Improving Sexual Satisfaction in Persons with Spinal Cord Injuries: Collective Wisdom

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Sexuality is an important part of life, and it is necessary for clinicians to have a specific format in which to address sexual issues with their patients. A systematic approach to working with patients with spinal cord injury (SCI) to improve their sexual functioning and response is presented. Nonjudgmental communication about sexual concerns is followed by a detailed pre- and postinjury medical, psychosocial, and sexual history. If preexisting sexual issues are present, it is recommended that the patient be referred for assessment and treatment of these separate from the patient's SCI-related concerns. Physical examination, with special attention to issues that could impact the patient's sexuality, is followed by a detailed neurologic assessment with specific attention to the T11-L2 and S3-5 spinal segments. Education of the patient with regard to his or her sexual potential and the need to be flexible in his or her sexual repertoire is followed by self-exploration and practice. Routine follow-up is suggested after patient's initial sexual exploration. Treatment of confounding and iatrogenic factors related to SCI is followed by more sexual experience. Afterwards the clinician is encouraged to use simple techniques to treat sexual issues and follow-up with the patient to assess the outcome. A structured program utilizing vibratory stimulation with or without midodrine is described as a way to achieve ejaculation and potentially orgasm, and techniques for treating severe autonomic dysreflexia are discussed. If these interventions do not alleviate the patient's sexual concerns, the clinician should refer the patient for more specialized consultation.

Key words: orgasm, satisfaction, sexual arousal, sexuality, spinal cord injury, women

Sexually pleasurable activities are important for people with spinal cord injury (SCI). Recent research has emphasized promoting the maintenance of positive sexuality beyond the reproductive aim. In light of this, clinicians now have a number of tools available to assist their clients in improving their sexual satisfaction post SCI. Several formats have been provided by various researchers and clinicians as a means to describe the treatment of sexual needs and concerns after SCI. In this review, we will follow the guidelines to promote sexual sustainability post SCI^{1,2} (see **Table 1**), which have been proposed as a means to educate, evaluate, and treat sexual concerns after SCI. Other formats include the Sexual Rehabilitation Framework³ (see **Table 2**), a user-friendly clinical guide that helps clinicians recognize factors that impede or improve sexual and reproductive function and outline appropriate,

multidisciplinary therapeutic options in response to the patient's priorities.

Methods

Documents for this review are based upon a MEDLINE search of the topics of spinal cord injury, sexuality, orgasm, sexual arousal, and satisfaction in addition to provider's knowledge and a review of data from our previous presentations.

Communication

The clinician must first be comfortable communicating with the patient. Unfortunately, talking about sexuality can be challenging for both clinicians and clients.⁴⁻⁶ In a survey of 458 individuals with SCI, only 8% had initiated a discussion of sexual concerns⁷ although

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Table 1. Guidelines to promote sexual sustainability after SCI

Communicate
Ask about sexual and medical issues before illness; refer if appropriate
Consider partner, cultural, and psychologic issues
Perform physical and neurological exams with special attention to T11-L2, S2-5
Educate the patient
Suggest practice
Follow-up with a review of basics
If problems persist, treat confounding and iatrogenic issues
Follow-up again
Treat the basics, eg, provide medications to improve desire or arousal
Follow-up again with further communication
Use more advanced techniques, eg, refer for invasive techniques or further counseling

Table 2. Sexual Rehabilitation Framework

Sexual area	Sexual concern	Referral/Comments
Sexual drive/interest		
Sexual functioning abilities		
Fertility & contraception		
Factors associated with the condition		
Motor & sensory influences		
Bladder & bowel influences		
Sexual self-view & self-esteem		
Partnership issues		

most wanted more education and counseling. Consumers' comfort level for discussing sexuality was greatest with another person with SCI followed by doctors, nurses, psychologists, rehabilitation counselors, and social workers. Other people with whom they felt comfortable discussing sexuality included spouse, girlfriend, boyfriend, parents, sex therapists, surrogates, or anyone genuinely concerned.

Broaching the subject of sexuality is probably the most difficult part for novice providers. A provider's communication style can positively or negatively affect a patient's views about sexuality after SCI. By initiating the topic of sexuality as part of the routine SCI assessment, the provider gives

permission to persons with SCI and their partners to discuss issues related to sexuality.

Communication bridges include the demonstration of respect through providing privacy, asking permission to proceed with more probing questions, being patient and allowing the client time to respond, and tailoring the depth of the discussion to the client's readiness. Patients must be informed that sexual health care is part of their rehabilitation program and that sexual health services will be offered periodically throughout their rehabilitation and can also be requested.⁸ Continuing education and training in providing comprehensive sexual health care is important to increase clinicians' comfort, competence, confidence, and skill in talking about and treating sexual issues. **Table 3** lists key issues associated with facilitating communication related to sexuality. Other resources are available for providers who have a further interest in exploring this topic.⁹⁻¹²

Sexual History and Physical Examination

Obtaining a clear and concise sexual history, including a thorough medical and psychosocial history, is critical for correctly identifying the sexual issues in persons with SCI. A suggested format for assessing the medical aspects of the sexual history is shown in **Table 4**. Past and current illnesses that can affect sexual interest and function

Table 3. Techniques for communicating about sex

Use a matter of fact tone of voice and neutral body language
Use postural echo (where clinician and client sit in mirror image to each other)
Make eye contact
Use a written scale or questionnaire
Use open-ended questions
Let the patient tell his or her story without interruption
Verbally acknowledge the patient's concerns; use reflective listening to let the patient know you are aware of the importance of issues to him or her
Normalize/legitimize the patient's questions and/or concerns
Avoid judgmental and/or shaming remarks
Use conditional phrasing when providing information, ie, "this is unlikely," "this may happen"
Provide reassurance and/or normalization

Table 4. Medical aspects of the sexual history

Define the <u>chief complaint</u> (sexual desire, genital or mental arousal difficulties, orgasmic issues, ejaculatory issues, fertility concerns, or sexual pain).
Is the complaint <u>lifelong</u> (primary - always been there even prior to injury) or <u>acquired</u> (secondary to a new medication, the injury, etc)?
Is the complaint <u>situational or generalized</u> (happens in only some situations or sexual acts, or in all situations)?
Create a <u>description</u> of the sexual issue as the person experiences it.
Define what is the <u>sexual context</u> (solo sexual activity or partnered within a good or strained relationship).
Define what is the <u>medical context</u> (illness, depression, medications, fatigue, spasm, etc) and what other therapies or medications the patient is taking or have tried to date that may positively or negatively affect sexual issues.

must be sought. The mind and body work in tandem; in taking the medical history, especially in persons with neurological changes, it is important that the clinician include neurochemical issues such as depression and psychotropic medications in the medical assessment, as these can significantly affect sexual function. In persons with preexisting cardiovascular disease, it is appropriate to look for associated sexual problems. In patients with diabetes, evidence of autonomic neuropathy should be pursued in conjunction with queries related to bladder functioning. In persons with a history of cancer, especially bladder, prostate, cervical, uterine, vulvar, breast, penile, testicular, or rectal carcinoma, the provider should ask them about surgeries, radiation, or chemotherapy with resultant sexual side effects. Concomitant or preexisting history of traumatic brain injury should be sought along with its potential distinct impact on sexuality. With preexisting or current substance abuse, chronic narcotic use, or SCI only,¹³ low testosterone and decreased libido are prevalent and testing for and treating low levels is appropriate. Questioning for opiate-induced hyperalgesia and the negative sexual side effects of opiates is also important.

It is also important for clinicians to ask about psychosocial issues in the sexual history. Issues that were present prior to injury that are related to previous relationships, sexual preferences, abuse, partner issues, gender, orientation, and cultural and religious issues are especially important when discussing sexuality. Patients with preexisting psychosexual concerns will likely need a referral for counseling if they are to cope with the impact of these issues in conjunction with an SCI. The patient's partner can be a source of support or

distress for the patient; for example, the partner may embrace and encourage sexual modifications of the patient or may reject or avoid sexual advances as a result of the SCI. The patient's cultural situation must also be taken into account, as some cultures are more accepting of disability and role reversal than others. Several global questions shown in **Table 5** can be used to assess present and past sexual functioning, response, and expression and to explore body image, sexual esteem, values, and beliefs.

A physical examination assessing the gastrointestinal, respiratory, genitourinary, cardiovascular, neurologic, skin, and musculoskeletal areas should be performed to rule out problems that could impede sexual participation, such as respiratory issues, cardiac disorders, pain, infection, or skin hypersensitivities. Genitalia should be examined for skin integrity, infection, and catheter-induced urethral erosion. Pressure sores, urinary tract infections, genital lesions, and hemorrhoids can derail participation in sexual activities. Spasticity and contractures and their potential impairment of sexual positions must be considered and addressed.

In women, the labia majora and minora and vulvar opening should be examined; in men, the glans penis, shaft, and testicles should be examined. Clinicians should also look for signs of hypogonadism in men with SCI (soft or small testes, reduced body and facial hair, loss of musculature). Older men should have an up-to-date prostate assessment. For women, clinicians should ascertain that appropriate gynecologic examinations have been performed. The status of their menses, childbearing status, and reproductive organs should be considered as they will affect recommendations for birth control and the need

Table 5. Psychosocial aspects of the sexual history

How would you describe your sexuality before your injury?
Tell me about your sexuality since acquiring your injury.
Do you have any history of sexual abuse or physical abuse?
What is your sexual orientation?
How does your current [sexual interest, function, response, and expression] compare to your past experience?
Tell me about the first time you masturbated or had sex with a partner since your injury?
What went through your mind the first time you saw your full reflection in a mirror after your injury?
How would you rate yourself as a loveable and capable sexual partner?
What is most troubling for you at the moment?
Describe a typical situation when you have experienced [insert particular problem you are focused on].
How do you feel about your [diminished/loss of sensation overall, diminished/loss of sensation in your genitals, pain, loss of orgasm, inability to ejaculate, incontinence]?
How much of a concern is this for you? For your partner? In finding a partner?
To what extent do you believe there is hope for your sexual future?
What role does your religious and or cultural background play in your sexual life?
Where would you like to start?

for hormonal therapies. For both sexes, issues related to prevention and treatment of sexually transmitted diseases must also be addressed.

Neurologic Examination and the Impact on Arousal and Orgasm

Assessment with the International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI)¹⁴ is important to determine the best approach to educating patients with SCI about their sexual potential and improving their sexual responses. Based upon this examination, the clinician can document the level of injury; this will aid in determining the degree of assistance the patient needs for mobility and activities of daily living, both of which impact the person's ability to self-manage during sexual activity. Special attention should be given to the degree of remaining sensory function in the T11-L2 dermatomes. In controlled, laboratory-based studies of the sexual responses of men¹⁵ and women,¹⁶ greater values of the combined sensory scores to pinprick and light touch in these dermatomes were shown to correlate with the ability to attain psychogenic erection and increase vaginal vasocongestion (lubrication). Thus, the greater the preservation of sensation in this area, the more the client can be counseled to explore and

pursue psychogenic arousal with fantasy, romantic environments, and videos.

The ISNCSCI requires a rectal examination to identify deep anal and S4-5 surface sensation and to determine whether there is voluntary contraction of the rectal sphincter. Examination of the performance of the bulbocavernosus reflex is also important to determine whether this sacral reflex is present or absent. Retention of erection and lubrication ability in response to manual stimulation is related to the presence of reflex function in this sacral area. Moreover, research in both men¹⁷ and women¹⁶ using the 1992 ISNCSCI¹⁸ revealed that persons with complete lower motor neuron (LMN) injury affecting their sacral cord (no bulbocavernosus or anal wink reflex, no sensation in S3-S5) were significantly less likely to experience orgasm as compared to persons with all other levels and degrees of SCI. This does not mean persons with this type of injury should be told they cannot achieve orgasm, rather they should be encouraged to explore more nongenital sexual options and persons with all other injuries should be affirmed that they have the potential to experience orgasm.

Results from the neurologic examination and patients' responses to questions should be utilized in the assessment tool of the revised

International Standards on documentation of remaining Autonomic Function after SCI¹⁹ (ISAFSCI; see **Figure 1**). This is the preferred method for describing the overall impact of SCI on sexual responses and has recently been found to have good interrater reliability.²⁰ The clinician documents the anatomic diagnosis (ie, whether the spinal cord lesion is supraconal, conal, or cauda equina) with this format. The clinician records the potential for psychogenic genital arousal, with 0 being no function, 1 being impaired, and 2 being normal. The clinician should also record the patient's potential for reflex genital arousal utilizing a similar numerical approach. The patient is then asked about their perception of orgasm and whether it is intact, impaired, or absent. A similar methodology is used to document female menstrual function.

Male and female basic sexual function data sets^{21,22} are complementary to the ISAFSCI as a way to document ongoing issues related to

sexual dysfunction before and after SCI. These were assessed in a population of 115 subjects with traumatic SCI and 39 with nontraumatic SCI for psychometric properties with no areas of concern noted.²³ Although sexual changes are often present in persons with SCI, a diagnosis of sexual dysfunction according to the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (DSM-V)²⁴ is only considered if the problem has been present for 6 months and occurs in over 75% of sexual encounters. The disorder must also cause "clinically significant distress in the individual." Based upon these criteria, the following sexual disorders are acknowledged: female sexual arousal and interest disorder, female orgasmic disorder, sexual pain disorders, male hyposexual desire disorder, early ejaculation, erectile disorder, delayed ejaculation, and hypersexual disorder. Further review of the diagnostic criteria of these disorders is beyond the scope of this article; the reader is referred to DSM-V for this information.

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Autonomic Standards Assessment Form

Patient Name: _____

Autonomic Diagnosis: (Supraconal ☐, Conal ☐, Cauda Equina ☐)

General Autonomic Function

System/Organ	Findings	Abnormal conditions	Check mark
Autonomic control of the heart	Normal		
	Abnormal	Bradycardia Tachycardia Other dysrhythmias	
	Unknown		
	Unable to assess		
Autonomic control of blood pressure	Normal		
	Abnormal	Resting systolic blood pressure below 90 mmHg Orthostatic hypotension Autonomic dysreflexia	
	Unknown		
	Unable to assess		
Autonomic control of sweating	Normal		
	Abnormal	Hyperhidrosis above lesion Hyperhidrosis below lesion Hypohidrosis below lesion	
	Unknown		
	Unable to assess		
Temperature regulations	Normal		
	Abnormal	Hyperthermia Hypothermia	
	Unknown		
	Unable to assess		
Autonomic and Somatic Control of Broncho-pulmonary System	Normal		
	Abnormal	Unable to voluntarily breathe requiring full ventilatory support Impaired voluntary breathing requiring partial vent support Voluntary respiration impaired does not require vent support	
	Unknown		
	Unable to assess		

Lower Urinary Tract, Bowel and Sexual Function

System/Organ	Score
Lower Urinary Tract	
Awareness of the need to empty the bladder	
Ability to prevent leakage (continence)	
Bladder emptying method (specify) _____	
Bowel	
Sensation of need for a bowel movement	
Ability to Prevent Stool Leakage (continence)	
Voluntary sphincter contraction	
Sexual Function	
Genital arousal (erection or lubrication)	Psychogenic _____ Reflex _____
Orgasm	
Ejaculation (male only)	
Sensation of Menses (female only)	

2=Normal function, 1=Reduced or Altered Neurological Function
0=Complete loss of control, NT=Unable to assess due to preexisting or concomitant problems

Date of Injury _____ Date of Assessment _____

This form may be freely copied and reproduced but not modified.
This assessment should use the terminology found in the International SCI Data Sets (ASIA and ISCoS - <http://www.iscos.org.uk>)

Examiner _____

Figure 1. International Standards for Autonomic Function after SCI.

When evaluating persons with SCI, a rehabilitation professional should use a slight revision of the self-report form developed by New and Currie²³ and ask, “Did or do you have any sexual problems unrelated to your spinal cord damage?” This can be followed by, “Do you have any sexual problems due to your spinal cord damage?” If they report that they had sexual issues prior to injury, it is recommended that the clinician educate them about and address their sexual concerns as part of the rehabilitation process and offer them the opportunity to speak with a sexual health professional. The remaining questions regarding orgasm, psychogenic and reflex erection, and lubrication and menstruation should also be asked with results recorded as normal, reduced/altered, absent, or unknown. It should be noted that the numerical scoring system was not recommended for the data set in version 1.0; however, version 2.0 is in development and these data sets may be altered to include an overall numerical option.

Education and Recommendations for Sexual Exploration

The goals of sexuality education after injury are to provide basic information about what changes to expect related to SCI and to broaden the client’s concept of satisfying sexual experiences. Without help to dispel myths and obtain accurate information, clients may hold onto negative beliefs regarding their sexuality and their sexual potential. Tepper identified common myths or limiting beliefs held by people with SCI (Table 6) that impeded their process of sexual self-discovery^{25,26} and needed to be addressed through sexuality education and counseling. Sexuality education

should provide sexual information and specific suggestions to the client in order for him or her to become “sexually abled” and to feel good about sexuality.²⁷ After receiving adequate sexuality education, clients should understand the impact their injury has on their sexual response and how this can inhibit desire and response. They should also be able to identify ways to compensate for the changes in function and to tell a partner what feels good and where.

Topics to cover in sexuality education include a review of the sexual response cycle, the effects of SCI on sexual function and response and the treatments available to compensate for these changes, findings from research on pleasure and orgasm in people with SCI, and factors that facilitate the process of sexual self-discovery.²⁴⁻²⁹ Other issues that can impact sexuality should also be reviewed. The clinician can provide the patient with suggestions as to how to improve their responsiveness. These may include basic issues such as improving the romantic aspect of their sexual environment (soft music, low lighting, candles, flowers, and pleasant smells) and ensuring genital hygiene and bladder and bowel issues have been taken care of (catheterizations and bowel programs prior to sexual activity to avoid accidents). Reviewing strategies related to mobility challenges and positioning is also important. The clinician should let the patient know that the use of lubricant and oils is useful not only for persons with SCI but also for able-bodied persons and that these may improve a person’s or partner’s sexual pleasure. Further recommendations for accommodations for sexual expression are available through books and articles,^{26,27} lectures, videos, and discussion groups. Free and useful resources include the Sex and Paralysis Video Series,³⁰ the PleasureABLE Sexual Device Manual for People With Disabilities,³¹ and the Sexuality and Sexual Function after Spinal Cord Injury Model Systems Fact Sheet.³²

After clinicians have evaluated clients as to their sexual potential and have provided them with information, they should encourage the clients to explore their own sexuality and what works for them. Some persons who are focused on preexisting sex roles may not have tried oral sex or had a pattern of masturbation. It is

Table 6. Limiting beliefs about sexuality that need to be dispelled

I have no feeling; therefore, my sex life is over.
I’m not experiencing pleasure or orgasm anymore; sex is pointless. Why bother?
My partner left me, cheated on me, avoided having sex with me; hence, I’m not lovable and I’m not a capable partner.
No one will want a person with a disability as a lover.
I shouldn’t be thinking about sex right now; I should be focused on [fill in the blank].

useful to give patients permission to try these techniques and to discuss new activities with their partner. Depending on the readiness of the clients, clinicians can give these suggestions during inpatient rehabilitation in the clients' room or an independent living room if there is privacy, during a home visit, or during outpatient follow-up visits. Additionally, a program such as the one at Institut de réadaptation Gingras-Lindsay-de-Montréal may offer a structured approach for patients to explore their sexual potential.

Treating Confounding Issues

It is recommended that after the initial education of patients and their self-exploration of their capacities, clinicians should again ask them about their sexual concerns. Even though patients may have participated in sexual education during rehabilitation, they may not have been able to assimilate the information at that time. Sometimes patients have received information and yet have no recollection of it. Many patients will find that they can resume sexual activity but still complain of difficulty with arousal, satisfaction, or the inability to achieve orgasm. These concerns can often be related to confounding issues and iatrogenic phenomenon.

Studies show that more than 50% of persons with SCI achieve orgasm.^{33,34} Because orgasm is a neurologic phenomenon, many of the individuals with SCI who report anorgasmia should also have the capacity to achieve orgasm. Reasons for orgasmic dysfunction can be related to a number of issues. Preexisting psychologic or medical issues and psychologic and medical or iatrogenic issues that have occurred concomitant or subsequent to the injury may be the source of orgasmic dysfunction as opposed to the injury itself.

Incontinence related to neurogenic bladder or bowel can cause practical interference and anxiety with sexual activities. Spasticity may lead to contractures and cause difficulty with obtaining access to the genitals during sexual activity. Pressure sores from friction or prolonged pressure to the skin during sexual activity can be a detriment to sexual freedom and can be a cause of autonomic dysreflexia (AD). Moreover, the development of pressure sores may make sexual

activity inadvisable and may impede some reflexes, such as ejaculation from vibrostimulation.

Sexual dysfunction can result from concomitant SCI problems or iatrogenic causes. Patients are commonly placed on multiple medications during their initial hospital stays and they continue taking them long past discharge; many of these medications have sexual side effects. If patients are on medications with sexual side effects, the clinician can speak to them regarding the timing of their sexual activities and potentially about reducing the dose of the medications. Additionally, the clinician can consider changing a medication to one with less sexual side effects or adding a medication with pro-sexual side effects for the patients' primary problem. For instance, in persons with preexisting hypertension who are on beta blockers, the impact of SCI is likely to lower their blood pressure; therefore, changing their medication to clonidine may be a way to eliminate the sexual side effects of the beta blocker with the added benefit of decreasing spasticity.³⁵ Serotonin-specific reuptake inhibitors and serotonin norepinephrine reuptake inhibitors used to treat pain and depression can cause desire, arousal, and orgasmic dysfunction in able-bodied men and women³⁶; in persons with SCI with complaints of sexual dysfunction, it may be appropriate to wean them off of these medications or to add or switch to an antidepressant with fewer negative sexual side effects (such as bupropion or mirtazapine). The antiepileptic drugs pregabalin³⁷ and gabapentin,³⁸ which are often used to treat chronic neuropathic pain, are linked to sexual dysfunction. Moreover, baclofen, which is commonly used to treat spasticity, is known to cause arousal and orgasmic dysfunction.^{39,40}

The occurrence of genital orgasm has been shown to take significantly longer in persons with SCI than in able-bodied persons. People with SCI should be counseled that masturbation to orgasm may take longer and feel different. Moreover, they may not feel anything at all if they have lost all genital sensations. However, masturbation may still trigger orgasm if given enough time; the patient must focus on the sensations and responses he or she does have and not get distracted by negative sexual thoughts about what is not the same. Additionally, as it is unlikely that persons

with complete LMN injuries affecting their sacral spinal segments will experience genital orgasm,^{16,17} it is helpful to tell them about people, with SCI and able-bodied, who have orgasms through fantasy⁴¹ or through nongenital exploration.

It is recommended that once confounding issues are addressed, clinicians give patients the opportunity to again explore their sexuality. Clinicians should emphasize the fact that adjusting to sexual changes after SCI takes time and that with experience the patients will learn more about how their body responds and become more comfortable with their new sexuality. It is also recommended that the clinician manage any limiting contextual factors to the person's sexual expression before adding any medications or treatments specifically to improve sexual function.

Medications and Other Noninvasive Techniques to Treat Sexual Dysfunction

After iatrogenic and confounding factors have been addressed, the clinician should consider beginning basic medications and therapies to treat sexual dysfunction. A number of medications can be utilized to improve various aspects of sexual function. In women who have vaginal/vulvar atrophy and vaginal dryness due to estrogen deficiency, vaginal estrogens can help them maintain healthy urogenital tissues. Phosphodiesterase type 5 inhibitors (PDE5i), sildenafil, tadalafil, and vardenafil can augment genital arousal responses; PDE5i have been shown to be very effective in treating erectile dysfunction in men with SCI.⁴² Although the use of sildenafil was not shown to improve successful sexual responses in a multicenter study of women,⁴³ its off-label use may be considered for women with complaints of sexual dysfunction. For men with low testosterone, replacement to physiological levels is safe and important in reducing sexual and physical effects of hypogonadism.⁴⁴ For women with low testosterone specifically related to a loss of ovarian function, the use of off-label testosterone⁴⁵ can be considered as a way to improve their interest in sex and potentially orgasmic capacity. Although it has just been US Food and Drug Administration (FDA) approved, flibanserin⁴⁶ can be considered in women who are premenopausal, who do not drink

alcohol, and who have hypoactive sexual desire. Ospemiphene⁴⁷ can be utilized in postmenopausal women with dyspareunia. Prescription of other devices such as penile rings and vacuum suction devices to improve erectile capacity and clitoral vacuum suction devices to improve orgasmic dysfunction can also be considered as noninvasive ways to remediate sexual concerns. The clinician should warn men, especially those with poor or no genital sensation, who are utilizing vacuum devices or constrictive rings that the rings should not be left on for more than 30 minutes and that there are the possibilities of skin damage and AD with excess stimulation. Penile (intracavernosal) injections are often utilized by men with SCI for the reliability and rigidity of erectile response; clients should be taught by an experienced clinician to use the injections and to carefully dose to avoid priapism (prolonged erection).

More Advanced Techniques to Attain Orgasm and Ejaculation

The ability to experience orgasm is one of the most often asked about issues at the beginning of rehabilitation or at the time of injury. Although orgasm without ejaculation is reported after SCI, orgasm is also commonly reported in association with ejaculation.⁴⁸ Thus, for men, the goal of achieving ejaculation can be considered a first step in trying to reach orgasm. Studies on individuals with SCI generally find that genital stimulation is preferred as a way to achieve orgasm, even in the case of complete lesions; so that at least for men, achieving ejaculation seems like a viable way to regain orgasmic potential.

There are several ways to trigger ejaculation in men with SCI, starting with natural modes of stimulation and gradually moving to more invasive procedures.⁴⁹⁻⁵³ Although natural sources of stimulation – whether masturbation, intercourse, or oral sex – have been associated with relatively poor success rates in the literature, they should be tried before assistive devices so that persons with SCI may maintain their sexual spontaneity. A recent meta-analysis indicates that 12% of men with SCI achieved ejaculation⁵⁴ through masturbation, but early literature indicates more variable results ranging from 5% to 32%^{55,56}

depending on the lesion type affecting the sacral segments (upper motor neuron [UMN] vs LMN) and completeness of lesion. Other studies support these later findings with results ranging from 30% and 33% success when ejaculation was systematically assessed during masturbation.^{57,58} Perhaps these optimistic findings result from sample bias (eg, lesion level and completeness, motivated patients participating in the study), but they may also result from research instructions that specifically insisted on continuing stimulation regardless of the outcomes. Overall, findings suggest that natural stimulation may be successful in individual patients and should be encouraged with the understanding that longer periods of stimulation may be required; this strategy that is consistent with data indicating that more time is required to achieve ejaculation and orgasm in individuals with SCI.¹⁶

Even though orgasm may be the ultimate goal of ejaculation, patients should be encouraged to focus their attention on their sexual sensations during masturbation regardless of whether ejaculation or orgasm is obtained. Somatic sensations may be diminished or absent after SCI, but diffuse autonomic sensations may be experienced and should be highlighted so the person can acknowledge the similarities with preinjury orgasm. Two questionnaires are available in the literature to assess the perceptual sensations of pleasure and orgasm: Courtois et al's^{58,59} questionnaire on genital, cardiovascular, muscular, and autonomic sensations associated with sexual stimulation and climax in individuals with SCI (and recently validated on able-bodied controls),⁶⁰ and Mah and Binik's⁶¹ questionnaire on sensory-emotional sensations characterizing orgasm in the able-bodied population. These questionnaires can be helpful in bringing the patients' attention to the range of sensations – genital, nongenital, or sensory-emotional – that can build up and characterize sexual pleasure and climax.

When natural stimulation does not produce ejaculation in men with SCI, penile vibratory stimulation (PVS) is advised. The patient must have an intact lumbosacral reflex for PVS to work. Patients can use commercial vibrators, such as more powerful massagers,^{62,63} or the FertiCare personal device with optimal stimulation parameters⁶⁴

(high amplitude and speed) that are specifically designed for use in men with SCI. The FertiCare improves the ejaculation success rate from 49%^{57,58} to 55%^{62,65} and even 83%.⁶⁴ Studies with the FertiCare further suggest that 2 stimulators can be used together (sandwich technique) to improve ejaculation success. A 2-headed device has also been developed and has had successful results.⁶⁶ There are reports of men using external genital electrostimulation to elicit ejaculation at home, but this technique has not been studied in the laboratory for efficacy and safety.⁶⁷

In the Institut de réadaptation Gingras-Lindsay-de-Montréal, trials with PVS are usually provided during initial rehabilitation. Patients are trained in vibratory use, stimulation parameters, and perceptual responses. After the initial trials, patients become eager to use vibrators, in particular the FertiCare device, at home to achieve self-exploration and pleasure. As part of the initial training, patients are instructed about the potential for AD after SCI and their blood pressure (BP) is monitored. AD is a clinical condition that is defined by a minimal increase in systolic blood pressure (SBP) of 20 mm Hg, but the increase can vary along a continuum, clinically defined by the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure⁶⁸ as normal below 130 mm Hg, as mild between 140 and 159 mm Hg (and borderline between 140 and 149 mm Hg), moderate between 160 and 179 mm Hg, and severe at 180 mm Hg or higher. A recent review of the literature⁶⁹ indicates that on average SBP changes in able-bodied men at ejaculation or climax reach 163 mm Hg with an immediate reduction in BP following cessation of activity, suggesting that mild to moderate hypertension as recorded during ejaculation in the able-bodied population is normal. Courtois et al^{57,58} investigated BP changes in men with SCI at ejaculation and explored their relationship to sexual sensations. Changes in SBP in their sample ranged from 111 mm Hg to 152 mm Hg^{57,58} and were accompanied with a variety of sensations, including feelings of hyperventilation, heart racing, goose bumps, hot flashes, sweating, increased spasticity or muscle tone, all of which resemble the sensations of sympathetic activity that are described in able-bodied men and women

at orgasm.^{70,71} These findings^{59,70} suggest that hypertension during sexual activity after SCI is not always a pathological sign of AD, but it is likely a normal physiological event accompanying increased sympathetic activity during sexual arousal and orgasm.

Although severe AD must be prevented and controlled in men with SCI at ejaculation, mild to moderate sensations that are normal signs of increased sympathetic activity during sexual activity should not be discouraged and may be a part of the perception of orgasm. For men with SCI above T6, consideration should be given to performing initial vibrostimulation tests in the clinical setting in order to monitor BP and to assess the risks of severe AD upon ejaculation (eg, SBP >180). Once risk is clarified and, if necessary, properly treated,⁶⁸ patients may be encouraged to use vibrostimulation at home and to pay attention to their overall sensations, not only to upcoming ejaculation.

Positive feedback during ejaculation trials in the clinical setting may also be given with regard to overall signs of sexual responsiveness (eg, observed spasticity or shivers during a test) to draw the patients' attention to the cardiovascular, autonomic, and muscular signs that build up during arousal and climax and to reframe their perceptions as to "normal" response. Initial trials in the clinical setting can also evaluate men for possible retrograde ejaculation^{57,58,72} or for the presence of sperm in the prostatic urethra as a stand-alone ejaculation,^{73,74} which can be misinterpreted as a lack of ejaculation or orgasm.

If vibrostimulation fails, treatment with oral midodrine, an α -1 agonist, has been shown to facilitate ejaculation in men with SCI.^{57,58,75-77} No severe side effects have been noted; those that were reported were limited to tingling, hot flashes, and spasms, which also appear during vibrostimulation and ejaculation. The drug is ingested 45 minutes before sexual activity with vibrostimulation; the dose is started at 5 mg and increased gradually (in separate sessions) up to 25 mg or 30 mg. According to Soler et al,^{73,74} midodrine is successful in increasing ejaculation and facilitating orgasm in men with SCI.

Similar procedures can be provided to women with SCI to facilitate orgasm; some procedures initially developed for men can be adapted for

women.^{49,78} Questionnaires can be used to help women reframe the sensations that build up to or characterize orgasm. Vibrostimulation can be encouraged with the use of regular sex toys or with the FertiCare device, providing stronger stimulation parameters albeit only on the clitoris. Midodrine and PDE5 inhibitors may be attempted on an individual basis.

Prophylaxis and Treatment of Severe AD During Ejaculation and/or Orgasm

Some people with SCI may experience AD in association with sexual activities, particularly men who use vibratory stimulation. Managing AD for sexual activity in patients with severe dysreflexia consists of nonpharmacological and pharmacological approaches. Nonpharmacological approaches include cessation of the sexual activity (the precipitating stimulus), sitting up (and lowering the legs below the pelvis if possible) to allow for blood pooling to the lower extremities and a drop in arterial BP to occur, and loosening any tight or constricting clothing or sexual accessories. If this does not decrease or alleviate the symptoms or drop the SBP to below 150 mm Hg over 5 minutes, pharmacological methods can be introduced.

Medications have most commonly been utilized in the literature for prophylaxis or treatment of AD in sperm retrieval procedures, but they can also be utilized for persons who may have a problem with confirmed severe dysreflexia in association with sexual activity and/or orgasm. Nifedipine is a calcium channel blocker that decreases peripheral vascular resistance and can acutely lower BP. It is most often given in a "bite and swallow" or "puncture and sublingual" method at a dose of 10 mg prior to the procedure. It can successfully keep high BP from arising during ejaculation or treat provoked severe AD, but it does have the risk of provoking more severe hypotension and even stroke or acute myocardial infarction.⁷⁹ Prazosin is a postsynaptic alpha-1 adrenoreceptor blocker with minimal effect on cardiac function. In one small randomized controlled trial, prazosin twice daily was well tolerated. It did not lower baseline BP excessively and was shown to shorten the duration and severity of AD episodes over a 2-week period.⁸⁰ Prazosin, however, must be taken the

night before sexual activity, so it requires significant planning. Nitrates reduce acute episodes of AD by their relaxation of vascular smooth muscle in the peripheral arteries and veins. It is more effective to administer nitrates in a patch that can be quickly wiped off the skin than in sublingual form in case of hypotension or headache. However, this form of nitrate administration is more at risk of being transferred to a sexual partner. Furthermore, nitrates should not be taken within 24 hours of the use of sildenafil or vardenafil, medications for erection enhancement. Tadalafil has an even longer half-life, and daily tadalafil would be a contraindication to nitrate use. Sildenafil, while being mildly hypotensive, had no effect on changes in BP during episodes of AD initiated by vibrostimulation in men with SCI.⁸¹ The use of captopril and terazosin for AD in sexual activity has not been well studied, but they are recognized drugs for the treatment of AD. Regular daily dosing of terazosin may have positive effects in terms of alleviating incontinence and preventing episodes of AD.⁸⁰

Other Advanced Techniques to Treat Sexual Dysfunction

Even though many of the techniques previously described can help remediate sexual concerns, there will still be patients who need further treatments for their sexual concerns. These may include advanced personal sexual counseling or marital counseling, use of the clitoral vacuum suction device,⁸² or surgical procedures such as penile prostheses or urinary diversions. Although not clinically available, a small case series recently trialed a sensory substitution system for men with SCI from insensate penis to the tongue.⁸³

A complete discussion of these procedures is beyond the scope of this article. It is recommended

that the clinician consult a specialist if patients are in need of this level of care.

Conclusion

The prospects for resuming a satisfying sex life after SCI continue to improve. In this article, we have suggested a systematic way to address people's concerns related to sexuality after SCI. Regardless of the technique chosen by the professional, it is important that the patients be treated with respect for their values, sexual preferences, and interest or lack thereof in remaining sexually active. It is most important that clinicians be optimistic with patients regarding their sexual potential. Because of the psychologic aspects of sexuality, clinicians can cause undue harm by making statements such as "give up on sex," "sex is dead," "forget having children," or "just give it time," especially when the options provided here are not offered. Above all, it is important that clinicians do not add to the patients' potential distress related to their sexuality and that they continue to assist patients who request treatment of their sexual concerns or refer patients to a qualified professional.

Future research related to sexuality and SCI is necessary. Although significant progress has been made treating arousal issues in men, sexuality remains a priority for persons with SCI in order to achieve their optimal quality of life. As new treatments are established for able-bodied individuals, they should be tested in persons with SCIs. Moreover, the use of new technologies and care models should be explored to allow patients with SCIs to achieve access to care.

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