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How does multiple trauma, traumatic brain injury (TBI) or spinal cord injury (SCI) affect sexual functioning?

Sex is an important part of life for many people, therefore dealing with erectile problems, living with the effects of physical injury, changes in your appearance or side-effects of treatment can have an enormous impact on your sex life and relationships.

Normal sexual behaviour and erectile function depends on a complex interaction between various body-systems, including the brain, nerves, blood-supply and hormones. All of these systems (alone or in combination) may be affected following multiple trauma, traumatic brain injury (TBI) or spinal cord injury (SCI). For men, trauma may result in problems with achieving or maintaining erections (commonly referred to as erectile dysfunction; ED), problems with ejaculation, or how they think/feel about sex - all of these problems may have an indirect, if not profound impact on long-term functional recovery and overall quality of life.

Following multiple trauma, spinal injury, or TBI, it is not unusual for some men to go through a period of reduced sexual drive (reduced libido). Apart from physical effects of injury, the way the body responds sexually also depends on thoughts and feelings – thoughts and feelings about yourself and others may be influenced by changes in mood, motivation, personality and thought-processes. This may be complicated by depression, emotional trauma following the injury, medication, or changes in hormone levels.

As some men grapple with the changes and implications associated with their injury, many may initially ignore the importance of sexual difficulties, as they remain focused on physical rehabilitation and recovery of mobility. Other men may be reluctant to acknowledge sexual difficulties, due to cultural or personal reasons.

There are a wide range of treatments and interventions that may be helpful for the man and his partner, which is why assessment of sexual function should be routinely incorporated into rehabilitation and follow-up services for trauma-survivors. The information below describes common sexual problems after TBI, SCI or multiple trauma and ways to improve sexual functioning.

Normal erection physiology

Erectile dysfunction (ED) is the inability to achieve or maintain an erection that is sufficiently rigid for achieving satisfying sexual intercourse - it is either partial or complete, depending on the extent of damage to the brain, spine or peripheral nerves and blood vessels - all of which may be affected following multiple trauma, SCI or TBI.

The physiological mechanism of achieving and maintaining an erection is complex, but on a basic level, it essentially involves two different types of erections (reflex and psychogenic) functioning co-operatively. Both mechanisms augment each other during sex. An intact nervous system is required for a successful and complete erection, but even after injury, some men may be able to achieve either reflex or psychogenic erections.

Reflex erections occur with direct manual (tactile) stimulation of the penis. The ability to generate reflex erections relies on the preservation of nerve circuits in the lower, sacral segments (S2, S3 and S4) of the spinal-cord, without involvement of the brain.

The other types of erections, psychogenic erections, originate in the brain – these are the result of imaginary/erotic stimuli that exert their effect by chemical messages travelling down the spinal cord (through the thoracic T-10 to lumbar L-2 spinal regions), which trigger dilation of blood vessels that occurs during erection. In general, complete injuries to the spinal cord (above the sacral segments: thoracic T-10 to lumbar L-2) are more likely to result in difficulty in obtaining erections in response to imaginary stimuli, but reflex erections tend to remain intact. Men with SCIs between S2-4 and T10-L2 levels may retain both reflex and psychogenic erections.

Although the nerve signals are crucial, the strength or quality of a man’s erection is ultimately determined by the state of the blood vessels governing the flow of blood into sponge-like tissue of the penis (the corpora cavernosa). A chemical called nitric oxide (NO), secreted by the peripheral nerves causes the relaxation of smooth muscles responsible for regulating the diameter of blood vessels supplying the penis - this leads to increased blood-flow, which subsequently leads to penile erection.

What causes changes in sexual functioning after Multiple Trauma?

Apart from trauma to the head or the spine, problems may also occur as a result of incidental trauma and musculoskeletal injury to other parts of the body (especially in the case of multiple trauma, involving the abdomen or pelvic region). Similarly, trauma to the limbs, which may result in temporary immobilization, or painful movement, can also indirectly affect the ability to engage in sexual activity. Multiple trauma may also affect the nerves and blood vessels supplying the abdomen and pelvic region, which may directly affect the ability to achieve/maintain erections – the ability to experience normal sensation (sense of touch) may also be affected.

What causes changes in sexual functioning after SCI?

Bladder, bowel, erectile and ejaculatory problems may co-exist during the initial period following spinal injury – this is because the specialised spinal nerves that are responsible for these functions are in close proximity. Although it is not always the case, some of these functions may gradually improve, over time.

The male genital reflexes that are responsible for erections and ejaculation may be affected during the period of initial spinal injury. In addition to erectile problems, some men with SCI may also have problems with ejaculation, orgasm and loss of genital sensations, but erectile function depends largely on the nature, location (level of the spine) and extent of the spinal damage.

The physiological mechanism of achieving and maintaining an erection is complex, but on a basic level, it essentially involves two different types of erections (reflex and psychogenic) functioning together. Even after severe spinal injury, some men may be able to achieve either reflex or psychogenic erections.

Reflex erections occur with direct manual (tactile) stimulation of the penis. The ability to generate reflex erections relies on the preservation of nerve circuits in the lower, sacral segments (S2, S3 and S4) of the spinal-cord, without involvement of the brain. If the sacral segment of the spinal cord is intact, therefore, a man may still be able to achieve reflex erections. Typically however, continuous stimulation may be needed to maintain reflex erections and the rigidity of the erection may not always be sufficient

for sexual intercourse. In contrast, a sacral-level injury (compared with an injury involving higher levels of the spinal cord), may compromise the ability to achieve reflex erections.

The other types of erections, psychogenic erections, originate in the brain – these are the result of imaginary/erotic stimuli that exert their effect by chemical messages travelling down the spinal cord (through the thoracic T-10 to lumbar L-2 spinal regions), which trigger dilation of blood vessels that occurs during erection. In general, complete injuries to the spinal cord (above the sacral segments: thoracic T-10 to lumbar L-2) are more likely to result in difficulty in obtaining erections in response to imaginary stimuli, but reflex erections tend to remain intact. Men with SCIs between S2-4 and T10-L2 levels may retain both reflex and psychogenic erections.

Reproductive dysfunction in men with SCI is usually the result of a combination of erectile dysfunction, ejaculatory problems, and abnormal semen characteristics, although this varies depending on the nature, level and severity of the injury. In complete upper spinal cord injuries, ejaculation may be completely absent (commonly referred to as anejaculation). Some men who are able to ejaculate experience ejaculation into the bladder (commonly referred to as retrograde ejaculation), whereas others may experience delayed ejaculation.

Apart from problems with ejaculation, SCI can also cause semen abnormalities in the form of low sperm viability and low sperm motility. The action of the immune system following SCI and factors affecting sperm transportation/storage are most likely explanation for these abnormalities. Semen abnormalities are also most likely to occur in SCI men who have complete lesions of the spinal cord and because this condition most often affects young men, fertility may be a major concern for these patients. Although some SCI men may occasionally have the ability to become fathers, successful conception may be difficult without active medical intervention, including microsurgical sperm retrieval procedures and assisted ejaculation, by means of devices that provide vibratory or electrical stimulation.

What causes changes in sexual functioning after TBI?

The regions of the brain (and the nerves and blood vessels supplying these regions) that are normally active during sexual response in health are susceptible to damage

following traumatic brain injury (TBI). The extent of disruption caused by such damage also depends upon the location of injury (in the brain) and the extent of the injury.

There are a number of reasons why a man may develop sexual problems following TBI. Some are directly related to damage to the brain tissue itself, or they may be related to incidental damage (physical trauma) to the nerves travelling to other parts of the body, via the spine and the peripheral nerves. Because head trauma may also result in physical disability, changes in sensations in the rest of the body, or changes in thinking or relationships will also have an impact on the ability to engage in sexual activity.

Some men experience transient changes in hormone levels following TBI – this may be as a result of damage to the parts of the brain (such as the hypothalamus and pituitary) responsible for regulating hormones, such as testosterone. The immediate, indicative signs of these changes include reduced or increased desire for sex (libido), problems with achieving or maintaining erections (erectile dysfunction; ED), reduced sperm-production and delayed ejaculation. Management of post-TBI hormonal changes is important to optimise functional recovery, improve quality of life and avoid long-term problems – this is why your neurologist, or endocrinologist (a specialist who has experience in dealing with hormone abnormalities) may want to monitor hormone levels in the period following initial injury.

Psychological wellbeing and mood may also indirectly affect sexual function following TBI. It is important therefore, that an appropriate assessment should incorporate questions directed at supporting physical functioning, whilst at the same time addressing any problems that may have an impact on sexual function, including body image, mood, perceived health status and quality of life.

Below is a summary of the possible causes of changes in sexual functioning after TBI:

- *Damage to brain tissue*: Changes in sexual functioning may be caused by damage to the parts of the brain that regulate, or control sexual functioning.
- *Hormonal changes*: Damage to the brain can also affect the production of various hormones that affect sexual functioning. Because this is widely recognised, many neurologists are well-placed to monitor this closely and where appropriate, hormone therapy may be initiated, or onward referral to an endocrinologist (specialist in managing hormone problems) can be arranged.

- *Side-effects of various medications*: Various medications used to manage anxiety, depression, pain, seizures or muscle spasm, after TBI (particularly antidepressants, anti-anxiety medications, pain-killers, anticonvulsants and muscle relaxants), also have the capacity to negatively affect sexual functioning and contribute to the development of ED.

- *Fatigue/tiredness*: Following TBI, regulation of the normal sleep-wake cycle may be disrupted and some men experience excessive sleepiness, tiredness and they may notice that they fatigue very easily. Problems with excessive sleepiness, or fatigue can therefore indirectly affect motivation or interest in sex and sexual activity.

- *Mobility problems*: Physical weakness, pain, discomfort, weakness, balance problems, muscle-spasm (tightness of muscles), slowed or ataxic (uncoordinated) movements may also make it difficult to achieve a comfortable position for having sex.

- *Changes in body-image/self-esteem*: Some men may feel less confident about how they look and about their attractiveness after TBI. This may affect their comfort with sexual activity.

- *Changes in thinking and emotions*: Problems with memory attention, communication, forward-planning, problem-solving and imagining can also affect sexual functioning. Individuals with TBI may experience emotional lability, feeling anxious, sad, or irritable (sometimes for no apparent reason). These feelings may negatively affect motivation or desire for sex.

- *Changes in relationships and social activities*: The nature of a man's relationship may change following TBI, or he may experience difficulties meeting new people. This makes it difficult to embark on new relationships, or find a sexual partner.

- *Reduced libido (decreased desire):* Many men may experience less desire or interest in sex – this may be related to how they are feeling physically (for instance if they are experiencing pain/discomfort), or psychologically (if they feel less confident about themselves).

- *Increased desire*: Some men may experience increased interest in sex after TBI and may want to have sex more often than usual. Others may have

difficulty controlling their sexual behaviour in certain circumstances and make inappropriate sexual comments or make sexual advances in inappropriate situations.

- *Reduced arousal*: Whilst some men may continue to be interested in sex, they may experience difficulty in becoming sexually aroused, or they may not be physically able to respond to sexual stimuli, because of physical weakness, or changes to the way they experience sensations. Multiple trauma, (particularly affecting the abdomen or pelvic region) can also damage the blood supply and nerves responsible for causing erections.

- *Difficulty or inability to reach orgasm/climax*: Some men may experience difficulty climaxing or reaching orgasm. If this is a problem and even if they are still able to achieve erections, they may not experience the physical satisfaction that normally accompanies sexual activity.

- *Reproductive changes:* Some men may have decreased sperm production and may have difficulty getting a woman pregnant – this may be related trauma to the parts of the brain responsible for regulating hormones that encourage sperm production (e.g. testosterone), or it may be due to incidental trauma to the abdominal region, or the pelvis.

What can be done to improve sexual functioning after Multiple Trauma, SCI or TBI?

Understandably, some men feel embarrassed talking openly about sexual problems, but talking to your GP, hospital doctor or nurse means that you may be able to get appropriate support and treatment. It can also help to make you feel better and more in control - remember that sexuality is a normal part of human functioning, and problems with sexuality can be addressed, just like any other medical problem. If you are not comfortable discussing sexual problems with your doctor, it is important to identify an alternative health professional who you feel comfortable you can talk to.

Erectile dysfunction in men with TBI, SCI and multiple trauma is amenable to various treatments (available as either single or combination therapy), including oral treatment

with phosphodiesterase-5 inhibitors (PDE5-Is), intracavernosal injections (ICI), intraurethral alprostadil, vacuum devices, and penile implants. Your GP, hospital doctor, nurse practitioner or Clinical Nurse Specialist (CNS) may be able to recommend some of these treatments to help getting erections for masturbation or sex. Under Department of Health guidelines, men with multiple trauma, SCI or TBI may be entitled to prescription of treatments for problems with erections (or other sexual problems) on the NHS. There is no age limit for receiving treatment, however there may be conditions around how much medication can be prescribed. Follow your doctor's advice about how to take your treatment, and for how long. Treatments may not initially work and it may take some time and commitment, before you notice any benefits. If you have tried your treatment several times and it doesn't seem to be working, go back and let your doctor or nurse know. It may be possible to review your treatment, offer alternatives, try a combination of treatments, or refer you to a specialist service such as an erectile dysfunction (ED) clinic.

Adjusting to life after a TBI, SCI or multiple trauma can often put additional stress on your intimate relationship. If you or your partner are experiencing difficulties with your relationship, consider talking to your partner about how you feel. Individual counselling or psychotherapy may help with any emotional issues that can affect sexual functioning, as can marital or couples therapy. Some men and their partners also find it useful to see a sex therapist, to overcome sexual problems and improve sexual functioning.

When engaging in sexual activity, adopt a position that you find most comfortable, so that you can move without experiencing pain, or losing balance. This may involve discussion with your partner and adopting a position that may be different to the one you have been used to, or attempting sex at a time of day when you are less likely to be tired/fatigued.