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Sexuality and Spinal Cord Injury

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Introduction

With longer life expectancies following SCI, the emphasis in spinal cord injury rehabilitation over the past decade has gradually shifted to improved quality of life and community integration. Toward this goal, issues related to sexuality are important to address in both the acute and post acute stages spinal cord injury. Providing sexual education to individuals with SCI and their partners is best accomplished by an interdisciplinary team approach in which both medical and psychological issues can be addressed.

Male Sexual Act

Erectile and ejaculatory function are complex physiological activities that require the interaction between the vascular, nervous and endocrine systems. Erections are controlled by the parasympathetic nervous system.

In describing this process, erection is controlled by a reflex arc that is mediated in the sacral spinal cord. This reflex involves an afferent and efferent limb. The afferent limb consists of somatic afferent fibers from the genital region that travel through the pudendal nerve into the sacral spinal cord. These fibers travel through the cauda equina and exit via the S2 to S4 nerve roots of the spinal cord. The post-ganglionic parasympathetic fibers secrete nitric oxide, which causes relaxation of the smooth muscle of the corpus cavernosum and increases blood flow to the penile arteries. Consequently, the vascular chambers of the penis become engorged with blood and the result is an erection. This reflex is modulated by higher brainstem, subcortical and cortical centers. In addition, erectile function is influenced by hormonal factors such as testosterone.

Ejaculation signals the culmination of the male sexual act and is primarily controlled by the sympathetic nervous system. Similar to the sympathetic innervation of the bladder, these fibers originate in the thoraco-lumbar spinal cord and travel into the sympathetic chain. These impulses then travel through the splanchnic nerves into the hypogastric plexus. After synapsing in the inferior mesenteric ganglion, postganglionic fibers travel through the hypogastric nerves to supply the vas deferens, seminal vesicles and ejaculatory ducts in the prostate.

Female Sexual Act

The physiology of the female sexual act has not been studied as well as the male sexual act. However, female sexual satisfaction is dependent on a complex interaction of the endocrine and nervous systems. Sexual excitation is the result of psychogenic and

physical stimulation. This arousal is manifested by vaginal lubrication and tightening of the interoitus. Stimulation of the genital region including the clitoris, labia majora and labia minora causes afferent signals to travel via the pudendal nerve into the S2 to S4 segments of the spinal cord. These fibers interact with efferent parasympathetic fibers that project through the pelvic nerve. The result is dilation of arteries to perineal muscles and tightening of the interoitus. In addition, the parasympathetic fibers cause the Bartolin's glands to secrete mucus, which aids in vaginal lubrication.

Female orgasm is characterized by the rhythmic contraction of the pelvic structures. Female orgasm also results in cervical dilation, which may aid in sperm transport and fertility.

Sexual History

A simplified sexual history should be part of the initial clinical assessment. Key elements include physical capabilities, past sexual activities and current sexual function. In addition, the clinician should inquire into the partner's availability, partner satisfaction, sexual orientation, behavioral repertoire and past sexual abuse. Open ended questions often facilitate better communication and provide the individual with the opportunity to ask specific questions of the clinician. Topics of a more sensitive nature should be reserved for later in the interview when a therapeutic relationship has been established.

Psychological Considerations

Adaptation to an SCI is a gradual process that extends over a prolonged period of time. Successful sexual adjustment is influenced by many factors such as age at time of injury, quality of social supports, physical health, gender and severity of the injury. Losses need to be mourned so that the remaining strengths can be nurtured and developed. To achieve satisfying sexual adjustment, a person with an SCI will have to learn their new sexual abilities, as opposed to recapturing the past.

After a traumatic injury, individuals typically go through a period of reduced sexual drive. Although libido is not affected by SCI, it may be diminished by depression, trauma of the injury, medications or lower testosterone levels. Initially after injury, some persons with SCI may deny the importance of sexual issues and remain focused on ambulation and recovery of functioning. Other individuals may be reluctant to discuss issues related to sexuality due to cultural or personal reasons. Other individuals may go through a period of sexual "acting out" (i.e., unacceptable sexually explicit language, inappropriate unwanted physical contact with staff, etc.) while on the rehabilitation unit. Such behavior is not uncommon as an individual grapples with the changes and implications associated with a spinal cord injury.

During the acute rehabilitation phase, a sensitive discussion regarding sexuality is appropriate. The person with SCI may inquire about issues such as dating, attractiveness, relationships, parenthood and physical appearance. Other topics of interest may include erections, lubrications, positioning, sensation, orgasm, ejaculation and fertility. Many individuals will inquire about sexuality as it related to bladder and bowel function. Even

if the individual does not initiate discussions about these topics during rehabilitation, it is important for members of the rehabilitation team to provide basic information.

In the months following discharge, most patients begin to experiment with the changes in their sexual functioning. Most people with injuries are sexually active within the first year following discharge from the rehabilitation hospital. However, the process of mastering the sexual changes is a gradual process that can extend over a prolonged period of time. It is during these months following discharge that most people with a spinal cord injury are most ready to receive information and counseling regarding sexuality. Unfortunately, at this time they may be isolated from their previous rehabilitation staff members and lack the community resources to obtain accurate and useful information.

As for women, Margareta Kreuter and colleagues from Denmark have reported that 80% of women with spinal cord injury are sexually active following their injury. Their work has demonstrated that both women with SCI as well as able bodied women are motivated by intimacy needs rather than purely physical desires. For the women with SCI who were not sexually active, issues related to feelings of unattractiveness, inadequacy and low self esteem seem to be the primary issues needing to be addressed.

Male and Female Arousal

Men and women with SCI often lack sensation at traditional erogenous areas such as the genital and nipple areas. As such, stimulating these areas may result in penile erections or vaginal lubrication but not necessarily sexual pleasure. However, other areas, sometimes not normally recognized as erogenous areas, such as the ears, eyelids and neck, can be stimulated to provide sexual arousal. Some individuals find the skin surface around the neurological level to have heightened tactile sexual response. This is an area often used in sexual activity and typically found to be extremely erotic and pleasurable (Kreuter et al. 2008).

Male Sexual Function: Erections, Ejaculation and Orgasm

Men with SCI may obtain either reflexogenic or psychogenic erections. Reflex erections are achieved by manual stimulation of the genital region. Typically, these erections will be sustained only as long as the stimulation is provided. In contrast, psychogenic erections are the result of erotic stimuli that result in cortical modulation of the sacral reflex arc. In general, erections are more likely with incomplete injuries (both upper and lower motor neuron), than complete injuries. Many times, men with a spinal cord injury can only maintain an erection while the penis is stimulated and the rigidity of the erection is insufficient for sexual intercourse. As such, the erection must be augmented with devices, medications or a penile implant if the couple wish to engage in sexual intercourse.

In men with spinal cord injury, the ability to ejaculate is less common than the ability to obtain an erection. The rate of ejaculation varies depending on the nature and location of the neurological injury. In complete upper motor neuron lesions, the ejaculation rate is estimated at 2 percent. In incomplete upper motor neuron lesions, the ejaculation rate is estimated to be somewhat higher at approximately 32%. Many men who are able to

ejaculate experience retrograde ejaculation into the bladder, some may experience dribbling of semen.

The experience of orgasm in men with SCI is variable. Some individuals describe a primarily emotional event. Others experience generalized muscle relaxation or a pleasant sensation in the pelvis or at the sensory level. Other men report orgasm to be non-existent following the injury.

Oral Therapy for Male Sexual Dysfunction

Sildenafil (Viagra) was approved by the FDA in 1998, and may have a significant role in the treatment of erectile dysfunction for men with SCI. Sildenafil is a type 5 phosphodiesterase inhibitor (PDE 5) that prevents the intracorporal breakdown of cyclic GNP. It is rapidly absorbed after oral administration and is taken approximately 60 minutes before anticipated sexual activity. It is most effective for men who are capable of achieving reflex erections. It can assist the man in gaining further rigidity and in sustaining the erection for penetration. Sildenafil is contraindicated in men taking nitrates due to the risk of profound hypotension. Many men with spinal cord injury have low baseline blood pressure and this agent should be prescribed with caution. In addition, this drug is not recommended for those individuals with cardiac disease. Side effects noted in this otherwise well population include facial flushing, dyspepsia, headache and visual disturbances.

Since the introduction of Sildenafil, other PDE 5 medications such as Tadalafil (Cialis) and Vardenafil (Levitra) have been successfully used to enhance the quality of erections. These medications, which are taken two hours before sexual activity, have a similar dilating effect on the penile vasculature and have gained in popularity over the last several years. Tadalafil has been especially welcomed among younger men because of its extended half life of 36 hours and ability to make sexual activity more spontaneous. Recently, lower doses of Tadalafil have been introduced which are taken on a daily basis in order to maintain a therapeutic level over an extended period of time. The daily dosage of Cialis is recommended for men who are sexually active more than twice per week.

Intracavernosal Injection Therapy

Therapy with intracavernosal injection of papaverine, alprostadil and phenotolamine is an accepted and effective treatment of erectile dysfunction. Initiating this therapy necessitates a referral to a urologist. Initially, individuals are given small doses of the pharmacological agents and the dose is increased until a satisfactory erection is obtained for intercourse. Sometimes, a mixture of agents is prescribed. Erections should not persist beyond four hours before seeking medical attention Priapism is a possibility; therefore, both partners should be properly trained. Many men with tetraplegia have impaired hand function and will require a cooperative partner to perform the injection. Some individuals with incomplete injuries may experience minor pain at the injection site. Penile fibrosis is also a potential risk of intracavernosal therapy. To avoid such a complication, the individual or partner is encouraged to put pressure on the injection site for several minutes following injection.

Transurethral Therapy

Recently, transurethral delivery systems for administering agents that result in erections have been approved. The medication delivered is usually alprostadil and a small pellet is inserted in the urethra prior to sexual activity. This treatment is generally not as effective as intracavernosal therapy and can cause burning among men who have some intact sensation. Many men are not satisfied with the rigidity of the erections obtained and in general the procedure is not widely recommended.

Penile Vacuum Devices

These devises create a vacuum around the penis. As a result, blood is drawn into the corporal spaces. A band is then slipped off the plastic cylinder around the base of the penis to maintain penile tumescence. Ejaculation may be retarded due to the constriction of the urethrea. However, newer models are available with constricting bands that are less likely to diminish ejaculation.

Vacuum devices are non-invasive, economical and efficacious. However, these devices require some degree of manual dexterity. For many men with tetraplegia, the partner must be willing to assist with the procedure. In addition, men must transfer out of the wheelchair and be in a recumbent position to obtain a good vacuum seal at the base of the penis. Individuals with incomplete injuries may experience pain, discoloration and coldness at the base of the penis. Constriction rings should not remain in place for more than 30 minutes. Longer time periods may be associated with potential skin breakdown. Vacuum devises are more accepted by men in more established sexual relationships. For younger couples, the devise is often regarded as un-natural and cumbersome. Some men use vacuum devices to augment erections obtained with oral medications although this has become less common in recent years. Vacuum devises are often used in underdeveloped nations where pharmacotherapy is unavailable or not affordable.

Penile Implants

Penile implants, on the other hand, are enjoying great success today and the new technology has made them extremely popular. Many men with spinal cord injury speak very highly of the devises. After the initial adjustment, many men feel very positive about an implant. For men who choose this method to improve erections, especially younger ones, there is an emotional adjustment in accepting the fact that an implant is the only remaining solution to restore an erection. This emotional process can take some time! Implants should generally be considered after other treatments have proven to be ineffective.

Penile implants are highly effective and can be very satisfying for many couples. The individual however needs to be realistic and know what to expect. An implant will not return the sexual functioning of your youth nor will it increase genital length. An informed and properly informed individual however knows what to expect and is most often quite satisfied with the results.

Even today, an implant remains the last resort in restoring sexual functioning. The insertion of an implant is final and there is no going back after the surgery. It's a serious decision and should never be taken lightly. It should only be done after talking with your partner and your doctor. Many men feel that it is also helpful to obtain a second opinion before moving ahead with the surgical insertion of an implant. Ultimately however the decision is between you and your partner.

There are two types of implants on the market today. These include the bendable and the inflatable prostheses. The bendable implants seem to be less popular since the man has a permanent erection. This type of implant consists of two plastic rods that are placed in the erection chambers of the penis. These are the spaces that would normally fill with blood during an erection.

One of the main advantages of the bendable implant is that it helps a man to keep a condom in place. Naturally, this is important if he uses some form of condom drainage for urination. Although, this form of urinary drainage has become less popular in recent years, condom drainage may still be used at night. Some men who have been unsuccessful with intermittent catherizations also use it. The big disadvantage for the bendable implant however is the fact that the man has a permanent erection. This can be embarrassing at a gym, the beach or when wearing tight clothing.

The inflatable implant consists of a pair of inflatable cylinders that are surgically implanted into the penis. A pump for the implant is also surgically inserted into the scrotum. When a man wants to get an erection, he squeezes the pump, which moves fluid (usually saline) into the inflatable cylinders and makes the cylinders rigid. When deflated the penis returns to a normal flaccid size (Hakim 2002).

Penile implants are considered when other treatments have been unsuccessful, especially if trauma has disrupted the penile vascular system. It also may be indicated is severe Peyronie's disease is a factor. Implants are not considered in the first year post injury so that persons with SCI can make emotional adaptations to the injury and explore less invasive options for sexual activity.

Male Fertility

The act of ejaculation and the ability to have children is one of the most perplexing sexual issues facing couples with spinal cord injury (SCI). The etiology of SCI infertility is secondary to the organic pathology affecting the neuromuscular mechanisms controlling the ejaculatory sequence. Anejaculation results from a pathological interruption at any neurological/muscular level of the ejaculatory process.

The vast majority of men with all levels of spinal cord injury experience difficulties in the attempt to have a child through the impregnation of an egg during sexual intercourse. These problems are often called male related factors are typically associated with erectile dysfunction, ejaculatory dysfunction, poor semen quality or a combination of these factors. Naturally, lack of sexual desire may also be a significant factor that can affect

arousal, sexual performance and frequency of sexual contact. Some disturbance or interruption in any of these aspects can lead to reproductive problems.

As a result of ejaculatory difficulties, men with SCI must often utilize techniques, other than intercourse, to achieve impregnation of the female's egg. These include manual stimulation, the use of penile vibratory stimulation or the use of a rectal probe, called electroejaculation. Although electroejaculation is the least preferred, it is the most effective with up to an 83% success rate. In general however, any of these techniques can be used to obtain the semen sample. Both of these techniques may precipitate autonomic dysreflexia so that couples need to be aware of the symptoms associated with this sudden increase in blood pressure.

After obtaining the sample and determining the quality of the semen, the couple can attempt pregnancy with various fertility procedures. These currently available fertility procedures include intra-vaginal insemination, intra-uterine insemination (IUI), in-vitro fertilization (IVF), gamete intrafallopian transfer (GIFT) and intracytoplasmic sperm injection (ICSI).

While men with spinal cord injuries have a variety of options in obtaining sperm and in fertilizing the egg of their partner, they still face challenges as a result of the effect of the SCI on the quality of the sperm. Research has demonstrated that although men with spinal cord injuries have normal numbers of sperm, the percentage of motile sperm tends to be lower than men without injury. In general, men with SCI have been shown to have approximately 20% of motile sperm as compared to 70% in men who are able bodied.

Researchers at the University of Miami have reported in the Journal of Urology that sperm motility does not correlate with level of injury, age, time post injury or frequency of ejaculation. In addition, these researchers have noted that men with SCI have fragile sperm that quickly lose their ability to swim. Fortunately however, sperm quality does not decline over the years since the man was injured. As a result, sperm banking shortly after injury, which was popular in the past, is no longer considered a viable and necessary option for future fertilization.

For men with spinal cord injuries, successful pregnancy rates range from 10 percent to 35 percent. In general, men with incomplete lesions (both upper and lower motor neuron) are more likely to become fathers than those with complete lesions. Conditions that may contribute to infertility include retrograde ejaculation and especially repeated urinary tract infections. Issues such as elevated testicular temperatures from sitting in the wheelchair, tight underwear or other lifestyle factors are generally not considered significant issues in sperm quality.

Urinary and Fecal Incontinence

Urinary and fetal incontinence at inopportune times and subsequent social rejection are major fears of many people with SCI. These factors are often a major reason why individuals are not socially or sexually active after a spinal cord injury. A bladder or bowel accident may occur at any time during courtship, sexual activity or during social

events. The embarrassment, shame and humiliation associated with incontinence create undue anxiety and are often regarded as insurmountable obstacles to a sexual relationship. Communication, preparation and timing of sexual activity are important considerations in addressing these difficult possibilities.

To minimize untimely episodes of incontinence, the bladder should be emptied prior to sexual activity. Foley catheters, if present, can be taped to the side of the penis with a condom placed over the catheter. Females can engage in sexual intercourse despite the presence of a Foley catheter by taping the catheter to the abdomen. Despite the best management program, sexual stimulation can cause urinary and or fecal incontinence. Embarrassing passage of gas from the vagina, bowel or ostomy bag can be avoided by gentle thrusting, coital positioning and a careful diet. Fluids should be limited during the hours preceding sexual activity. Towels should be available to manage episodes of urinary or fecal incontinence. Most importantly, couple need to discuss these issues and communicate with one another regarding their feelings, anxieties and fears.

Female Sexual Function: Sexual Arousal and Vaginal Lubrication

Most women with SCI can achieve some level of vaginal lubrication. This lubrication, similar to erection in the male, can be mediated by reflexogenic or psychogenic factors. Women with incomplete (both upper and lower motor neuron) injures are more likely to have satisfactory lubrication. If vaginal lubrication is unsatisfactory, then a water soluble lubricant can be recommended. Sildenafil may be of limited value in women with SCI by increasing blood flow to the perineum and increasing vaginal lubrication which may improve sexual satisfaction. However, previous studies on the use of PDE 5 medications such as Sildenafil with women have been disappointing and have been terminated by the pharmaceutical industry. Current studies seem to be more focused on the role of testosterone replacement for women with sexual dysfunction.

Female Fertility

Immediately after injury, 44 percent to 58 percent of women suffer from temporary amennorhea. Menstruation usually returns within 6 months post injury. Neither the level nor the completeness of the injury appears to be associated with the interruption of menstrual cycles. In a small percentage of women with SCI, there are also changes in cycle length, duration of flow, amount of flow and amount of menstrual pain. Most women with SCI are fertile and should use appropriate birth control techniques unless the couple desires to have a child.

Birth Control

The issue of birth control can be somewhat problematic for women with SCI. Condoms provide contraception as well as diminish the risk of transmission of sexually transmitted diseases. A diaphragm may be another acceptable option if the individual has adequate hand dexterity or a cooperative partner. Oral contraception is associated with increased incidence of thromboembolism and must be prescribed with caution in women with SCI. Oral contraceptives that contain only progesterone may be safer than medications that

contain both estrogen and progesterone. The IUD may be associated with increased incidence of pelvic inflammatory disease and autonomic dysreflexia. In addition, women with SCI may not be able to perceive if the devise has migrated out of the cervix.

Pregnancy

Pregnant women with SCI have an increased risk of urinary tract infections, leg edema, autonomic dysreflexia, constipation, thromboembolism and pre-mature birth. Since uterine innervation arises from the T10 to T12 levels, patients with lesions above T10 may not be able to perceive uterine contractions or fetal movements. It may be difficult to differentiate between pregnancy induced hypertension (pre-eclampsia) and autonomic dysreflexia. Autonomic dysreflexia may be the only clinical manifestation of labor. During the second and third trimester, pregnant women may have difficulty in performing functional tasks that were previously completed independently. Transfers may require the assistance of a caregiver and a power wheelchair may be necessary for mobility. Locating an obstetrician and anesthesiologist with a supportive attitude, an accessible office and experience in SCI can be difficult in many areas.

Conclusion

Sexual adaptation after an SCI is a gradual process that involves psychological and physical adjustments. The availability of new medications, devices and procedures have greatly enhanced the possibility of having a satisfactory sexual life after a SCI. Currently, The Consortium for Spinal Cord Medicine at the Paralyzed Veterans of America is developing clinical practice guidelines on sexuality and reproductive health that will address the information that should be communicated to individuals and their partners after injury.

Suggested Readings

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