GOOD VIBRATIONS AND BEYOND
PENILE VIBRATORY STIMULATION IN MEN WITH SPINAL CORD INJURY

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The population most often injured: young men.

In the U.S., 80% of new injuries occur to men 16-35 years old.

Similar statistics worldwide.

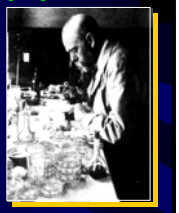
Infertility is a major complication of SCI in men. 90% cannot father children via sexual intercourse.

Reproductive function is nearly normal in most women with SCI.

CONDITIONS CONTRIBUTING TO INFERTILITY IN MEN WITH SCI:

- Erectile dysfunction
- Ejaculatory dysfunction ←
- Semen abnormalities ←

Before the mid-1980s, little was known about infertility in men with spinal cord injury.



MEDICAL REASONS

Methods of semen retrieval were crude:
- •Vibrators had a low success rate
- •Surgical methods of sperm retrieval were uncommon

IVF was relatively new

GIFT and ICSI were in the experimental stage

SOCIETAL REASONS

Less societal integration of persons with SCI

Men were told: "you will never father children"

Many men did not seek help

Development of EEJ in mid-1980s revolutionized treatment of infertility in men with SCI. Semen could be now be retrieved from almost any man with SCI.

IMPACT OF ELECTROEJACULATION:

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

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

CURRENT METHODS OF OBTAINING SPERM FROM ANEJACULATORY MEN

Penile Vibratory Stimulation (PVS) ←
Electroejaculation
Prostate Massage
Surgical Sperm Retrieval

PENILE VIBRATORY STIMULATION (PVS)

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). Engineered and marketed high amplitude vibrator, which became commercially available in 1995.

PVS PROCEDURE:

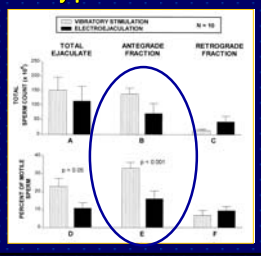
- Subject transferred to exam table.
- 10 - 30 mg nifedipine given, to prevent autonomic dysreflexia in patients with LOI T6 and above.
- Bladder may be emptied and buffer added.
- Vibrator applied for up to 2 minutes.
- If no ejaculation, stimulation stopped, penile skin inspected, stimulation resumed.

- 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.

IMPORTANT THINGS TO KNOW ABOUT PVS:

- 85% success rate if level of injury is T10 or above, and vibrator is high amplitude.
- Bulbocavernosus response and hip flexor response are predictive of ejaculation.
- If risks are managed, couples may perform PVS at home.
- Compared to EEJ, PVS results in higher yield of motile sperm in the antegrade fraction.

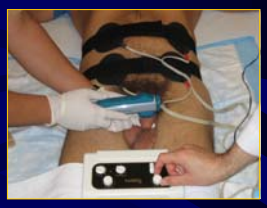
J Urol 1997;157:151-157



MAXIMIZE SUCCESS OF PVS

TWO VIBRATORS

J Urol, 2007;177:660-663



ABDOMINAL ELECTRICAL STIMULATION + PVS

Urology, 2006;68: 204.e9 - 204.e11

REFERENCES RELATING TO PVS

Kafetsoulis A, Brackett NL, Ibrahim E, Attia GR, Lynne CM: Current trends in the treatment of infertility in men with spinal cord injury. Fertil Steril 2006; 86 (4): 781-789.

Brackett NL: Semen retrieval by penile vibratory stimulation in men with spinal cord injury. Hum Rep Update 1999; 5 (3): 216-222.

Brackett NL: Penile vibratory stimulation for men with spinal cord injury. VIDEO. Hum Rep Update 1999; 5 (5) 551-552.

Brackett NL, Ferrell SM, Aballa TC, Amador MJ, Padron OF, Sonksen J, Lynne CM: An analysis of 653 trials of penile vibratory stimulation in men with spinal cord injury. J Urol 1998; 159 (6): 1931-1934.

IF PVS FAILS, PATIENT IS REFERRED FOR EEJ

DR. STEPHEN SEAGER DEVELOPED EEJ.

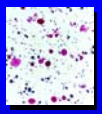
NEARLY 100% SUCCESS RATE IN MEN WITH SCI.

CONDITIONS CONTRIBUTING TO INFERTILITY IN MEN WITH SCI:

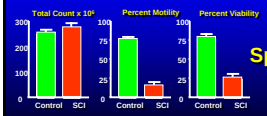
- Erectile dysfunction
- Ejaculatory dysfunction
- Semen abnormalities

THE SEMEN OF MEN WITH SCI HAS ABNORMAL QUALITIES

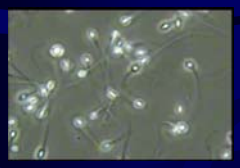
Macroscopic appearance is abnormal



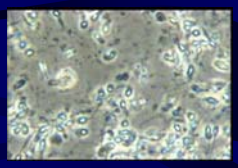
Microscopic appearance is abnormal



Sperm parameters are abnormal



CONTROL



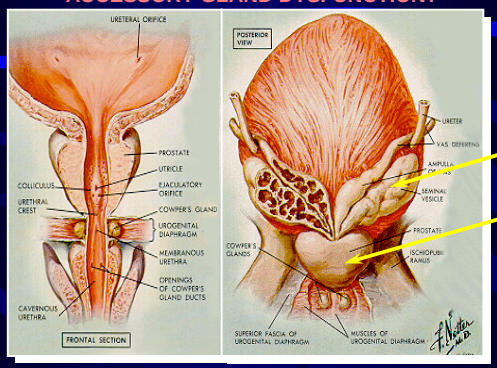
SCI

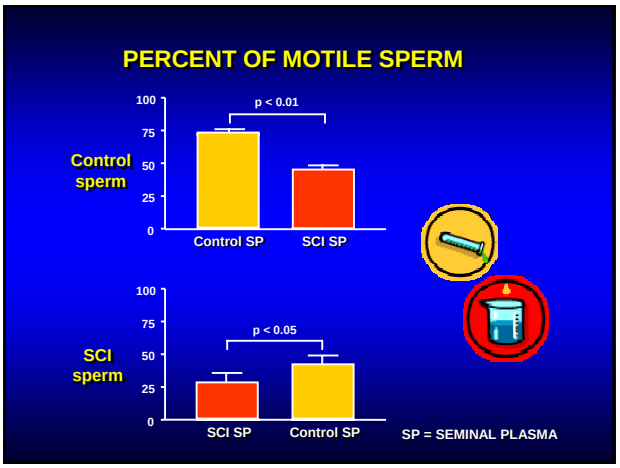
The semen quality of men with SCI is uncommon in the general population. Is poor semen quality related to changes in lifestyle following SCI?

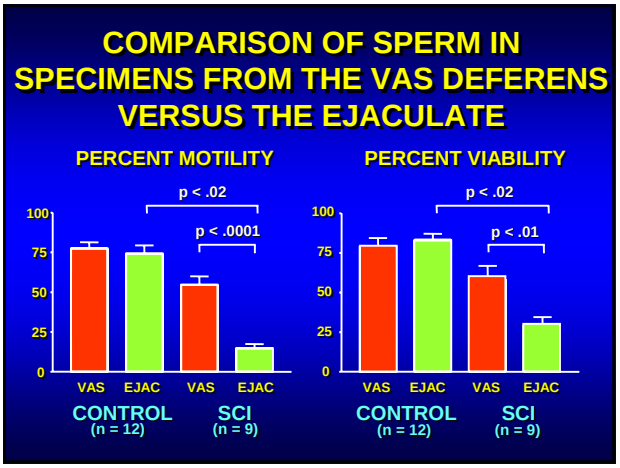
- Scrotal hyperthermia
- Method of bladder management
- Infrequency of ejaculation
- Method of ejaculation
- Years post-injury

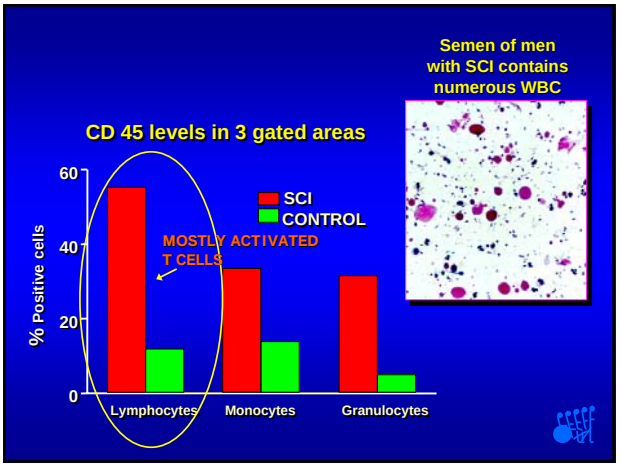
LOW SPERM MOTILITY IN MEN WITH SCI DOES NOT SEEM TO BE DUE TO "LIFESTYLE FACTORS"

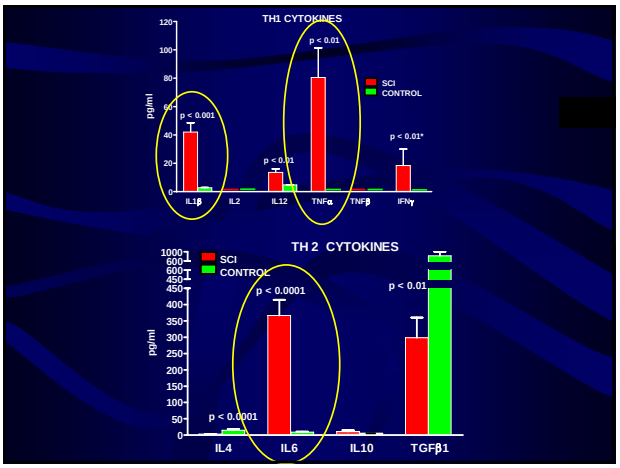
IS THE PROBLEM DUE TO ACCESSORY GLAND DYSFUNCTION?

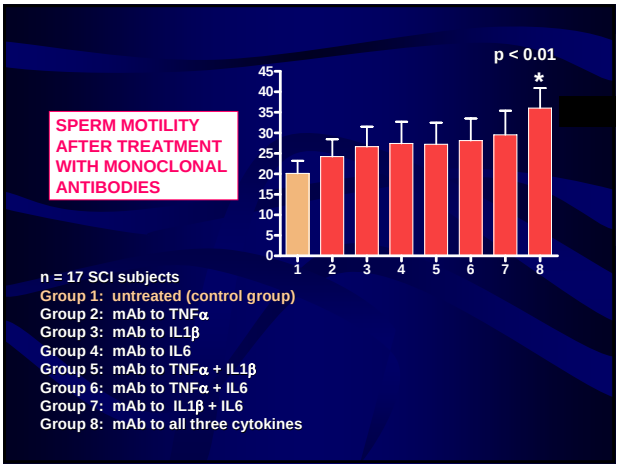


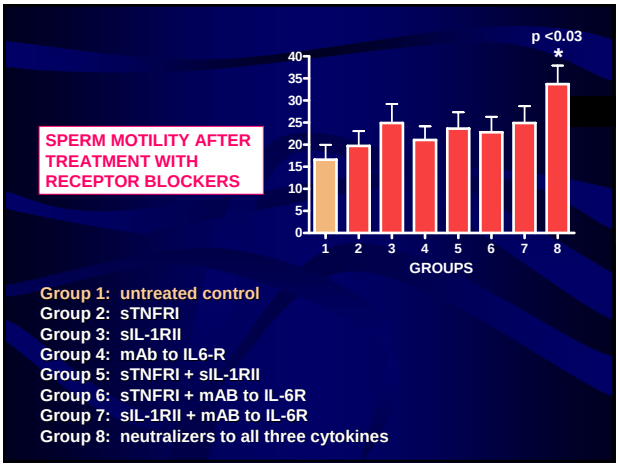

PERCENT OF MOTILE SPERM
Control sperm
100
75
50
25
0
p < 0.01
Control SP
SCI SP
SCI sperm
p < 0.05
SCI SP
Control SP
SP = SEMINAL PLASMA


COMPARISON OF SPERM IN SPECIMENS FROM THE VAS DEFERENS VERSUS THE EJACULATE
PERCENT MOTILITY
PERCENT VIABILITY
p < .02
p < .0001
p < .01
100
75
50
25
0
VAS
EJAC
CONTROL
(n = 12)
SCI
(n = 9)


Semen of men with SCI contains numerous WBC
CD 45 levels in 3 gated areas
% Positive cells
60
40
20
0
SCI
CONTROL
MOSTLY ACTIVATED T CELLS
Lymphocytes
Monocytes
Granulocytes


TH1 CYTOKINES
pg/ml
SCI
CONTROL
p < 0.001
p < 0.01
p < 0.01
p < 0.01*
IL1β
IL2
IL12
TNFα
TNFβ
IFNγ
TH 2 CYTOKINES
SCI
CONTROL
p < 0.0001
p < 0.01
p < 0.0001
IL4
IL6
IL10
TGFβ1


SPERM MOTILITY AFTER TREATMENT WITH MONOCLONAL ANTIBODIES
p < 0.01
*
n = 17 SCI subjects
Group 1: untreated (control group)
Group 2: mAb to TNFα
Group 3: mAb to IL1β
Group 4: mAb to IL6
Group 5: mAb to TNFα + IL1β
Group 6: mAb to TNFα + IL6
Group 7: mAb to IL1β + IL6
Group 8: mAb to all three cytokines


SPERM MOTILITY AFTER TREATMENT WITH RECEPTOR BLOCKERS
p <0.03
*
GROUPS
Group 1: untreated control
Group 2: sTNFRI
Group 3: sIL-1RII
Group 4: mAb to IL6-R
Group 5: sTNFRI + sIL-1RII
Group 6: sTNFRI + mAB to IL-6R
Group 7: sIL-1RII + mAB to IL-6R
Group 8: neutralizers to all three cytokines

OPTIONS FOR ASSISTED CONCEPTION

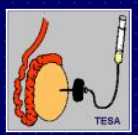
INTERESTING MEDICAL / ETHICAL PROBLEM

Until recently, semen retrieval was therapy of first choice for anejaculatory men with SCI

PVS
88% success rate if LOI above T10.

EEJ
95% success rate

Recent improvements in the treatment of male factor infertility in general have led to a problem for couples with SCI male partners in particular.



SURGICAL SPERM RETRIEVAL (SSR)

INTRACYTOPLASMIC SPERM INJECTION (ICSI)

Ejaculates of men with SCI (increasingly) not being examined as a source of sperm for ART.

EJACULATE IS FIRST SOURCE EXAMINED FOR ART IN ABLE-BODIED MEN

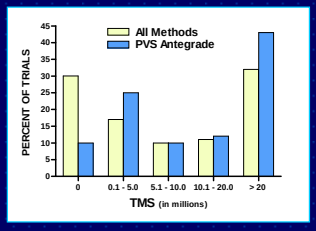
WHY IS EJACULATE NOT FIRST SOURCE EXAMINED IN MEN WITH SCI?

TOP 3 REASONS FOR NOT OFFERING PVS OR EEJ

- PVS
  - DO NOT HAVE PVS EQUIPMENT: 45%
  - NOT AWARE OF PVS: 39%
  - NOT TRAINED IN PVS: 39%
- EEJ
  - DO NOT HAVE EEJ EQUIPMENT: 60%
  - NOT TRAINED IN EEJ: 42%
  - REFERRAL PRESENTS LOGISTICAL PROBLEMS: 34%

Kafetsoulis et al., Fertil Steril, 2006; 86: 781-789

TOTAL MOTILE SPERM OBTAINED FROM MEN WITH SCI



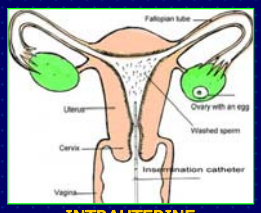
1739 PVS / EEJ ejaculation-positive trials.
Sufficient TMS for IUI found in:
70% of all trials; 90% of PVS antegrade trials

Kafetsoulis et al., Fertil Steril, 2006; 86: 781-789

SSR COMMITS COUPLE TO ICSI: MOST INVASIVE AND EXPENSIVE OPTION.

EJACULATE = MORE ART OPTIONS:

HOME INSEMINATION



INTRAUTERINE INSEMINATION

PREGNANCY RATES IN COUPLES WITH SCI MALE PARTNERS

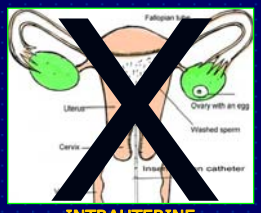
IVI (HOME INSEMINATION):		IUI:	
		9-18%	PER CYCLE
25-63%	PER COUPLE	30-60%	PER COUPLE
ELLIOTT	2003	OHL	2001
SONKSEN	1997	PRYOR	2001
LÖCHNER-ERNST	1997	RUTKOWSKI	1999
NEHRA	1996	TAYLOR	1999
DAHLBERG	1995	CHUNG	1996

SURVEY:

DO YOU COUNSEL COUPLES TO ATTEMPT HOME INSEMINATION? 54%=NO

DO YOU OFFER IUI TO COUPLES WITH SCI MALE PARTNERS? 34%=NO

HOME INSEMINATION



INTRAUTERINE INSEMINATION

QUESTIONS: ? ? ? ? ? ? ?

Who is responsible for informing/training physicians about PVS and EEJ?

Must a physician explain/offer all A.R.T. options to couples with SCI male partners? (Lawsuits have occurred in similar cases).

AMA GUIDELINES FOR INFORMED CONSENT

Physicians are ethically and (in all 50 states) legally obligated to discuss alternative treatments with their patients, regardless of the cost of the treatment, or if the physician performs the treatment.

http://www.ama-assn.org/ama/pub/category/4608.html

EVEN WHEN THE PROGNOSIS IS CONSIDERED VERY POOR OR FUTILE, THE PHYSICIAN MUST EXPLAIN THE TREATMENT TO THE PATIENT AND EXPLAIN WHY IT IS FUTILE.

FERTIL STERIL 2004; 82: 806-810

POTENTIAL SOLUTIONS

- Provide information about PVS and EEJ in training programs.
- Create online registry of specialists who perform PVS and EEJ.
- Establish best practice policies for treating these couples.

TAKE HOME MESSAGE:

- Men with SCI present a unique infertility population.
- Semen quality is impaired. Toxic seminal plasma contributes.
- Technologies are available to overcome deficits and assist conception.
- Choice of technology is currently controversial.

THANK YOU