Male and Female Fertility after SCI

Nancy Brackett PhD, HCLD
Charles Lynne MD, FACS
Stacy Elliott, MD
Shea Hocaloski, RN

September 4, 2016
OBJECTIVES

• To highlight the fertility experiences of women and men with SCI through case discussions.

• To discuss the current practice and strategies in management of fertility issues.

• To explore a multidisciplinary perspective on the most common issues related to fertility after SCI.
MALE FERTILITY AFTER SCI
Nancy L. Brackett, PhD, HCLD
Semen retrieval
Semen quality
Charles M. Lynne, MD
Management of the male partner
Management of the couple

FEMALE FERTILITY AFTER SCI
Stacy Elliott, MD
Reproductive issues
Preconception issues
Labour and Delivery
Shea Hocaloski, RN
Lactation
Postpartum issues

CASE STUDIES
Panel
MALE FERTILITY AFTER SCI

Nancy L. Brackett, PhD, HCLD
Semen retrieval
Semen quality

Charles M. Lynne, MD
Management of the male partner
Management of the couple

FEMALE FERTILITY AFTER SCI

Stacy Elliott, MD
Reproductive issues
Preconception issues
Labour and Delivery

Shea Hocaloski, RN
Lactation
Postpartum issues

CASE STUDIES

Panel
COMMON CAUSES OF SPINAL CORD INJURY IN THE UNITED STATES

#1 Motor Vehicle Accidents: 38%

#2 Falls: 30%

#3 Violence: 14%

#4 Sports: 9%

#4 Other: 9%
DO MEN ENGAGE IN MORE RISK-TAKING BEHAVIOR?

WORLDWIDE 4:1 MALE: FEMALE WHY?

IS ESTROGEN NEUROPROTECTIVE?
FERTILITY IS IMPAIRED IN MEN, BUT NOT WOMEN

Infertility is a major complication of SCI in men. 90% cannot father children by sexual intercourse.

Women with SCI can conceive and deliver children with nearly the same success rate as the general population.
CONDITIONS CONTRIBUTING TO INFERTILITY IN MEN WITH SCI:

• ERECTILE DYSFUNCTION
• EJACULATORY DYSFUNCTION
• SEMEN ABNORMALITIES
ERECTILE DYSFUNCTION

TREATMENTS FOR ERECTILE DYSFUNCTION IN MEN WITH SCI:

PDE-5 inhibitors

- Sildenafil citrate (Viagra). Best proven effectiveness.
- Vardenafil HCl (Levitra). Effective for 4-6 hours

Intracavernous injection

- Alprostadil (Caverject): prostaglandin E-1
- (Trimix): Papaverine + Phentolamine + Alprostadil

Intraurethral application: Alprostadil (MUSE)

Vacuum erection devices / restriction bands

Penile prosthesis
Current treatments for ejaculatory dysfunction in men with SCI

PURPOSE OF TREATMENT

SEXUAL PLEASURE

SEmen RETRIEVAL
**PROS & CONS**

**PVS:** Safe, 85% success if LOI at or rostral to T10, inexpensive, can be performed at home by most patients. Highest TMS yield. 15% success if LOI caudal to T10. Autonomic dysreflexia (AD).

**EEJ:** Safe, nearly 100% success rate, procedure cost is similar to PVS. Startup equipment cost relatively high. Invasive. AD. Requires specialized training. Lower antegrade motility than PVS.

**PM:** No specialized equipment. Fast. Easy. Inexpensive. Inconsistent results. AD?

**SSR:** No specialized equipment necessary. May lessen risk of AD in some patients. High cost. Very low TMS yield. Commits couple to highest cost ART.
Penile vibratory stimulation: first line of treatment for anejaculation in men with SCI.

Many commercially available vibrators – what is the best choice for the patient?
Jens Sonksen, M.D., PhD, established amplitude as a key factor (Paraplegia 1994, 32:651-60). Developed the FertiCare vibrator, which became commercially available in 1995. Effective in 85% of men whose LOI is T10 or above.

Kambiz Tajkarimi, MD, developed the Viberect-X3 which became commercially available in 2013. Similar success rates to the FertiCare.
AUTONOMIC DYSREFLEXIA CAN BE SAFELY MANAGED BY PRETREATMENT WITH MEDICATIONS SUCH AS PROCARDIA
PVS PROCEDURE:

- Subject transferred to exam table.
- 10 - 30 mg nifedipine given, to prevent autonomic dysreflexia in patients with LOI above T 7.
- Bladder may be emptied and buffer added.
- Vibrator applied for up to 2 minutes. (Most respond in 2 min.)
- BP monitored.
- If no ejaculation, stimulation stopped, penile skin inspected, stimulation resumed.

- Stimulation stopped if: unstable vital signs, edema of penile skin, no ejaculation within 10 minutes.
- Antegrade specimens collected in sterile cup. Retrograde specimens collected by emptying bladder.
IF PVS FAILS, PATIENT IS REFERRED FOR EEJ

Dr. Stephen Seager popularized and refined EEJ for humans… which he adapted from veterinary medicine
Development of EEJ in mid-1980s revolutionized treatment of infertility in men with SCI. Semen could now be retrieved from almost any man with SCI.

**IMPACT OF ELECTROEJACULATION**

**MEDICAL**

- Became a coded procedure. Physicians could bill for semen retrieval from men with SCI.
- Led to increased use of semen retrieval for fertility diagnosis or insemination.

**SCIENTIFIC**

- Data began to accumulate on the quality of semen in men with SCI

**SOCIETAL**

- Increased chances of fatherhood in men with SCI
- Positive impact on couples’ relationships
- Improved quality of life
EEJ PROCEDURE

- Patient assessed for risk.
- Pretreated with nifedipine, if necessary.
- Patient placed in lateral decubitus position.
- Probe placed in rectum.
- Current delivered.
- Antegrade and retrograde specimens collected.
Both procedures are simple, effective and relatively safe. Both procedures carry the risk of autonomic dysreflexia.

Advantages of EEJ:
- Usually works when PVS fails.
- No risk to penile skin (although risk to rectal mucosa).

Advantages of PVS:
- PVS is preferred more by patients than EEJ.
- **PVS results in better semen quality than EEJ.**
- PVS is less invasive than EEJ.
- Attempts at home insemination are possible with PVS but not with EEJ.
SPERM MOTILITY IS HIGHER WITH PVS v. EEJ

Summary of 3 studies performing PVS and EEJ in the same group of subjects. All data from antegrade ejaculates.

10 SCI patients, p<0.001

11 SCI patients, p<0.05

10 neurologically intact squirrel monkeys, p<0.01

 Brackett et al., 1997
 Ohl et al., 1997
 Yeoman et al., 1998
WHAT KIND OF SEMEN QUALITY CAN WE EXPECT FROM MEN WITH SCI?

NUMEROUS STUDIES HAVE REPORTED ON SEMEN QUALITY IN MEN WITH SCI

OUR GROUP (as of 2016):

645 men with SCI
3,423 PVS procedures
2,449 EEJ procedures
SEMEN OF MEN WITH SCI HAS ABNORMAL QUALITIES

MACROSCOPIC APPEARANCE IS ABNORMAL

MICROSCOPIC APPEARANCE IS ABNORMAL

SPERM PARAMETERS ARE ABNORMAL
The semen profile of men with SCI is uncommon in the general population. Is poor semen quality related to changes in lifestyle following SCI?

- Methods of bladder management
- Scrotal hyperthermia
- Infrequency of ejaculation
- Method of ejaculation
- Years post-injury
LOW SPERM MOTILITY IN MEN WITH SCI DOES NOT SEEM TO BE DUE TO LIFESTYLE FACTORS
Can endocrinopathy explain the problem?

Many different hormone profiles, but similar semen profiles in men with SCI

<table>
<thead>
<tr>
<th></th>
<th>No difference from control</th>
<th>Lower than control</th>
<th>Higher than control</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH</td>
<td>Huang 1995</td>
<td>Naftchi 1980</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tsitouras 1995</td>
<td>Brackett 1994</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Huang 1998</td>
<td>Tsitouras 1995</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safarinejad 2001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naderi 2003</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kostovski 2008</td>
<td></td>
</tr>
<tr>
<td>FSH</td>
<td>Naftchi 1980</td>
<td>Brackett 1994</td>
<td>Huang 1995</td>
</tr>
<tr>
<td></td>
<td>Tsitouras 1995</td>
<td>Safarinejad 2001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Huang 1998</td>
<td>Naderi 2003</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kostovski 2008</td>
<td></td>
</tr>
<tr>
<td>Testosterone</td>
<td>Naftchi 1980</td>
<td>Tsitouras 1995</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brackett 1994</td>
<td>Safarinejad 2001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Huang 1995</td>
<td>Naderi 2003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Huang 1998</td>
<td>Kostovski 2008</td>
<td></td>
</tr>
<tr>
<td>Prolactin</td>
<td>Brackett 1994</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Huang 1995</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Huang 1998</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Naderi 2003</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IS THE PROBLEM DUE TO ACCESSORY GLAND DYSFUNCTION?
SEMINAL PLASMA OF SCI PATIENTS INHIBITS SPERM MOTILITY OF NON-INJURED CONTROLS

Brackett et al., J Urol 1996; 155: 1632-1635
COMPARISON OF SPERM IN SPECIMENS FROM THE VAS DEFERENS VERSUS THE EJACULATE

PERCENT MOTILITY

PERCENT VIABILITY

Brackett et al., J Urol 2000; 164: 712-715
Semen of men with SCI contain numerous WBC’s.

CD 45 levels

Mostly activated T-cells

Basu, et al., 2002

% positive cells

- Lymphocytes
- Monocytes
- Granulocytes

 SCI
 Control
Basu et al., 2004

**TH1 CYTOKINES**

- IL1β
- IL2
- IL12
- TNFα
- TNFβ
- IFNγ

**TH2 CYTOKINES**

- IL4
- IL6
- IL10
- TGFβ1

* p < 0.001
* p < 0.01
* p < 0.01*
* p < 0.0001
* p < 0.01

(pg/ml)
CYTOKINE NEUTRALIZATION IMPROVES SPERM MOTILITY IN MEN WITH SCI

After Rx with mAb

GROUPS
Cohen et al., 2004

After Rx with RI Agents

GROUPS
Brackett et al., 2007

% Motility

GROUPS

0 10 20 30 40 50

p < 0.01

*p

p < 0.03

GROUPS

Rx = Treatment
mAb = monoclonal antibody
RI agent = receptor interference agent

Group 1: Untreated (Control group)
Group 2: mAb/RI agent to TNF-α
Group 3: mAb/RI agent to IL-1β
Group 4: mAb/RI agent to IL-6
Group 5: mAb/RI agent to TNF-α + IL-1β
Group 6: mAb/RI agent to TNF-α + IL-6
Group 7: mAb/RI agent to IL-1β + IL-6
Group 8: mAb/RI agent to all three cytokines
INFLAMMASOME

Triggers

Sensor Protein

ASC

Pro-caspase -1

Inflammasome (caspase-1 activating complex)

Pro IL-1β
Pro IL-18

Caspase -1

IL-1β
IL-18
CASPASE-1 AND ASC ARE HIGHER IN SEMINAL PLASMA OF SCI VS. CONTROL SUBJECTS

ROLE OF PANNEXIN-1 IN THE ACTIVATION OF THE INFLAMMASOME

![Diagram showing the role of Pannexin-1 in the activation of the inflammasome.](Image)
PROBENECID
• Uricosuric drug
• Well-established treatment for gout
• Blocks pannexin channels

PILOT STUDY
• Men with SCI
• Probenecid, oral, 4 weeks
• Semen quality analyzed:
  o Pre-Rx: (before probenecid)
  o Post-Rx: (after 4 weeks on probenecid)
  o F/U: (Stop probenecid, analyze 4 wks later)
Results:

• Probenecid well-tolerated
• Sperm motility improved in each subject
• Greatest improvement seen in rapid linear motility

MALE FERTILITY AFTER SCI
Nancy L. Brackett, PhD, HCLD
Semen retrieval
Semen quality
Charles M. Lynne, MD
Management of the male partner
Management of the couple

FEMALE FERTILITY AFTER SCI
Stacy Elliott, MD
Reproductive issues
Preconception issues
Labour and Delivery
Shea Hocaloski, RN
Lactation
Postpartum issues

CASE STUDIES
Panel
MANAGEMENT OF THE MALE PARTNER / COUPLE
WHAT DO WE DO
THE CHALLENGE: 25 YEARS IN 8 MINUTES

• We’ve seen and collected data on approximately 700 subjects, all but a handful were volunteers.

• Helped directly / indirectly get >300 children born.

• Participated in the evaluation and / or development of all the devices for sperm retrieval currently in use.

• We’ve processed almost all of our subjects the same way and collected data on each encounter so that we’ve been able to develop an algorithm for evaluation and management based on this extensive experience. This is a living database since each day current patients are added whether new or follow-up.
We are fortunate to have a long-term team of coworkers: Dr. Brackett and myself for 25 years Sonny Aballa for over 20 years Dr. Emad Ibrahim for over 12 years
BASICALLY, WHAT WE DO NOW IS WHAT WE’VE DONE FOR MANY YEARS:

First Visit: Subject / couple oriented as to goals and procedures. Female partner is counseled to have her fertility status independently evaluated.

Basic H&P; be sure to include meds; GU issues current and/or past; fertility problems before injury; specific questions about AD; ASIA evaluation.

LOI, BC and Hip reflexes are the most useful findings to us.*

*Discussed Later
KEY POINTS:

Success rate of ejaculation:
- PVS: 86% success if LOI T10 or rostral
  15% success if LOI T11 or lower
- EEJ: nearly 100% success regardless of LOI

Total motile sperm count:
- If the ejaculate has sperm in it, the total number of motile sperm will be $\geq 5$ million 75% of the time.
- Patients less than 1 year post injury may be inconsistent or non-responders to PVS or EEJ.
ALGORITHM FOR SEMEN RETRIEVAL IN MEN WITH SCI

Based on 3,152 semen retrieval procedures in 500 men with SCI


PVS: Penile Vibratory Stimulation
EEJ: Electroejaculation
SSR: Surgical sperm retrieval
ALGORITHM FOR SEMEN RETRIEVAL IN MEN WITH SCI

Based on 3,152 semen retrieval procedures in 500 men with SCI


PVS: Penile Vibratory Stimulation
EEJ: Electroejaculation
SSR: Surgical sperm retrieval
SOME CLINICAL TIPS TO HELP PREDICT WHO WILL BE A GOOD CANDIDATE FOR PVS

• The bulbocavernosus reflex (BCR) and the hip flexor response (HR) are indicators of the integrity of the spinal reflex arcs which are required for ejaculation.

• PVS requires at least an intact S2-S4 spinal cord segment. The BCR measures the integrity of this segment when present.

• HR is a pathological flexion reflex commonly seen in patients with SCI. This reflex measures the integrity of L2-L4 and presumes the integrity of the spinal cord segments immediately above the S2-S4 segments.
SUMMARY OF CLINICAL TIPS TO HELP PREDICT WHO WILL BE A GOOD CANDIDATE FOR PVS

PATIENTS WITH LOI AT CERVICAL SEGMENTS:
The presence or absence of BCR and or HR is no more useful in predicting ejaculation than LOI alone. All patients with cervical LOIs should have PVS as the first choice.

PATIENTS WITH LOI BETWEEN T1 AND T6:
All patients who have at least one reflex present (BCR or HR) should be offered PVS first. The absence of both reflexes is predictive of no response to PVS.

PATIENTS WITH LOI BETWEEN T7 AND T12:
Patients with no BCR are poor candidates for PVS.

PATIENTS WITH A LUMBAR LEVEL OF INJURY:
The number of subjects in this study was too small to make a definitive statement.

MEDICAL ISSUES

90% of men with an SCI cannot ejaculate and need assistance in obtaining sperm to achieve conception.

What options are available to the couple wishing to have children?

Intra Uterine Insemination: IUI (aka artificial insemination)

In-Vitro Fertilization/Intra-Cytoplasmic Sperm Injection: IVF/ICSI

These Assisted Reproductive Technologies (ARTs) exactly the same things that are available to couples without an SCI

At-home Intra-vaginal Insemination

This is peculiar to the SCI community where just getting the ejaculate might be the problem but the number of motile sperm available is OK

HOW ??
MEDICAL ISSUES

Intra Uterine Insemination: IUI (aka artificial insemination)

In-Vitro Fertilization/Intra-Cytoplasmic Sperm Injection: IVF/ICSI

These Assisted Reproductive Technologies (ARTs) exactly the same things that are available to couples without an SCI

At-home intra-vaginal insemination

This is peculiar to the SCI community where just getting the ejaculate might be the problem but the number of motile sperm available is OK

Very Important!!

These procedures are driven by the TOTAL MOTILE SPERM (TMS) available
How many motile sperm do we need for the various ART procedures?

At Home Intra Vaginal: $\approx 15$ million
Intra Uterine Insemination: $? \ 5$ million
IVF/ICSI: $1 - 100,000$

Least Invasive

Simplest, Cheapest
Modest Complexity and Cost
Most Complex and Costly

Most Invasive
1739 PVS / EEJ ejaculation-positive trials. Sufficient TMS for IUI found in majority of trials.

Kafetsoulis et al., 2006a
## PREGNANCY RATES

<table>
<thead>
<tr>
<th>Intravaginal Insemination:</th>
<th>Intrauterine Insemination:</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% - 70% per couple</td>
<td>9% - 18% per cycle</td>
</tr>
<tr>
<td>Leduc 2012</td>
<td>Kathiresan 2011</td>
</tr>
<tr>
<td>Sonksen 2012</td>
<td>Ohl 2001</td>
</tr>
<tr>
<td>Kathiresan 2011</td>
<td>Pryor 2001</td>
</tr>
<tr>
<td>Elliott 2003</td>
<td>Rutkowski 1999</td>
</tr>
<tr>
<td>Lochner-ernst 1997</td>
<td>Taylor 1999</td>
</tr>
<tr>
<td>Nehra 1996</td>
<td>Chung 1996</td>
</tr>
<tr>
<td>Dahlberg 1995</td>
<td></td>
</tr>
</tbody>
</table>
IF ICSI IS INDICATED, SPERM CAN BE OBTAINED NON-SURGICALLY IN MOST CASES


### IVF/ICSI Outcomes Are Similar Using Sperm from SCI v. Non-SCI Men

<table>
<thead>
<tr>
<th>IVF/ICSI Outcomes</th>
<th>SCI Patients PVS n=12</th>
<th>SCI Patients EEJ n=16</th>
<th>Non-SCI Patients Masturbation n=297</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy rate per cycle (%)</td>
<td>42.9</td>
<td>37.5</td>
<td>42.2</td>
</tr>
<tr>
<td>Pregnancy rate per couple (%)</td>
<td>58.3</td>
<td>50.0</td>
<td>57.9</td>
</tr>
<tr>
<td>Live birth rate per cycle (%)</td>
<td>42.9</td>
<td>33.3</td>
<td>37.6</td>
</tr>
<tr>
<td>Live birth rate per couple (%)</td>
<td>58.3</td>
<td>43.8</td>
<td>53.5</td>
</tr>
</tbody>
</table>

No significant differences between groups

KEY POINTS:

Pregnancy Rates:

• **Intravaginal insemination (home insemination):**
  
  25-70% per couple

• **Intrauterine insemination:**
  
  9-18% per cycle
  
  24-60% per couple

• **IVF/ICSI:**
  
  with PVS = same as non-SCI male factor
  
  with EEJ = slightly lower than non-SCI male factor
MALE INFERTILITY: TAKE HOME MESSAGES

1. Men with SCI present a unique infertility population.
2. Semen quality is impaired. Toxic seminal plasma contributes.
3. Technologies are available to overcome deficits and assist conception.
4. Choice of technology is currently controversial.
MALE FERTILITY AFTER SCI
Nancy L. Brackett, PhD, HCLD
  Semen retrieval
  Semen quality
Charles M. Lynne, MD
  Management of the male partner
  Management of the couple

FEMALE FERTILITY AFTER SCI
Stacy Elliott, MD
  Reproductive issues
  Preconception issues
  Labour and Delivery
Shea Hocaloski, RN
  Lactation
  Postpartum issues

CASE STUDIES
Panel
Fertility for Women with SCI
Compared to men with SCI, fertility in women with SCI is not an issue. Birth control is more challenging (40 – 75%). Pregnancy and childbirth have more complications than pre-injury. The conception of being able to be a mother suffers after SCI. Babies are often of lower birth weight.
Menstrual periods after injury

- Immediately following injury, amenorrhea may occur, lasting on average of 4-6 months
- Only 50% of women with SCI will experience amenorrhea, with the majority resuming periods by one year
- Ovulation can occur before the onset of the first period so birth control is required
Despite this initial delay in menstruation following traumatic SCI, fertility in women is believed to be unaffected.

Unfortunately, 15% of the female participants in one survey thought their injury had negatively affected their fertility, and 22% felt that their injury had negatively altered their chances of being a mother.

Anderson KD et al Spinal Cord 2006
Resumption of menses

- Can exacerbate SCI sequela (increased AD, bladder spasm, worsening of muscle spasm)
- Naproxen, ibuprofen, mefenamic acid
- Tampons and pads can create catheter occlusion or interference with placement
- Labial pressure sores more occur more often
- Mobility limitations affect menstrual hygiene, higher risk for toxic shock
- Higher risk for vaginal and perineal candidiasis
- Not surprisingly women go to surgical or hormonal solution for cessation of menses

Jackson, A. Chapter 34 in Lin 2012
Pre-conception issues

- Some data suggest that women with SCI become pregnant for the first time at a later age.
- Actual data hard to come by.
- Studies have shown between 14 – 22% of women with SCI underwent pregnancies.
Pre-conception issues

• Must seek medical advice prior to pregnancy and obtain “team”
• That said, not all SCI pregnancies are high risk and many of the same issues affect women with and without SCI
• Medications need to be managed as per all pregnancies, and the need for reduction or discontinuation may discourage considering a pregnancy at all
Pregnancy Risks & Complications

- Bladder: ↑UTI, management changes
- Anemia
- Venous thrombosis
- Skin: ↑ breakdown
- Transfer difficulties
- Autonomic dysreflexia (AD)
- Pre-term labour
- Unattended birth

Ref: Jackson AB et al Arch Phys Med Rehabil 1999; PVA clinical practice guidelines; Sterling et al. JOGC Jan 2013 2010
Pressure of growing fetus...
as for all women but SCI exacerbates...

• Increased bladder pressure tends to promote urinary leakage and contributes to increased UTI, reflux, watch kidneys
• Causes diaphragmatic restrictions that can increase the risk of respiratory compromise or infection in quadriplegics
• Puts pressure on the inferior vena cava and common femoral veins – worsen edema and may predispose to DVT
Weight alterations

- Weight alterations change seating contours – lead to pressure ulcers
- Transfers become more difficult and unsafe with altered center of balance
- Increased pressure on bladder and bowel
- Must be followed by OT and PT to modify or change wheelchair so not to have shoulder issues post-partum
Bowel issues

• Constipation increases due to decreased bowel motility secondary to increased progestin and iron supplementation.
• Have to modify bowel programs
• Loss of independence with decreased mobility makes bowel management more difficult
Other issues...

- Autonomic dysreflexia
- Increased spasm
- Heterotopic ossification
- Have to follow drug use indications in pregnancy by semester (i.e. naproxen OK in 1\textsuperscript{st} and 2\textsuperscript{nd} trimester, not allowed in 3\textsuperscript{rd} due to premature closure of ductus arteriosus and neonatal hypertension and causes prolongation of labour and delivery)
Labour

- Uterine pain is T10 – L1 (first stage of labour) followed by cervical dilatation and perineal stretching (pudendal S2 – 4)
- Injury above T10 may not feel initial labour
- Feel for uterine hardening, contractions suggestive of Braxton-Hicks
- Should be monitored from 28 - 30 weeks onward for effacement and dilatation
Atypical labour symptomatology

- Pain above the level of lesion
- Referred shoulder or upper back pain
- Increased spasm
- Increased bladder spasms
- Autonomic dysreflexia
Labor and Delivery Issues

- Level of lesion determines ability to recognize labor or assist with pushing
- Premature cervical dilation/labour ↑
- C/S, vacuum and forceps extraction ↑
- Trend = education to try and reduce rate of C/S (most are vaginal in Vancouver BC)
- Distinguish pre-eclampsia from autonomic dysreflexia (may need epidural)

Ref: Jackson AB et al Arch Phys Med Rehabil 1999
Post-partum issues

- Mode of Delivery (impact on transfers and spasms if C-Section)
- Transportation (getting in and out of the car)
- Birth control issues
- Equipment (baby care & self-care items)
- Emotional health (identifying supports)
- Lactation/breastfeeding
Lactation in SCI

• A multi-centre cross-sectional web based questionnaire was distributed to women in both Canada and Sweden
• A total of 52 women responded to the survey (31 Canada; 21 Sweden)
• 38 women completed the survey in full (18 women > T6; 20 women < T6)
• Survey assessed:
  1. classification of SCI (level and AIS score)
  2. Issues related to pregnancy and the postpartum period
  3. Complications and perceived severity associated with lactation and breastfeeding
  4. Duration of exclusive breastfeeding
Lactation in SCI

Women with injuries > T6 experienced more breastfeeding related problems than women with injuries < T6

These issues are:

- Insufficient milk production
- Engorged breasts
- Autonomic Dysreflexia (only in injuries > T6)
- Problems with positioning
- Latching difficulties
- Sleep deprivation
- Leaky breasts
- Clogged milk ducts
- Sadness/ depression
- Increased spasticity
- Mastitis
- Baby unwilling to feed
- Baby spitting up
- Breast abscess

*Insufficient milk production was the primary reason women with SCI introduced supplementary nutrition*
Feeding/Motherhood

https://www.pinterest.com/explore/quadriplegic/

http://growingyourbaby.blogspot.ca/2009

http://sci-bc.ca/18-things-i-wish-i-knew-before-i-got-pregnant

https://www.pinterest.com/specialaddition/breastfeeding/
Lactation in SCI: Autonomic Dysreflexia

- AD is more common complication for women with SCI than the literature suggests
- 38.9% of women >T6 reported AD compared to 0% <T6
Bottom line on birth control

- Many women with SCI use birth control (70%+).
- Benefits for the individual with SCI need to be carefully compared to the risks (the medical issues, i.e., long term hypoestrogenization from DPMA).
- Decision must be individualized.

Consider:
- manual dexterity
- quality of circulation in lower extremities
- clotting abnormalities
- chance of having to have reoccurring surgeries
- history of cardiovascular disease
- susceptibility to UTI’s
- genital sensation potential problems with menstrual hygiene

Ref: PVA clinical practice guidelines 2010
Equipment: Accessible crib

http://www.pedialift.com/
Babies of Women with SCI

- May be lower birth weight, linked to UTI’s during pregnancy??
- Not repeated finding as of yet
- Breast feeding is less likely in SCI (may be a problem in women with injury above T4 due to loss of suckling afferent pathways to facilitate let down reflex)
- AD as complication more common than previously thought

Parenting ...communication and peer group interaction essential

www.sciparenting.com
www.mamppappalam.se
www.wheelchairmommy.com

Finnish Association of SCI parenting magazine
Blogs for peer groups
yes, you can do it!

view the guide

Pregnancy and Spinal Cord Injury
An information booklet for women with SCI

Created in partnership with:
Vancouver Coastal Health’s Sexual Health Rehabilitation Service
BC Women’s Hospital and Health Centre’s Maternal Fetal Medicine Service
Rick Hansen Institute
Spinal Cord Injury BC (SCI BC)

http://sexualhealth.sci-bc.ca/scipregnancy/
The importance of a multi-disciplinary team

Collaborations important for perinatal care for women with SCI
Take home message...

• Fertility is unaffected for women post SCI
• Birth control must be individualized
• Pregnant women with spinal cord lesions generally have successful pregnancy outcomes just like able-bodied
• Have a coordinated multidisciplinary team in place
• Be positive – but be aware of risks and think prevention
• Patient needs to be informed/educated and may have to be their own advocate until the medical profession is caught up
Thank you for listening!

Sexual Health Rehabilitation Service
stacy.elliott@vch.ca, shea.hocaloski@vch.ca
MALE FERTILITY AFTER SCI
Nancy L. Brackett, PhD, HCLD
Semen retrieval
Semen quality
Charles M. Lynne, MD
Management of the male partner
Management of the couple

FEMALE FERTILITY AFTER SCI
Stacy Elliott, MD
Reproductive issues
Preconception issues
Labour and Delivery
Shea Hocaloski, RN
Lactation
Postpartum issues

CASE STUDIES
Panel
CASE 1: MALE WITH SCI

RG is a 39 yr old paraplegic. LOI T-10 He responds easily to EEJ but his ejaculate is extremely poor; Concentration: < 100,000/ml; Motility: 5%. He and his wife are having ICSI. On the day of egg retrieval there are no motile sperm in his ejaculate.

What are our / their options now?
CASE 2: FEMALE WITH SCI

Newly injured 24 years old para engaged to be married - fertility potential, period of amenorrhea, contraception in the meantime, modes of delivery to talk about, bloodwork to RU abnormalities (i.e. prolactin).
CASE 3: MALE WITH SCI

YZ is a 27 year old man who is on his honeymoon in the Bahamas. While in Eleuthra on day 2 of his honeymoon, he sustains a C5-C6 spinal cord injury diving off a boat into 2 feet of water. He almost drowns. He is resuscitated and stabilized in the Bahamas and after 10 days is evacuated to Miami. His wife is distraught. She tells us they both come from large families and were planning on starting theirs immediately on their honeymoon. She has consulted with “Dr. Google” and has found out that sperm can be frozen.

What are our / their options now?
CASE 4: FEMALE WITH SCI

Married 32 year old quad with one child (age 5) pre-injury. She was incontinent with intermittent catheterization and had ileal conduit. Wants another child and is concerned about how she will manage the pregnancy and delivery (with the conduit also), lactation (she had problems the first time) and baby care.