

## FEMALE SEXUAL FUNCTION

## A Retrospective Case Series on Patient Satisfaction and Efficacy of Non-Surgical Lysis of Clitoral Adhesions

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## ABSTRACT

**Background:** Clitoral adhesions are characterized by adherence of preputial tissue to the glans clitoris and can be managed using a non-surgical approach in order to relieve symptoms of sexual dysfunction.

**Aim:** To evaluate efficacy and patient satisfaction associated with the non-surgical lysis procedure in order to determine if it is an appropriate treatment for symptomatic clitoral adhesions.

**Methods:** The non-surgical lysis procedure is performed by using a fine Jacobsen mosquito forceps to separate the plane between the prepuce and the glans of the clitoris, removing smegma and/or keratin pearls from underneath the adhesions and allowing for visualization of the entire glans. A chart review of 61 women that were treated for clitoral adhesions using the non-surgical lysis procedure at 1 sexual medicine practice was performed and an online survey was sent to these patients.

**Main Outcome Measures:** Encrypted survey responses were used to evaluate patient satisfaction as well as self-reported improvement in sexual functioning and pain before and after the procedure.

**Results:** 41 survey responses were received out of 61 eligible (67% response rate). A large majority reported improvement in pain (76%), sexual arousal (63%), and ability to achieve orgasm (64%) and no participants reported worsening in these symptoms. Of the 16 women that reported the inability to orgasm from external clitoral stimulation prior to the procedure, 6 (38%) were able to do so afterwards. Seventy-one percent of respondents reported improvement in their satisfaction with sex and 83% reported being satisfied with their decision to have the procedure. Ninety-three percent of participants reported that they would recommend this procedure to a friend with clitoral adhesions.

**Clinical Implications:** The results of this study will help clinicians to recognize the non-surgical lysis procedure as a treatment option for clitoral adhesions.

**Strengths & Limitations:** This study is the first of its kind assessing a cohort of patients undergoing the non-surgical lysis procedure for clitoral adhesions. Its limitations include a small sample size from 1 clinic and lack of validated instrument to evaluate sexual function and pain before and after the procedure.

**Conclusion:** Providers should regularly examine the clitoris of patients with symptoms of sexual dysfunction in order to determine if they have clitoral adhesions. The non-surgical lysis procedure may be a viable therapeutic option for these patients that has demonstrated both satisfaction and symptom relief. **Myers MC, Romanello JP, Nico E, et al. A Retrospective Case Series on Patient Satisfaction and Efficacy of Non-Surgical Lysis of Clitoral Adhesions. J Sex Med 2022;XX:XXX–XXX.**

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**Key Words:** Questionnaire; Clitoral Adhesions; Lysis Procedure; Dyspareunia; Anorgasmia; Female Sexual Dysfunction

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## INTRODUCTION

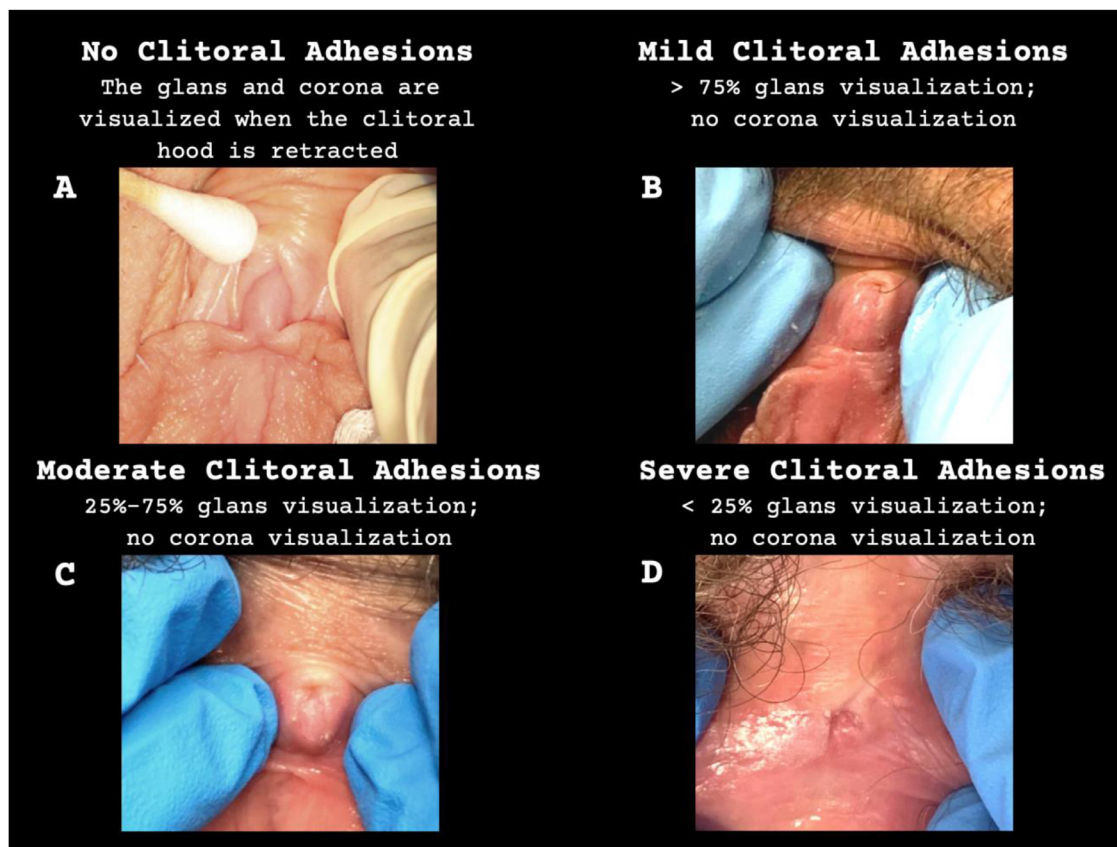
Clitoral adhesions occur when the clitoral hood (prepuce) adheres to the glans clitoris. The severity of phimosis is categorized based on the proportion of the surface of the glans exposed, without full corona visualization (Figure 1).<sup>1</sup> The corona is a ridge of tissue between the glans and the clitoral body that is found under the prepuce and can be obscured by adhesions (Figure 2). When clitoral adhesions are present, the closed compartment of space under the prepuce can lead to the accumulation of squamous cells and smegma, irritation, erythema, and/or infection.<sup>2</sup> Symptoms of clitoral adhesions include discomfort or pain of the clitoris, clitoral hypersensitivity or hyposensitivity, difficulty with arousal, and muted or absent orgasm.<sup>1</sup>

Clitoral adhesions have been associated with a history of dyspareunia, yeast infection, urinary tract infection (UTI), lichen sclerosus (LS), blunt perineal or genital trauma, decreased free testosterone, menopause, long-term oral contraceptive use, and other sexual dysfunctions including persistent genital arousal disorder/genitopelvic dysesthesia (PGAD/GPD),<sup>1</sup> which is characterized by distressing genital arousal that is not associated with concomitant sexual interest or thoughts. Patients can be screened for clitoral adhesions on physical exam by retracting the prepuce to expose

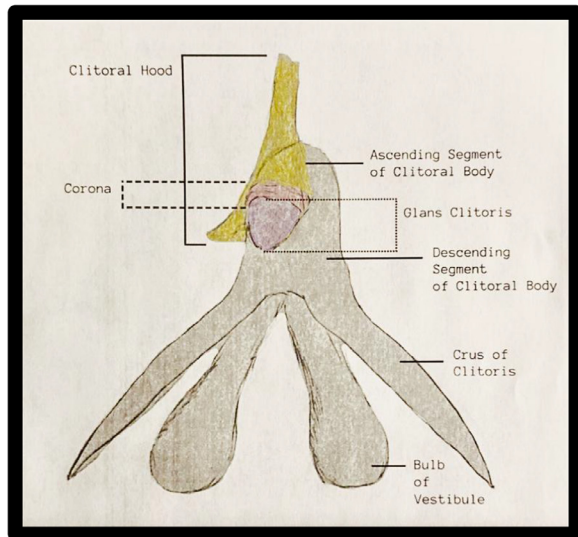
the entire glans and corona. Previous studies found that the prevalence of clitoral adhesions was 33% in a group of 589 college students undergoing routine examination, and 22% in a group of 614 patients presenting to a sexual medicine clinic.<sup>3,4</sup>

There are both surgical and non-surgical interventions to manage clitoral adhesions. Surgical management of clitoral adhesions has been described as early as 1975; however, earlier studies did not assess efficacy and patient satisfaction.<sup>5-7</sup> In 1975, Kramarosky and Manriquez first described hoodoplasty for clitoral adhesions in which the prepuce was separated from the glans followed by trimming of the prepuce.<sup>5</sup> This technique has the potential to cause significant complications, including neurosensory loss which manifests as clitoral numbness.<sup>6</sup>

More recently, studies on the management of clitoral adhesions have assessed efficacy and/or patient satisfaction, but only in the setting of a surgical lysis procedure and exclusively in patients who also had LS.<sup>2,8,9</sup> LS is a chronic, inflammatory dermatosis in the anogenital region typically found in pre-pubertal or postmenopausal women that causes skin thinning, whitening, wrinkling, itching, and pain (Figure 3).<sup>9</sup> Although LS is an important etiology of clitoral adhesions, they can also occur in women without LS. Additionally, there have been no published



**Figure 1.** Panel A shows a clitoris without adhesions<sup>1</sup>. Panels B, C, and D show adhesions of increasing severity that were collected from patient charts.



**Figure 2.** The anatomy of the clitoris, highlighting the relationship between the glans clitoris, corona, clitoral body, and clitoral hood.

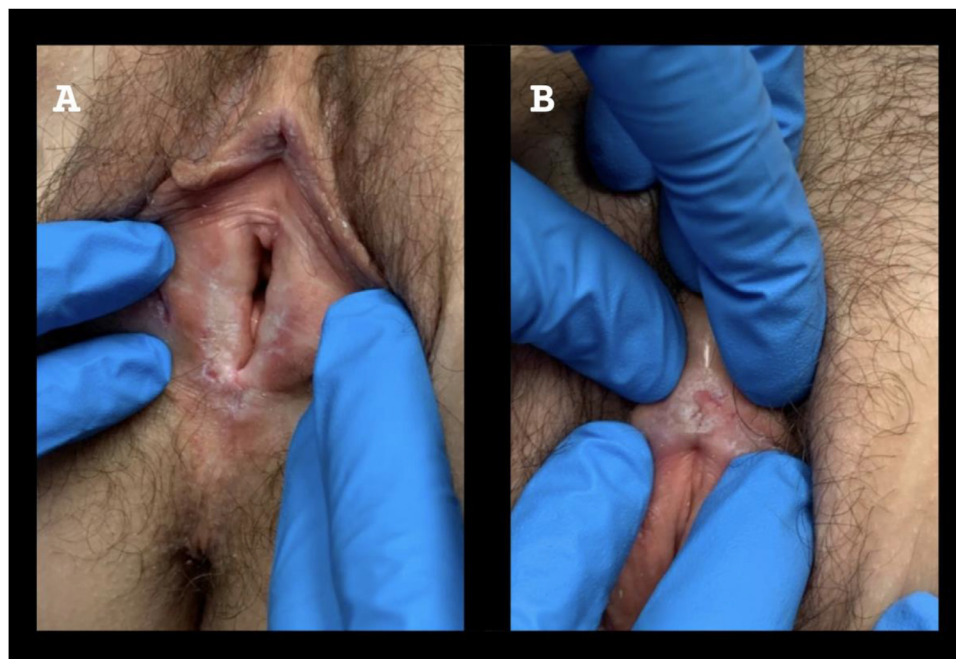
studies to date that have addressed efficacy and patient satisfaction for the non-surgical lysis of clitoral adhesions. If effective, non-surgical procedures are ideal as they are able to be performed in the office and are less invasive, painful, costly, and time-consuming both during the procedure and in recovery. This study aims to evaluate patient satisfaction and improvement in symptoms after the non-surgical lysis procedure which may be an additional tool in the management of sexual dysfunction associated with clitoral adhesions.

## MATERIALS AND METHODS

This is a retrospective cohort study of women who underwent a non-surgical lysis of clitoral adhesions procedure, performed by 1 physician who specializes in urology and sexual medicine. All patients presented with a complaint of sexual dysfunction that was determined to be related to clitoral adhesions found on systematic vulvar exam. During this examination, the prepuce was retracted and clitoral adhesions were evaluated as absent, mild, moderate, or severe as outlined in [Figure 1](#). Once diagnosed, patients were presented with conservative management options (which included retraction of the clitoral hood and/or topical agents consisting of local hormone, steroids, antifungals, or petroleum jelly) or the lysis procedure. Consent was obtained from all patients who underwent the non-surgical lysis procedure.

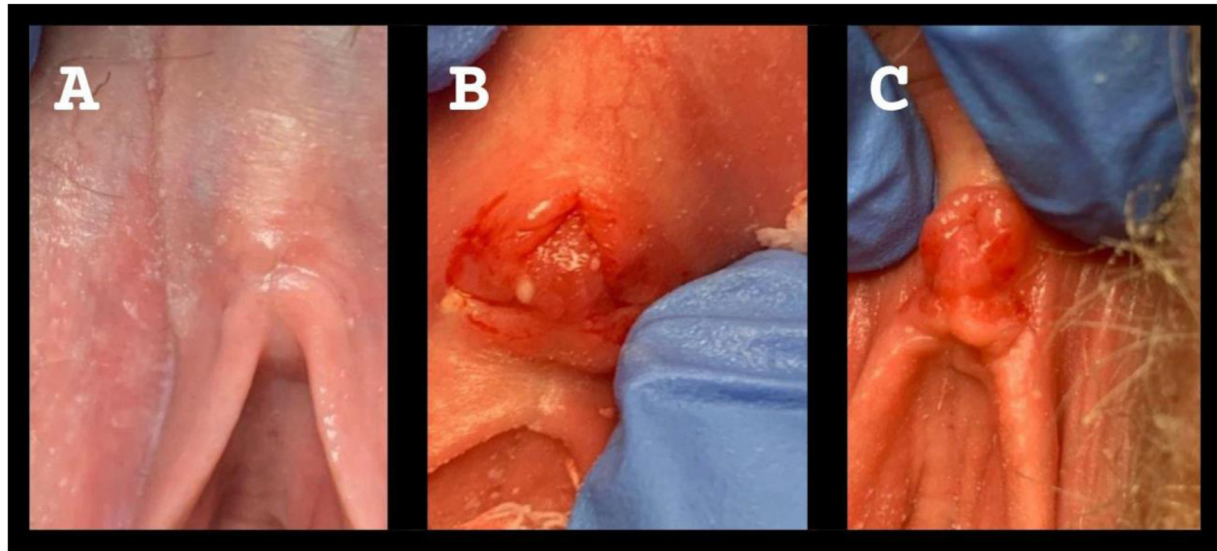
To perform this procedure, a topical local anesthetic is applied or a nerve block is performed on the dorsal nerve of the clitoris. A fine Jacobsen mosquito forceps can be used to separate the plane between the prepuce and the glans, removing smegma and/or keratin pearls from underneath the adhesions and allowing for visualization of the entire glans ([Figures 4 and 5](#)).<sup>1</sup> Following the procedure, patients were instructed to pull back the prepuce at least once daily and/or apply topical agents consisting of local hormone, steroids, antifungals, or petroleum jelly to the area in order to prevent recurrence.

All patients that met the study criteria ([Figure 6](#)) were included in the chart review, identified by their medical record, and assigned non-identifiable codes that were associated with data collected from medical charts. Information obtained during



**Figure 3.** Panel A shows a vulva with LS and clitoral adhesions. Panel B highlights severe clitoral adhesions.



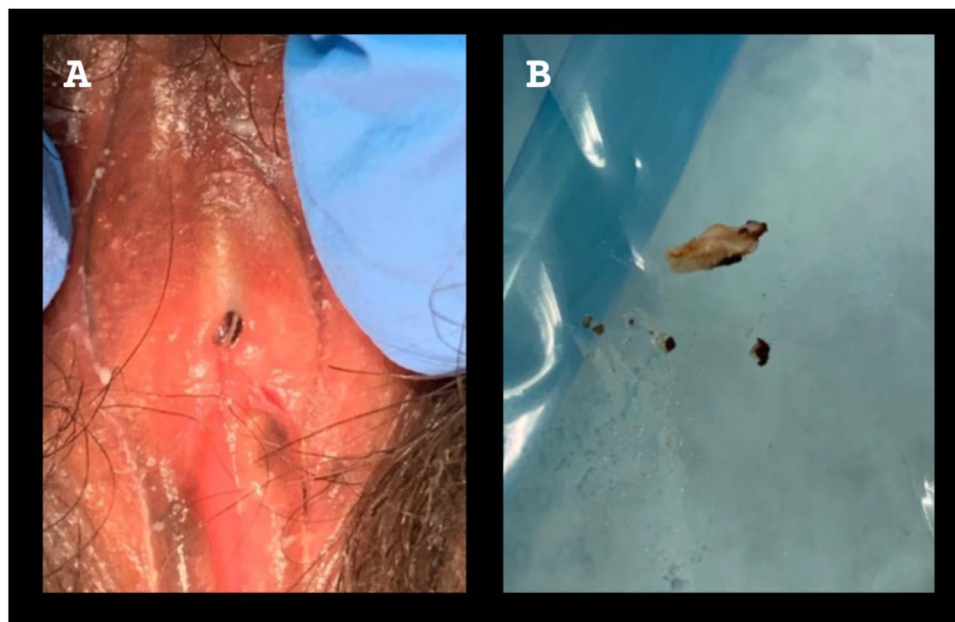


**Figure 4.** Panel A shows a clitoris with severe clitoral adhesions. Panel B shows keratin pearls found under the clitoral hood during the lysis procedure. Panel C shows the glans clitoris and corona clearly visualized after the lysis procedure with underlying balanitis.

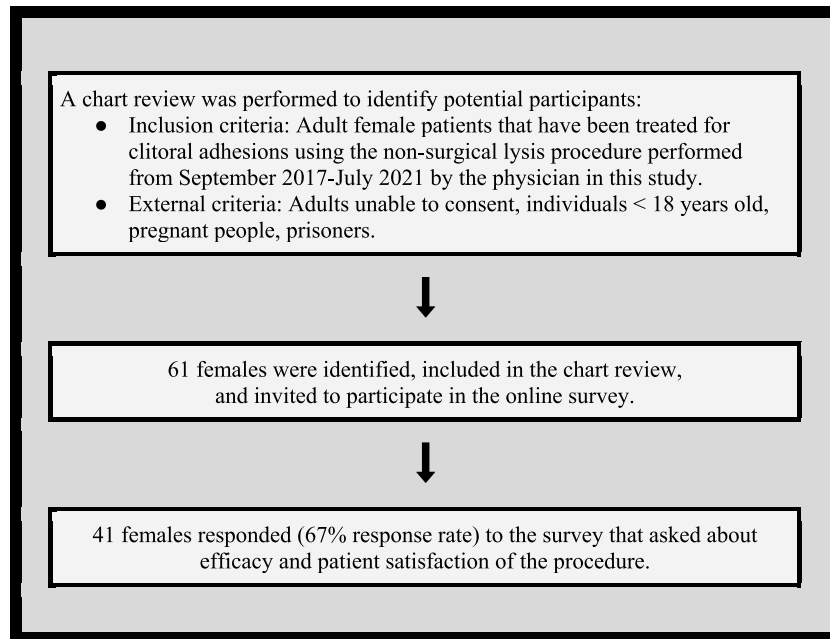
the chart review included the severity of adhesions at the time of diagnosis, age at first visit, and medical history.

The 61 women included in the chart review were contacted by the physician via secure message and given information about the research study aims and how to access the voluntary electronic survey. Responses were only associated with the same unidentifiable codes used in the chart review. The survey included questions about medical history, symptoms of adhesions, duration of symptoms, and previous treatment prior to the procedure, and was pilot tested in advance by a few voluntary

patients. Participants also reported how specific parameters of their sexual functioning changed after the procedure and answered questions about the procedure itself, their recovery, recurrence, and their satisfaction with the procedure. Respondents that reported pain as a symptom answered questions about how their pain changed after the procedure. They also selected 1 or more sensory descriptors of their pain before and after the procedure from the following: sharp/lacerating, pinching/crushing, tugging/wrenching, hot/searing, tingling/stinging, dull/heavy, and tender/splitting.



**Figure 5.** Panel A shows a severe adhesion. Panel B shows smegma removed from underneath an adhesion during the lysis procedure.



**Figure 6.** Study participant criteria, identification, and responses.

Descriptive statistics based on demographics were used to describe the patient population and their symptoms. Calculations were not powered given this was a convenient sample with the goal of describing outcomes after the procedure rather than comparing 2 different groups. The study was approved by the [anonymized] Institutional Review Board (IRB ID: STUDY00003994) and electronic informed consent from survey participants was obtained.

## RESULTS

### Chart Review

Sixty-one women underwent a non-surgical lysis procedure and therefore met the criteria for chart review. The average age of participants at their first appointment was 41 years. All patients were symptomatic and presented with 1 or more of the following: discomfort or pain of the clitoris, clitoral hypersensitivity or hyposensitivity, difficulty with arousal, and muted or absent orgasm. The medical demographics of the participants are summarized in [Table 1](#).

### Survey Results

The survey was sent to all 61 women identified in the chart review and 41 responses were received (67% response rate). The medical demographics of the survey respondents are summarized in [Table 2](#).

**Symptoms and Diagnosis.** Participants reported their symptoms of clitoral adhesions before undergoing the lysis procedure: discomfort (54%), clitoral hyposensation (51%), pain (39%), and redness/swelling (22%). Among the 16 women that reported pain as a symptom prior to the procedure, pain was reported during: sexual activity (75%), other activities (63%), and constantly (13%). Eighty-two percent of participants experienced symptoms for more than 1 year before undergoing the lysis procedure and 67% experienced symptoms for more than 2 years. Only 24% of participants had been diagnosed with clitoral adhesions prior to assessment by the physician in this study. Before undergoing the lysis procedure, a subset of patients attempted to manage their clitoral adhesions using the following modalities: retraction of the clitoral hood (24%), hormone cream (17%), steroid cream (17%), antifungal cream (5%) and petroleum jelly

**Table 1.** Medical demographics of the 61 women that were included in the chart review.

Number and percentage of participants with a history of:	Pelvic floor and/or sexual dysfunction	53 (87%)
	Provoked vestibulodynia	23 (38%)
	Dyspareunia	8 (13%)
	Hypoactive sexual desire disorder/low libido	14 (23%)
	Back pain or spinal pathology (herniated disc, scoliosis, syring, degenerative sacroiliac joints)	26 (43%)
	Urinary frequency, urgency, or leakage	32 (52%)

**Table 2.** Medical demographics of the 41 women who responded to the study survey.

Number and percentage of participants that reported:	Being menopausal	7 (17%)
	History of hormonal birth control use	30 (73%)
	History of UTIs	24 (59%)
	History of yeast infections	23 (56%)
	Diagnosis of lichen sclerosus	5 (12%)
	History of blunt perineal/genital trauma	1 (2%)
	Diagnosis of endometriosis	2 (5%)
	Diagnosis of persistent genital arousal syndrome/genitopelvic dysesthesia (PGAD/GPD)	4 (10%)
	Diagnosis of vulvodynia/vestibulodynia	18 (44%)
	Diagnosis of depression	15 (37%)
	Diagnosis of anxiety	15 (37%)

(5%). Sixty-one percent of participants underwent the non-surgical lysis procedure as their first attempt at treatment.

**Procedure and Recovery.** Seventy-six percent of respondents underwent 1 lysis procedure, 22% had 2 procedures, and 2% had 3 procedures. The indication for repeated procedures was recurrence of symptoms and the findings of readherence on exam. Twenty-seven percent of respondents reported that the procedure was painful, and 54% reported that recovery from the procedure was painful. Eighty percent of respondents reported they could have comfortable physical/sexual stimulation within 1 month of the procedure, and 31% reported that it took 1 week or less.

**Pain.** While only 16 women reported pain as a symptom of their clitoral adhesions, when asked how their pain changed with the procedure, 25 women responded as if they experienced pain associated with clitoral adhesions. Among these responses, 76% reported improvement in their pain after the procedure and no participants reported worsening in their pain (Table 3, Section A). Twenty-one women provided descriptors of their pain prior to the lysis procedure and 16 women provided descriptors of their pain afterwards. Both before and after the procedure, the pain was most commonly described as tender/splitting, followed by sharp/lacerating, and tingling/stinging, suggesting that the procedure did not change the quality of the pain associated with clitoral adhesions but reduced its severity.

**Sexual Functioning.** Sixty-four percent of respondents reported improvement in their ability to orgasm and 63% reported improvement in their sexual arousal after the procedure (Table 3, Sections B and C). No participants reported worsening in their ability to achieve orgasm or their sexual arousal. Seventy-one percent of participants reported improvement in their satisfaction with sex (Table 3, Section D). In addition, all 24 women that reported the ability to orgasm from external clitoral stimulation prior to the procedure maintained this ability afterwards. Of

the 16 women that could not orgasm from external clitoral stimulation before the procedure, 6 (38%) gained this ability afterwards. Unfortunately, 3 of these 6 women did report losing this ability over time.

**Patient Satisfaction.** Eighty-three percent of respondents were satisfied with their decision to have the procedure (Table 3, Panel E) and 93% reported they would recommend the procedure to a friend with clitoral adhesions. Voluntary comments on the procedure were collected in Figure 7.

**Recurrence.** Forty-six percent of respondents reported recurrence of adhesions, 44% reported no recurrence, and 10% were unsure. Only 12 of the 19 women who reported recurrence indicated when it occurred: 1–3 months (17%), 3–6 months (42%), 6–12 months (33%), and 1–2 years (8%) after the procedure. A subset of patients attempted to prevent recurrence after the procedure using the following modalities: retraction of the clitoral hood (80%), steroid cream (24%), hormone cream (22%), petroleum jelly (22%), and antifungal cream (7%). There was no association between the incidence of recurrence and the use of any of these treatments.

**Lichen Sclerosus.** Clitoral adhesions are often associated with LS.<sup>2,8,9</sup> Five survey respondents (12%) reported a diagnosis of LS; however, only 3 women were confirmed to have diagnosed LS during the chart review. These women were also confirmed to have been optimally treated with high-potency steroids prior to the procedure. The outcomes reported by women with and without confirmed LS include: improvement in ability to orgasm (100% vs 58%), improvement in satisfaction with sex (100% vs 68%), improvement in sexual arousal (100% vs 58%), satisfaction with the procedure (100% vs 81%), proportion that would recommend the procedure to a friend (100% vs 92%), proportion that reported procedural pain (0% vs 29%), and proportion that reported recurrence of adhesions (33% vs 47%). Of note, this study was not powered to assess a difference between these groups.

**Table 3.** Summary of main parameters on the efficacy of and satisfaction with the procedure from study survey.

Change in vulvar (including clitoral) pain after procedure	Number and percentage of respondents	Change in ability to achieve orgasm after procedure	Number and percentage of respondents
Overall Improvement	19 (76%)	Overall Improvement	25 (64%)
Significant Improvement	11 (44%)	Significant Improvement	10 (26%)
Moderate Improvement	7 (28%)	Moderate Improvement	7 (18%)
Slight Improvement	1 (4%)	Slight Improvement	8 (21%)
No Change	6 (24%)	No Change	14 (36%)
Worsened	0 (0%)	Worsened	0 (0%)
Total	25 (100%)	Total	39 (100%)
Change in Ability to Become Sexually Aroused after Procedure	Number and Percentage of Respondents	Change in Satisfaction with Sex after Procedure	Number and Percentage of Respondents
Overall Improvement	25 (63%)	Overall Improvement	29 (71%)
Significant Improvement	10 (25%)	Significant Improvement	11 (27%)
Moderate Improvement	10 (25%)	Moderate Improvement	7 (17%)
Slight Improvement	5 (13%)	Slight Improvement	11 (27%)
No Change	15 (38%)	No Change	11 (27%)
Worsened	0 (0%)	Worsened	1 (2.4%)
Total	40 (100%)	Total	41 (100%)
Satisfaction with Decision to have Procedure	Number and Percentage of Respondents		
Overall Satisfied	33 (83%)		
Extremely Satisfied	26 (65%)		
Mostly Satisfied	7 (18%)		
Indifferent	5 (13%)		
Mostly Unsatisfied	2 (5%)		
Extremely Unsatisfied	0 (0%)		
Total	40 (100%)		

**Participant Reflections on the Lysis Procedure**

"I had no idea about the clitoris before meeting [this doctor] and I believe this needs to change so women are able to better understand their bodies."

"The procedure gave me more sexual confidence and freedom as well as greater understanding of my genital anatomy."

"It's critical that women are educated to ask for this examination and for physicians to educate their patients about it."

"It was painless, so easy to recover and an absolute GAME CHANGER for me. I was extremely grateful to receive this."

"It has improved my life and I am relieved it could be treated. I hope other women who have this problem have access to the same treatment."

"It improved my quality of life by helping me understand my body better and led to other forms of sexual exploration and satisfaction because of this."

"This is also something no one talks about - it's embarrassing - which means that the numbers of undiagnosed cannot even be estimated."

"I had external symptoms, but [other] doctors kept swabbing and looking at the vagina."

"After the procedure, I spoke to my two older sisters. Neither of them had ever heard of the adhesions and when they asked their doctors, neither were able to diagnose if my sisters had the same issue. I had been trying to understand my pain for over 10 years by the time [this doctor] officially diagnosed and treated me."

**Figure 7.** Participant reflections on the lysis procedure that were collected at the end of the survey.

## DISCUSSION

The current study demonstrated improvement in pain and sexual functioning as well as high patient satisfaction with the non-surgical lysis procedure among the 41 participants; 76% reported improvement in pain, 63% reported improvement in sexual arousal, and 71% reported improvement in satisfaction with sex. The non-surgical lysis procedure may especially benefit women who report muted or absent orgasm associated with clitoral adhesions. The procedure demonstrated success in improving the ability to orgasm in 64% of respondents. Of the 16 women that were unable to orgasm from external clitoral stimulation prior to the procedure, 6 gained this ability afterwards. Although 3 of these 6 women did report losing this ability over time, 5 women were still extremely satisfied with their decision to have the procedure and all 6 women would recommend it to a friend with clitoral adhesions. Additionally, 83% of participants reported satisfaction with their decision to have the procedure and 93% reported they would recommend the procedure to a friend with clitoral adhesions. Given these findings, we believe the non-surgical lysis procedure should be included in the discussion of therapeutic options for women with clitoral/vulvar pain and sexual dysfunction associated with clitoral adhesions.

This study demonstrates high patient satisfaction and improvement in sexual functioning after the non-surgical lysis procedure for clitoral adhesions in women with and without LS. While previous research has focused on clitoral adhesions in women with LS, only 12% of women in our study reported a concomitant diagnosis of LS. Clitoral adhesions should not be considered solely as an adjunct side-effect of LS, but rather as an independent pathology. Physicians should examine the clitoris in women with and without LS to determine if clitoral adhesions are present. In this small series we found that this procedure resulted in similar improvement in sexual arousal (100% vs 58%), ability to orgasm (100% vs 58%), satisfaction with sex (100% vs 68%) and has similar rates of patient satisfaction (100% vs 81%) between women with and without LS. The non-surgical lysis procedure can thus be considered as a therapeutic option for women with and without LS and further research on the efficacy of treatments for clitoral adhesions in all women is needed.

Among the participants who completed the survey, 46% reported recurrence of adhesions and 10% were unsure whether they had experienced recurrence. Patients are often instructed to retract the clitoral hood and use steroid cream, hormone cream, antifungal cream, or petroleum jelly to prevent readherence after the procedure. Among participants, there was no difference in these practices between patients with and without recurrence. Future studies are needed to determine which of these modalities are effective in managing adhesions and/or preventing recurrence.

Strengths of this study include that it is the first study to explore the efficacy and satisfaction with the non-surgical lysis procedure for clitoral adhesions in contrast with the surgical procedure. Additionally, while previous research on the surgical lysis

procedure included only women with LS, this study included all women treated for clitoral adhesions using the non-surgical procedure. As well, this study included more participants than any other reported study on clitoral adhesions. An additional strength of the study is consistent procedural technique as all procedures were done by a single high volume surgeon. Lastly, the survey component of the study received a high patient response rate (67%).

Limitations of this study include the lack of a validated measure to assess sexual function, such as the Female Sexual Function Index (FSFI). The FSFI requires respondents to have participated in sexual activity in the past 4 weeks and is limited to penetrative sex. We did not believe there was a validated scale for clitoral causes of sexual dysfunction, as would be indicated in this particular condition. Additionally, a validated pain scale was not used to assess pain associated with clitoral adhesions because our study sought to characterize the change in pain after the procedure. We believed that qualitative reports of how participants' pain changed provided more information regarding the magnitude of improvement in pain than numerical pain ratings would provide. As well, while our study is the largest reported case series on clitoral adhesions, the sample size remains relatively small with all procedures performed by a single physician. Given the simplicity of the procedure, it is unlikely there would be significant variation across providers. Further research is needed to directly compare efficacy and patient satisfaction between providers and with the non-surgical lysis and other treatments.

## CONCLUSION

This case series demonstrated that the non-surgical lysis of adhesions was well tolerated and overall successful in improving pain and sexual functioning associated with clitoral adhesions. Although these results suggest that the non-surgical lysis procedure could be recognized as a treatment option for pain and sexual dysfunction associated with clitoral adhesions, there are currently limited diagnosis codes (ICD codes) for clitoral adhesions and no procedure codes (CPT codes) for the lysis of clitoral adhesions. The lack of proper codes creates a barrier to the diagnosis and treatment of this condition. Proper codes support the importance and medical necessity for performing the lysis procedure and would help communicate a patient's diagnosis to other healthcare providers, insurance payers, and data registries.

Examination of the clitoris for adhesions is often overlooked. All participants in our study felt that physicians should be trained to examine the clitoris for adhesions and to routinely do so in their practice of medicine. Unfortunately, medical school and residency training on the anatomy of the clitoris and its pathologies is lacking. As gynecologists and urologists perform the majority of pelvic exams, increased training in these programs on the examination of the clitoris during routine pelvic examination may allow patients to have increased access to diagnosis and care of clitoral pathologies, including adhesions. Urologists may be uniquely



positioned to incorporate the management of clitoral adhesions into their practice, as they are already trained to manage male preputial disorders, including penile phimosis. This study provides evidence that a knowledge of clitoral anatomy and a simple procedure may benefit patients affected by clitoral adhesions.

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*Conflict of Interest:* RSR has consulted for Sprout Pharmaceuticals and Absorption Pharmaceuticals and has received grants/research support from IPSEN and Abbvie, Inc.

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## STATEMENT OF AUTHORSHIP

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