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Application of Sex Aids in Men With Sexual Dysfunction: A Review

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Abstract

Background: Although sex aids have been used in clinical practice for ages, the scientific literature assessing their application in men with sexual dysfunction is limited.

Aim: To summarize medical literature regarding scientific uses of the most common sex aids in men with sexual dysfunction and assess their clinical applicability.

Methods: An extensive literature review was performed with regard to the use of sex aids in Sexual Medicine. Our search included journal articles, books and guidelines in different databases: Embase, Pubmed, and Cochrane. The key words were: “sex aids”, “sex toys”, “pornography”, “lubricants”, “constriction bands”, “dildos”, “vibrators” “vacuum devices”, “external penile devices”, and “sex swings” were searched. Date of last search was December 4th 2018.

Outcomes: To assess the utility of sex aids in men with sexual dysfunction and formulate recommendations for clinicians.

Results: Various sex aids are available for men with sexual dysfunction. We present a comprehensive review of the most common sex aids currently available: pornography, lubricants, constriction bands, dildos, vibrators, vacuum devices, external erectile support devices, and aids to positioning. We discuss their indications, outcomes, precautions, and complications.

Clinical implications: This review is intended to provide sexual medicine practitioners and academics an overview of sex aids for men with sexual dysfunction for use in both clinical practice and research.

Strengths & Limitations: This is a compilation of scientific data for a topic that has broad application in sexual medicine and yet has been poorly addressed in the scientific literature.

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Because the lack of sufficient data and the heterogeneous nature of different sex aids, a systematic review could not be performed.

Conclusion: Having a comprehensive understanding of the sexual dynamics of individuals and couples combined with the appropriate integration of sex aids may have a positive effect in the treatment of male sexual dysfunctions.

Keywords

Sex aids; Lubricants; Constriction Bands; Dildos; Vacuum Device; Vibrators; Pornography; Erectile Dysfunction; Orgasmic Disorder

INTRODUCTION

The concept of sex aids is very broad, and, judging from the literature on this topic, their medical utility varies greatly. Frequently, but not exclusively, referred to as sex toys, the term sex aids refers to an object or device that is primarily used to facilitate human sexual pleasure. The first attempts to enhance sexual activities through the use of an object date from more than 30,000 years ago where archeologists unearthed a piece of a stone tool which, according to some authors, may have been a sex aid due to its phallic shape, size and smooth surface. (1) There are reports suggesting the use of olive oil as a sexual lubricant from around 350 BC (2). Moreover, one of the first treatment options for erectile dysfunction (ED) was detailed in the Kama Sutra in India around 300 AD, detailing dildos and penis extensions made of wood or reeds tied to the waist (2).

Despite this long history, the development and global use of sex aids have had their restrictions within the boundaries of the law. For example, until recently, many states in the United States banned the sale of sex toys completely (3), while other jurisdictions still prohibit sex shops and the merchandise they sell. Countries like the Maldives, Saudi Arabia, United Arab Emirates, Vietnam, Thailand, and Malaysia prohibit the commercialization and the possession of sex toys, as they are considered obscene. Recently Tanzania banned the sale of lubricants because it was thought to encourage homosexuality (4). Perhaps for reasons like these, the use of sex aids is not well accepted by many individuals, including healthcare professionals, which preclude more generalized use in populations that might benefit from it. Despite these controversies, sex aids and lubricants have become increasingly available in major commercial outlets or through the Internet (5). Indeed, even the Food and Drug Administration (FDA) has cleared devices commonly referred to as sex toys for medical treatments.

According to the World Health Organization and the Declaration of Sexual Rights by the World Association for Sexual Health adopted by international assemblies such as the United Nations, sexual pleasure is a human right (6). As sex aids are considered tools to help individuals achieve sexual pleasure, they can be particularly helpful in the context of sexual dysfunction. Sexual dysfunction can result from a complex interaction of organic, psychogenic, and contextual factors resulting in unsatisfactory sexual function for the patient or a couple (7). Understanding a patient's sexual dysfunction requires an understanding of the patient's sexual, medical, and psychosocial history. Patients should be treated with

a multidisciplinary approach to management, and some may benefit from the use of sex aids, helping in the achievement of a universal right in the context of sexuality and sexual relationships (5, 8). Sexual concerns of patients without diagnostic criteria for a specific sexual dysfunction might also be addressed with the correct counseling of the appropriate sex aid.

Sexual dysfunctions are prevalent in the male population with a negative impact on quality of life and satisfaction with sex life (9). Those dysfunctions usually include different aspects of male sexuality such as low sexual desire, ED, and ejaculation/orgasm disorders. Sexual medicine practitioners should be familiar with sex aids and their indications in the male population. The purpose of this article is to review the medical literature regarding the indications and outcomes of the use of the most common sex aids in men with sexual dysfunction.

METHODS

An extensive literature review was performed with regard to the use of sex aids in Sexual Medicine. Our search included journal articles, books and guidelines in different databases: Embase, Pubmed, and Cochrane. No time limit was pre-established for our search and only articles written in English were selected to be included in this review.

We opted to search for keywords terms, including: “sex aids”, “sex toys”, “pornography”, “lubricants”, “constriction bands”, “dildos”, “vibrators” “vacuum devices”, “external penile devices”, “aids to positioning”, “sex swings”, and “wedges” (Figure 1). Date of last search was December 4th 2018. From all the references retrieved, we chose those references with relevant content related to these topics.

RESULTS

Pornography

Originally, the term pornography refers to the writings about or depictions of prostitutes. The term derives from the Greek word *pornographos*, which again derives from the Greek words *pórne*, meaning “whore”, and *graphein* meaning “to write” (10–12). According to Diamond, the most common definition of pornography used by researchers and in the US courts today is: “media basically construed as intended to entertain or arouse erotic desire” (13).

Pornography focuses on physical sexuality, so as to arouse quick intense reactions (14, 15). This may also be highlighted by the presence of submission or unequal power relationships by differential dress, costuming, or positioning. A distinction has also been made between non-violent and violent pornography, regarding the portrayal of explicit violence of varying degrees that are perpetrated against one individual by others. (15)

Cross-cultural research shows that pornography is widely used, and utilization rates vary from 50–99% amongst men and 30–86% amongst women subject to age and culture (16–18). Compared to women, men have been found to spend more time watching pornography and to watch it more frequently, be exposed at a younger age, and use it more often

during masturbation. Furthermore, men have been found to be more attracted to both a wider range of hardcore pornography and pornography devoid of relationship context and emotional attachments as compared to women (18). Recent literature has shown that men who self-reported more pornography usage had increased sexual arousal to the standardized pornography materials and stronger desire for partnered sexual activity and masturbation (19).

Indications and Usage—For both partner-based and masturbation activity, pornography is often used as a means of sexual enhancement, arousal, or inspiration in order to explore sexual preferences including sexual orientation or learning new sexual techniques (20–22). Moreover, pornography may be used out of simple curiosity or out of habit for some men. It can be used in the treatment of sexual dysfunctions such as problems with desire, arousal, orgasm, erectile function, and pain disorders because it may help in evoking sexual fantasies, increasing sexual arousal, inducing and/or maintaining erections, or diverting attention from sensations of pain or distractions (18). In the setting of counseling and therapy, pornography may also be used to increase sexual awareness and sexual self acknowledgement, and to enhance sexual feelings, sexual inspiration, and sexual communication (23). Wylie and Pacey have made a convincing argument that pornography may also be used in fertility services for the production of semen samples (14). For these reasons, many clinics maintain a collection of pornographic materials that are regularly used by men and women with sexual health problems as an adjunct to diagnostic testing in the form of audiovisual sexual stimulation (AVSS) (14).

Outcomes—Through complex stimulation in different areas of the brain, pornography is usually very effective in inducing a sexual response in men without sexual dysfunction. In contrast it has been demonstrated that men with hypoactive sexual desire disorder (HSDD) have less activation of certain cerebral connections and are less responsive to audiovisual stimuli (24). An observational study that investigated 71 men with either HSDD or ED demonstrated that these individuals had lower arousal levels when watching pornography compared to men without either HSDD or ED (25). However, there is no published data regarding the efficacy of pornography in the treatment of HSDD or ED.

In the setting of male infertility, it has been postulated that AVSS might improve semen quality for the purpose of assisted reproductive techniques. Despite the fact the AVSS may facilitate semen sample collection, there is no data to support that it improves semen parameters or outcomes in fertility clinics (26, 27).

Precautions and Complications—There is some ideological controversy regarding the use of pornography leading to sexual dysfunctions. Landripet *et al* reported that there was little evidence, if any, of the association between pornography use and male sexual dysfunction (28). A review of clinical case reports has suggested, but not demonstrated, that some patterns of porn consumption may generate arousal, attraction, and sexual performance problems (29). We agree that abuse of pornography may be comorbid with some sexual dysfunctions, but current data do not allow to establish a cause-effect relationship.

However, for both partner-based and masturbatory activity, as well as in clinical practice, it remains crucial that one respects and is aware of personal boundaries, relational and contextual issues, individual backgrounds, and cultural traditions. In addition, it is critical to avoid compliance pressure, to be aware of social desirability responses, and to understand that appropriate person-porn matching are important if pornography is to be used in the clinical setting (30). It is noteworthy to mention that individuals in relationships wherein only one individual admits to pornography use may have more inhibited sexual communication and lower reported closeness to their partners in comparison to those in which both partners confirmed pornography consumption, as demonstrated in a online cross sectional study with 200 participants (31).

Although most couples will experience no negative effect as a result of the introduction of pornography in their sexual activity, some might experience unrealistic expectations, decreased sexual interest in their partner, and increased insecurity (32). Brain *et al* described pornography-induced ED and pornography-induced low libido, which are reversible conditions (29). Further, although research findings on the impacts of pornography on relationship satisfaction remain equivocal, with the literature showing both positive and adverse effects (33, 34), addressing the couple's concerns regarding pornography usage is essential. It is also important to evaluate religious beliefs, because for many pornography usage is intrinsically wrong and could create moral conflicts (35). Finally, in clinical practice, patterns of pornography usage (frequency and content) should be obtained. It is relevant to mention that compulsive pornography consumption, also know as pornography addiction, has been described in the literature (36). However, practitioners should be aware that the exact definition of pornography addiction and the distinction between such condition and excessive pornography use remain controversial. Even though some methodological limitations were found in studies addressing deleterious effects of pornography use, it has been reported that pornography addiction may lead to increased feelings of isolation and relationship breakdowns (37).

Lubricants

Indications and Usage—Lubricants are liquids or gels applied to minimize dryness and pain during sexual activity (38). According to the 2012 National Survey of Sexual Health and Behavior, Reece *et al* reported that 70% of men in the United States older than 24 years of age admit to using lubricants for intercourse, masturbation, and partnered sexual play (39). Around 90% of men who have sex with men (MSM) reported lifetime lubricant use (40).

Personal lubricants are used for a variety of reasons, including the enhancement of sexual pleasure, the reduction of pain and potential injury, as well as the improvement of vaginal dryness (41). Patients with an abnormal penile aspect ratio as observed in patients with Peyronie's disease may face penile instability and might benefit from the use of lubricants during intercourse in order to decrease penile axial load. Soft glans syndrome and couples with penile-vaginal disproportion are both reasonable indications for the use of lubricants during sexual activity. As it is expected to reduce friction during intercourse, it might also be useful for delaying orgasm in individuals with premature ejaculation (PE).

Different lubricants have different qualities such as viscosity, slipperiness, and how long they may last during intercourse. Natural lubricants contain natural plant oils (vegetable, olive, safflower, peanut, and canola oil). Petroleum-based lubricants include petroleum and mineral oils. Other isotonic and pH neutral lubricants are also available (42). Various products are available, and most people prefer an odorless, non-irritating preparation. Water- or silicone-based lubricants are recommended since they break down with warm, soapy water (38). Silicone-based lubricants have an advantage over water-based ones because they persist longer on skin and mucous membranes. However, there are fewer options on the market that are usually more expensive (43).

Examples of different commercial and naturally available lubricants and their characteristics are demonstrated in Table 1.

Outcomes—Only a few studies have addressed the use of, or interest in using, lubricants for sexual activities, and very little is known about lubricant use in the context of sexual pleasure, satisfaction, or enhancement (44). However, in general lubricants make sex feel more comfortable and pleasurable (45). There are data suggesting that silicone-based lubricants might improve sexual satisfaction during intercourse more effectively than water-based options in a randomized controlled trial in women following treatment for breast cancer (43). However, there is no study proving such outcome in male sexual dysfunction.

Herbenick *et al* reported high rates of sexual satisfaction in a nationwide sample of men aged 18–59 years using lubricants in the United States (46). A study that prospectively evaluated 41 men who engaged in receptive anal intercourse that kept a sex diary has demonstrated that lubricant use was common in that study population. Lubricants were used during 88.9% of anal intercourse episodes by 95% of men (47). A cross-sectional study that evaluated 300 MSM in Tanzania has reported that about two thirds of study subjects used lubricants to facilitate penetration and reduce pain (48).

It has been demonstrated that most HIV transmissions among MSM occur during receptive anal intercourse (49) In this scenario, it has been postulated that hyperosmolar and water-based lubricants could increase HIV and sexually transmitted infection risk as they may cause mucosal damage (47). On the other hand, the absence of lubrication may lead to traumatic anal intercourse, which could by itself increase the risk of HIV transmission according to a study with sex workers in Africa (50).

Precautions and Complications—Petroleum-based lubricants are not recommended since they may increase the risk of vaginal infection (51) and also tend to have an unpleasant odor. Oil-based or petroleum-based lubricating products in combination with latex condoms have been shown to increase the risk of condom breakage (52). Natural oils, such as mineral and coconut oils, can also break down latex products. The damage may go unnoticed, increasing the risk of pregnancy or sexually transmitted infections (53). Therefore, the Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA) recommend using water-based lubricant with condoms. One theoretical adverse effect is that lubrication sufficient to noticeably reduce friction may also reduce sensation, potentially impacting negatively upon sexual pleasure and making it more difficult for some

individuals to reach orgasm. However, no study has ever demonstrated such adverse event. Despite the fact that lubricant could be very helpful during vaginal or anal penetration, it is important to counsel patients that they should not be considered a replacement for sexual stimulation and arousal.

The use of a lubricant may be particularly challenging in an infertile couple given that some lubricant products have been shown to adversely affect sperm motility during in vitro studies (54–58). On the other hand, in a clinical study, Steiner *et al* reported that women who used lubricants during their fertile days had a similar fecundity to those who did not use lubricants (59). As conflicting data fails to provide definitive evidence, lubricants that are isosmotic with neutral pH and that do not contain glycerol should be preferably used when trying to conceive (55). In addition, we recommend that couples trying to conceive should avoid lubricant with known sperm toxicity (Table 1). Some sperm-friendly lubricants include: Pre-seed, egg whites, and mineral oil (55).

Constriction Bands

Indications and Usage—Constriction bands are defined as compressive devices that apply pressure at the base of the penile shaft resulting in obstruction of venous blood outflow, thus aiming to increase penile rigidity and, therefore, improving erections (60). Their use has been classically indicated for patients with venous leak or those experiencing sexual incontinence.

The types of constriction devices used are extremely varied, ranging from simple plastic rings and rubber bands to more complex polymer devices. Some recent models are designed with a protruding clitoral stimulator designed to stimulate the clitoris during sex to increase the partner's pleasure. Variable tension loops are also available and consist of a specific type of compression band useful for the treatment of sexual incontinence (61). Here, the patient himself varies the amount of applied, in contrast to the classic fixed penile constriction band, thus enhancing patient comfort (61). As opposed to other constriction devices, the purpose is to apply tension strong enough to compress the urethra without interfering with inflow or outflow from the corporal bodies (Figure 2). It is a simple and non-invasive strategy and appears to be an effective clinical treatment in order to decrease the frequency and volume of climacturia, as well as arousal incontinence. By reducing or even treating these issues, variable tension loops may also help relieve the distress usually associated with these conditions (62). Unfortunately there are not many treatment options available for such cases and efficacy studies are limited.

Outcomes—Constriction bands provide a more prolonged erection, and some may benefit from the sensation of tightness and engorgement that wearing a constriction band provides (63).

Loss of erectile sustaining ability is the most common reason for the use of constriction bands. There are four sources of venous drainage from the corporal bodies: dorsal veins, spongiosal veins, cavernosal veins, and crural veins. These constriction bands cannot restrict outflow from cavernosal or crural veins, therefore patients with diffuse venous leak will generally gain minimal improvement in their erectile rigidity. For men with adrenalin-

mediated loss of sustaining, the use of constriction bands may help decrease anxiety levels during sexual encounters.

The most recent clinical study evaluated a total of 124 men who had undergone radical prostatectomy (RP), now with climacturia on more than 25% of attempts where orgasm was achieved. The authors found significant improvement in the severity of climacturia and degree of bother in patients and partners as about half of the patients were completely dry using the device (62).

Precautions and Complications—It is important to mention that many complications have been associated with prolonged use of rings and bands. Prolonged occlusion of venous return may lead to venous thrombosis and progressively leads to lymphatic and arterial obstruction (60). Depending on the duration of this process it may result in local irritation and erosion (64). In-vitro and in-vivo studies with ischemic priapism have demonstrated that acute hypoxia leads to smooth muscle paralysis (65, 66). Ultimately corporal smooth muscle infarction and ischemic necrosis may occur (60, 67–71).

Silberstein *et al* recommended using constriction devices that are made of nonmetallic materials for no more than 30 minutes (60). Silicon devices are recommended as rubber may cause skin irritation in patients with latex allergy. In addition, they should not be used in patients with penile sensation loss. Some authors have demonstrated that blood gas analysis determined 30 min after applying the constriction ring showed ischemia of the penis with venous blood to penile blood volume of 38%–42% (72, 73).

Dildos

Indications and Usage—A dildo is a device used for sexual stimulation of the vagina and/or anus through penetration. Some clinicians make distinctions between dildos designed for vaginal and anal use. However, for the purpose of evaluating such devices in male sexual dysfunction, both were grouped into the same category in the present article. The exact origin of the word is debatable. The most probable etymology is derived from the Italian word *diletto* (a woman's delight). Other possible explanations include the ancient English word *dally* (to toy) or *dill-doll* (to soothe). Dildos can be made of silicone, rubber, metals, or glass and are usually phallic in shape. A cross-sectional study that reviewed dildos marketed for vaginal or anal insertion at online stores found that the length of most dildos was sized between 4 and 5 inches, and circumference was between 4 and 6 inches (74).

Dildos can also be enhanced by functions such as vibration. It is most widely used by women for masturbation purposes or homosexual partners during sexual activity (75). Another possible indication is the resumption of sexual intercourse for patients after traumatic genitourinary injuries or treatment for penile cancer. From a internet-based survey from 25,294 MSM throughout the United States, 62% reported having or using dildos (76).

Outcomes—Despite dildos have been used for centuries suggesting that these sex aids are useful, there is minimal scientific literature reviewing their clinical outcome.

Based on a case report, Gray *et al* advocated the use of strap-on dildos for patients with ED following prostate cancer treatment. The authors discussed the potential benefits of using this sex aid in overcoming the fear of erectile failure, offering potential satisfaction to patients and patients' partners (77).

Precautions and Complications—Although no physical complications should follow the use of dildos, it is important to adequately counsel patients regarding their use. Factors attributed to non-adherence of dildos use for any indication include embarrassment, anxiety, modesty, predicted or actual pain upon use, fear of damaging the vagina, feeling unskilled at putting an object inside one's partner, and having insufficient information about dildo use. (78)

Ayantunde *et al* reported that the most common hospital presentation of foreign bodies in the rectum was the erroneous use of vibrators and dildos (79) A retrospective study of patients presenting to a single institution for colorectal emergencies related to retained foreign bodies demonstrated that up to 50% had some degree of rectal injury and 10% had perforation (80). In that series of 30 individuals (26 men and 4 women), all patients were taken to the operating room for extraction and 16% required laparotomy. Patients should be educated about the correct use of dildos to minimize the risk of trauma.

Vibrators

Indications and Usage—Vibrators are devices that are used for vibratory stimulation of erogenous areas. It has been classically used in the female sexual health arena. They come in a range of shapes and sizes, for either internal or external use. A wide variety of vibrators are available, and may vary in shape, size, and vibrating frequencies. They can also fall into several broad categories: clitoral, dildo-shaped, rabbit-shaped, egg or bullet vibrators, bendable, waterproof, programmable and remote-control, vibrating cockring, anal vibrators and, dual/triple area vibrators, among others. Although the use of vibrators as a sexual aid has classically been linked to female sexual dysfunctions, some reports have shown that the prevalence of men who have incorporated a vibrator into sexual activities during their lives was 44.8% (81).

In addition, penile vibrators have been employed for anejaculation and ED in spinal cord injury patients (SCI) since the 1970s. The FDA cleared the use of penile vibrators to induce erections and facilitate ejaculation in men with SCI in 2011. It is thought the vibrations stimulate the pudendal nerve branches in the penis (82). Patients with multiple sclerosis (MS), congenital spinal cord abnormalities, and poorly controlled diabetes may also benefit from penile vibrator stimulation therapy. For the purpose of penile vibratory stimulation (PVS) in obtaining semen in neurogenic patients seeking fertility, vibrators that deliver at least 2.5 mm of amplitude should be preferably used. The Ferti Care vibrator (Multicept, Albertslund, Denmark) and the Viberec-X3 (Reflexonic, Frederick, MD, USA) are examples of FDA-cleared devices for the ejaculation of men with SCI. The Viberec-X3 device has two built-in vibrating pads that can simultaneously stimulate the dorsum and frenulum of the glans penis. Similarly, the Ferti Care vibrator can be used in “sandwich” fashion with two devices for improved efficacy (83).

Nelson *et al* evaluated 36 men with anorgasmia and normal T levels and demonstrated that vibratory stimulation is capable of restoring orgasm in 72% of patients (84). For diabetic patients, as long as the afferent and efferent limbs of the ejaculation reflex arc are intact, penile vibrators may be used.

Outcomes—Men who use vibrators are more likely to report participation in sexual health promoting behaviors, such as testicular self-exams and tend to score higher on the International Index of Erectile Function (IIEF) (81). Reports show that male vibrator use is more prevalent during interactions with female partners than during masturbation alone and during partnered sexual play than during intercourse. Accordingly, studies have suggested that women play an important role in driving the vibrator use of men, potentially as a means for her to achieve orgasm. For MSM, vibrators are used in a variety of ways to increase the quality of the sexual experience. Increasingly men are incorporating vibrators into their solo and partnered sexual activities, and sexual medicine practitioners should consider how this might affect sexual history taking, interventions, and education (81).

PVS is a very efficient method to inducing ejaculation in patients with SCI (85–87). Brackett *et al* have demonstrated that level of injury was a good predictor of patients responding to this method with 57% of those with a level of injury of T10 and above responding vs. only 15% of those with a level of injury of T11 and below (88). It is less effective below this level because the nerves involved in the ejaculatory reflex might be damaged. Since SCI is the most common cause of neurogenic anejaculation, SCI patients are the most studied. Most of these men maintain their ability to ejaculate and achieve orgasm despite the reduced sensation in the genital organs.

In addition, the orgasmic experience of ejaculation seems to be unrelated to anejaculation. Pleasurable orgasm has been reported with mild to moderate anejaculatory dysfunction (AD), and unpleasant or painful sensations have been reported with severe AD; as demonstrated by Courtois *et al* in a cohort of 81 men with different degrees of neurological impairment following SCI (89). Vibrator use may play an important role in sexual rehabilitation of SCI patients.

PVS also has been used for treatment of delayed orgasm in patients without SCI. One study found that 72% of men with secondary delayed orgasm were able to restore orgasm with PVS (84). The effect was translated to the setting of intercourse, where these men were able to reach orgasm approximately two-thirds of the time. PVS also has been effective in patients with diabetic neuropathy and multiple sclerosis (86, 90).

The role of PVS in penile rehabilitation after pelvic radical surgery is still being investigated. PVS is theorized to stimulate the nerve roots responsible for erectile function, increase local release of nitric oxide and blood flow, and facilitate nerve healing (91). A randomized, controlled trial with a sample of 68 men after radical prostatectomy found that subjective erectile function scores were higher for men using PVS during the 1 year of follow-up, although this was not statistically significant (91).

Precautions and Complications—There are no scientific reports that vibrator use can cause bothersome physical side effects when used properly. Actually, men who admit to using vibrators regularly have less sexual dysfunctions in comparison to those who have never tried them. Men who reported vibrator use in the past month had slightly higher IIEF scores in comparison to those who had never used them or tried them in the past year (81).

Men with SCI or sensation loss should be careful because long exposure to high frequencies may lead to skin abrasions (92). Autonomic dysreflexia is a known complication in individuals with SCI that may be triggered by uninhibited sympathetic discharge below the level of injury during PVS (93). It is characterized by hypertension and alterations in cardiac rhythm, but chills or shivering, pounding headaches, flushing, or diaphoresis might be present. Precaution is warranted because it might lead to cardiovascular complications such as stroke or sudden death. In high risk patients prophylaxis with calcium channel blockers 15 min before beginning the procedure is recommended (94).

Unfortunately there is no good data supporting or refuting the idea that vibrator use habituate individuals to particular ways of sexual stimulation. Furthermore no evidence exists that vibrators enhances or impairs the ability to achieve orgasm (41). In summary, the use of vibrators is safe, and patients should be informed that introducing a vibrator might increase arousal, pleasure, and orgasmic intensity.

Vacuum Therapy

Indications and Usage—Vacuum devices (VD) have been utilized for improving erectile rigidity since the beginning of the 20th century (95). However, they did not become widely used until the 1970s, and, more importantly, the VDs have become a FDA cleared non-surgical treatment option for ED (95–97).

The vacuum device consists of a clear plastic cylinder with an aperture at one end that is placed over the penile shaft. At the other end of the cylinder is a pump mechanism that is used to generate negative pressure within the cylinder. It is used in coordination with an elastic constriction band, which is placed around the base of the penis, to maintain the erection after the cylinder is removed (72, 98). There are different sizes of cylinders and elastic bands for the optimal correct adjustment to the penis. FDA cleared devices have been specially designed with a pop-off valve to limit the amount of pressure to maximum of 200–250 mmHg (99). This mechanism was developed to reduce the likelihood of pressure-induced penile injury. Therefore FDA cleared devices are preferred.

The negative pressure causes an inflow of blood into the corporal bodies and the constriction band helps maintain the trapped blood within the corpora cavernosa. However, it has been postulated that these devices might work through a pharmacological effect as well; specifically, the stretch and stimulation of the cavernosal nerves and blood vessels leading to the nitric oxide release (97, 100). Thus the NO/cGMP signaling pathway has been linked to the effect behind maintaining erections and the return of natural erections even in the absence of constriction bands (101).

Outcomes—Even though there is a scientific rationale and its use has allowed many couples to successfully resume penetrative sexual relations, satisfaction rates remain controversial. In a paper from 27 years ago that assessed 100 men with ED the overall satisfaction rate was 68%, and the most common reasons for dissatisfaction and discontinuing the use of the device included premature loss of penile tumescence and rigidity, pain or discomfort either during application of suction or during intercourse, and inconvenience (102). In this study VDs resulted in an improvement in erection hardness, an increase in frequency of sex, an increase in overall sexual satisfaction, and increased satisfaction for the partner. Dropout rates of up to 30% have been cited and the most common reasons include, inadequate rigidity, penile pain, failure to ejaculate, and dissatisfaction with penile appearance and temperature (99, 102). On the other hand, a more recent analysis demonstrated that only 12% of patients who were treated with external negative pressure device were satisfied with their treatment modality (103).

A classic study from Bosshardt *et al* demonstrated that men who used the VD for 6 months were able to restore their ability for sexual intercourse (72). In this study with 26 men the average rigidity measured at the base and tip of the penis after application of the VD was > 80% and the duration and extent of nocturnal penile tumescence improved. Moreover, experimental studies in rats showed that VD therapy preserves erectile function through anti-hypoxic, anti-apoptotic, and anti-fibrotic mechanisms by improving the arterial blood flow into the penis (73, 101, 104).

The use of VD has also been advocated as a tool for penile rehabilitation and ED treatment after RP as it has been shown to be effective in preventing penile shrinkage induced by experimental models of cavernous nerve injury. (73, 105–109). In a pilot clinical study 28 men were randomized to early VD, and the conclusion was that initiating VD at 1 month after RP improves early sexual function and helps to preserve penile length (110).

Another study evaluated the efficacy of adding VD in diabetic men with severe ED who were PDE5I non-responders. The authors found that combined use of sildenafil and a VD significantly enhanced erectile function and improved the outcome (111). In addition, a more recent analysis has suggested that VD use might benefit patients prior to penile implant surgery by increasing penile length and girth, thus facilitating the implantation of a larger device. In this prospective cohort, 13 patients with penile fibrosis used VD for 10–15 min twice daily for 3 months prior to successful penile implant surgery, suggesting that the use of VD might result in softening of corporal fibrosis (112). However, this was a nonrandomized study in a tiny population and has never been corroborated.

Precautions and Complications—VDs are suitable for all groups of patients. However, patients who are at risk for developing veno-occlusive priapism because of hematological conditions, such as sickle cell disease, thalassemias, or leukemias, are discouraged from using a vacuum device. Caution should be taken by men with coagulation problems, diminished penile sensation, or significant penile curvature. Moreover, patients with poor manual dexterity or strength, such as men with Parkinson's disease or rheumatoid arthritis, may have difficulties with regular use (113). Patients who have reduced sensation in their penis, especially men with SCI, are at risk for trauma with repeated use of the constriction

band (114). It should be used with extreme caution in this group and the ring should be applied for only short periods of time. Men with severe Peyronie's disease or congenital penile curvature should use a vacuum device with caution as the straight cylinder may traumatize the curved penis (97).

Bruising, skin breakdown, and penile pain associated with the application of the constriction band have already been discussed. The tightness of the band may also result in failure to achieve an ejaculation and the development of a temporary penile numbness. One of the other problems with the erection achieved with the vacuum device is that it may hinge at the point of application of the constriction ring. That is, the penis behind the ring is soft and only the portion of the shaft that is beyond the ring has any degree of hardness. Therefore, the ring must be applied as far proximally as possible (115).

If used in a proper fashion, no long-term negative effects have been reported. The main down sides of these devices include pronounced subcutaneous venocongestion, reduced penile temperature, reliance on constriction bands, and difficulty integrating those devices into sexual relations. It has been estimated that the surface temperature of the penis during use of the VD is 1°C lower than the temperature prior to application of the device (98). These factors make the vacuum device erection a non-cosmetic one, and some patients find this unpalatable.

External Penile Devices

Indications and Usage—For men with ED who are unwilling or unable to undergo penile implant surgery, there are currently two available external penile support devices that can aid in sexual intercourse.

The 'Erektor' is an external device composed of a rigid rod and two rings at either end (Figure 3). The rod provides support along the ventral side of the penis with one ring at the base and the other designed to tightly fit behind the glans penis. The device is custom measured for each patient. In theory, this gives a flaccid or weakly erect penis enough rigidity to have penetrative intercourse.

The other external device is a penile cast that is worn over the penis during intercourse (Figure 4). There are two fenestrations in the cast around the corona glans to allow for sensation. It is composed of a body and attachments. There have been no published trials to establish the efficacy of the device at this time. However, it may serve as an option for patients with end-organ failure that may not be candidates for, or unable to afford, penile implants.

Penile sleeves are sex aids designed to fit the outer surface of the penile shaft. Most of them are made of flexible materials and do not provide support for penetration. However, penile sleeves may be useful for patients with PE as they help reducing sensitivity during intercourse and delaying ejaculation.

Outcomes—There have been no independent trials or research done to validate the devices' intended functions, though the company claims to have many patient and

physician testimonials (82). However, these devices may be useful for patients in certain circumstances, and sexual medicine practitioners should be aware of their utility.

Precautions and Complications—Despite the lack of scientific literature reporting any known adverse effects related to the use of external penile devices, there is a theoretical risk for skin and mucosal abrasions to the penis, vagina or anus. Patients and partners who have diminished sensation in the genital area, and vaginal or anal stenosis should use it with caution.

Aids to Positioning

Indications and Usage—Individuals with limited mobility or with positional issues during sexual activity might benefit from positional aids. Such aids include sex swings, pillows and wedges.

A sex swing is a harness that suspends the user from above to assist in sexual activity through decreasing physical effort, increasing anatomical access, and enabling greater freedom of movement (Figure 5). Although there is tremendous variability in material and design, the basics consists of a harness or sling suspended from a frame or hoist. The user secures him- or herself in the harness, which is attached to a frame or hoist from above. Depending on the harness, the user may be suspended in a supine, prone, or sitting position. Positioning pillows can be used to elevate or support the body so the individual or couple can adopt more comfortable positions during sexual activity. Wedges are special pillows that offer angled support to amplify movement range.

Aids to positioning can be used by physically impaired patients, including those who are wheelchair bound, providing greater freedom of movement and a greater ability to participate in a variety of sexual activities. Additionally, some men with ED, especially those who suffer from venous leak report more rigid erections in the standing position, as observed in clinical practice and in accordance of mathematical principles related to the physiology of erection (116). In such patients, partners can utilize a sex swing to assist in sexual intercourse while the patient stands. Sex swings allow patients with limited mobility or disabilities to experience fuller sexual relations. (www.streetsie.com/wheelchair-hoist-sex-swing/). Pillows and wedges might provide more steady and comfortable support to one's body, taking the pressure off knees, backs, and necks with more favorable angles of motion.

Outcomes—No scientific data are available regarding the use of sex swings in clinical practice.

Precautions and Complications—Secure installation is crucial to avoid injury while using a sex swing. The swing can be adjusted to match a partner's height and optimize the angle to suit both partners. Some sex swing hoists are automated, allowing the swing to raise or lower with a remote control. Some patients may already have a personal bed hoist, which can function as a sex swing.

There are no data reporting injuries.

SUMMARY

This literature available regarding the applicability of sex aids is very limited and consists basically of observational studies. Despite their generalized use in the male population for ages, their effectiveness and risks in clinical practice have been poorly discussed in the scientific literature, which prevents more formal recommendations from healthcare societies. It is important to mention that integrating any sex aid into the sexual practice of an individual or couple might have some physical and/or psychological consequences and require comprehensive evaluation. For such reasons, sexual medicine practitioners should familiarize themselves with the range of sex aids aimed at augmenting sexual function and sexual satisfaction in men with sexual dysfunction. It is also important to respect cultural and religious traditions before recommending products or devices that might have negative repercussions. Sex aids are relevant for both research and clinical practice and their utility tend to expand with technological advances such as the development of virtual reality and remotely accessed devices.

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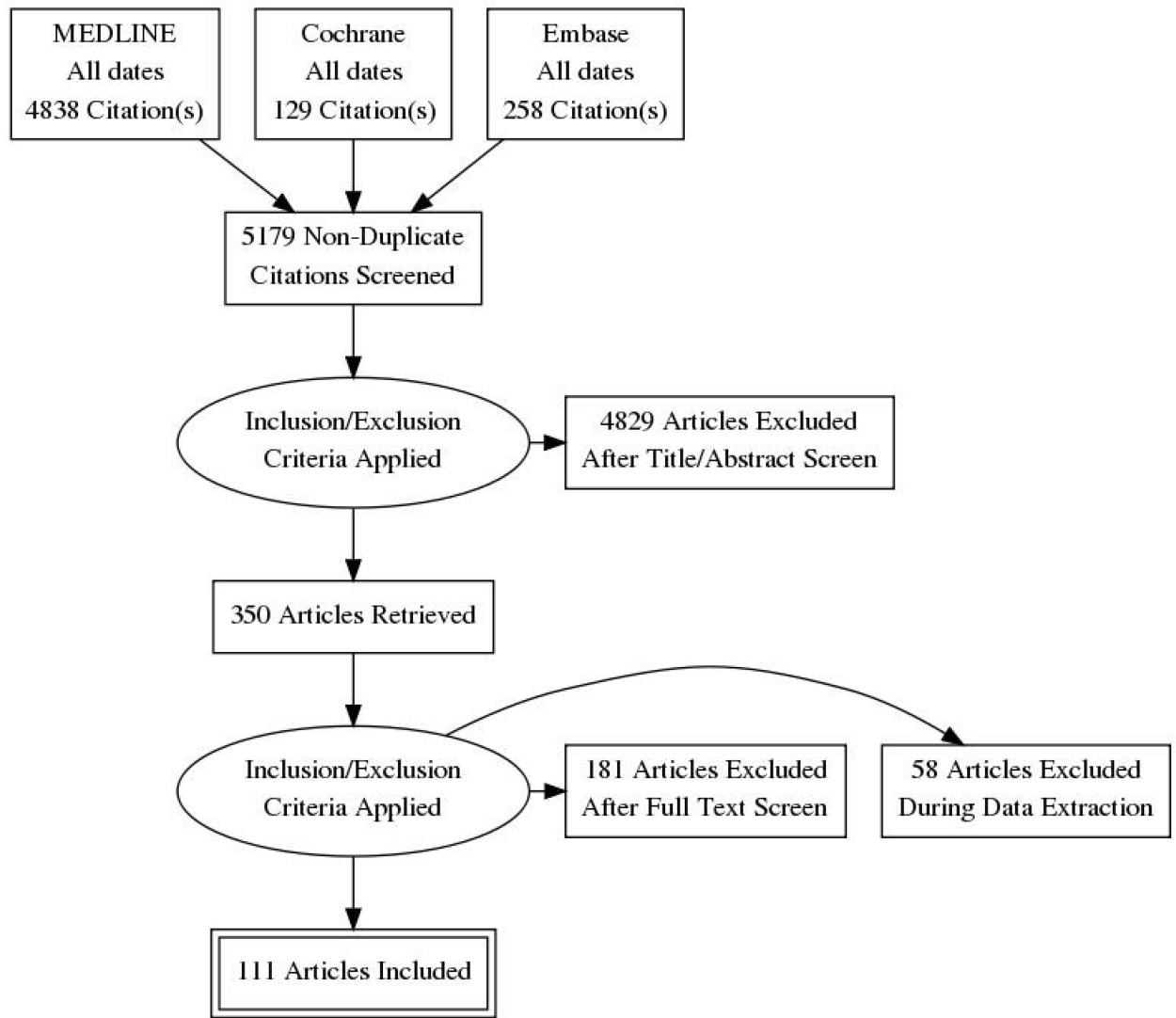


Figure 1:
Diagram of the search strategy for sex aids in male sexual dysfunction.



Figure 2:
UroStop: a FDA cleared variable tension loop for treatment of climacturia.



Figure 3:
External penile support device: Erektor.



Figure 4:
External penile support device: Penile cast.



Figure 5:
Example of Sex Swing.

Table 1 –

Common lubricants and their chemical characteristics

	<u>Categories</u>	<u>pH</u>	<u>Osmolality mOsm/kg</u>	<u>Sperm Toxicity</u>
KY Jelly	Water-based	4.5	2430	+
Astroglide	Water-based	4.3	2299	+
Replens	Water-based	2.9	1491	+
Good C Lovelean	Water-based	4.8	269	+
Pjur	Silicon-based	N/A	N/A	**
Glycerin	Petroleum-based	N/A	N/A	+
Vaseline	Petroleum-based	N/A	N/A	+
Mineral Oil	Petroleum-based	N/A	N/A	–
OliveOil	Oil-based	N/A	N/A	+
Canola Oil	Oil Based	N/A	N/A	+
Coconut Oil	Oil Based	N/A	N/A	–
Pre-Seed	Hydroxyethylcellulose-based	7.2–7.8	380	–
Saliva	Natural	6.2–7.4	70	+
Egg whites	Natural	6.5	276	–

* Ideal pH values for lubricants are around normal vaginal pH (3.5–4.5); desirable and acceptable osmolality values are 380 and 1200 mOsm/kg, respectively, as recommended by the WHO. In order to have a pH e osmolality values the *fluid has to be soluble in water. That is the reason why oil-based lubricants have no pH.*

** sperm toxicity not evaluated in previous studies