaneous electrical nerve stimulation" and "sexual pain disorders", and (3) obtaining expert guidance and undergoing a specialist review. This search strategy was rigorously tested and refined to ensure its effectiveness for this review. Subsequently, this strategy was adapted for use in other databases (Table 1).

Table 1. Search equation in each database and results.

Databases	Strategy Search	Result
Pubmed	((“transcutaneous electric nerve stimulation” OR “transcutaneous electrical nerve stimulation” OR “transcutaneous electrical stimulation” OR “Transcutaneous Nerve Stimulation” OR “TENS” OR “ transdermal electrostimulation” OR “analgesic cutaneous electrostimulation” OR “electroanalgesia” OR “neuromodulation” OR “Neuromuscular electrical stimulation” OR “electrical muscle stimulation” OR “EMS” OR “percutaneous electrical nerve stimulation” OR “percutaneous nerve Stimulation” OR “percutaneous electrical nerve stimulation” OR “percutaneous electrical neurostimulation” OR “Percutaneous neuromuscular Electrical stimulation” OR “percutaneous electrical muscle stimulation” OR “functional electrical stimulation” OR “Percutaneous electrical neuromodulation” OR “intramuscular stimulation” OR “intramuscular electrical stimulation” OR “percutaneous electrical muscle stimulation” OR “electroacupuncture” OR “electro- acupuncture” OR “electrical acupuncture” OR “electric stimulation therapy” OR “electrostimulation” OR “electrotherapy” OR “nerve stimulation therapy”) AND (“Dyspareunia” OR “Vestibulodynia” OR “Vulvar pain” OR “vulvodynia” OR “sexual pain disorder” OR “vulvar pain syndrome” OR “vulvodynia treatment” OR “vaginismus” OR “dyspareunia” OR “vestibulitis”)).	61

Continued on next page

Databases	Strategy Search	Result
Scopus	((“transcutaneous electric nerve stimulation” OR “transcutaneous electrical nerve stimulation” OR “transcutaneous electrical stimulation” OR “Transcutaneous Nerve Stimulation” OR “TENS” OR “transdermal electrostimulation” OR “analgesic cutaneous electrostimulation” OR “electroanalgesia” OR “neuromodulation” OR “Neuromuscular electrical stimulation” OR “electrical muscle stimulation” OR “EMS” OR “percutaneous electrical nerve stimulation” OR “percutaneous nerve Stimulation” OR “percutaneous electrical nerve stimulation” OR “percutaneous electrical neurostimulation” OR “Percutaneous neuromuscular Electrical stimulation” OR “percutaneous electrical muscle stimulation” OR “functional electrical stimulation” OR “Percutaneous electrical neuromodulation” OR “intramuscular stimulation” OR “intramuscular electrical stimulation” OR “percutaneous electrical muscle stimulation” OR “electroacupuncture” OR “electro- acupuncture” OR “electrical acupuncture” OR “electric stimulation therapy” OR “electrostimulation” OR “electrotherapy” OR “nerve stimulation therapy”) AND (“Dyspareunia” OR “Vestibulodynia” OR “Vulvar pain” OR “vulvodynia” OR “sexual pain disorder” OR “vulvar pain syndrome” OR “vulvodynia treatment” OR “vaginismus” OR “dyspareunia” OR “vestibulitis”)).	896
Web of Science	TS = ((“transcutaneous electric nerve stimulation” OR “transcutaneous electrical nerve stimulation” OR “transcutaneous electrical stimulation” OR “Transcutaneous Nerve Stimulation” OR “TENS” OR “transdermal electrostimulation” OR “analgesic cutaneous electrostimulation” OR “electroanalgesia” OR “neuromodulation” OR “Neuromuscular electrical stimulation” OR “electrical muscle stimulation” OR “EMS” OR “percutaneous electrical nerve stimulation” OR “percutaneous nerve Stimulation” OR “percutaneous electrical nerve stimulation” OR “percutaneous electrical neurostimulation” OR “Percutaneous neuromuscular Electrical stimulation” OR “percutaneous electrical muscle stimulation” OR “functional electrical stimulation” OR “Percutaneous electrical neuromodulation” OR “intramuscular stimulation” OR “intramuscular electrical stimulation” OR “percutaneous electrical muscle stimulation” OR “electroacupuncture” OR “electro- acupuncture” OR “electrical acupuncture” OR “electric stimulation therapy” OR “electrostimulation” OR “electrotherapy” OR “nerve stimulation therapy”) AND (“Dyspareunia” OR ”Vestibulodynia” OR “Vulvar pain” OR “vulvodynia” OR “sexual pain disorder” OR “vulvar pain syndrome” OR “vulvodynia treatment” OR “vaginismus” OR “dyspareunia” OR “ vestibulitis”)).	92
Science Direct	((“transcutaneous electric nerve stimulation” OR “TENS”) AND (“Dyspareunia” OR “Vestibulodynia” OR “Vulvar pain”))	1388

The references of pertinent reviews were examined to identify additional studies that might be eligible for inclusion in this review.

The PICOS (participants, intervention, comparator, outcomes, and study design) eligibility criteria were used for the selection of the articles in the following manner:

P (Participants): women with genito-pelvic pain penetration disorders;

I (Intervention): transcutaneous electrical nerve stimulation alone or combined with other techniques;

C (Comparator): placebo therapy or pharmacological therapy;

O (outcomes): pain-related variables; and

S (Study Design): randomized clinical trials.

Only full-text randomized controlled trials written in English and Spanish were included in the systematic review. Systematic reviews and meta-analyses, observational studies, clinical practice guidelines, letters, abstracts, editorials, conference papers, theses, and dissertations were excluded.

Duplicates were removed after all the studies were retrieved from the databases. Two independent authors performed a first screening of the title and abstract. In the second screening, articles were selected according to the full-text. Upon selecting the articles, data extraction and quality assessments were performed. A third reviewer was responsible for resolving any disagreement between the two main reviewers.

2.3. Assessment of methodological quality and risk of bias

The methodological quality of the articles included in the systematic review were assessed by the Downs and Black Assessment Scale [16]. This scale has 27 items with five subscales (study quality, external validity, study bias, confounding and selection bias, and study power). The methodological quality is classified as "excellent" if studies have a score of 26 or higher, "good" if they are between 20 to 25, "fair" if they are between 25 to 19, and "poor" if they are 14 or below. This scale is considered one of the six highest-quality assessment scales suitable to evaluate systematic reviews due to the high validity and reliability presented.

Additionally, we assessed the risk of bias in each study using The Cochrane Risk of Bias Tools for randomized controlled trials method (RoB 2) [17]. This tool includes seven elements with six subscales (performance bias, selection bias, detection bias, reporting bias, attrition bias, and other bias). When there is a low risk for each domain, this study is considered to have a high quality. On the other hand, it has a fair quality when one criterion does not meet or when two criteria are unclear, and there is no known important limitation that could invalidate the results. It has a poor quality when there are important limitations that could invalidate the results, and when two or more criteria are listed as either a high or unclear risk of bias.

3. **Results**

3.1. Study selection

The flowchart of the systematic review is presented in Figure 1. At first, a total of 2437 articles were selected from the electronic databases. After removing the duplicates, 2322 studies remained. Following an additional screening based on the title, abstract, and full text, 2309 articles were excluded, and 13 studies resulted in the selection. Additionally, 9 of these studies were removed after performing a deeper reading because they did not fit with the inclusion criteria. Moreover, 1 article was included from a separate method. Finally, 5 studies were included in the systematic review [18−22].

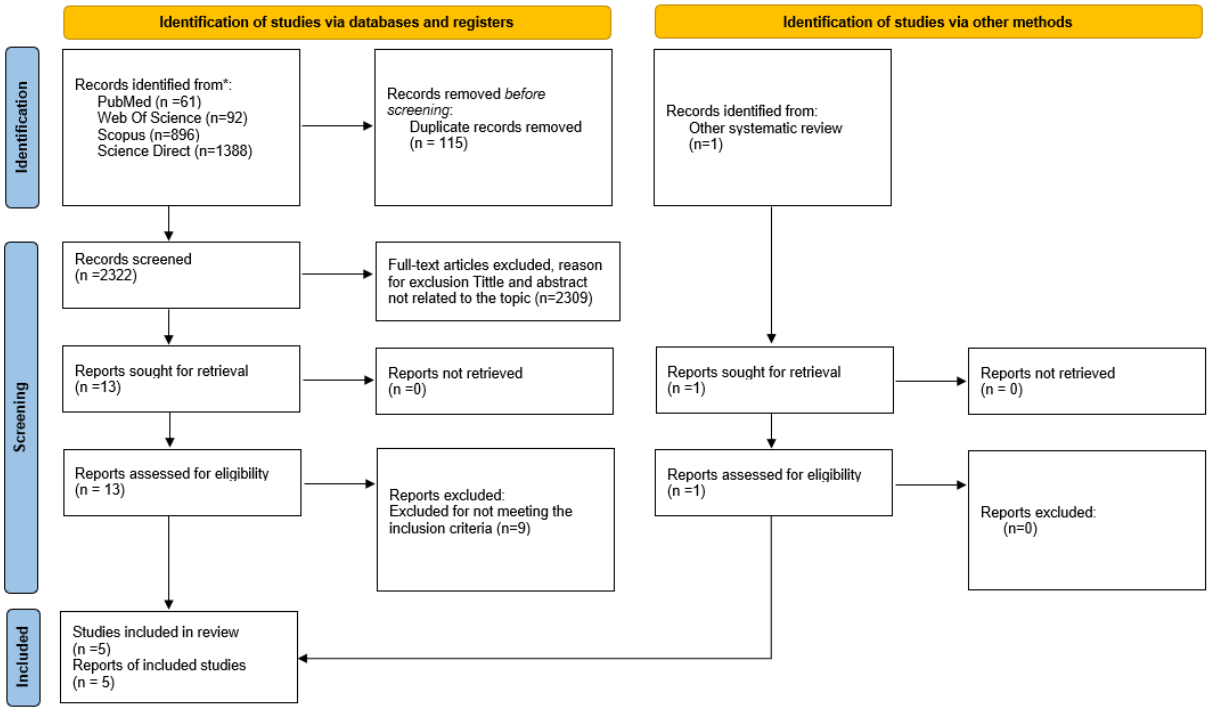

Figure 1. Flow diagram.

3.2. Study characteristics

The characteristics of the included studies are shown in Table 2.

Table 2. Characteristics of the included articles.

Author, year	Experimental group			Control group		
	Sample (n)	Diagnosis	Mean age (SD)	Sample (n)	Diagnosis	Mean age (SD)
Ghaderi F et al., 2019	32	Dyspareunia	34.94 (9.15)	32	Dyspareunia	35.72 (8.01)
Murina F et al., 2018	21	Vestibulodynia/dyspareunia	28.8 (6.5)	21	Vestibulodynia/dyspareunia	29.1 (9.1)
Aydin S et al., 2015	24	Female sexual dysfuntions without Urinari incontinence	39.6 (8.8)	18	Female sexual dysfuntions without Urinari incontinence	35 (8.1)
Murina F et al., 2013	10	Vestibulodynia	34.4 (NR)	10	Vestibulodynia	31.8 (NR)
Murina F et al., 2008	20	Vestibulodynia	30 (NR)	20	Vestibulodynia	26 (NR)

*Note: SD: Standard deviation; NR: Non reported.

A total of 208 women with GPPPD were included. The participants who composed the study were classified in different groups within the category of GPPPD: one study included women with

dyspareunia [18], two studies included women with vestibulodynia [19,20], one study included women with vestibulodynia and dyspareunia [21], and one study included women with FSD [22].

The number of participants on each study was heterogeneous, and the sample ratio ranged between 20 and 64 women. The mean age of the participants ranged from 26 to 39.6 years.

The characteristics of the interventions are shown in Table 3.

Table 3. Characteristics of the interventions.

Author, year	EG Intervention	Frequency and duration	CG Intervention	Frequency and duration	Follow-up
Ghaderi F et al., 2019	Intravaginal massage techniques + intravaginal TENS + pelvic floor muscle exercises	40 min/session 1 session/week 3 months	No treatment while on the waiting list.	40 min/session 1 session/week 3 months	3 months
Murina F et al., 2018	5mg of vaginal tablets of diazepam+ intravaginal TENS	Diazepam: 7 days/week 60 days TENS: 30 min/session 3 days/week 60 days	Placebo + intravaginal TENS	Placebo: 7 days/week 60 days TENS: 30 min/session 3 days/week 60 days	No
Aydin S et al., 2015	Intravaginal TENS	20 min/session 1 session/week 8 weeks	Placebo	20 min/session 1 session/week 8 weeks	No
Murina F et al., 2013	Oral Palmitoylethanolamide, transpolydatin + TENS	Pharmacological treatment: 2 times/day 60 days TENS: 30 min/session 3 sessions/week 60 days	Placebo + TENS	Placebo treatment: 2 times/day 60 days TENS: 30 min/session 3 sessions/week 60 days	No
Murina F et al., 2008	TENS	2 sessions/week 10 weeks	Placebo	2 sessions/week 10 weeks	3 months

As seen in Table 3, the interventions applied in the studies were heterogeneous; some studies compared the use of TENS with a placebo therapy [19,22], while other studies analyzed the combination of TENS with other techniques such as manual intravaginal techniques, pelvic floor muscle exercises [18], or pharmacological treatments [20,21].

The number of sessions of the treatment ranged from 8 to 24 sessions for the TENS application. The duration of the applied stimulus varied from 20 min to 30 min. The frequency of the application varied from 1 to 3 times a week. In addition, two of the five studies had associated follow-ups; the patients were evaluated at 3 months after the intervention.

Table 4 summarizes the variables, tools, and results of the included studies.

Table 4. Variables, tools, and results of the included studies.

Author, year	Variables and tools	Results
Ghaderi F et al., 2019	-Strenght and endurance pelvic floor muscles: Modified Oxford Scale -Severity of pain: VAS -Sexual function (Desire, arousal, lubrication, orgams, satisfaction, painless): FSFI.	At the end of the intervention, all variables were statistically significant ($p < 0.05$) in the EG. At 3 months follow-up VAS continued being statistically significant in the EG.
Murina F et al., 2018	Severity of pain: VAS. Dyspareunia severity: Marinoff dyspareunia scale. Pelvic floor muscles tone and activity: Surface electromyography Vestibular nerve fiber current perception threshold: Current perception threshold.	VAS score decreased post-treatment in the EG, but it was not statistically significant ($p > 0.05$). Marioff dyspareunia score in the EG showed a significant difference ($p < 0.05$). PFM tone and activity was statistically significant after the intervention for EG ($p < 0.01$).
Aydin S et al., 2015	Sexual function (Desire, arousal, lubrication, orgams, satisfaction, painless): FSFI. Pelvic floor muscle assessment (power, endurance, dynamic endurance, fast contractions): PERFECT scheme.	In the EG, FSFI domains that improved were desire, arousal, orgasm and satisfaction. In the CG, FSFI domains that improved were desire, arousal and orgasm. Power, endurance, fast contractions, and repetitions were significantly improved in the EG. ($p < 0.0001$). Only endurance was significantly improved in the CG ($p = 0.008$).
Murina F et al., 2013	Severity of pain: VAS. Dyspareunia severity: Marinoff dyspareunia scale. Vestibular nerve fiber current perception threshold: Current perception threshold.	None of the observed differences were statistically significant between the EG and CG ($p > 0.05$).
Murina F et al., 2008	Severity of pain: VAS. Dyspareunia: Marinoff dyspareunia scale. Sexual function (Desire, arousal, lubrication, orgams, satisfaction, painless): FSFI.	At the end of the treatment and at 3 months follow-up there were significant differences between groups in favor to the EG in all the variables ($p < 0.05$).

*Note: VAS: Visual Analoge Scale; FSFI: Female Sexual Function Index; EG: experimental group; CG: Control group.

The variables and the tools used on each article are described as follows: severity of pain was measured with the visual analogical scale (VAS); sexual function was measured with the Female Sexual Function Index (FSFI); the strength and endurance of pelvic floor muscles were measured with the modified Oxford scale; Dyspareunia was measured by the Marinoff dyspareunia scale; the pelvic floor muscle (PFM) tone and activity was measured with a surface electromyography; the vestibular nerve fiber current perception threshold was measured with a current perception threshold; and the pelvic floor muscle function was measured with the PERFECT (Power, Endurance, Repetitions, Fast contractions, and Every Contraction Timed.) scheme.

The results obtained from the analyzed variables were statistically significant ($P < 0.05$) for most of the variables in the experimental group just at the end of the treatment, as well as for some of the variables at the 3 months follow-up.

3.3. Methodological quality and risk of bias results

The Downs and Black Assessment Scale, which was used to assess the methodological quality, is presented in Table 5.

As seen in Table 5, all the included studies obtained a good quality with a scoring that ranged from 20 to 24 points.

Table 5. Methodological quality of the included studies and the Downs and Black Assessment scale.

Author, year	Reporting Score obtained/total score	External validity Score obtained/total score	Internal validity(bias) Score obtained/total score	Counfounding and selection bias Score obtained/total score	Power Score obtained/total score	Total Score obtained/total score
Ghaderi F et al., 2019	10/11	3/3	6/7	4/6	1/1	24/28
Murina F et al., 2018	9/11	2/3	6/7	5/6	1/1	23/28
Aydin S et al., 2015	9/11	3/3	5/7	6/6	1/1	24/28
Murina F et al., 2013	9/11	2/3	7/7	5/6	0/1	23/28
Murina F et al., 2008	7/11	2/3	6/7	5/6	0/1	20/28

The results of the RoB 2 are presented in Figure 2.

As seen in Figure 2, the majority of the included studies have obtained some concerns [19−22], and one study had a high risk of bias [18].

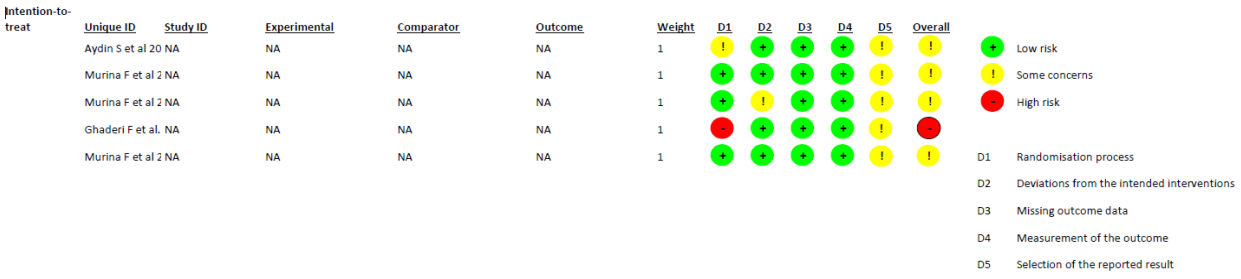

Figure 2. Results of RoB 2.

4. Discussion

The current review aimed to examine the effectiveness of TENS in women with GPPPD. GPPPD is a complex, individual, and multidimensional experience that affects women. Multiple variables interact and affect female sexual function including personal relationships, psychosocial factors, and physiological changes [1].

Regarding the research participants, the age of the women in the studies varied between 18−50 years. These results are in line with previous studies [23,24]. The age range was wide because GPPPD is a condition that affects women of all ages [25]. GPPD can occur at any age due to a variety of risk factors that are present throughout a woman's life. These factors include hormonal changes during puberty, pregnancy, and menopause, as well as psychological conditions such as depression and anxiety, which can arise at any stage. Additionally, chronic illnesses, medication use, and lifestyle factors such as stress or a lack of physical activity can contribute to sexual dysfunction. The complex interplay of biological, psychological, and social factors means that sexual dysfunction is not limited to any specific age group, but can be experienced at different times in a woman's life [26,27].

When it comes to treatments, one of the most highlighted has been TENS therapy [11]. Our results suggest that a TENS-based intervention, either isolated or combined, has improved sexual function, the strength and endurance of the pelvic floor muscles, and the pain severity. These results are in line with other similar systematic reviews and meta-analyses that performed TENS interventions in other pathologies such as chronic pelvic pain [28] or musculoskeletal pain [29].

Electrical nerve stimulation has also proven effective in treating bladder dysfunction. Patients with persistent overactive bladders and associated pain were treated using percutaneous tibial nerve stimulation (PTNS). This treatment not only led to an improvement in urinary symptoms, but also resulted in a significant reduction in pelvic pain as reported by the patients [30].

TENS is believed to have two mechanisms for relieving pain. The first is the gate-control theory, which postulates the presynaptic inhibition of pain signals by the stimulation of non-nociceptive afferent neurons [31]. The activation of Aβ-nerve fibers might attenuate pain signals from nociceptor C-fibers on interneuronal and spinal levels. The second mechanism is believed to use the descending pain suppression pathway, which originates in the cortex and is therefore called supraspinal inhibition [28]. The lower frequencies of 5−20 Hz are recommended for urinary incontinence, with 40−60 Hz recommended for muscle strengthening. At 50 Hz, a fused tetanic contraction is produced, with a minimal relaxation of the fasttwitch muscle fibers between pulses [29]. Additionally, electrical stimulation enhances the proprioception and coordination of pelvic floor muscle contraction, improves the neuromuscular connections, muscular fiber mechanism, and genital atrophy, and increases the blood flow to the urethra and pelvic floor muscles [32–34].

With respect to the duration of the treatment and the frequency of the sessions, they were heterogeneous. It varied from 8 to 24 sessions (1 to 3 times of application per week) and 20 to 30 minutes of application. These parameters are similar to other studies that have applied TENS in other pathologies [31]. Nevertheless, the follow-up was just measured in two of the studies at a 3 month follow-up [18,22], where some of the variables measured a continued improvement to pain.

There were some limitations in our study. First, the number of databases used to perform the review could have been greater. In addition, the lack of information of the participant characteristics made it difficult to compare the study results. There was a lack of relevant information, such as if the women were nulliparous, primiparous, or multiparous, or if they used a contraceptive method. We consider this information relevant, since GPPPD is a multifactorial problem, where all these characteristics can influence the symptomatology and the results of the studied variables.

The fact that the study interventions included more than TENS made it difficult to compare the results of the articles; however, at the same time, it justifies that a single technique should not be the solution for a multifactorial disorder such as GPPPD.

Another limitation of the study was the lack of follow-ups: just two studies reevaluated at a 3 months follow up. The positive results must be confirmed through further studies with a larger number of patients and a longer follow-up period. Moreover, future trials need to be performed to define the timing and frequency of sessions for an optimum efficacy of TENS treatment to confirm our observations.

5. Conclusions

In conclusion, the results of this systematic review suggested that a TENS-based intervention, either isolated or combined, improved the pain severity, sexual function, and the strength and endurance of the pelvic floor muscles in women with GPPPD at short and medium terms. Identifying interventions, such as electrostimulation, that can alleviate dyspareunia symptoms, is crucial to improve the quality of life for the affected individuals. Additionally, by determining the efficacy of electrostimulation, healthcare professionals can better tailor the treatment plans, thus providing patients with evidence-based options to effectively manage their condition. This knowledge empowers clinicians to offer comprehensive care that addresses both the physical and psychological aspects of dyspareunia, thus ultimately enhancing the patient outcomes and satisfaction.

Author contributions

López-López Laura: conceptualization, data curation, investigation, methodology, roles/writing–original draft, writing–review & editing; Villalobos-Santos Lourdes and Del Castillo-Matías Rocío: data curation, investigation, methodology, roles/writing–original draft; Díaz-Mohedo Esther: methodology, roles/Writing–review & editing; Torres-Sánchez Irene: conceptualization, methodology, statistical analysis, roles/writing–review & editing and roles/writing–original draft.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

Conflict of interest

All authors declare no conflicts of interest in this paper.

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