

Sexual and reproductive function in spinal cord injury and spinal surgery patients

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Abstract

Sexual and reproductive health is important quality of life outcomes, which can have a major impact on patient satisfaction. Spinal pathology arising from trauma, deformity, and degenerative disease processes may be detrimental to sexual and reproductive function. Furthermore, spine surgery may impact sexual and reproductive function due to post-surgical mechanical, neurologic, and psychological factors. The aim of this paper is to provide a concise evidence-based review on the impact that spine surgery and pathology can have on sexual and reproductive function. A review of published literature regarding sexual and reproductive function in spinal injury and spinal surgery patients was performed. We have found that sexual and reproductive dysfunction can occur due to numerous etiological factors associated with spinal pathology. Numerous treatment options are available for those patients, depending on the degree of dysfunction. Spine surgeons and non-operative healthcare providers should be aware of the issues surrounding sexual and reproductive function as related to spine pathology and spine surgery. It is important for spine surgeons to educate their patients on the operative risks that spine surgery encompasses with regard to sexual dysfunction, although current data examining these topics largely consists of level IV data.

Introduction

Sexual and reproductive function are important factors contributing to quality of life in many patients.¹ Spine pathology can have negative impacts on sexual and reproductive function.^{2,3} The effects of spinal cord injury, which has a prevalence of 906 per million in the United States, are particularly profound.⁴ In a study examining spinal cord injury (SCI) subjects with a median of 2 years post-injury, the authors found that higher levels of sexual

adjustment, measured using the Sexual Interest and Satisfaction Scale (SIS), were positively correlated with higher quality of life (QL) scores using a visual analogue scale (VAS) ($r=0.52$, $P<0.001$).⁵ Kreuter *et al.* also reported a positive correlation between sexual adjustment (SAS scale) and quality of life using VAS ($r=0.39$, $P<0.01$).⁶ In a survey of 681 SCI men and women, 13% of quadriplegics ranked sexual function as the highest priority to improve quality of life, with 26.7% of paraplegics ranking it the highest.¹

There are many methods of assessing outcomes after injury, including the: ASIA Impairment Scale (AIS),⁷ the International Standards to document remaining Autonomic Function after Spinal Cord Injury (ISAFSCI),⁸ the Lumbar Stiffness Disability Index (LSDI),⁹ the Oswestry Disability Index (ODI).¹⁰ While some of these tools specifically address sexual function, others address more general global functioning with additional assessment of sexual function. The purpose of this review is to provide a concise, evidence-based review examining the impact that spine trauma and spine surgery can have on sexual and reproductive function, and to review the available diagnostic and treatment modalities, which exist.

Anatomy: science of erection and ejaculation

The penis is comprised of erectile and nonerectile tissue. The internal pudendal artery supplies erectile tissue, comprised of the corpus spongiosum and two corpora cavernosa. Dilation of arterioles supplying the erectile tissue causes blood to flow into the expanding empty spaces, expanding and constricting draining veins against the surrounding tunica albuginea.¹¹ Innervation consists of parasympathetic, sympathetic, and somatic fibers from the sacral segments S2-S4 nerve roots. The pelvic nerves provide autonomic function where as the pudendal nerves are responsible for somatic function. The hypogastric nerves also provide innervation and originate in the thoracic-lumbar (TL) segments T11-L2.² Ejaculation occurs in two phases: emission and expulsion. Emission (introduction of spermatozoa to the posterior urethra) is controlled by sympathetic and parasympathetic innervation from the pelvic plexus. The expulsion phase consists of rhythmic contraction of the bulbospongiosus and ischiocavernosus muscles along with relaxation of the external urethral sphincter, which are all somatically innervated by the pudendal nerve. The internal urethral sphincter is responsible for preventing retrograde ejaculation and has sympathetic and parasympathetic innervation. The exact triggering of expulsion is not entirely

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ly known, but is viewed as likely being a spinal reflex.¹²

Effects of spinal trauma on sexual and reproductive function

Spinal cord, cauda equina, and sacral root injury

Predicting and understanding sexual and reproductive function following SCI requires a sound understanding of spine trauma pathoanatomy. The neurological level of injury (NLI) is defined as the most caudal segment of the spinal cord with intact sensory and anti-gravity motor function on right and left sides of the body. Sensation and motor function rostral to that level must be intact. Sacral sparing refers to preservation of sensory and/or motor function at the S4-S5 sacral segments and is used to refer to an incomplete spinal cord injury; complete spinal cord injuries do not exhibit sacral sparing. A complete injury to the cauda equina is a lower motor neuron injury which may result in flaccid paralysis of the lower limb muscles, an areflexic bowel and bladder, and the bulbocavernosus reflex may be lost.⁷

Severity of injury: American Spinal Injury Association classification

The ASIA Impairment Scale (AIS) is used to

describe the completeness or severity of SCI (Table 1).⁷ Kim *et al.* found no significant difference in AIS scores between those reporting sexual dysfunction and those reporting no difficulties with sexual dysfunction. Although the American Spinal Injury Association (ASIA) impairment scale helps to classify the extent of neurological injury, it does not provide any information regarding sexual function.¹³

Severity of injury: International Standards to document remaining Autonomic Function after Spinal Cord Injury

The ASIA and the International Spinal Cord Society (ISCoS) have developed an assessment to document the autonomic functioning in an individual after spinal cord injury called the International Standards to document remaining Autonomic Function after Spinal Cord Injury (ISAFSCI).⁸ The assessment form includes scoring on sexual function (Figure 1).

Erection

Erectile function depends on the level of injury in SCI men. Both sacral segments and thoracic-lumbar segments modulate erectile function. In a study of 71 SCI men,² 100% of the men retained reflexogenic erections when the complete lesion was above the sacral segments. Subjects with injury to the conus medullaris and cauda equina were able to generate erections using psychogenic and reflexogenic stimuli in 90% and 80% of cases, respectively. The production of reflexogenic erections in this group is likely due to the fact that lesions to the conus medullaris or cauda equina are often partial in nature. A limitation of this study was the definition of erection as an increase in penile circumference of at least 3 mm with no definition of rigidity necessary for penetrative intercourse.² Lesions below T11

generally only allow filling of the corpora cavernosa via reflexogenic erections, while lesions above T11 will allow filling of both the corpora cavernosa and the corpus spongiosum.¹⁴

Ejaculation

In the study by Courtois *et al.*, men with lumbosacral spinal cord injuries sparing the upper lumbar and thoracic segments were able to maintain ejaculation; however, this was generally immediately after tumescence.²

Sexual function: data on outcomes and satisfaction

Numerous investigations have examined sexual satisfaction after SCI. Kreuter *et al.* showed that 61% of SCI patients were satisfied with their sex life, compared to 86% of the controls (without SCI) expressing satisfaction ($P<0.001$).⁶ Additionally, there may not be an association between sexual satisfaction and decubitus ulcers ($P=0.073$).¹⁵ A retrospective study showed a correlation between younger age at injury and more satisfaction with sexual life after injury in SCI men and women ($P<0.001$).⁵ Kreuter *et al.* demonstrated the importance of psychological factors in sexual adjustment after spinal cord injury. They found that partner satisfaction with sex and satisfaction with the patient's sexual adequacy, both as perceived by the patient were strongly correlated with sexual adjustment after SCI ($r=0.86$ and 0.89 respectively, $P<0.001$).⁶

Male-specific outcome data

A study examining outcomes at least 10

years post SCI-injury in 193 men found that 75% reported achieving an erection, with 39% of those reporting deliberate erections, 44% reported spontaneous erections, and 17% reported both. Of this study population, 65% reported the erection as hard/normal. Overall, 44% achieved ejaculation, 56% of those had used an ejaculatory aid. Those reporting ejaculation were significantly younger (mean 46 years *versus* 54 years) than those who reported inability to ejaculate ($P<0.0001$).¹⁶

Another investigation examining erection in SCI men found that the percent of men achieving erection varied with type of injury: complete upper motor neuron lesion, incomplete upper motor neuron, complete lower motor neuron, incomplete lower motor neuron lesions achieving 93%, 99%, 26%, 90% rates of erection respectively.¹⁴

Men are less satisfied with sex life than women following SCI.¹⁶ Sexual satisfaction has been shown to decrease with age in traumatic SCI men ($P<0.001$). Lower sexual satisfaction was found in men whom injury occurred at an older age ($P=0.001$).¹⁵ Cervical injury level was associated with higher levels of sexual satisfaction than lower injuries ($P=0.030$)¹⁵ and men with upper motor neuron injuries tend to have more frequent erections. Neuropathic pain and fecal incontinence led to sexual dissatisfaction in men ($P=0.006$, $P=0.002$, respectively).¹⁵

In another cross-sectional survey of 193 men with traumatic SCI, no statistically significant difference in sex life satisfaction between quadriplegic and paraplegic men was found ($P=0.5$). They also found that sex life satisfaction and age were not correlated, contrary to the study by Valtonen. They also reported a trend toward more sex life satisfaction if ejaculation was possible, although this relationship was not statistically significant ($P=0.13$). No statistically significant difference between satisfaction with sex life and problems with incontinence, pressure ulcers, spasticity, or pain were reported in this study ($P=0.12$).¹⁶

Table 1. The American Spinal Injury Association Impairment Scale.

Grade	Description
A	Complete. No sensory or motor function is preserved in the sacral segments S4-S5.
B	Sensory incomplete. Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5, AND no motor function is preserved more than three levels below the motor level on either side of the body.
C	Motor incomplete. Motor function is preserved below the neurological level,* and more than half of key muscle functions below the single neurological level of injury have a muscle grade less than 3 (Grades 0-2).
D	Motor incomplete. Motor function is preserved below the neurological level,* and at least half (half or more) of key muscle functions below the NLI have a muscle grade >3 .
E	Normal. If sensation and motor function as tested with the ISNCSCI are graded as normal in all segments, and the patient had prior deficits, then the AIS grade is E. Someone without a SCI does not receive an AIS grade.

*For an individual to receive a grade of C or D, i.e. motor incomplete status, they must have either (1) voluntary anal sphincter contraction or (2) sacral sensory sparing (at S4/5 or DAP) with sparing of motor function more than three levels below the motor level for that side of the body. The Standards at this time allows even non-key muscle function more than 3 levels below the motor level to be used in determining motor incomplete status (AIS B *versus* C).

Females-specific outcome data

A cross-sectional survey of 472 women with SCI found that the percentage of women reporting sexual intercourse increased with years after injury. In total, 87% reported intercourse before injury, compared to 49% at 1-year post injury, 65% at 2 to 10 years post injury, and 76% at 11+ years post injury ($P<0.001$). Females with injury to the thoracic spinal cord reported a statistically significant decrease in sexual intercourse frequency after

injury ($P<0.05$). Completeness of injury was not found to associate with frequency of sexual intercourse ($P>0.05$). Eleven point four percent of women reported autonomic dysreflexia associated with sex after injury. Cervical spine injury was most strongly associated with autonomic dysreflexia ($P<0.01$). Bladder incontinence was reported by 12% of the cervical spine injured patients, 21.9% of the thoracic spine injured patients, and 7.1% of the lumbar/sacral spine injured patients ($P<0.05$).¹⁷

In Jackson and Wadley's study, only 37.3% of females reported they were able to achieve orgasm after injury compared to 79.1% before

injury ($P<0.0001$). The study displayed that increasing number of years post injury, lower level of injury, and incomplete of injuries correlate with a greater chance to achieve an orgasm ($P<0.0001$, $P<0.05$, and $P<0.05$, respectively).¹⁷ Valtonen *et al.* found that urinary and fecal incontinence in addition to spasticity were the most common concerns of sexually active women following traumatic SCI.¹⁵ Valtonen *et al.*¹⁵ and Biering-Sørensen *et al.*¹⁶ found mixed results regarding level of injury and sexual satisfaction in women and mixed results regarding age at injury and sexual satisfaction.



Autonomic Standards Assessment Form

Patient Name: _____

General Autonomic Function

System/Organ	Findings	Abnormal conditions	Check mark
Autonomic control of the heart	Normal		
	Abnormal	Bradycardia	
		Tachycardia	
		Other dysrhythmias	
	Unknown		
Autonomic control of blood pressure	Normal		
	Abnormal	Resting systolic blood pressure below 90 mmHg	
		Orthostatic hypotension	
		Autonomic dysreflexia	
	Unknown		
Autonomic control of sweating	Normal		
	Abnormal	Hyperhidrosis above lesion	
		Hyperhidrosis below lesion	
		Hypohidrosis below lesion	
	Unknown		
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		

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

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 to document remaining Autonomic Function after Spinal Cord Injury assessment.

Reproduction following spinal cord injury

Following SCI, some women are able to become pregnant and successfully bear children,¹⁷ although pregnancy in SCI women carries several risks. There was a statistically significant increase in diabetes and UTIs during pregnancy postinjury compared to preinjury ($P<0.05$). Pregnancy was also associated with higher rates of disability-related complications, including higher rates of autonomic dysreflexia, pressure ulcers, worsening spasticity, leakage around indwelling catheters, catheter expulsion due to spasm, and more frequent catheterization. Overall, 75% of SCI women who became pregnant complained of pregnancy complications compared to 49.8% of non-SCI pregnant women ($P<0.05$). Labor symptomatology can range from normal uterine contractions, pain, and rupture of membranes to pain above injury level, increased spasticity, autonomic dysreflexia, and bladder spasms. SCI women had lower rates of spontaneous vaginal delivery (48% *vs* 62%) and required more frequent use of C-sections (17.8% *vs* 8.3%) or forceps/vacuum extraction (13.9% *vs* 6.9%). Higher rates of labor and delivery complications were also noted, including: blood pressure instability (22.7% *vs* 5.3%, $P<0.05$) and prematurity (21.2% *vs* 12.6%, $P=0.07$). SCI women did however have higher rates of delivering without anesthesia (50% *vs* 23.9%, $P<0.05$). Among babies not born prematurely, those from SCI mothers were more likely to have low birth weight (less than 5 lbs 6 oz) (13.6% *vs* 4.5%, $P<0.05$). The babies were also less likely to be breastfed (11% *vs* 28%, $P<0.05$).¹⁷ In a survey of 188 SCI men, 81% had not made a woman pregnant after injury, with 34% of those saying the problem was due to the spinal cord injury and 22% responding with no answer. Of the men reporting pregnancy with a partner, 100% could achieve an erection and 89% ejaculation. Of the men reporting no pregnancy in a partner, 71% could achieve an erection and 34% ejaculation ($P=0.0005$ and $P<0.0001$ respectively).¹⁶

Spinal deformity and degenerative disease

Mechanical factors

Pathology of the spine other than SCI can also affect sexual and reproductive function. Berg *et al.* demonstrated a significant increase in sex life quality ($P<0.001$) after lumbar fusion surgery or total disc replacement. The improvement in sex life quality was most closely correlated with decreased back pain ($r=0.71$).¹⁰

Spinal stiffness: lumbar stiffness disability index

The Lumbar Stiffness Disability Index (LSDI) is a questionnaire designed to assess impairment in performing ADLs after spinal arthrodesis with scores on each of the 10 questions ranging from 0 (No effect at all) to 4 (Cannot do at all). The tenth question is *Engage in sexual intercourse*. Scores range from 0 to 40 with the final score being computed as (raw score)/40 \times 100. Higher scores correspond with more impairment. Patients with fusion of five or more spinal levels had a significantly higher LSDI score than patients with one-level fusion (35.4 *vs* 24.2, $P=0.05$). The total LSDI scores did not vary significantly for thoracolumbar fusions versus upper thoracic ($P=0.50$).⁹ Hart *et al.* reported a significant decrease in disability associated with stiffness in patients receiving 1-level arthrodesis ($P=0.012$). Patients receiving 5 or more level arthrodesis reported an increase in disability associated with stiffness; however, not to a significant level ($P=0.055$).¹⁸

Physiological effects of spinal surgery

Anterior lumbar spine surgery: transperitoneal vs extraperitoneal approach

Retrograde ejaculation (RE) is associated with anterior lumbar spine surgery, and is a phenomenon caused by failure of the internal urethral sphincter to close. This failure causes ejaculate to enter the bladder potentially causing subfertility.¹⁹ In a multicenter, prospective 2-year study involving anterior lumbar discectomy and interbody fusion, retrograde ejaculation was noted in 1.7% of the group receiving the retroperitoneal approach and 13.3% of men receiving the transperitoneal approach with a statistically significant difference ($P=0.017$). The condition resolved by 12 months in one third of those affected, and there was no difference in recovery based on approach. The authors hypothesized that the difference in incidence of RE between the groups was due to surgical technique; the superior hypogastric plexus is protected by peritoneum during the retroperitoneal approach, whereas the plexus is dissected in the transperitoneal approach,²⁰ however the patients were not randomized in this study.

Recombinant human bone morphogenetic protein 2 (rhBMP-2)

There has been debate as to whether the use of rhBMP-2 during anterior lumbar interbody fusion (ALIF) at the L4-L5 or L5-S1 level

increases the risk of retrograde ejaculation (RE). An analysis of 5 prospective, randomized trials showed a higher incidence of RE with the use of rhBMP-2 (3.4% *vs* 1.7%) but there was no statistical significance ($P=0.242$, Fisher exact test).²¹ A retrospective analysis of 69 ALIFs with rhBMP-2 *versus* 174 ALIFs without rhBMP-2 found higher rates of RE (7.2%) in the rhBMP-2 group *versus* 0.6% in the non-rhBMP-2 group ($P=0.0025$).²² Of note, half of those who developed RE recovered by one year. A retrospective chart review of 95 men with L5-S1 level surgery found no statistically significant difference in the rate of RE between those surgeries using ALIF and rhBMP-2 and ADR (artificial disc replacement). Both types of surgery were done using an anterior, retroperitoneal approach. RE rates were 7.4% in the ALIF with rhBMP-2 group and 9.8% in the ADR group ($P=0.7226$), with recovery of function in only one quarter of patients. This study did not compare patients using ALIF without rhBMP-2, but the authors argue that the ADR group was a suitable replacement because the anterior midline surgical exposure is the same for both groups. Of note, patients in the ALIF group were significantly older (49 *vs* 35, $P<0.001$), and a higher percentage (97.6%) of patients in the ADR group had degenerative disc disease as the primary indication *versus* 72.2% of patients in the ALIF group ($P<0.001$).²³ A prospective study examining the incidence of RE after ALIF compared the rates of RE using a questionnaire versus quantitative testing using postejaculatory urine analysis and concluded that RE was overestimated when a questionnaire was used *versus* laboratory analysis (41.7% *vs* 9.5%). Additionally, the study did not show a statistical difference in RE rates between the group receiving rhBMP-2 and the group not receiving rhBMP-2 ($P>0.80$).²⁴ Importantly, these studies have also not assessed stand alone cage ALIF versus anterior plate with cage constructs, which could potentially affect the rates of RE.

A 10-year follow-up cohort-controlled study demonstrated a statistically significant ($P=0.0012$) higher incidence of RE in patients with exposure to rhBMP-2 (6.3%) *versus* those patients without exposure (0.9%).²⁵ Unfortunately, many of the studies examining the effect of rhBMP-2 use on RE employed questionnaires without laboratory testing for RE, thus placing their results into question. Due to conflicting results from numerous studies, Mroz *et al.*,²⁶ Siemionow *et al.*,²⁷ Tannoury *et al.*,²⁸ as well as the authors of this review believe that the matter of whether rhBMP-2 use is an independent risk factor for RE is still up for debate without a proven definitive causative effect.

Experience of approach surgeon

General surgeons or vascular surgeons have been used to provide surgical exposure during anterior lumbar surgery. A study by Smith *et al.* showed statistically lower values of estimated blood loss, operative time, and hospital stay time ($P=0.0007$, $P=0.0003$, $P=0.0006$, respectively) when the approach is performed by general or vascular surgeons. Retrograde ejaculation in two patients was a complication only of the group using an access surgeon.²⁹

Total disc replacement vs anterior lumbar interbody fusion vs posterior lumbar interbody fusion

A randomized controlled trial comparing total disc replacement (TDR) to posterior lumbar interbody fusion (PLIF) using the ODI (Oswestry Disability Index) item 8, Table 2,³⁰ found a significant increase in sex life quality ($P<0.001$) when either method was used with this improvement in sex life quality most correlated with decreased back pain ($r=0.71$).¹⁰

Interventions: a guide to early management and appropriate referral

Medications

Early interventions may help maximize sexual and reproductive function in spinal cord injury patients. Intracorporeal (IC) therapy is an important option to assist SCI men to achieve erection. Intracorporeal therapy often includes using papaverine – direct smooth muscle inhibition – and phentolamine – alpha-adrenergic blocker leading to smooth muscle relaxation and prostaglandin E1. Many studies have supported the efficacy of these IC medications,^{31,32} but complications such as

bleeding at the injection site and scarring of the tunica albuginea causing curvature may prohibit their use.³¹ The release of sildenafil in 1998 made oral therapy an option. Sildenafil works by blocking phosphodiesterase 5 leading to slower catabolism of cGMP. A prospective study examining 41 SCI patients identified 93% of patients as having penile rigidity adequate for sexual intercourse and a statistically significant increase in erectile function and intercourse satisfaction using the International Index of Erectile Function (IIEF) questionnaire after using sildenafil ($P<0.05$). Patients had to have an intact sacral spinal reflex segment leading to reflexive erections caused by direct somesthetic stimulation. Patients could also have psychogenic erections caused by extrinsic visual, auditory, chemosensory input or erotic thoughts. They found no significant improvement in orgasm or ejaculatory function.³³

Psychosocial therapy

The Consortium for Spinal Cord Medicine clinical practice guidelines state that sexual education in spinal cord injury patients should focus *not only about the mechanics and practicalities of sexual activity, but also integrate a person's personal needs, questions, life views, and life context as these relate to sexuality. Sexuality should be understood in the context of a person's life rather than as a separate and distinct entity.*³⁴ A questionnaire of 190 SCI individuals found sufficient levels of sexual counseling resulted in higher sex life satisfaction (Mann-Whitney, $P=0.004$).¹⁵ It is a valuable adjunct to the various other forms of treatment.

Physical aids

Vacuum erection devices (VED) uses vacuum to cause corporal filling. A cost-utility analysis deemed VED an acceptable and appropriate solution to a challenging problem.³⁵ A series of cases looking at 20 SCI men found that at 6 months 60% of men and 42% of their female partners found that the device had improved their sexual relationship. Petechiae and penile skin edema were reported as the

most frequent complications.³⁶ In spinal cord injured men who cannot ejaculate, penile vibratory stimulation (PVS) or rectal probe electroejaculation (EEJ) can be used to induce ejaculation. PVS is considered the less invasive of the two methods and results in higher semen quality.³⁷ A more cranial level of injury is correlated with a higher success rate of PVS. The highest rate of ejaculation was obtained using a 2.5 mm amplitude vibrator.³⁸ In patients not responding to PVS, the 1-adrenergic agonist midodrine was shown to help 64.6% of the 102 SCI men achieve antegrade or retrograde ejaculation. Better responses were seen in patients with complete (ASIA A) UMN lesions above T10.³⁹

Surgical intervention

Surgically implanted prosthetic devices are also an option for SCI patients, especially those who have failed pharmacological and mechanical treatment. The devices are often rigid, semi-rigid, or inflatable penile implants. Common risks include colonization and infection of the device.⁴⁰ The implants can also be useful for fitting urinary condoms and a study in 37 SCI men showed 41% of patients reporting benefit to their marital life.⁴¹

Summary

Sexual and reproductive health are important factors which can affect the quality of life of patients suffering from spinal cord injury. A sound understanding of pathogenesis, common impairments, and treatment of sexual and reproductive issues associated with SCI can help spine practitioners counsel, treat, and refer their patients. Several effective psychological, pharmacological, surgical, and mechanical treatments are available for patients with SCI-related sexual dysfunction. Importantly, most of the available literature on the sexual and reproductive complications of spinal injury and spine surgery is low level evidence, most commonly level III or level IV studies, thus further research is required to refine our understanding of these problems.

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Table 2. The Oswestry Disability Index item 8.

Statement	Corresponding score
My sex life is normal and causes no extra pain.	0
My sex life is normal but causes some extra pain.	1
My sex life is nearly normal but is very painful.	2
My sex life is severely restricted by pain.	3
My sex life is nearly absent because of pain.	4
Pain prevents any sex life at all	5

For each ODI item, a statement is picked and the corresponding score is given.³⁰

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