

PAIN

Attachment and Childhood Maltreatment as Moderators of Treatment Outcome in a Randomized Clinical Trial for Provoked Vestibulodynia



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ABSTRACT

Background: Although distal developmental factors, such as attachment and childhood maltreatment (CM), are associated with the occurrence, severity, and adjustment to provoked vestibulodynia (PVD)—the most prevalent form of vulvodynia—no studies to date have examined whether these variables are related to treatment efficacy in the context of PVD. Attachment and CM may act as moderating variables when examining different treatment modalities, whereby individuals with more insecure attachment orientations (anxiety/avoidance) or a history of CM may benefit less from treatments with higher interpersonal contexts, such as sex and couple therapy—a recommended treatment for PVD.

Aim: The present randomized clinical trial (RCT) examined attachment and CM as predictors and moderators of sexual satisfaction, distress, and function at post-treatment and 6-month follow-up while comparing 2 treatments for PVD: Topical lidocaine, and a novel cognitive behavioral couple therapy focused on women's pain and partners' sexuality.

Methods: One hundred eight women with PVD were randomized to a 12-week treatment of either lidocaine or couple therapy. Women completed questionnaires at pretreatment, post-treatment, and at a 6-month follow-up.

Outcomes: (1) Global Measure of Sexual Satisfaction; (2) Female Sexual Distress Scale-Revised; (3) Female Sexual Function Index.

Results: Both attachment and CM were significant moderators of treatment outcomes. At either post-treatment or 6-month follow-up, in the couple therapy condition, women with greater attachment avoidance had poorer outcomes on sexual distress, satisfaction and function, whereas women with higher levels of CM had poorer outcomes on sexual satisfaction and sexual function, compared to women in the lidocaine condition.

Clinical Implications: Although these novel findings need further replication, they highlight the importance for clinicians to take into account distal factors, for instance, attachment and CM, when treating sexual difficulties such as PVD, as these variables may affect more interpersonal dimensions of treatment (eg, trust, compliance, etc.) and ultimately, treatment progress.

Strengths & Limitations: Using a rigorous RCT study design and statistical approach, this study is the first to examine attachment and CM as moderators in the treatment of sexual difficulties. It is however limited by the use of self-report measures, and further studies are necessary to validate the generalizability of current results to other sexual difficulties.

Conclusion: Findings support the role of interpersonal factors in the treatment of PVD and indicate that short-term psychological interventions, such as couple therapy, may be less beneficial for women with antecedents of

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INTRODUCTION

Provoked vestibulodynia (PVD) is a chronic pain condition with a prevalence of 8%–10% among women of all ages.¹ It is characterized by pressure-provoked pain located at the entrance of the vulvar vestibule, often described as a sharp, cutting, or burning sensation.² Women with PVD often see themselves deprived of a satisfying sex life, as they report lower sexual satisfaction and function and greater sexual distress than women without this condition.¹ In fact, sexual impairment and distress are often the main motives for women and couples to seek help.³

Typical treatments for PVD include psychotherapy, particularly cognitive-behavioral therapy (CBT; in individual, group or couple format), physiotherapy, and medical care such as oral pharmacotherapy, topical ointments or surgical interventions.⁴ To this day, 2 of the top recommended treatments for PVD are psychological interventions and physiotherapy.⁴ However, although not recommended for long term use, topical lidocaine—a local anesthetic—has been demonstrated as being effective to reduce pain and remains one of the most prescribed treatments for PVD.^{4,5} Espousing the recent *Interpersonal Emotion Regulation Model of Women's Sexual Dysfunction*, positing that proximal (ie, occurring during sexual activities) and distal (ie, predisposing interpersonal events/styles) interpersonal factors play a role in couples' adjustment to sexual difficulties, including PVD, a recent randomized clinical trial (RCT) tested the efficacy of a novel cognitive-behavioral couple therapy (CBCT) in comparison to topical lidocaine.⁶ This study demonstrated that CBCT was as efficacious as lidocaine to improve sexual function and more efficacious than lidocaine to reduce sexual distress, suggesting that interpersonal factors, which can be addressed via couple therapy, might modulate women's sexual adjustment to PVD.

Although the 2 most studied distal factors, attachment and childhood maltreatment (CM), have been linked to sexual adjustment in women with PVD,^{7–11} no study to date has examined the impact of these distal developmental factors on treatment efficacy for PVD. However, it has been shown that individuals with a history of CM or with insecure attachment tend to benefit less from treatment, regardless of the pathology treated.^{12–16} The present study's goal was therefore to examine attachment and CM as predictors and moderators of women's sexual satisfaction, distress and function at post-treatment and at 6-month follow-up in a RCT for PVD, comparing the efficacy

of CBCT and topical lidocaine. Doing so may help first line health professionals to better orient women with PVD toward an appropriate treatment. s

Attachment

Attachment develops during childhood according to the sensitivity and consistency of care provided by primary caregivers.¹⁷ Attachment tends to persist through time, where romantic partners often become the main attachment figure in adulthood, to which one turns to fulfill comfort, caregiving and sexual needs.¹⁸ Adult attachment is often conceptualized along 2 continuous dimensions: attachment anxiety (negative representation of the self, fear of abandonment and excessive proximity needs) and attachment avoidance (negative representation of others, discomfort with emotional intimacy, excessive self-reliance).¹⁹

Attachment insecurity (ie, high attachment anxiety and/or high attachment avoidance) in adulthood is linked with poorer overall sexual adjustment in normative samples,²⁰ and has been associated with greater pain intensity, greater sexual distress, and lower sexual function and satisfaction in clinical samples of women with PVD.^{7,11,21,22} However, no study to date has examined the associations between attachment and the treatment of sexual difficulties, including PVD. Yet, past research has identified attachment insecurity as a nonspecific predictor of poorer outcomes in the treatment of chronic pain and a myriad of other psychological difficulties, by being related to poorer patient-provider relationship, poorer treatment adherence and self-efficacy, and difficulty managing illness-related distress.^{12,23–25}

In the field of chronic pain, 2 studies involving multidisciplinary treatments—including psychological interventions—showed that attachment insecurity was associated with poorer treatment outcomes in terms of depressive symptoms, self-efficacy and pain catastrophizing.^{23,24} Also, an uncontrolled study testing a group therapy combining CBT and acceptance and commitment therapy in 72 individuals with chronic pain reported that those with higher attachment insecurity had greater opioid use and anxiety and depression scores remaining in the clinical range at post-treatment.²⁵ Only one study found opposite results in a RCT comparing mindfulness-based CBT to a control wait-list, where individuals with higher attachment avoidance experienced a greater decrease in pain intensity in the CBT condition. The authors suggested that as insecure individuals tend to adopt maladaptive coping strategies, they may benefit more from

interventions that can enhance their coping abilities than secure individuals.²⁶

Although no research has examined the role of attachment while comparing psychological to medical interventions, certain studies suggest that attachment insecurity, especially attachment avoidance, may act as a moderator of treatment outcome.²⁷ In fact, 2 RCTs yielding similar results demonstrated that individuals with higher attachment avoidance benefited more from CBT than from interventions that have a greater interpersonal focus, such as interpersonal psychotherapy or psychodynamic psychotherapy.^{28,29} Another single treatment prospective study involving 12 couples showed that greater attachment avoidance was significantly associated with persisting relationship strain 3 years after terminating a couple therapy.³⁰ These results suggest that attachment avoidance may lead to poorer outcomes in treatments with a greater focus on interpersonal and intimate processes, including couple therapy. Although the aforementioned studies found no significant interaction between attachment anxiety and treatment modality, Marmarosh and Wallace (2016) suggested that individuals with greater attachment anxiety may present characteristics and behaviors that could have deleterious effects on couple therapy outcomes.²⁷ These include inappropriately hurtful disclosures, lack of empathic concern, poor caregiving abilities, more destructive behaviors during conflicts, and ambivalence toward commitment to one's partner. One uncontrolled study examining the outcomes of a 5-week group format of couples' therapy found that compared to secure individuals, insecure individuals had poorer outcomes on psychopathology and problem solving capacity at post-treatment and presented a decrease in these outcomes once the treatment had ceased.³¹ Overall, prior research suggests that higher attachment avoidance and anxiety may lead to poorer outcomes in couple therapy due to its highly intimate and interpersonal nature and therefore act as a moderator of treatment outcomes when tested against less interpersonally oriented treatments, such as topical lidocaine.

Child Maltreatment

CM refers to all types of abuse and neglect perpetrated by a caregiver toward a child under 18 years of age.³² This maltreatment includes sexual, physical, and emotional abuse as well as physical and emotional neglect, with exposure to multiple types being the norm.^{33,34} Multitype and repeated episodes of CM are associated with more adverse and long-lasting consequences^{35,36} including in the sexual realm.^{37–40} Around 25%–59% of women with a history of childhood sexual abuse report a sexual dysfunction⁴¹ and more than 80% of patients receiving sex therapy report at least one type of CM.^{37,42}

Population-based studies also showed that women with vulvodynia were 3–6 times more likely to report severe childhood physical or sexual abuse compared to women without vulvodynia.^{8,43} In women with PVD, higher reports of CM as well as penetrative sexual abuse were related to lower sexual function.^{9,10} As CM is a risk factor for the onset of PVD and is

related to lower sexual adjustment in women with PVD, it is surprising that no studies have investigated its impact on treatment. In the treatment of sexual dysfunctions, only one uncontrolled study tested the effect of childhood sexual abuse on the efficacy of mindfulness-based psychoeducational group therapy in 26 women with sexual desire/interest or arousal disorders. It found that women with a history of childhood sexual abuse reported greater improvement on sexual arousal, sexual function, and sexual distress than women without such history.⁴⁴ However, as mindfulness-based interventions have been shown to be effective in treating trauma symptoms, this result might not extend to CBT or medical treatments for PVD.^{45,46}

Childhood trauma is related to less trust in physicians and the health care system and poorer adherence to recommended health care.⁴⁷ However, studies examining CM as a predictor or moderator of treatment outcomes in RCTs for chronic mental health issues reported that CM does not globally predict poorer response to treatment, but rather acts as a moderator. In non-trauma-focused psychotherapies, such as CBT, individuals with a history of CM experience poorer treatment outcomes than individuals without such history.^{15,48} Yet, medical treatments seem to be as effective regardless of CM history. For instance, CM was unrelated to treatment response to antidepressants in patients with irritable bowel syndrome.⁴⁹ In a RCT including a sample of 334 adolescents with persistent depression, youth with a CM history responded more poorly to the CBT combined with antidepressants condition compared with non-abused youth, whereas this difference was not observed in the antidepressants alone condition.⁵⁰ Similarly, in a RCT involving 427 adolescents with major depressive disorder, teens with a history of sexual abuse reported significant improvement in the antidepressant medication condition, whereas they remained in the depressed range in the CBT alone condition.⁵¹ As nontrauma-focused CBT does not specifically address the trauma or its repercussions, it may not be enough to offer individuals with a history of CM the skills to overcome their trauma-related schemas and better regulate their emotions, and therefore be less effective than medical treatments for these individuals.⁵² Taken together, these results suggest that women with PVD with a history of CM may benefit more from medical interventions than from nontrauma-focused psychotherapeutic interventions.

Study Aims and Hypotheses

The current study examined whether distal developmental factors—attachment and CM—differentially predicted the effect of treatment for PVD on women's sexual adjustment (sexual satisfaction, sexual distress, and sexual function) at post-treatment and 6-month follow-up in a RCT comparing CBCT to topical lidocaine. We hypothesized that women with greater attachment avoidance or attachment anxiety and/or with a greater history of CM would experience poorer treatment outcomes, and that this effect would be greater in the CBCT condition relative to the lidocaine condition.

METHOD

Participants

Participants were 108 women diagnosed with PVD currently involved in a romantic relationship. Women were recruited in 2 sites (Site A: $n = 47$; Site B: $n = 61$) between May 2014 and March 2018. Forty-five participants (42%) were recruited through advertising in newspapers, websites, universities, hospitals and medical clinics, 37 (34%) through participation in prior studies by the authors, 25 (23%) were referred by a physician, and 1 (1%) by a friend.

Inclusion criteria for this study were: (1) being 18 years old or over, (2) being engaged in a long-term relationship of at least 6 months, (3) women cohabiting and/or having at least 4 in person contacts with their romantic partners every week, for the past 6 months, (4) penetration or attempted penetration at least once per month, for the past 3 months, (5) women experiencing pain at the entrance in the vulvo-vaginal region in at least 80% of intercourse attempts for at least 6 months, (6) pain triggered solely during activities exerting pressure on the vulvar vestibule (eg, during tampon insertion, intercourse), and (7) women having a diagnosis of PVD confirmed by a collaborating physician. Women were excluded if there were: (1) lack of clear evidence that the pain is pressure-provoked or linked to intercourse, (2) women with pain having an active infection (eg, candida) or dermatological condition, as diagnosed by a physician, (3) involvement of the participants in another form of treatment for PVD or couples therapy, (4) self-reported severe untreated medical or psychiatric condition, (5) pregnancy or planning on being pregnant during the study's timeframe, (6) women being over 45 years old and/or having started menopause, due to hormonal and gynecological changes associated with perimenopause and menopause,^{53,54} (7) clinical levels of relational distress, as indicated by the cut-off score of the widely used and well-validated Couple Satisfaction Index,⁵⁵ and (8) self-reported intimate partner violence.

Procedure

The recruitment and flow of participants throughout the study are shown in Figure 1. Interested participants were contacted and screened for eligibility by phone by a research assistant. Eligible participants were invited for an in-person orientation meeting during which the procedure and consent form were explained by a research assistant or a PhD student in clinical psychology. Free and informed consent from participants was obtained during this meeting. During this session participants also took part in a structured interview on sociodemographic variables and pain and sexual history, followed by the completion of pretreatment measures on an online secured platform. Based on their answers, eligibility was determined and all eligible women moved forward with an appointment with a gynecologist to assess PVD symptomatology using the cotton-swab test, which is a standardized and validated method whereby

pressure is applied at 3-, 6-, and 9-o'clock positions of the vulvar vestibule using a cotton swab while women rate their pain intensity from 0 to 10.⁴

Women with a confirmed PVD diagnosis and their partners were then randomized, according to the independent stratified randomization method provided by Dacima, to 1 of 2 treatment conditions, either a CBCT or nightly application of topical lidocaine. At each site, only research coordinators, assistants dedicated to the lidocaine condition and CBCT therapists were aware of participants' randomization status. All other research personnel and investigators were blind for the entire duration of the study. Participants took part in the treatments for a period of 12 weeks, which was followed by a post-treatment laboratory-based assessment during which they took part in a structured interview and completed self-report questionnaires. Six months after the post-treatment assessment, participants were invited for a 6-month follow-up following the same procedure. Participants received a \$30 financial compensation for the completion of questionnaires at each time-point and treatments were offered free of charge. The study was approved by the Centre Hospitalier de l'Université de Montréal and the IWK Health Centre Institutional Review Boards. The results of the main RCT have been accepted for publication.⁶

Treatment Conditions

Cognitive Behavioral Couple Therapy (CBCT). Participants randomized to CBCT took part in 12 weekly in-person sessions of 75 minutes, with the first session being 90 minutes to accommodate an assessment. The aims of CBCT were to: (1) enable participants to reframe PVD as a multidimensional pain problem affecting both women and their partners, (2) promote adaptive pain coping to in turn decrease pain intensity, and (3) improve couples' sexual well-being by encouraging women and their partners to adapt their sexuality to the pain context. The treatment protocol included information about the nature and consequences of PVD, education about pain as a multidimensional problem, breathing techniques, vaginal dilation exercises, cognitive defusion, distraction focusing on sexual imagery, expansion of the sexual repertoire, and exercises to improve pain and sexuality-relevant communication and intimacy in couple interactions.

Therapists were clinical psychology PhD students ($n = 8$) or junior clinicians (PsyD or PhD, $n = 2$; MA in clinical sexology, $n = 1$) who followed a treatment manual outlining the content of each session and homework to be assigned. Therapists received training on delivering the CBCT beforehand, were instructed to adhere to the treatment manual and received weekly supervision with a registered clinical psychologist specialized in sex and couple therapy. Sessions were video recorded and a random sample representing one quarter of videos were viewed and coded by 2 independent clinical associates, which revealed that therapists

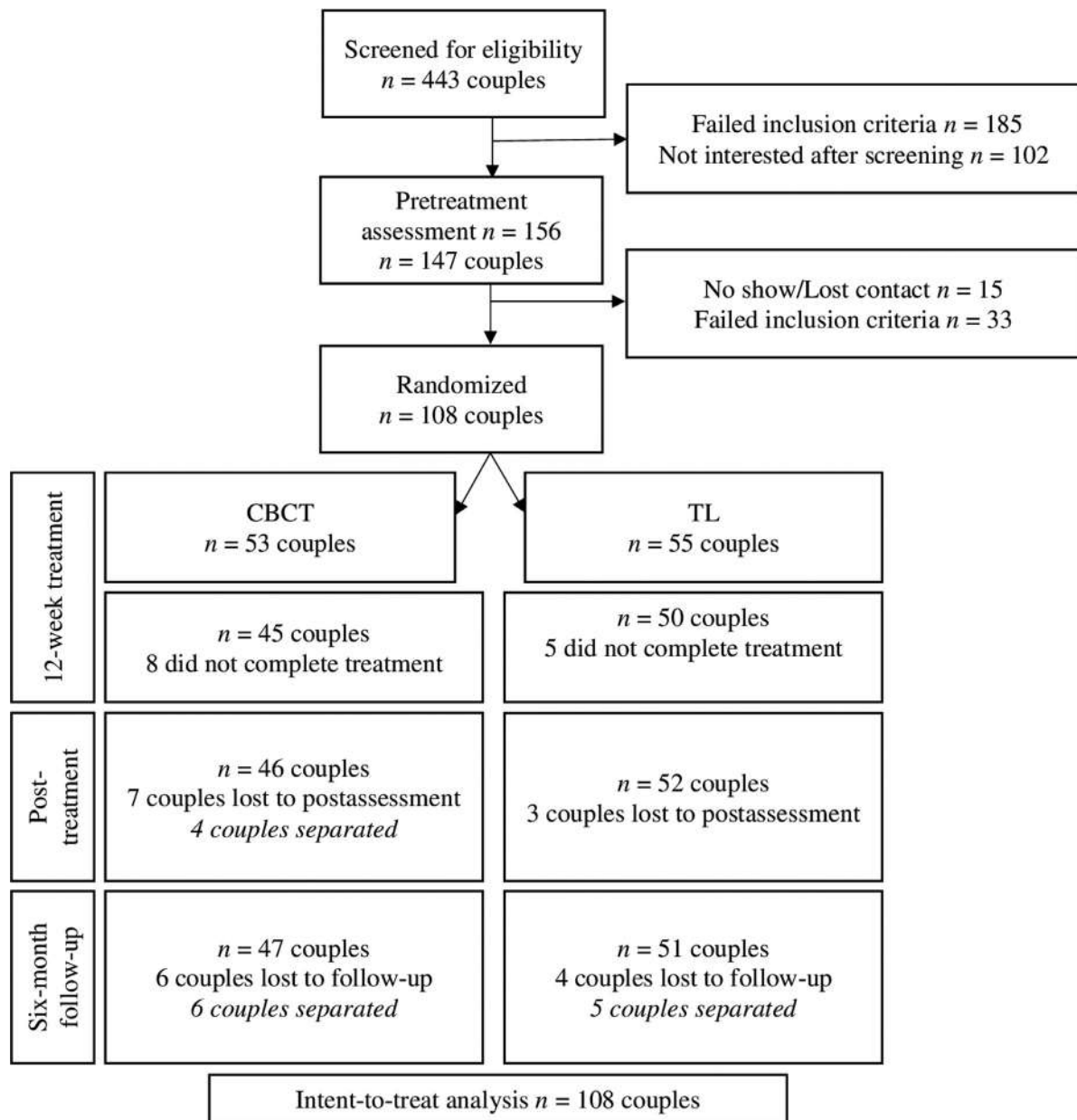


Figure 1. Flow chart of participants in the study. CBCT = cognitive-behavioral couple therapy; TL = topical lidocaine.

adhered to the treatment manual 93.8% of the time, with a strong inter-rater reliability of 0.70 (mean weighted kappa). Participants in the CBCT arm attended 10.6 out of 12 sessions (standard deviation [SD] = 3.53; 88.7%), and women completed 67.7% of homework exercises.

Topical Lidocaine. Participants randomized to this condition applied a 5% lidocaine ointment (50 mg/g, Xylocaine, AstraZeneca, tube of 35 g) on the vulvar vestibule nightly for 12 weeks. A research assistant was trained by a co-investigating physician in the use of lidocaine to explain its application to participants in a standardized manner and performed

weekly phone calls to participants to monitor potential adverse effects. Women were instructed to apply the ointment on a cotton ball that would be placed at the vaginal introitus, with the purpose of having the analgetic be kept in contact with the entry of the vagina overnight for a period of 7–8 hours via their underwear. If participants wished to engage in sexual activity on any given night, they were instructed to remove the cotton ball and any remaining excess of the lidocaine ointment before sex, and to repeat the regimen before going to bed. Women monitored their adherence to treatment in a booklet. Women used the lidocaine cream 79.4% of the nights during the treatment period.

Measures

Attachment. Attachment was measured using the Experiences in Close Relationships—Short Form.⁵⁶ Participants rated their general feelings regarding romantic relationships according to 2 continuous dimensions, namely attachment anxiety (eg, “I worry that romantic partners won’t care about me as much as I care about them”) and attachment avoidance (eg, “I try to avoid getting too close to my partner”). Each subscale includes 6 items and participants rated their answers on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicate greater attachment anxiety or avoidance. Good psychometric properties are reported for this instrument, with alpha coefficients and test-retest correlations of, respectively, 0.86 and 0.82 for attachment anxiety and 0.88 and 0.89 for attachment avoidance.⁵⁶ Ordinal correlation alphas were 0.78 for attachment anxiety and 0.79 for attachment avoidance in the current sample.

Childhood Maltreatment. The Childhood Trauma Questionnaire (CTQ)—Short Form⁵⁷ was used to assess 5 types of CM, namely emotional, physical and sexual abuse, and emotional and physical neglect. Emotional abuse was defined as demeaning behaviors or verbal assaults by an older individual resulting in the child’s humiliation or in the lessening of sense of self-worth. Physical abuse was considered as bodily assaults resulting in or causing risk of injury by an older individual toward a child. Sexual abuse was defined as any sexual contact or demeanor between a child under 18 years of age and an older individual. Emotional neglect was considered as a failure to acknowledge and to meet the child’s psychological and emotional needs, such as love, nurturance, belonging and support. Finally, physical neglect was defined as the failure of caretakers to provide for the child’s basic physical needs of shelter, food, clothing, safety, and/or health care. Participants rated the frequency with which these various forms of abuse and neglect took place during their childhood on a 5-point Likert scale ranging from 1 (*never true*) to 5 (*very often true*). Items were summed and total scores ranged from 25 to 125, where higher scores indicated more severe forms of CM given that this instrument measures both the frequency of each type of abuse or neglect and the cumulative experience of multiple types of CM. The CTQ shows good psychometric properties, with Cronbach’s alphas varying from 0.61 to 0.95 and test-retest correlations between 0.79 and 0.95 over a 2–6-month period.^{57–59} Cronbach’s alpha in the current sample was 0.92.

Sexual Satisfaction. The Global Measure of Sexual Satisfaction⁶⁰ was used to assess women’s subjective global satisfaction with their sexual relationship with their partner. This scale includes 5 bi-polar items to which individuals report whether they experience their sexuality as good or bad, pleasant or

unpleasant, negative or positive, satisfying or unsatisfying, and valuable or worthless, on a 7-point Likert scale. Total scores range from 5 to 35, where higher scores indicate greater sexual satisfaction. A study comparing instruments assessing sexual satisfaction found the Global Measure of Sexual Satisfaction to be the most satisfactory,⁶¹ with an alpha of 0.90 and a test-retest correlation of 0.84.⁶⁰ Cronbach’s alpha in the current sample was 0.91.

Sexual Distress. Sexual distress was measured using the Female Sexual Distress Scale-Revised.⁶² This instrument is designed to assess personal distress related to sexuality by measuring, among other feelings, the levels of anger, guilt, shame, stress, and dissatisfaction regarding one’s sex life. Participants rated the frequency of these feelings on a 5-point Likert scale of 0 (*Never*) to 4 (*always*). Total scores range from 0 to 52, where higher scores indicate greater levels of sexual distress. This instrument shows good psychometric properties with Cronbach’s alphas of >.86 in original validation study,⁶² and of 0.91 in the current sample.

Sexual Function. Women’s sexual function was assessed using the Female Sexual Function Index.⁶³ This scale is composed of 19 items assessing 6 dimensions of sexual function over the past 4 weeks; desire, arousal, lubrication, orgasm, satisfaction, and pain. Total scores range from 2 to 36, where higher scores indicate better sexual functioning. This instrument has demonstrated good psychometric properties in both populational^{63,64} and PVD samples,⁶⁵ and Cronbach’s alphas ranging from 0.82 to 0.97 and from 0.90 to 0.97 have been reported in respective samples. Cronbach’s alpha in the current sample was 0.89. Women who had no sexual activity in the last 4 weeks received a code of ‘missing’ for that question, to avoid biasing the score toward dysfunction.⁶⁶

Data Analysis

Descriptive analyses and bivariate correlations were examined using SPSS 26.0.

Multilevel modeling was used to examine if attachment dimensions and CM predicted or moderated treatment outcomes using Mplus 8.3.⁶⁷ Two-level models (time points nested in women) were separated by outcome (sexual satisfaction, sexual distress, and sexual function) and by moderator (attachment and childhood maltreatment), for a total of 6 models. Each model included the main effect of time as a within-subjects variable (level 1; pretreatment, post-treatment, 6-month follow-up; simultaneously estimated separate linear slopes of change from pre- to post-treatment and from pretreatment to follow-up with pretreatment as the reference), the main effect of attachment or childhood maltreatment and of treatment condition as between-subjects variables (level 2), all 2-way interactions between time,

attachment or childhood maltreatment and treatment condition as cross-level interactions, and the interaction between time, attachment or childhood maltreatment, and treatment condition as 3-way cross-level interactions. We included random effects on the intercepts and time slopes of all models. A significant 3-way cross-level interaction indicated that the effect of the treatment condition (CBCT vs lidocaine) on the response to treatment significantly varied at different levels of attachment dimensions or CM. When all 3-way cross-level interactions were nonsignificant, they were removed from the model and only the 2-way cross-level interactions between time and attachment or CM and between time and treatment condition were kept. A significant cross-level interaction between time and attachment or CM indicated that the response to treatment varied at different levels of the predictor (with no significant difference between treatment condition). To interpret significant 3-way interactions, simple slopes tests were estimated for either one or 2 SD above (+1 or +2 SD) and below the mean (-1 or -2 SD) on the moderator. Attachment dimensions and CM were centered prior to analysis and calculation of interactions. Treatment condition was effect coded with topical lidocaine = -0.5 and CBCT = 0.5 for treatment condition. Data were analyzed with ML estimation; missing data from participants who dropped-out of the study and score-level missings were handled using Full Information Maximum Likelihood⁶⁷; all randomized participants were included in the analyses based on the intent-to-treat principle.

RESULTS

Sample Characteristics and Descriptive Analysis

Of the 108 eligible participants, 53 were randomized to CBCT and 55 were randomized to the lidocaine condition. Overall, 88% of participants ($n = 95$) completed the treatment and completion rates for post-treatment and follow-up were 90.7% ($n = 98$), with no significant difference between treatment conditions. No significant differences were found between treatment conditions on sociodemographic characteristics, childhood maltreatment, attachment avoidance and sexual outcomes at pretreatment. Attachment anxiety was significantly different between treatment conditions (CBCT: $M = 3.81$, $SD = 1.26$; lidocaine: $M = 3.20$, $SD = 1.12$; $t(105) = 2.65$, $P = .009$). Sociodemographic characteristics for the total sample are presented in [Table 1](#).

Zero-Order Correlations

Correlational analyses were conducted between sociodemographic variables and study outcomes to identify potential confounding variables. Relationship duration was significantly correlated with sexual satisfaction ($r = -0.26$, $P = .006$) and with sexual function ($r = -0.20$, $P = .043$) at pretreatment. A significant correlation was found between level of education (in years since first grade) and sexual function at 6-month follow-up ($r = -0.25$, $P = .018$). Finally, independent samples t-tests revealed

Table 1. Sociodemographic and clinical characteristics

	M (SD) or % (n)
Age (years)	27.06 (6.26)
Education (years)	17.06 (2.29)
Age at first intercourse	17.83 (3.24)
Pain duration (years)	6.52 (5.20)
Cultural background	
French Canadian	39.8% (43)
English Canadian	36.1% (39)
American	0.0% (0)
European	7.4% (8)
Other	15.7% (17)
Relationship status	
Not living with partner	20.4% (22)
Cohabiting	51.9% (56)
Married	27.8% (30)
Relationship duration (years)	5.43 (4.14)
Couple's annual income (CAD\$)	
\$0–\$19,999	18.5% (20)
\$20,000–\$39,999	20.4% (22)
\$40,000–\$59,999	13.9% (15)
\$60,000–\$79,999	14.8% (16)
\$80,000–\$99,999	11.1% (12)
\$100,000 and over	20.4% (22)
Treatment site	
Site A	43.5% (47)
Site B	56.5% (61)

there was a significant difference in sexual distress according to treatment site at pretreatment (Site A: $M = 31.57$, $SD = 9.89$; Site B: $M = 36.03$, $SD = 9.28$; $t(106) = 2.41$, $P = .018$) and at post-treatment (Site A: $M = 20.92$, $SD = 14.00$; Site B: $M = 28.29$, $SD = 13.53$; $t(95) = 2.59$, $P = .011$). Relationship duration, education and treatment site were included as covariates in their respective models according to their correlation with corresponding outcomes. Relationship duration and education were centered, and treatment site was effect coded (0.5 = Site A and -0.5 = Site B). Means, standard deviations, and correlations between moderators at pretreatment and study outcomes at pretreatment, post-treatment and 6-month follow-up are presented in [Table 2](#).

Moderators of Treatment Outcomes

Attachment Dimensions. Results for sexual satisfaction are presented in Model 1 of [Table 3](#). Moderation analyses indicated that there was a significant interaction between time, treatment condition, and attachment avoidance on sexual satisfaction at 6-month follow-up. As presented in [Figure 2](#), in the CBCT condition, women with lower levels of attachment avoidance (-1 SD)

Table 2. Means, standard deviations, and correlations for pretreatment moderators and study outcomes

	M (SD)	n	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Attachment anxiety	3.50 (1.22)	107	---										
2. Attachment avoidance	1.99 (.87)	108	0.10	---									
3. Childhood maltreatment	36.22 (12.49)	108	0.02	0.06	---								
4. Sexual satisfaction Pre	21.99 (6.75)	108	0.12	-0.12	-.17	---							
5. Sexual satisfaction Post	26.47 (6.96)	97	0.02	-0.11	-0.09	0.44 [‡]	---						
6. Sexual satisfaction F-U	25.14 (6.85)	91	-0.07	-0.07	-0.04	0.43 [‡]	0.64 [‡]	---					
7. Sexual distress Pre	34.09 (9.76)	108	0.11	0.08	-0.03	-0.47 [‡]	-0.37 [‡]	-0.38 [‡]	---				
8. Sexual distress Post	25.18 (14.14)	97	0.09	0.09	-0.04	-0.26 [‡]	-0.68 [‡]	-0.51 [‡]	0.54 [‡]	---			
9. Sexual distress F-U	24.02 (14.57)	95	0.16	0.00	-0.02	-0.28 [‡]	-0.61 [‡]	-0.77 [‡]	0.50 [‡]	0.71 [‡]	---		
10. Sexual function Pre	19.56 (5.12)	103	0.05	-0.17	-0.16	0.64 [‡]	0.34 [‡]	0.27*	-0.40 [‡]	-0.30 [‡]	-0.23*	---	
11. Sexual function post	22.65 (5.77)	93	0.05	-0.15	-0.19	0.24*	0.69 [‡]	0.45 [‡]	-0.23*	-0.70 [‡]	-0.56 [‡]	0.45 [‡]	---
12. Sexual function F-U	23.20 (5.87)	87	-0.07	-0.04	-0.06	0.28 [‡]	-0.48 [‡]	0.66 [‡]	-0.24*	-0.53 [‡]	-0.72 [‡]	0.46 [‡]	0.71 [‡]

F-U = follow-up; Post = post-treatment; Pre = pretreatment.

**P* < .05.

[†]*P* < .01.

[‡]*P* < .001.

Table 3. Multilevel model for the associations between attachment dimensions and study outcomes

Model 1: Sexual satisfaction						
Level-1	b (SE)	Z	<i>P</i>	b (SE)	Z	<i>P</i>
Intercept	22.10 (0.61)	36.36	.000			
Time (T1–T2)	4.41 (0.64)	6.87	.000			
Time (T1–T3)	2.88 (0.66)	4.38	.000			
Level-2	Effect on time T1–T2 slope			Effect on time T1–T3 slope		
Treatment condition	2.23 (1.34)	1.67	.095	0.39 (1.36)	0.27	.775
Attachment anxiety	-0.20 (0.56)	-0.36	.721	-0.45 (0.56)	-0.79	.428
Attachment avoidance	0.09 (0.73)	0.13	.901	0.54 (0.74)	0.73	.464
Treatment condition × Attachment avoidance*	-2.52 (1.47)	-1.72	.086	-3.84 (1.50)	-2.57	.010
Model 2: Sexual distress						
Level-1	b (SE)	Z	<i>P</i>	b (SE)	Z	<i>P</i>
Intercept	33.33 (0.97)	34.48	.000			
Time (T1–T2)	-8.83 (1.09)	-8.11	.000			
Time (T1–T3)	-9.72 (1.18)	-8.24	.000			
Level-2	Effect on time T1–T2 slope			Effect on time T1–T3 slope		
Treatment condition	-8.08 (2.23)	-3.62	.000	-2.64 (2.41)	-1.09	.275
Attachment anxiety	0.73 (0.91)	0.80	.423	1.19 (0.99)	1.19	.233
Attachment avoidance	1.18 (1.21)	0.98	.329	-0.68 (1.30)	-0.52	.601
Treatment condition × Attachment avoidance*	5.56 (2.42)	2.30	.021	4.47 (2.61)	1.72	.086
Model 3: Sexual function						
Level-1	b (SE)	Z	<i>P</i>	b (SE)	Z	<i>P</i>
Intercept	19.66 (0.49)	40.50	.000			
Time (T1–T2)	3.19 (0.52)	6.18	.000			
Time (T1–T3)	3.56 (0.53)	6.68	.000			
Level-2	Effect on time T1–T2 slope			Effect on time T1–T3 slope		
Treatment condition	0.79 (1.08)	0.73	.464	-0.26 (1.11)	-0.24	.813
Attachment anxiety	0.36 (0.45)	0.80	.423	-0.34 (0.46)	-0.73	.467
Attachment avoidance	0.11 (0.58)	0.18	.856	0.82 (0.59)	1.40	.163
Treatment condition × Attachment avoidance*	-3.14 (1.18)	-2.66	.008	-2.50 (1.20)	-2.08	.038

Note. Significant effects at *P* < .05 are bold-faced. Recruitment site: 0.5 = Site A and -0.5 = Site B; Treatment condition: -0.5 = Topical Lidocaine and 0.5 = CBCT.

*See Figures 1–3 for results of tests of simple slopes.

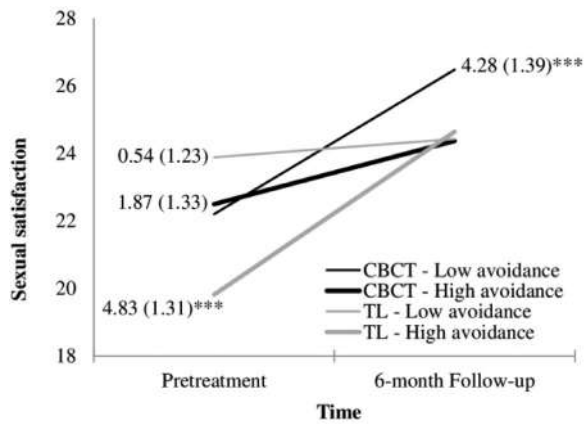


Figure 2. Interaction between time, treatment condition, and attachment avoidance on sexual satisfaction. CBCT = cognitive-behavioral couple therapy; TL = topical lidocaine. *** $P < .001$.

experienced a significant increase in sexual satisfaction between pretreatment and 6-month follow-up, whereas those with higher levels of avoidance (+ 1 SD) did not. In the lidocaine condition, women with lower levels of attachment avoidance did not experience a significant increase, whereas those with higher levels of avoidance experienced a significant increase in sexual satisfaction between pretreatment and 6-month follow-up. Attachment anxiety did not act as a significant predictor nor moderator of sexual satisfaction at post-treatment and 6-month follow-up.

Results for sexual distress are presented in Model 2 of Table 3. A significant interaction was found between time, treatment condition and attachment avoidance on sexual distress at post-treatment. As presented in Figure 3, in the CBCT condition, women with very low levels of attachment avoidance (- 2 SD) experienced a significant decrease in sexual distress between pretreatment and post-treatment, whereas women with very high levels of attachment avoidance (+2 SD) did not. In the lidocaine group, women with very high levels of avoidance (+ 2 SD) experienced a

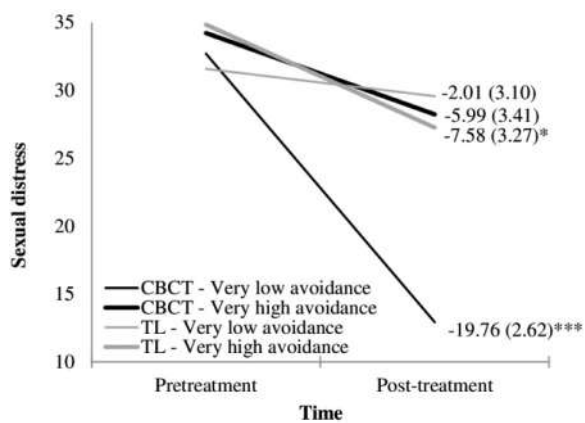


Figure 3. Interaction between time, treatment condition, and attachment avoidance on sexual distress. CBCT = cognitive-behavioral couple therapy; TL = topical lidocaine. * $P < .05$; *** $P < .001$.

significant decrease in sexual distress between pretreatment and post-treatment, while those very low levels of attachment avoidance did not. Attachment anxiety did not act as a significant predictor nor moderator of sexual distress at post-treatment and 6-month follow-up.

Results for sexual function are presented in Model 3 of Table 3. There was a significant interaction between time, attachment avoidance, and treatment condition on sexual function at both post-treatment and at 6-month follow-up. As presented in Figure 4, in the CBCT condition, women with very low levels of attachment avoidance (-2 SD) reported a significant increase in sexual function between pretreatment and post-treatment and between pretreatment and 6-month follow-up, whereas women with very high levels (+2 SD) of avoidance did not. In the lidocaine condition, women with very low levels of attachment avoidance did not experience a significant increase in sexual function at post-treatment and 6-month follow-up, whereas women with very high levels of attachment avoidance did. Attachment anxiety did not act as a significant predictor nor moderator of sexual function at post-treatment and 6-month follow-up.

Childhood Maltreatment. Results for sexual satisfaction are presented in Model 4 of Table 4. A significant interaction was observed between time, CM and treatment conditions on sexual satisfaction at 6-month follow-up. Results, reported in Figure 5, showed that in the CBCT condition, women with lower levels of CM (- 1 SD) experienced a significant increase in sexual satisfaction between pretreatment and 6-month follow-up, while those with higher levels of CM (+ 1 SD) did not. Conversely, in the lidocaine condition, women with lower levels of CM (- 1 SD) did not experience a significant increase in sexual satisfaction, while women with higher levels of CM (+ 1 SD) did.

Results for sexual distress are presented in Model 5 of Table 4 and showed that CM did not act as a significant predictor or moderator of sexual distress at post-treatment and 6-month follow-up.

Results for sexual function are presented in Model 6 of Table 4. As presented in Panel A and Panel B of Figure 6, there were significant interactions between time, CM and treatment. At both post-treatment and 6-month follow-up, women with lower levels of CM (-1 SD) randomized to CBCT and women with any level of CM randomized to lidocaine experienced a significant increase in sexual function, whereas women with higher levels of CM (+1 SD) randomized to CBCT did not.

DISCUSSION

The present study examined the role of distal developmental factors in the treatment of PVD. Results indicated that both attachment and CM acted as significant moderators of treatment outcomes, whereby women with greater attachment avoidance

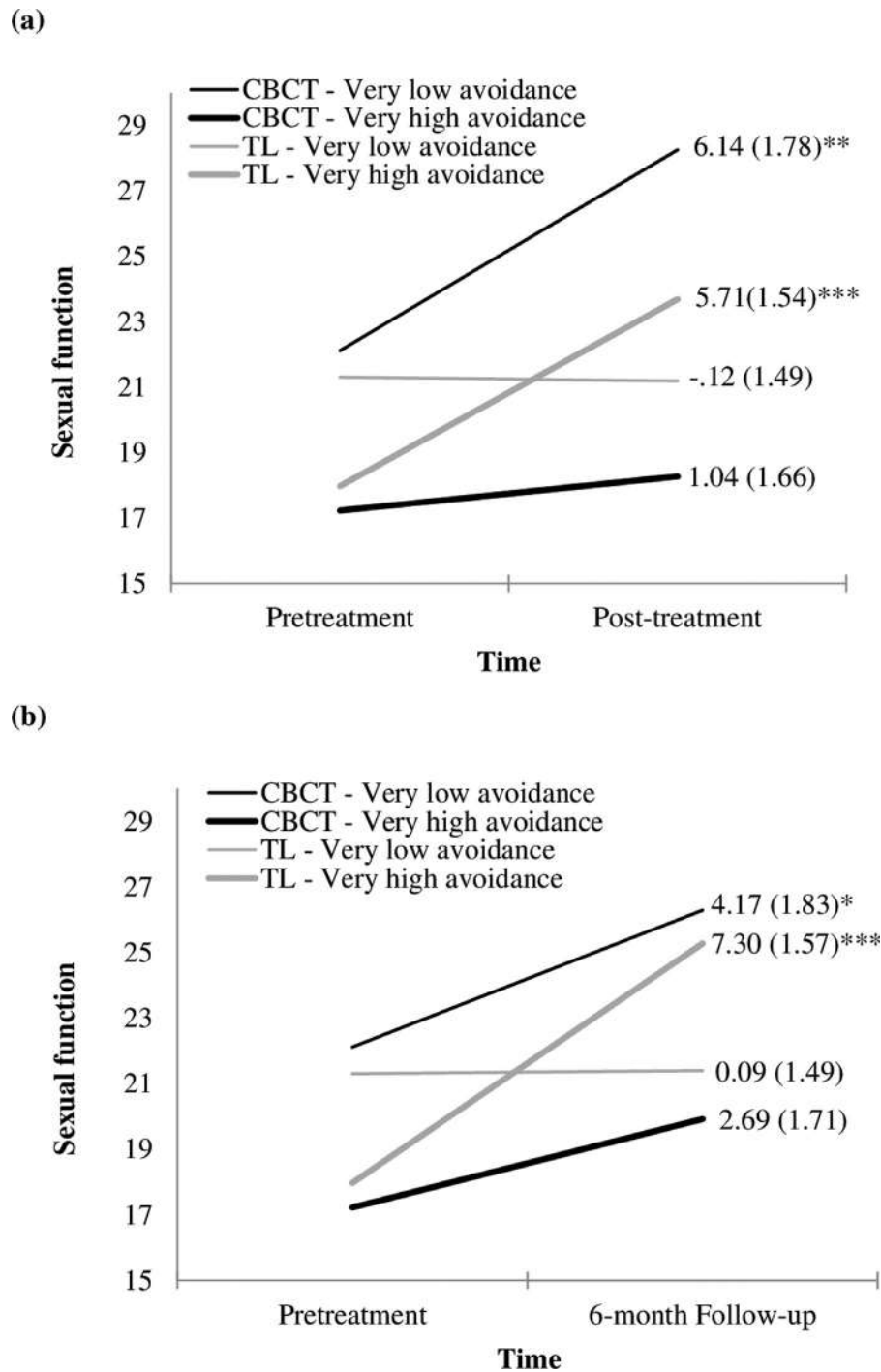


Figure 4. Interaction between time, treatment condition, and attachment avoidance on sexual function. CBCT = cognitive-behavioral couple therapy; TL = topical lidocaine. * $P < .05$; ** $P < .01$; *** $P < .001$.

or having experienced high levels of CM had poorer sexual outcomes in the CBCT condition than in the lidocaine condition. These results provide further evidence that distal interpersonal factors may influence women’s response to treatment for PVD.⁶⁸ Findings highlight that attachment and CM need to be assessed and considered in the treatment of PVD, which may help health professionals make informed recommendations.

Attachment as a Treatment Moderator

In line with our hypothesis, attachment avoidance acted as a significant treatment moderator of treatment outcome, where women with higher levels of attachment avoidance experienced poorer outcomes for sexual satisfaction at 6-month follow-up, sexual distress at post-treatment, and sexual function at both post-treatment and 6-month follow-up in the CBCT condition

Table 4. Multilevel model for the associations between childhood maltreatment and study outcomes

Model 4: Sexual Satisfaction						
Level-1	b (SE)	Z	P	b (SE)	Z	P
Intercept	22.16 (0.61)	36.28	.000			
Time (T1–T2)	4.30 (0.65)	6.66	.000			
Time (T1–T3)	2.69 (0.66)	4.07	.000			
Level-2	Effect on time T1–T2 slope			Effect on time T1–T3 slope		
Treatment condition	2.05 (1.30)	1.57	.116	0.08 (1.33)	0.06	.952
CM	0.00 (0.06)	0.08	.939	0.03 (0.06)	0.47	.640
Treatment condition × CM*	-0.18 (0.12)	-1.60	.110	-0.26 (0.12)	-2.22	.027
Model 5: Sexual distress						
Level-1	b (SE)	Z	P	b (SE)	Z	P
Intercept	33.21 (0.98)	33.94	.000			
Time (T1–T2)	-8.51 (1.12)	-7.59	.000			
Time (T1–T3)	-9.42 (1.20)	-7.83	.000			
Level-2	Effect on time T1–T2 slope			Effect on time T1–T3 slope		
Treatment condition	-7.27 (2.20)	-3.30	.001	-1.87 (2.37)	-0.79	.429
CM	0.00 (0.09)	0.05	.962	-0.06 (0.10)	-0.56	.578
Model 6: Sexual function						
Level-1	b (SE)	Z	P	b (SE)	Z	P
Intercept	19.72 (0.48)	40.97	.000			
Time (T1–T2)	3.02 (0.52)	5.79	.000			
Time (T1–T3)	3.36 (0.54)	6.23	.000			
Level-2	Effect on time T1–T2 slope			Effect on time T1–T3 slope		
Treatment condition	0.83 (1.05)	0.79	.431	-0.63 (1.09)	-0.57	.566
Childhood maltreatment	-0.05 (0.05)	-1.03	.301	0.00 (0.05)	0.03	.973
Treatment condition × CM*	-0.19 (0.09)	-2.04	.042	-0.24 (0.10)	-2.48	.013

CM = childhood maltreatment.

Note. Significant effects at $P < .05$ are bold-faced. Recruitment site: 0.5 = Site A and -0.5 = Site B; Treatment condition: -0.5 = Topical Lidocaine and 0.5 = CBCT.

*See Figures 4 and 5 for results of tests of simple effects.

compared to the lidocaine condition. These results suggest that women with a greater fear of intimacy who tend to be more self-reliant and distrusting of others have greater difficulty benefitting from couples' psychotherapy for PVD than those who are more

comfortable with emotional closeness. This result is consistent with the current literature on adult attachment suggesting that individuals with greater attachment avoidance experience poorer psychotherapeutic outcomes.¹²

Avoidant individuals tend to avoid contexts that could increase emotional proximity.⁶⁹ A few of the main goals of the present CBCT were to promote couples' relational and sexual intimacy, communication and problem-solving skills through intimate conversations and by using at home exercises to help couples increase feelings of closeness. Being encouraged to reveal one's feelings and to establish greater emotional, physical and sexual proximity with their partner might be challenging for individuals who have avoidant attachment orientations. This may in turn lead them to dismiss, and withdraw from, the therapeutic process and to subsequently benefit less from CBCT.^{20,27} This interpretation is in line with the conclusions of McBride et al (2006) positing that individuals with higher attachment avoidance might do better in less 'relationship focused' therapies, as they may be too threatening for those who regulate their attachment insecurity through the denial of relationship needs.²⁹ Also, establishing a trusting relationship with one's partner and with a therapist may take more time for women with greater attachment

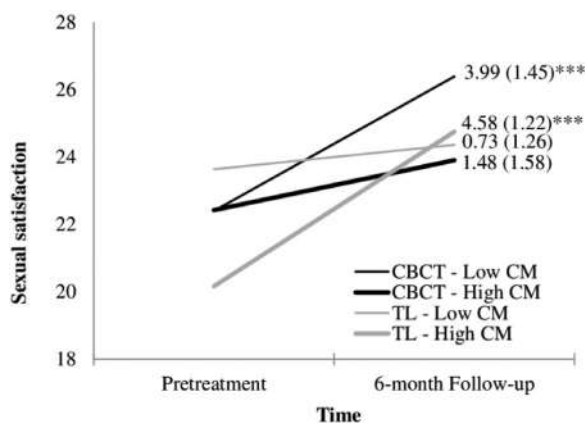


Figure 5. Interaction between time, treatment condition, and childhood maltreatment on sexual satisfaction. CBCT = cognitive-behavioral couple therapy; CM = childhood maltreatment; TL = topical lidocaine. *** $P < .001$.

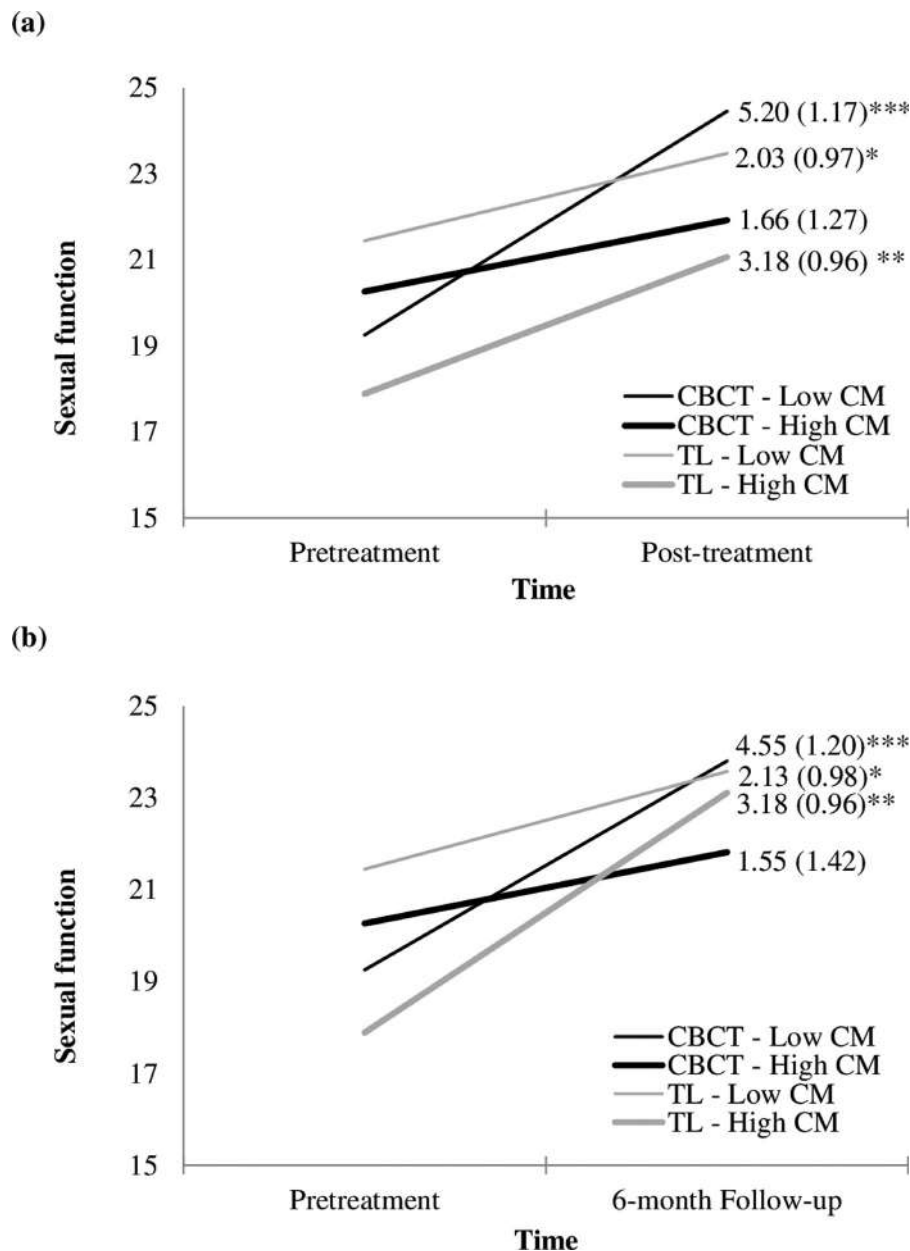


Figure 6. Interaction between time, treatment condition, and childhood maltreatment on sexual function. CBCT = cognitive-behavioral couple therapy; CM = childhood maltreatment; TL = topical lidocaine. $P < .05$; * $P < .01$; *** $P < .001$.

avoidance,⁷⁰ especially since they are less likely to seek therapy and more likely to have a more negative attitude toward therapy than secure individuals.⁷¹ Considering that the current CBCT is of short duration, twelve sessions of couple therapy may be insufficient for women with higher attachment avoidance to establish a trusting relationship with the therapist and fully engage and benefit from the therapeutic process.

Concurrently, by their strongly self-reliant nature,¹⁹ it may be easier and, incidentally, more beneficial for more avoidant women to use a medical treatment. Indeed, the use of topical lidocaine allowed them to reduce their symptomatology while minimally involving their partner, without having to disclose

much information to them and having little contact with professionals—that is, being self-sufficient in their treatment compliance. Moreover, women in the topical lidocaine condition may have felt empowered by the fact that they oversaw their own treatment, which aligns with avoidant individual’s tendency to be self-reliant. However, as the present study is the first to date to examine attachment while comparing treatment modalities, these results must be interpreted cautiously until further replication of these findings becomes available.

Interestingly, we found that attachment anxiety was neither a significant moderator nor a predictor of treatment outcome. Sexuality plays an important role in affection display and feeling

emotionally close to one's partner, especially in individuals with greater attachment anxiety.²⁰ Therefore, as both treatment conditions are oriented toward the goal of getting closer to one's partner, women with PVD with more attachment anxiety, although presenting more difficulties in emotion regulation and self-efficacy,^{21,72} may be more motivated, engaged, and compliant toward their treatment. This may lead to positive outcomes, just as in more securely attached individuals, as they strongly value their sex life. This finding may therefore be specific to either the couple's therapy context or to the treatment of sexual difficulties. As previous investigations of the role of attachment in the context of treatment yielded inconsistent results regarding attachment anxiety,²⁷ further replication of these results is needed to better understand the implication of attachment anxiety in this context.

Childhood Maltreatment as a Treatment Moderator

Mostly in line with our hypothesis, CM acted as a significant moderator of treatment outcomes, whereby individuals in the CBCT condition with higher levels of CM experienced poorer treatment outcomes for sexual satisfaction at 6-month follow-up and sexual function at both post-treatment and 6-month follow-up compared to the lidocaine condition. These results suggest that women with PVD who have experienced abuse or neglect as children may have more difficulty benefiting from short-term, sexuality-focused couple therapy than from other forms of medical treatment, such as topical lidocaine. Broadly, these results are consistent with RCTs for chronic mental health conditions which have found that CM predicted poorer response to treatment in nontrauma-focused CBT, but not in medical treatment.^{50,51}

Meta-analyses have reported that trauma-focused psychotherapy yields superior outcomes than nontrauma-focused therapy for trauma-related symptoms.^{52,73} Indeed, as was the case in the present CBCT for PVD, manualized nontrauma-focused CBT usually excludes exposure or other specific techniques that have been shown to decrease trauma-related symptoms.⁵² Moreover, individuals with a history of CM have demonstrated higher levels of emotion dysregulation and lower mentalizing abilities that impede the process and progress of couple therapy.⁷⁴ Indeed, women with a history of CM may have lacked fundamental skills that were necessary for undergoing the present couple therapy for PVD and some topics addressed or exercises prescribed during treatment may have represented important triggers of trauma-related emotions and reactions.⁷⁵ Given that CM may alter the associations with touch and the ability to experience sexual pleasure, prescribed exercises such as at-home vaginal dilation and couple sensate focus exercises may have been particularly challenging for some women reporting CM.⁷⁶ The current CBCT may have been less effective for women who have experienced CM as it was manualized and lasted only 12 sessions, which may not provide the space needed to efficiently address CM and in-treatment trauma-related reenactment and thus help women to be vulnerable in front of their partner. As previously

recommended by other researchers, incorporating an understanding of the impacts of trauma on sexuality and the couple relationship as well as affect regulation strategies to our current CBCT would represent an interesting avenue to adapt our treatment for women who reported CM.⁷⁷

Whereas nontrauma-focused CBT is usually less effective for patients reporting a CM history, medical treatment was shown to be as effective regardless of CM history in patients with irritable bowel syndrome.⁴⁹ The use of topical lidocaine in treating PVD does not require one to be vulnerable with a partner and does not address trauma-related difficulties such as communication issues, sexual assertiveness, affect dysregulation, and negative self-concept, which may be less confronting for women reporting CM and thus increase compliance with treatment. Thus, as opposed to CBCT, topical lidocaine may be effective to deal with the more objective physical component of PVD and thus increase sexual function, and over time, sexual satisfaction. Interestingly, probably due to the fact that CBCT was highly focused on pain and associated distress, CM did not act as a predictor nor a moderator of sexual distress at post-treatment and 6-month follow-up. Moreover, women randomized to the lidocaine condition with lower levels of CM experienced poorer outcomes for sexual satisfaction at 6-month follow-up compared to women in the CBCT condition. Other unexamined factors related to the development of PVD in these women without CM, such as partner support and sexual self-efficacy, might help understand why the increase in sexual satisfaction obtained with topical lidocaine was not maintained over 6 months. This surprising result should be replicated in future work before we make any recommendations based on this finding.

Strengths and Limitations

This study contributes to a scarce literature on the treatment of vulvodynia and has a number of strengths. Foremost, rigorous methodological and statistical processes were used throughout the study, such as a randomized trial design and intent-to-treat analyses, as recommended by current guidelines.⁷⁸ Also, this study is the first to examine attachment and CM as moderators in the treatment of sexual difficulties, although these variables are identified as central to sexual health and couple therapy.^{77,79} Results must however be interpreted in light of this study's limitations. The use of self-report measures may introduce retrospective or social desirability biases. Also, this study's sample was predominantly White and heterosexual, which limits the generalizability of our results to more diverse populations. Furthermore, although high internal validity plays a key role in validating novel treatments and is a strength of the present study, further studies are necessary to support the generalizability of the present results to other sexual dysfunctions. Importantly, as the current manualized CBCT compels participants to engage in more extensive levels of emotional and sexual intimacy, results may not reflect other forms of psychotherapy, such as individual or group CBT, or longer, more tailored, couples' interventions, which can address attachment and trauma-related difficulties.

Theoretical and Clinical Implications

From a theoretical perspective, this study lends support to the *Interpersonal Emotion Regulation Model* of women's sexual dysfunction by underscoring how distal interpersonal factors may influence the course of treatment for PVD.⁶⁸ As stressed by Norcross and Wampold (2011), there is a strong need to identify variables that can help clinicians make informed decisions as to which treatment modalities may be more effective for their patients.⁸⁰ The present study contributes to this matter by being the first to examine the differential impact of attachment and CM in 2 treatment conditions for sexual difficulties. From a clinical standpoint, this research captures the importance of distal interpersonal factors in the treatment of sexual difficulties as they may influence the course of treatment. Some researchers have recently been advocating for more attachment- and trauma-informed care in the treatment of chronic diseases and mental illnesses, as these variables influence individuals' physical, psychological, and social wellbeing.^{81,82} The present results support this matter where future CBCT for PVD should address attachment and trauma-related difficulties in treating PVD.

In conclusion, the present study showed that women with PVD with greater attachment insecurity and/or CM history benefited less from nontailored couples' interventions of high interpersonal nature, in the present case a CBCT for PVD, and benefited more from the application of topical lidocaine for improving their sexual wellbeing. Although the present findings should be interpreted carefully until further replication, health-care professionals should account for attachment and CM while pondering treatment modalities, as these variables have implications for the interpersonal dimensions of treatment, such as level of disclosure, help-seeking behaviors, trust, and compliance. Future studies should examine the pathways through which attachment insecurity or CM operate, for instance, through the development of the therapeutic alliance in both psychotherapeutic and medical settings, in order to better understand their implication in treatment efficacy for sexual dysfunctions.

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