

ORIGINAL RESEARCH—PAIN

Concurrent Deep–Superficial Dyspareunia: Prevalence, Associations, and Outcomes in a Multidisciplinary Vulvodynia Program

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ABSTRACT

Introduction. Little is known about women with concurrent diagnoses of deep dyspareunia and superficial dyspareunia.

Aim. The aim of this study was to determine the prevalence, associations, and outcome of women with concurrent deep–superficial dyspareunia.

Methods. This is a prospective study of a multidisciplinary vulvodynia program (n = 150; mean age 28.7 ± 6.4 years). Women with superficial dyspareunia due to provoked vestibulodynia were divided into two groups: those also having deep dyspareunia (i.e., concurrent deep–superficial dyspareunia) and those with only superficial dyspareunia due to provoked vestibulodynia. Demographics, dyspareunia-related factors, other pain conditions, and psychological variables at pretreatment were tested for an association with concurrent deep–superficial dyspareunia. Outcome in both groups was assessed to 6 months posttreatment.

Main Outcome Measures. Level of dyspareunia pain (0–10) and Female Sexual Distress Scale were the main outcome measures.

Results. The prevalence of concurrent deep–superficial dyspareunia was 44% (66/150) among women with superficial dyspareunia due to provoked vestibulodynia. At pretreatment, on multiple logistic regression, concurrent deep–superficial dyspareunia was independently associated with a higher level of dyspareunia pain (odds ratio [OR] = 1.19 [1.01–1.39], *P* = 0.030), diagnosis of endometriosis (OR = 4.30 [1.16–15.90], *P* = 0.022), history of bladder problems (OR = 3.84 [1.37–10.76], *P* = 0.008), and more depression symptoms (OR = 1.07 [1.02–1.12], *P* = 0.007), with no difference in the Female Sexual Distress Scale. At 6 months posttreatment, women with concurrent deep–superficial dyspareunia improved in the level of dyspareunia pain and in the Female Sexual Distress Scale to the same degree as women with only superficial dyspareunia due to provoked vestibulodynia.

Conclusions. Concurrent deep–superficial dyspareunia is reported by almost half of women in a multidisciplinary vulvodynia program. In women with provoked vestibulodynia, concurrent deep–superficial dyspareunia may be related to endometriosis or interstitial cystitis, and is associated with depression and more severe dyspareunia symptoms. Standardized multidisciplinary care is effective for women with concurrent dyspareunia. **Yong PJ, Sadownik L, and Brotto LA. Concurrent deep–superficial dyspareunia: Prevalence, associations, and outcomes in a multidisciplinary vulvodynia program. J Sex Med 2015;12:219–227.**

Key Words. Deep Dyspareunia; Superficial Dyspareunia; Provoked Vestibulodynia

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Introduction

Dyspareunia has been traditionally classified into superficial dyspareunia (pain with entry during vaginal penetration) and deep dyspareunia (internal pain during vaginal penetration) [1]. The most common cause of superficial dyspareunia is vulvodynia, while a common cause of deep dyspareunia is endometriosis [2,3]. The devastating impact of dyspareunia on women's sexual function, quality of life, and relationships has been well documented [1–6].

Most studies have focused on women with either superficial dyspareunia or deep dyspareunia alone. We are aware of only two studies that asked women about simultaneous deep and superficial dyspareunia [7]. In a survey of women in a primary care setting seen for a variety of indications, half of sexually active women reported dyspareunia: of these women with dyspareunia, 63% had deep dyspareunia, 17% superficial dyspareunia, 8% concurrent deep–superficial dyspareunia, and the remaining were unspecified [7]. In another study of women with dyspareunia, 31% of women reported pain with penetration occurring both at the introitus and in the vagina, 1% reported pain both at the introitus and in the pelvic area, and 4% reported pain at the introitus, in the vagina, and in the pelvic area [8]. In this study, location of the pain with penetration was found to depend on whether dyspareunia was related to vestibulitis (provoked vestibulodynia), vulvo-vaginal atrophy, or a negative physical exam, but was not related to psychosocial variables [8]. The impact of concurrent locations of dyspareunia on sexual outcomes was not investigated in these studies.

Aim

Our population consists of women seeking treatment for superficial dyspareunia due to provoked vestibulodynia at a multidisciplinary vulvodynia program [9–12], and our clinical observation is that a sizable subset of women also report deep dyspareunia (i.e., they have concurrent deep–superficial dyspareunia). Therefore, our aim was to study the prevalence, associated factors, and outcomes of these women with concurrent deep–superficial dyspareunia, compared with women with only superficial dyspareunia due to provoked vestibulodynia. Our hypotheses were that women with concurrent deep–superficial dyspareunia would be common in this population, that they would have more comorbidities at pretreatment,

and that they would have less favorable outcomes compared with women with only superficial dyspareunia due to provoked vestibulodynia.

Methods

Participants and Inclusion/Exclusion Criteria

This was a prospective observational study of women with superficial dyspareunia due to provoked vestibulodynia seen at an academic, tertiary referral, multidisciplinary vulvodynia program as previously described [9–12]. The study met the STROBE (Strengthening the Reporting of Observational studies in Epidemiology) criteria and was approved by our university and hospital institutional review boards.

Inclusion criteria for the program were a history of superficial dyspareunia, Q-tip tenderness of the vulvar vestibule (to confirm superficial dyspareunia due to provoked vestibulodynia) [9], and desire to complete the entire program. Exclusion criteria for the program were postmenopausal status, superficial dyspareunia due to causes other than provoked vestibulodynia (e.g., atrophy, vulvovaginitis, or primary vaginismus), poor candidate for group format (e.g., due to severe anxiety or depression), or patients in whom deep dyspareunia was the main symptom rather than superficial dyspareunia.

After informed consent was obtained, women received hard copies of a battery of standardized pretreatment questionnaires, which they were asked to complete at pretreatment prior to their assessment with a program gynecologist. After the gynecologist assessment (involving history, Q-tip palpation of the vestibule, and pelvic examination), participants underwent standardized multidisciplinary treatment in a 10-week program involving one educational seminar, one sexual education seminar, three psychological skills training groups (including cognitive behavioral therapy and mindfulness), and three individual pelvic floor physiotherapy sessions. Participants also had two follow-up appointments with the program gynecologists, and in some cases, the gynecologists may have recommended medical co-treatments (e.g., topical estrogen or lidocaine, or oral gabapentin or nortriptyline). Vestibulectomy is rarely performed in our program and only for those who have failed multidisciplinary care after at least 6 months of posttreatment follow-up. Standardized posttreatment follow-up questionnaires were completed by participants immediately posttreatment and at 6 months posttreatment. Questionnaire data from

pretreatment, immediate posttreatment, and 6 months posttreatment were entered prospectively into our database.

Procedures and Measures

This prospective study was done on the database from the first wave of consecutive cohorts of women seen through the program from 2009 to 2011 ($N = 158$ total), and thus a power analysis was not performed. In the pretreatment questionnaires, women were asked about whether they also experienced deep pain with penetration. The group with concurrent deep–superficial dyspareunia consisted of those women who answered “yes” to deep pain with penetration. The group with only superficial dyspareunia due to provoked vestibulodynia consisted of those women who answered “no” to deep pain with penetration. Three analyses were carried out: prevalence, associations, and outcome of the women with concurrent deep–superficial dyspareunia.

First, the prevalence of concurrent deep dyspareunia was calculated, and then compared with the prevalence of concurrent deep–superficial dyspareunia in the published survey of women with dyspareunia in a primary care setting [7] using the chi-square test ($P < 0.05$). We did not compare with the other previously published study [8], as the location of dyspareunia was classified in a different way (introitus, vagina, or pelvic area).

Second, the following variables from the pretreatment questionnaires were tested for an association with the group with concurrent deep–superficial dyspareunia: demographics—i.e., age, gravidity; dyspareunia-related factors—i.e., duration of dyspareunia symptoms, level of dyspareunia pain (self-reported level of pain for usual/average dyspareunia symptoms from 0 to 10), whether penetration is sometimes not possible (as a marker for significant vaginismus), and the Female Sexual Distress Scale [13]; other pain conditions—i.e., diagnosis of endometriosis, history of pelvic inflammatory disease, history of bladder symptoms, diagnosis of interstitial cystitis, and diagnosis of irritable bowel syndrome; and psychological factors—i.e., State-Trait Anxiety Inventory [14], Beck Depression Inventory-IA [15], and Pain Catastrophizing Scale [16]. Bivariate associations were tested using the *t*-test for continuous or interval variables (or the Mann-Whitney test if there was non-normality) and the Fisher exact test for binary variables ($P < 0.05$, without correction for multiple comparisons). Variables with binary associations ($P < 0.05$) were

then entered into a multiple logistic regression model in order to determine which variables had an independent association with concurrent deep–superficial dyspareunia by utilizing likelihood ratio model building ($P < 0.05$). Assumptions were checked and all 2×2 interactions were tested in the logistic regression.

For a corollary analysis, we retrospectively reviewed our original medical records to obtain the gynecologists' exam findings for vaginismus. While many patients could not tolerate a complete pelvic examination, when assessed, vaginismus was stated to be present or absent based on the gynecologist's impression of the pelvic floor tone, tenderness, and voluntary control.

Third, outcomes were assessed. The level of dyspareunia pain (0–10) and the Female Sexual Distress Scale [13] were compared between the group with concurrent deep–superficial dyspareunia and the group with only superficial dyspareunia due to provoked vestibulodynia, from pretreatment to immediate posttreatment to 6 months posttreatment, by using repeated measures analysis of variance (ANOVA) ($P < 0.05$). The Female Sexual Distress Scale is a validated measure that consists of 12 items scored on a Likert scale ranging from “never” to “always” (0–4), with a higher score indicating more sexual distress [13].

All statistics were performed using IBM SPSS Statistics for Windows Version 21.0 (IBM Corp, Armonk, NY, USA), with means expressed ± 1 standard deviation and odds ratios (ORs) expressed with 95% confidence intervals [17], unless otherwise noted. Statistical significance was $P < 0.05$ (two tailed). Participants with missing data at pretreatment or who were lost to follow-up were excluded pairwise for each statistical test (see Tables 1 and 2), and sensitivity analysis was not done.

Main Outcome Measures

Level of dyspareunia pain (0–10) and the Female Sexual Distress Scale at pretreatment, immediate posttreatment, and 6 months posttreatment were the main outcome measures.

Results

Participant Characteristics

Of the total sample ($N = 158$), eight women did not answer the question about deep pain with penetration, and therefore the analyses are based on a

Table 1 Bivariate associations

Variable (at baseline pre-treatment)	Sample n = 150		P value*
	Concurrent deep–superficial dyspareunia (n = 66)	Only superficial dyspareunia due to provoked vestibulodynia (n = 84)	
Demographic			
Age (years)	29.1 ± 6.8 (n = 66)	28.4 ± 6.0 (n = 84)	0.49
Nulligravid	75.8% (50/66)	80.0% (67/84)	0.56
Dyspareunia			
Duration of dyspareunia symptoms (months)	63.5 ± 54.0 (n = 61)	54.5 ± 50.7 (n = 80)	0.22†
Level of dyspareunia pain (0–10)	6.3 ± 2.2 (n = 64)	5.2 ± 2.6 (n = 79)	0.007
Penetration is sometimes not possible (marker for vaginismus)	78.5% (51/65)	86.9% (73/84)	0.19
Female Sexual Distress Scale‡ (0–48)	31.0 ± 9.6 (n = 65)	28.3 ± 9.8 (n = 83)	0.09
Other pain condition			
Diagnosis of endometriosis	18.2% (12/66)	4.8% (4/84)	0.014
History of pelvic inflammatory disease	0% (0/66)	1.2% (1/84)	1.00
History of bladder problems	24.2% (16/66)	8.3% (7/84)	0.011
Diagnosis of interstitial cystitis	9.1% (6/66)	7.1% (6/84)	0.77
Diagnosis of irritable bowel syndrome	22.7% (15/66)	16.7% (14/84)	0.41
Psychological factors			
State-Trait Anxiety Inventory§ (state anxiety) (20–80)	44.5 ± 5.1 (n = 63)	44.0 ± 5.3 (n = 82)	0.58
State-Trait Anxiety Inventory§ (trait anxiety) (20–80)	45.9 ± 5.0 (n = 66)	44.7 ± 4.7 (n = 84)	0.14
Beck Depression Inventory¶ (0–63)	13.0 ± 9.1 (n = 65)	8.9 ± 6.3 (n = 84)	0.003
Pain Catastrophizing Scale** (0–52)	25.6 ± 10.4 (n = 66)	23.9 ± 11.8 (n = 83)	0.36

*The Fisher exact test was used for binary variables and the *t*-test for continuous or interval variables (or Mann–Whitney test if there was non-normality)

†Mann–Whitney test due to non-normality

‡The Female Sexual Distress Scale ranges from 0 to 48, with higher scores denoting more distress

§The State and Trait Anxiety Inventory state anxiety and trait anxiety subscales scores range from 20 to 80, with higher scores indicating greater levels of anxiety as an emotional state and a personality trait, respectively

¶The Beck Depression Inventory scale ranges from 0 to 63, with higher scores denoting more depressive symptoms

**The total Pain Catastrophizing Score ranges from 0 to 52, with a higher score demonstrating more catastrophizing thoughts (e.g., rumination, magnification, or helplessness) regarding the pain

Table 2 Multiple logistic regression for concurrent deep–superficial dyspareunia

Variable (at baseline pre-treatment)	Concurrent deep–superficial dyspareunia (n = 142 informative cases for the multiple logistic regression)		
	OR* [95% CI]	Change in –2 log likelihood	P value
Level of dyspareunia pain (0–10)†	1.19 [1.01–1.39]	4.72	0.030
Diagnosis of endometriosis	4.30 [1.16–15.90]	5.25	0.022
History of bladder problems	3.84 [1.37–10.76]	7.02	0.008
Beck Depression Inventory (0–63)‡	1.07 [1.02–1.12]	7.36	0.007

*OR = exponential [b-coefficient]

†The OR for each unit increase in level of dyspareunia pain (0–10)

‡The OR for each unit increase in the Beck Depression Inventory (0–63)

CI = confidence interval; OR = odds ratio

sample size of 150. The average age was 28.7 ± 6.4 years (range 18–55 years; $n = 150$). Most were nulligravid (78.5%; 117/149). Sexual orientation was 96.2% heterosexual (126/131), 3.1% bisexual (4/131), and 0.8% lesbian (1/131). Marital status was 44.3% single (66/149), 30.2% married (45/149), 22.1% (33/149) common law, 2.0% (3/149) separated, and 1.3% (2/149) divorced. Of those currently in a relationship, the average relationship duration was 5.2 ± 5.3 years (range <1–40 years; $n = 128$). Ethnic distribution was 77.8% (112/144) Caucasian, 10.4% (15/144) East Asian, 6.9% (10/144) Indo-Canadian, 2.8% (4/144) Hispanic, 1.4% (2/144) Persian, and 0.7% (1/144) African Canadian. The average duration of dyspareunia symptoms was 58.4 ± 52.2 months (range 5.5–252 months; $n = 141$).

Prevalence

The prevalence of women with concurrent deep–superficial dyspareunia was 44% (66/150), while women with only superficial dyspareunia due to provoked vestibulodynia made up the remaining 56% (84/150). This prevalence of concurrent deep–superficial dyspareunia in our sample of women with dyspareunia was significantly greater than the prevalence of concurrent deep–superficial dyspareunia in the published survey [7] of women with dyspareunia in a primary care setting (7.6%; 19/248) (OR = 9.47 [5.36–16.72], chi-square = 73.5, $P < 0.001$).

Associations

At pretreatment, bivariate associations are summarized in Table 1: concurrent deep–superficial dyspareunia was significantly associated with four variables: greater level of dyspareunia pain (0–10), diagnosis of endometriosis, history of bladder problems, and higher score on the Beck Depression Inventory (more depression symptoms) ($P < 0.05$; Table 1). These four variables were entered into a multiple logistic regression model, and each variable was found to have an independent association with concurrent deep–superficial dyspareunia ($P < 0.05$; Table 2). Of the 23 subjects who had a history of bladder problems (16 in the concurrent group and 7 in the superficial only group; Table 1), 57% (13/23) described it as “urgency/frequency.”

In contrast to these four variables, there was no significant difference in the Female Sexual Distress Scale at pretreatment (Table 1). Also, there was no difference for penetration being sometimes not possible (as a marker for vaginismus) (Table 1). In the corollary analysis, physical exam evidence of

vaginismus was also not significantly more frequent in the group with concurrent deep–superficial dyspareunia (88.5%; 23/26) compared with the group with only superficial dyspareunia due to provoked vestibulodynia (78.4%; 29/37) (Fisher exact test, $P = 0.50$).

Outcome

For outcome, we had pretreatment, immediate posttreatment, and 6 months posttreatment data for the level of dyspareunia pain (0–10) in 24.7% (37/150) of participants: 22.7% (15/66) of those with concurrent deep–superficial dyspareunia and 26.2% (22/84) of those with only superficial dyspareunia due to provoked vestibulodynia. For outcome, we also had pretreatment, immediate posttreatment, and 6 months posttreatment data for the Female Sexual Distress scale in 42.0% (63/150) of participants: 43.9% (29/66) of those with concurrent deep–superficial dyspareunia and 40.5% (34/84) of those with only superficial dyspareunia due to provoked vestibulodynia.

For the level of dyspareunia pain (0–10), a between-group (concurrent deep–superficial dyspareunia vs. only superficial dyspareunia due to provoked vestibulodynia) and within-group (pretreatment, immediate posttreatment, 6 months posttreatment) repeated measures ANOVA was carried out (Table 3). The main effect of treatment was statistically significant ($F[2,70] = 4.92$, $P = 0.010$), indicating that both groups improved over time with treatment. However, the main effect of group was not statistically significant ($F[1,35] = 0.20$, $P = 0.66$), suggesting that there was no difference between the groups in their degree of improvement. The interaction between group and treatment was also not statistically significant ($F[2,70] = 2.07$, $P = 0.13$).

For the Female Sexual Distress Scale, the same repeated measures ANOVA was carried out (Table 4). The main effect of treatment was statistically significant ($F[1.9,114.4] = 26.2$, Huynh–Feldt correction for violation of sphericity, $P < 0.001$), indicating that both groups improved with treatment. The main effect of group was not statistically significant ($F[1,61] = 3.14$, $P = 0.08$), demonstrating no significant difference between the group with concurrent deep–superficial dyspareunia and the group with only superficial dyspareunia due to provoked vestibulodynia in how they improved over time. The interaction between group and treatment was also not statistically significant ($F[1.9,114.4] = 0.14$, $P = 0.86$).

Table 3 Outcome to 6 months posttreatment (level of dyspareunia pain)

Time	Level of dyspareunia pain (0–10)	
	Concurrent deep–superficial dyspareunia (22.7% follow-up; 15/66)	Only superficial dyspareunia due to provoked vestibulodynia (26.2% follow-up; 22/84)
Pretreatment (baseline)	6.7 ± 2.0	5.4 ± 2.9
Immediate posttreatment	4.7 ± 2.3	5.3 ± 2.4
6 months posttreatment	4.5 ± 1.9	4.5 ± 2.5

Level of dyspareunia pain (0–10) outcomes for the group with concurrent deep–superficial dyspareunia and the group with only superficial dyspareunia due to provoked vestibulodynia. On repeated measures analysis of variance (ANOVA), both groups significantly improved over time ($P = 0.010$), but with no significant difference between the groups ($P = 0.66$) (see text)

To check for bias in the outcome analysis, we compared the pretreatment level of dyspareunia pain between the participants who provided 6 months posttreatment data (6.0 ± 2.5) and those who were lost to follow-up (5.5 ± 2.4): there was no significant difference ($t = 1.17$, degrees of freedom [df] = 141, $P = 0.25$). Similarly, we compared the Female Sexual Distress Scale between the participants who provided 6 months posttreatment data (31.0 ± 9.5) and those who were lost to follow-up (28.3 ± 9.9), and there was also no significant difference ($t = 1.68$, df = 146, $P = 0.10$). Furthermore, when we controlled for different types of medical co-interventions prescribed by the program gynecologists (or by other care providers)—i.e., topical estrogen for provoked vestibulodynia, topical lidocaine for provoked vestibulodynia, hormonal suppression that can affect endometriosis (e.g., birth control pill, Depo-Provera, or Mirena intrauterine device), or medications that can affect interstitial cystitis (e.g., Elmiron, tricyclics, anti-epileptics)—there were no significant changes to the repeated measures ANOVA (data not shown), with one exception: for level of dyspareunia, controlling for hormonal suppression, the main effect of treatment became borderline significant ($F[2,70] = 2.59$, $P = 0.082$), likely related to insufficient power.

Conclusions

Concurrent deep–superficial dyspareunia was reported by nearly half of women (44%) seen for provoked vestibulodynia at a multidisciplinary vulvodynia program. The common prevalence is in line with our hypothesis and is markedly higher than the 8% prevalence of concurrent deep–superficial dyspareunia among women with dyspareunia in a primary care setting being seen for a variety of indications [7]. In other words, the distribution of dyspareunia subtypes is different in our tertiary care setting compared with the primary care setting, i.e., the relative proportion of concurrent deep–superficial dyspareunia among women with dyspareunia is much higher in our sample. This suggests that concurrent dyspareunia may be more clinically significant or may not respond to primary care treatments, resulting in women being more likely to seek referral for tertiary care.

In support of our hypothesis of more comorbidities at baseline, four variables from the pretreatment standardized questionnaires were found to have an independent association with concurrent deep–superficial dyspareunia: endometriosis, history of bladder problems, more depression symptoms, and a greater level of dyspareunia pain. (A diagnosis of interstitial cystitis was not

Table 4 Outcome to 6 months posttreatment (Female Sexual Distress Scale)

Time	Female Sexual Distress Scale (0–48)	
	Concurrent deep–superficial dyspareunia (43.9% follow-up; 29/66)	Only superficial dyspareunia due to provoked vestibulodynia (40.5% follow-up; 34/84)
Pretreatment (baseline)	32.7 ± 10.2	29.6 ± 8.6
Immediate posttreatment	32.5 ± 8.7	28.4 ± 7.3
6 months posttreatment	24.2 ± 10.2	21.4 ± 11.3

Female Sexual Distress Scale (0–48) outcomes for the group with concurrent deep–superficial dyspareunia and the group with only superficial dyspareunia due to provoked vestibulodynia. On repeated measures analysis of variance (ANOVA), both groups significantly improved over time ($P < 0.001$), but with no significant difference between the groups ($P = 0.08$) (see text)

associated with concurrent deep–superficial dyspareunia [Table 1] likely because it was underdiagnosed in women with bladder problems). The magnitude of the differences in these four variables between the groups and the ORs are listed in Tables 1 and 2. The ORs of 4.30 for endometriosis and 3.84 for bladder problems, for concurrent deep–superficial dyspareunia, are clinically significant. Also, the average Beck Depression Inventory score was 13.0 in the group with concurrent deep–superficial dyspareunia and 8.9 in the group with only superficial dyspareunia due to provoked vestibulodynia, which represents a shift from minimal (0–9) to mild (10–16) depression [15], and thus could be considered clinically significant. For the level of dyspareunia pain (0–10), there was an absolute difference of 10% in pain (average 6.3 in the concurrent group and 5.2 in the superficial only group). It should be noted that it was specifically the severity of dyspareunia pain, and not the duration of dyspareunia symptoms, that was associated with concurrent deep–superficial dyspareunia. Moreover, there was no difference in the Female Sexual Distress Scale at pretreatment. In addition, neither examination evidence of vaginismus nor a history of penetration being sometimes not possible (as another marker of vaginismus) was associated with concurrent deep–superficial dyspareunia. The likely reason is that vaginismus (i.e., pelvic floor dysfunction) was very frequent in both groups (>75%), and there may have been insufficient power to detect a difference or else pelvic floor dysfunction is truly similarly present in both groups.

Each of these four variables (endometriosis, history of bladder problems, more depression symptoms, and a greater level of dyspareunia pain) may play a unique role in the pathophysiology of concurrent deep–superficial dyspareunia. For example, some women with superficial dyspareunia due to provoked vestibulodynia may have endometriosis as an independent cause of deep dyspareunia, while others have bladder problems (likely related to interstitial cystitis) as an independent cause of deep dyspareunia. In other women with superficial dyspareunia due to provoked vestibulodynia, depression could also negatively affect the sexual response cycle, reducing genital sexual arousal and its associated physiologic changes, thereby also contributing to deep dyspareunia [18]. In contrast, depression (as well as a greater level of dyspareunia pain) may be a secondary consequence of having developed concurrent deep–superficial dyspareunia. These four variables could also contribute to

deep dyspareunia by increasing the risk of nervous system sensitization [19,20].

In contrast to our hypothesis of poorer outcomes, women with concurrent deep–superficial dyspareunia improved in the level of dyspareunia pain and the Female Sexual Distress Scale to 6 months posttreatment to a similar degree as women with only superficial dyspareunia due to provoked vestibulodynia. Standardized multidisciplinary management with physiotherapy and psychological therapy may improve concurrent deep–superficial dyspareunia by ameliorating mood, perhaps reducing sensitization, and lessening the chronic pelvic pain seen in interstitial cystitis and endometriosis. Although the follow-up rate at 6 months (25–40%) impacts the validity of these outcome data, there was no significant difference in the pretreatment level of dyspareunia pain and Female Sexual Distress Scale in those who followed up and those that did not, which does not support selection bias. It should also be emphasized that while both groups underwent a standardized multidisciplinary treatment program of gynecologist visits, education, psychological skills training, and pelvic physiotherapy, there was some heterogeneity in the medical co-interventions that we attempted to control statistically. To more conclusively address therapeutic response in the two groups, the ideal study design would be a randomized controlled trial of the standardized multidisciplinary treatment program in the two groups, without other medical co-interventions during the period of the clinical trial.

There are other limitations of this study. First, this study is from a tertiary referral program, and may not be generalizable to the general or primary care populations. Second, for this first wave of participants, we did not systematically collect objective examination data from the initial gynecologist assessment, and thus had to retrospectively review charts for the physical exam assessment of vaginismus. Third, data were obtained through patient standardized questionnaires (self-report), including the diagnosis of endometriosis, rather than through review of external medical records. Even with access to external medical records, it should be emphasized that an accurate diagnosis of endometriosis is challenging for several reasons [21]. The diagnostic gold standard is laparoscopic visualization of suspected endometriosis, followed by excision of the lesions and histological confirmation. However, national and international guidelines recommend initial empiric medical management (without laparoscopy) and thus many

women will receive a “clinical diagnosis” of endometriosis without the gold standard [22–24]. In addition, the gold standard requires experienced surgeons who can visualize atypical appearances of endometriosis and fully excise the suspected endometriosis for histological confirmation, a procedure that is not available outside of our tertiary referral center in our province. On the other hand, the strengths of the study include its prospective nature, the use of validated standardized questionnaires for sexual distress and psychological factors, the multifactorial approach, and its novelty in providing the first insights into the pathophysiology and outcomes of concurrent deep–superficial dyspareunia.

We did not have data on chronic pelvic pain in this study. However, chronic pelvic pain is a potential confounder, as some forms of “deep dyspareunia” may actually be exacerbation of already existing chronic pelvic pain by deep penetration. This phenomenon may be playing a role in those women with endometriosis or interstitial cystitis who report concurrent deep–superficial dyspareunia. On the other hand, exacerbation of chronic pelvic pain by deep penetration could perhaps be considered a form of deep dyspareunia. In addition, it remains possible that in women with endometriosis or interstitial cystitis, the deep dyspareunia is from direct contact with the endometriosis-affected structures (e.g., uterosacral ligaments and cul-de-sac) or direct contact with the bladder, respectively.

Caregivers should consider early referral of women with concurrent deep–superficial dyspareunia for multidisciplinary care. In women with provoked vestibulodynia alone, caregivers should consider screening for symptoms of endometriosis, interstitial cystitis, or depression, to identify those at risk of developing concurrent deep–superficial dyspareunia who may need closer surveillance. For caregivers already providing tertiary multidisciplinary care for provoked vestibulodynia, they can be reassured that this approach does appear to improve sexual distress even in women with concurrent deep–superficial dyspareunia.

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Statement of Authorship

Category 1

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Category 2

- (a) **Drafting the Article**
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- (b) **Revising It for Intellectual Content**
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Category 3

- (a) **Final Approval of the Completed Article**
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