

2020 The Korean Urological Congress and Expo

Issues on fertility in 2020: From cradle to grave

“Neurogenic bladder and fertility”

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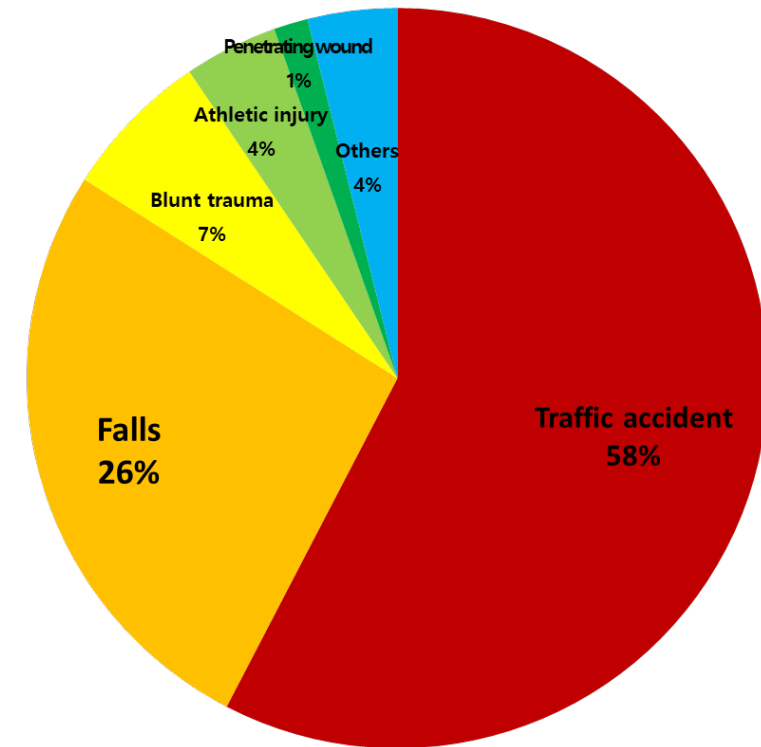
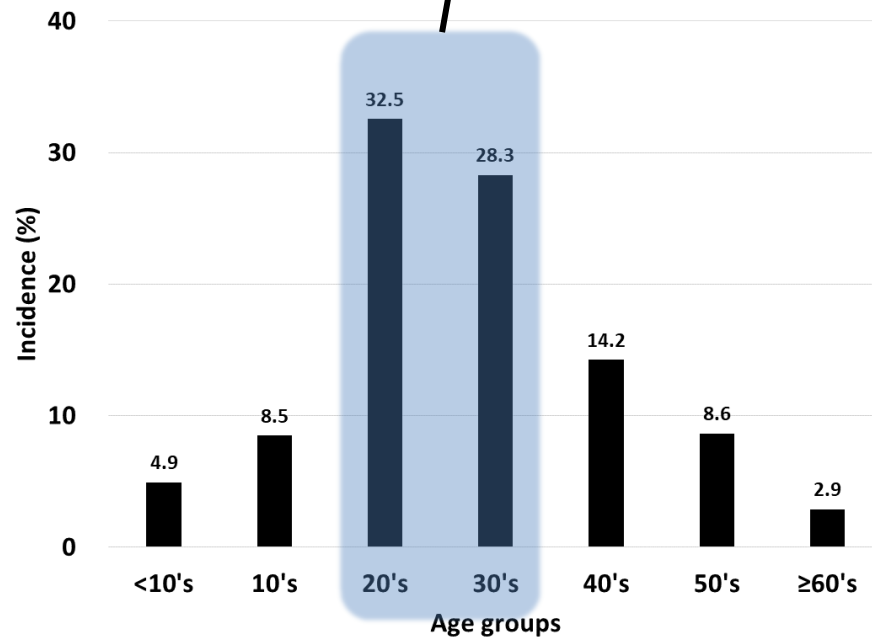
Incidence

- Incidence of spinal cord injury

- 0.1% at 2016¹

- Male 79.6%²

Fertility!!!



¹Korea Statistics, 2016

²Park CI, J Korean Acad Rehab Med, 1999

Pathophysiology

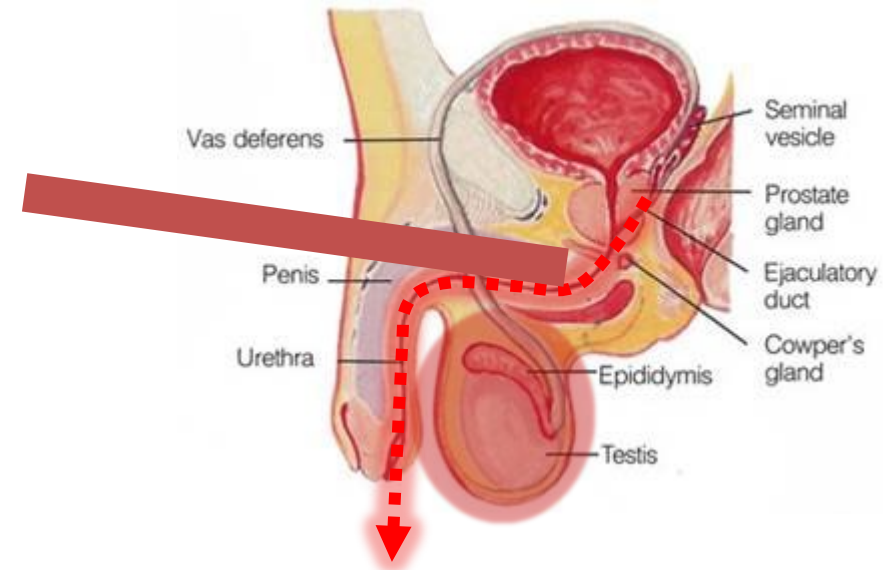


- The reasons for the problems of fertility in **neurogenic bladder**

Erectile dysfunction

Ejaculatory dysfunction

Semen abnormalities



→ Only **10%** will **father biologic children** without medical contribution¹

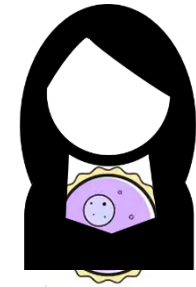
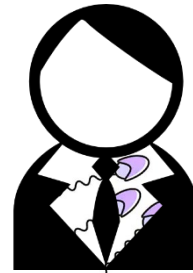
“Hopelessly infertility”

Goal of treatment

~~Erectile dysfunction~~

~~Ejaculatory dysfunction~~

~~Semen abnormalities~~



Easy

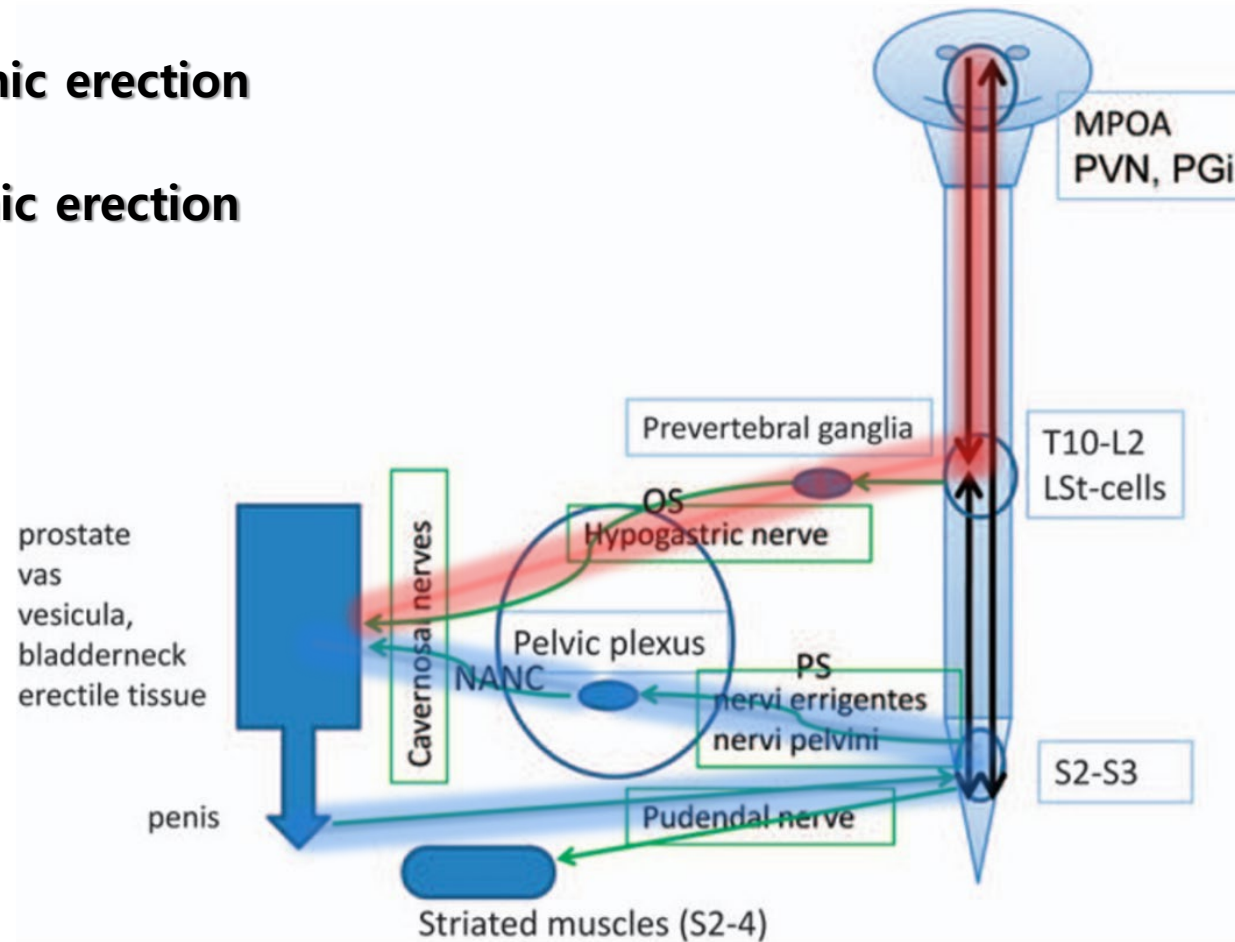
Cheap

Effective

Erection

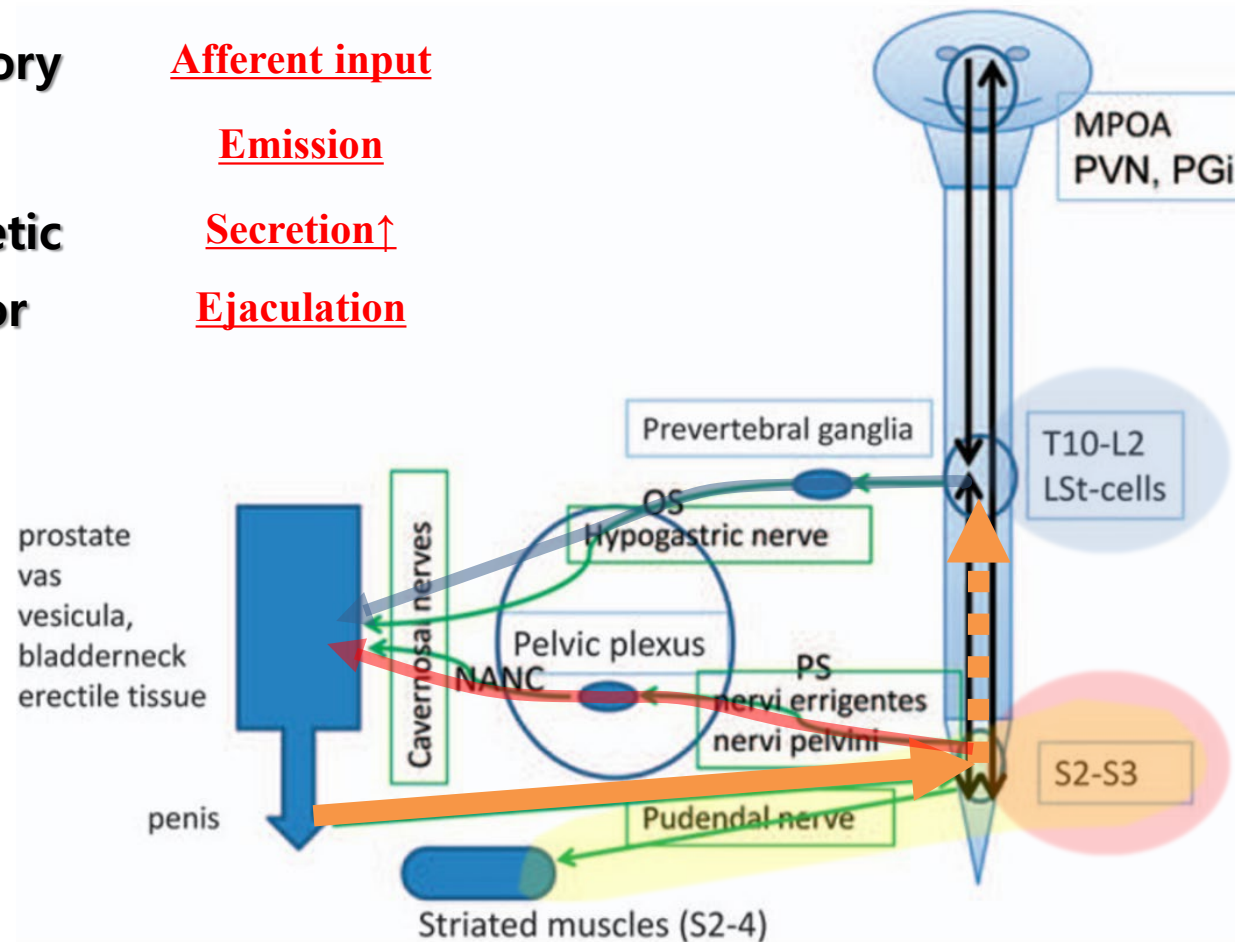
Reflexogenic erection

Psychogenic erection



Ejaculation

- | | |
|--------------------|-----------------------|
| 1) Somatic sensory | <u>Afferent input</u> |
| 2) Sympathetic | <u>Emission</u> |
| 3) Parasympathetic | <u>Secretion</u> ↑ |
| 4) Somatic motor | <u>Ejaculation</u> |



prostate
vas
vesicula,
bladderneck
erectile tissue

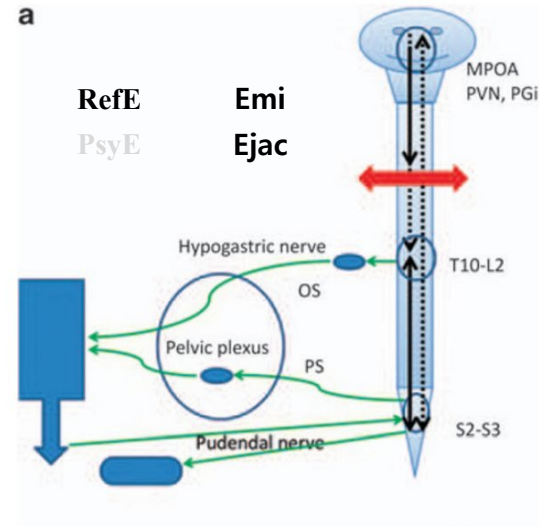
penis

Striated muscles (S2-4)

Bulbocavernosal m. contraction
Ischiocavernosal m. contraction
External sphincter m. relaxation

Erectile and ejaculatory dysfunction

"According to lesion"



RefE: reflexogenic erection
PsyE: psychogenic erection
Emi: emission
Ejac: ejaculation

Treatment of erectile dysfunction

1) PDE5 inhibitor¹ **S2-4 intact**

S2-4 injury → NO ↓

2) Intracavernosal injection²

3) Intraurethral application³

4) Vacuum erection device with a constriction band⁴

5) Implanted penile prosthesis^{5,6}



ERECTILE
DYSFUNCTION



¹Rizio N, J Spinal Cord Med, 2012

²Lebib BA, Ann Readapt Med Phys, 2001

³Bodner DR, Urology, 1999

⁴Denil J, Arch Phys Med Rehabil, 1996

⁵Kim YD, Int J Urol, 2008

⁶Henry GD, Urol Clin North Am, 2007

Treatment of ejaculatory dysfunction

- 1) Penile vibratory stimulation (PVS)^{1,2} >T10 vs. <T11
86% vs. 15%*
- 2) Electroejaculation (EEJ)^{1,3} 91.9%*
- 3) Prostate massage⁴
- 4) Surgical procedures⁵

Percutaneous **E**pididymal Sperm Aspiration

Micro**E**pididymal Sperm Aspiration

Testicular Sperm Aspiration

Testicular Sperm Extraction

Microdissection **T**esticular Sperm Extraction

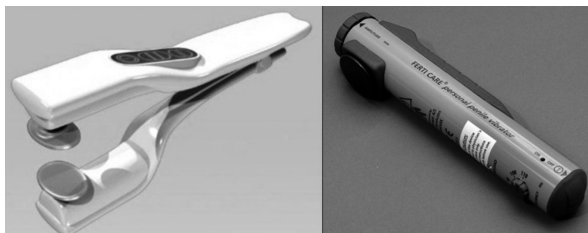


Fig. Device for penile vibratory stimulation

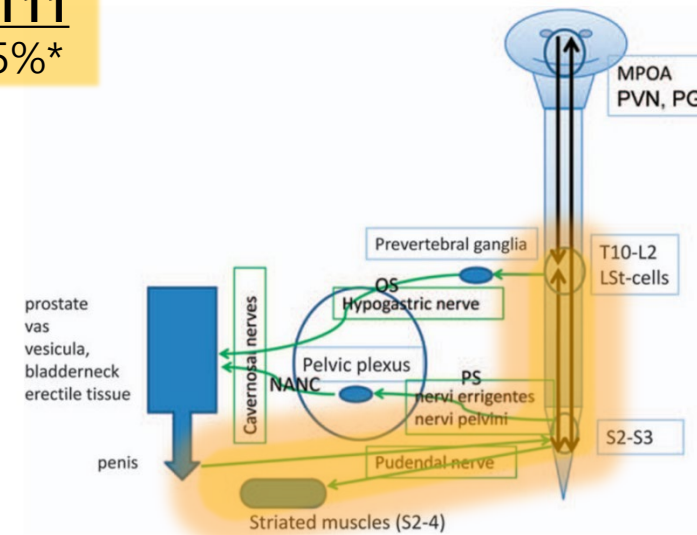


Fig. Electroejaculation device

¹Ibrahim E, Andrology, 2016

²Castle SM, Spinal Cord, 2014

³Kafetsoulis A, Fertil Steril, 2006

⁴Arafa MM, Int J Androl, 2007

⁵Sultan R, Anejaculation, 2013 pressed

Assisted reproductive technology

- 1) Intravaginal insemination¹
- 2) Intrauterine insemination²
- 3) In vitro fertilization/Intracytoplasmic sperm injection³

Assisted reproductive technology	Studies	Pregnancy rate (%) per couple
Intravaginal insemination	Leduc [9] Kathiresan et al. [10] Sønksen et al. [46]	25–70%
Intrauterine insemination	Kathiresan et al. [10] Ohl et al. [30] Rutkowski et al. [51] Pryor et al. [52]	24–60%
<i>In vitro</i> fertilisation/Intracyto-plasmatic sperm injection	Leduc [9] Bechoua et al. [11] Raviv et al. [12] Kathiresan et al. [48] Schatte et al. [49] Mc Guire et al. [50] Gat et al. [53] Kanto et al. [54]	29–75%

¹Sønksen J, Spinal Cord, 2012

²Cao S, Andrologia, 2014

³Brackett NL, Nat Rev Urol, 2010

Success rate of fertilization

- Pregnancy rates in SCI utilizing specific fertilization techniques

Author	Couples (n)	Method	Pregnancy rate per cycle (%)	Live birth rate per cycle (%)
McGuire <i>et al.</i> , 2011	31	EEJ/ICSI	36	36
Leduc, 2012	18	IVF	43	n/a
Löchner-Ernst <i>et al.</i> , 1997	109	PVS/EEJ/TESA	n/a	73
Nehra <i>et al.</i> , 1996	78	PVS/EEJ/IVI/IUI/ART	63	n/a
J Sønksen <i>et al.</i> , 1997	28	PVS/EEJ/IVI/IUI/ART	32	90
Taylor <i>et al.</i> , 1999	19	PVS/IUI	12	n/a
Kolettis <i>et al.</i> , 2002	27	EEJ/IVF ± ICSI	40	40
Kathiresan <i>et al.</i> , 2011	31	PVS/EEJ/IVF/ICSI	43	40

SCI, spinal cord injury; EEJ, electroejaculation; ICSI, intracytoplasmic sperm injection; IVF, in vitro fertilization; PVS, penile vibratory stimulation; TESA, testicular sperm aspiration; IVI, intravaginal insemination; IUI, intrauterine insemination; ART, assisted reproductive technology.

→ Only **10%** will **father biologic children** without medical contribution¹

“**Hopelessly infertility**”  “**Potentially fertile**”

Semen abnormality

- Sperm motility ↓, ejaculate volume ↓, normal sperm morphology ↓, neutrophils counts ↑¹
- According to technique to achieve ejaculation (motility)²
 - Masturbation in SCI: 37%
 - Masturbation in non-SCI: 58%
 - PVS: 26%
 - EEJ: 15%
- Factors associated with compromised semen parameters³
 - Storage
 - Timing of semen acquisition
 - Infection
 - Biochemical factors

Better prognosis	Worse prognosis
Unassisted ejaculation	Spinal shock
Penile vibratory stimulation	Post-injury >2 weeks
Repeat weekly PVS	Electroejaculation
Bladder catheterization	Aberrant sperm storage
	High pressure voiding
	Urinary tract infection
	Antisperm antibodies
	Elevated cytokines
	Elevated reactive oxygen species
	Elevated DNA fragmentation index

SCI, spinal cord injury; PVS, penile vibratory stimulation.

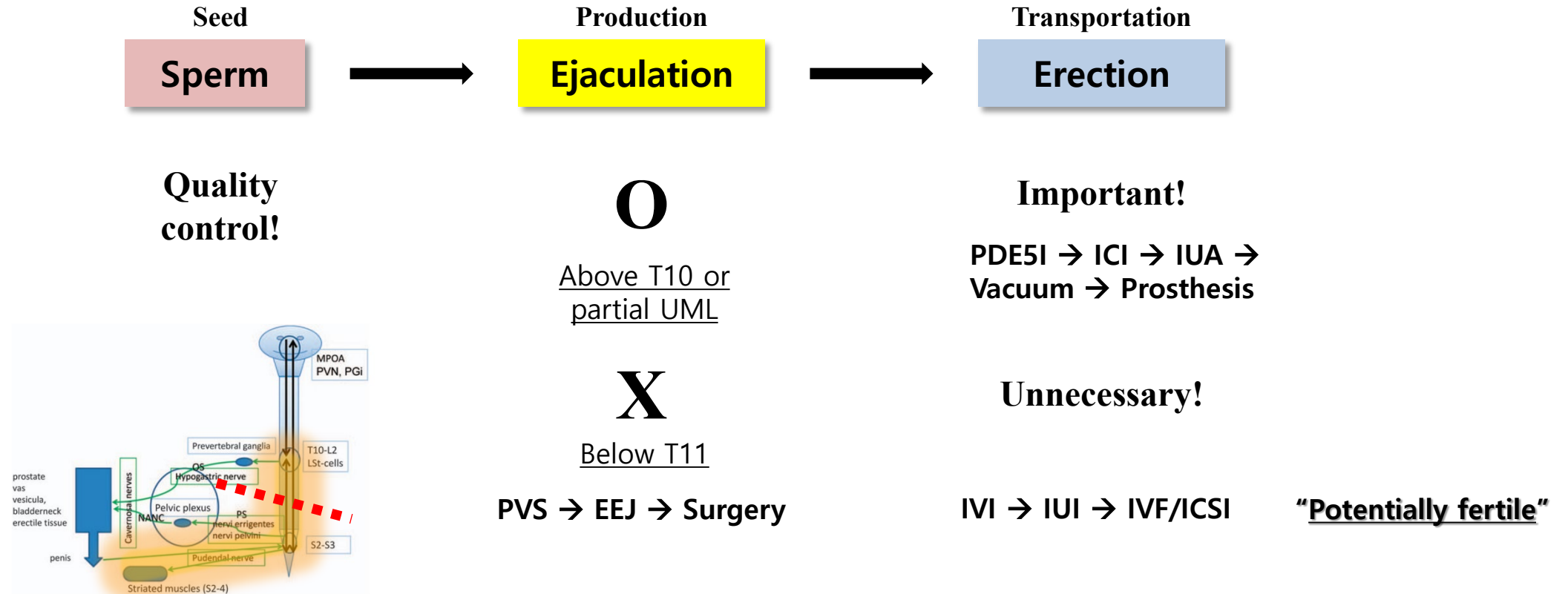
Trofimenko V, Transl Androl Urol, 2016

¹*da Silva BF*, Fertil Steril, 2010

²*Kathiresan AS*, Fertil Steril, 2011

³*Trofimenko V*, Transl Androl Urol, 2016

Summary



경청해 주셔서 감사합니다.