

CANADIAN UNDERGRADUATE UROLOGY CURRICULUM



Erectile Dysfunction

A Message from CanUUC

This educational material is intended to supplement medical student knowledge on urological health and medical practices. We are committed to promoting inclusion across all our materials. We acknowledge that some language used within this content may include terminology from source materials and research studies, which has been maintained to reflect the scientific context in which information was gathered.

Wherever possible, we aim to use language that is respectful of all individuals, recognizing gender diversity, variations in sex characteristics, and the importance of inclusive terminology.

Objectives

1. Define erectile dysfunction
2. List and classify the risk factors for erectile dysfunction (ED)
3. Describe the medical and surgical treatment options available for erectile dysfunction
4. List contraindications to PDE-5 inhibitors

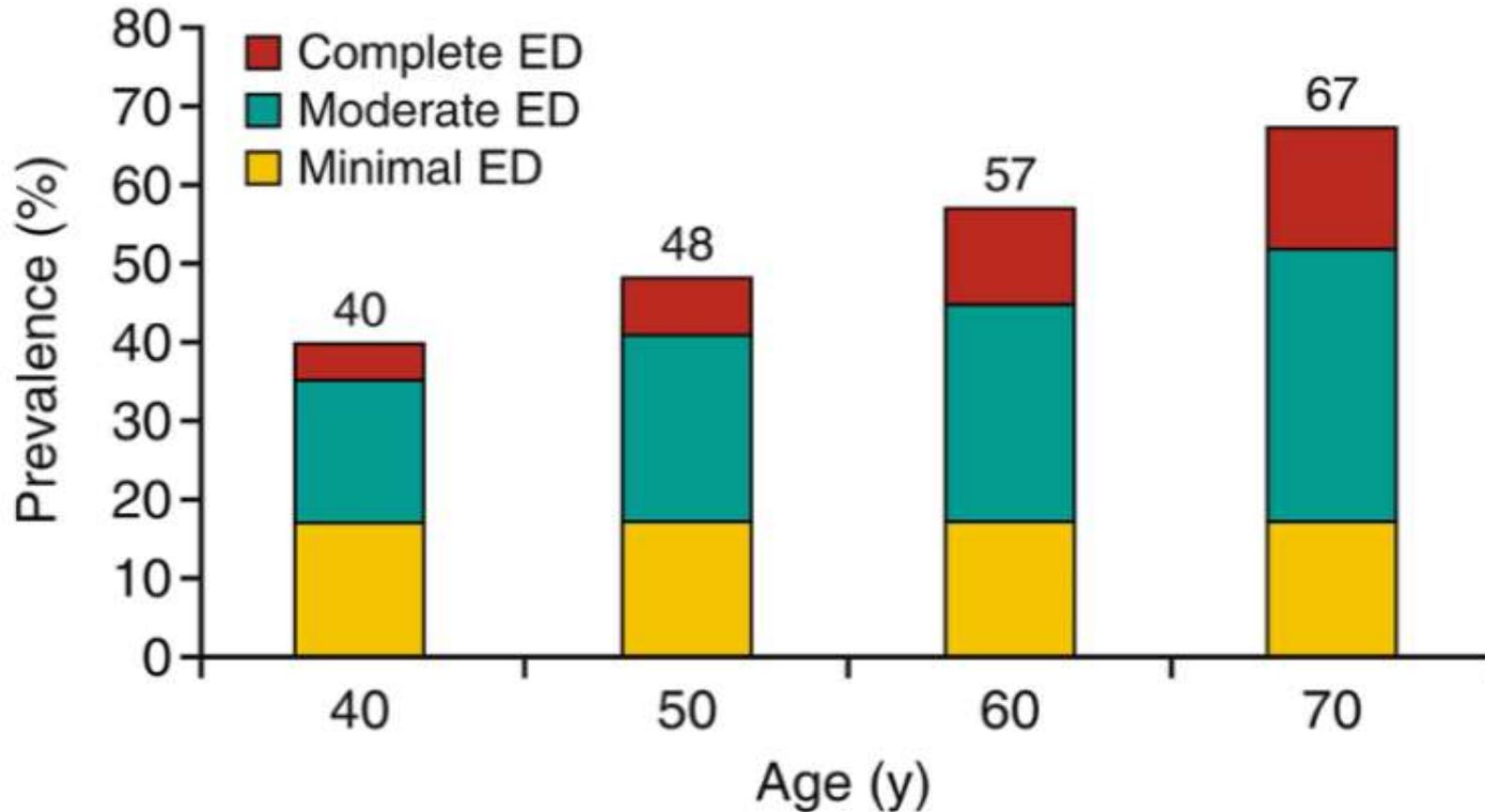
Erectile Dysfunction (ED) : Defined



“The consistent or recurrent inability to obtain and/or maintain an erection sufficient for satisfactory sexual activity”

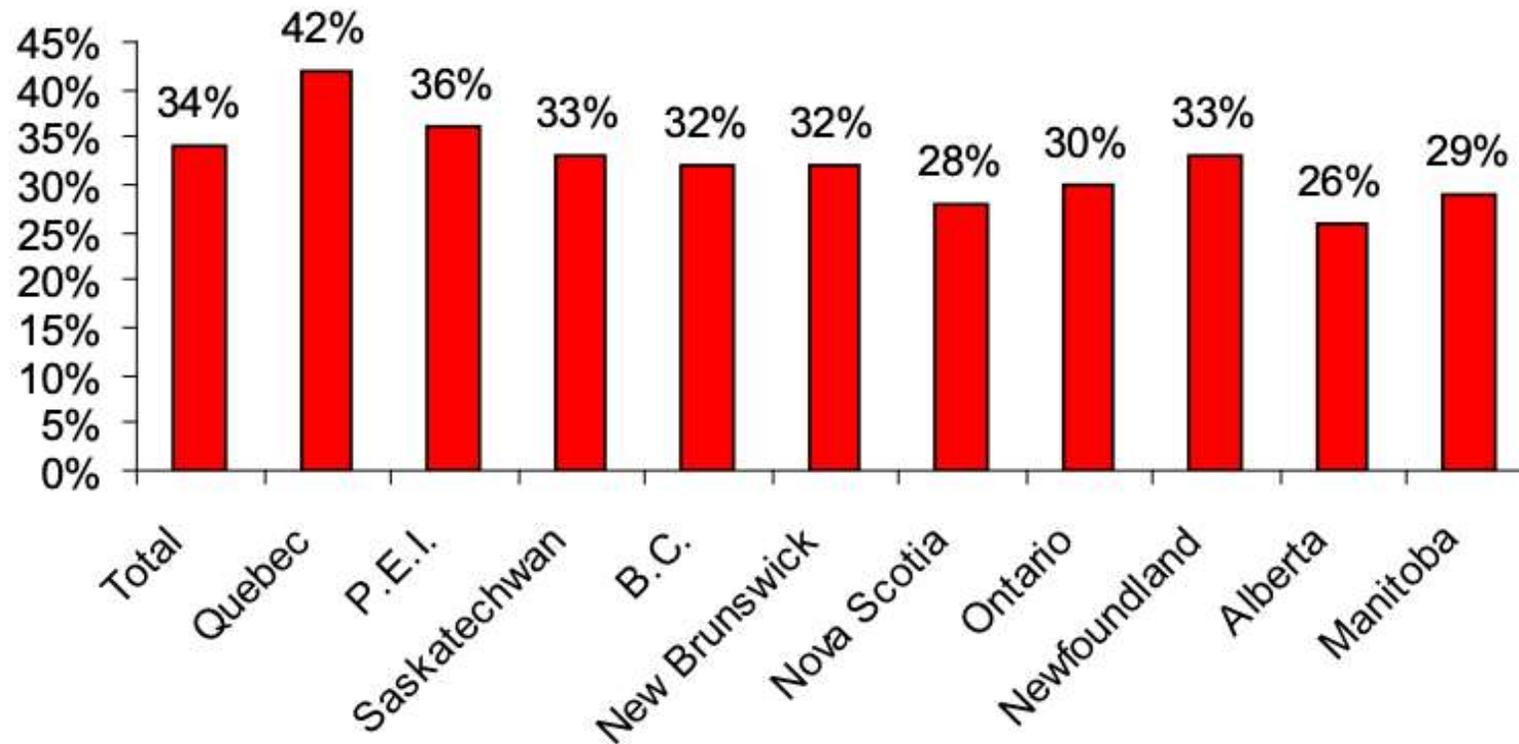
Prevalence of Erectile Dysfunction

Age-adjusted progression of ED



Incidence of Erectile Dysfunction

- One-third (34%) of men over 40 suffer from ED.
- Levels are similar across the country, although are slightly higher in Quebec and P.E.I. and slightly lower in Manitoba, Alberta and Nova Scotia.



Base: total men with SHIM scores of 21 and below (n=4,539)

Causes of Erectile Dysfunction

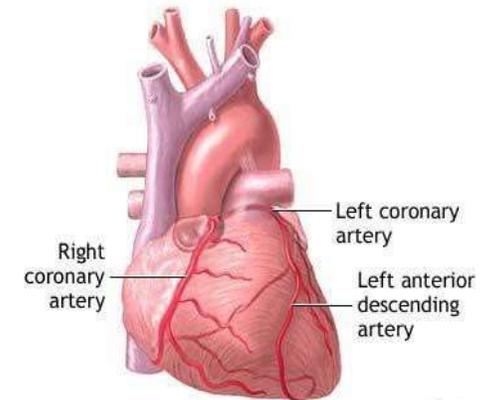
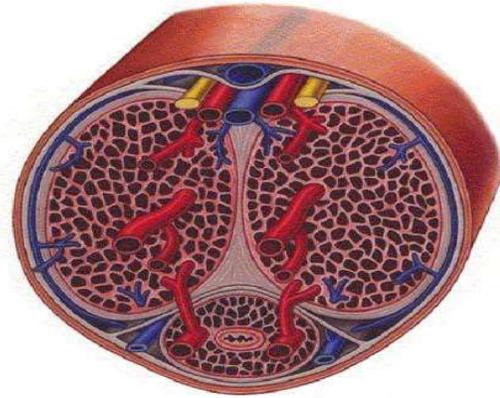
Category	Examples
Vascular	Arterial (cholesterol, diabetes, hypertension, trauma/surgery), venous leak
Neurogenic	Surgery/trauma, Multiple Sclerosis (MS), diabetes, stroke
Psychologic	Depression, anxiety, substance use disorders, performance anxiety
Hormonal	Low testosterone, thyroid disorders, high prolactin levels
Anatomical	Peyronie's disease, phimosis
Medication Induced	SSRIs, antihypertensives, alcohol, tobacco use

Major Risk Factors for ED

- CV Risk Factors:
 - Smoking
 - Obesity
 - Sedentary lifestyle
 - Hypertension
 - Diabetes
 - Hyperlipidemia
- Cardiovascular Disease
- Peripheral VD
- Mental health conditions
- Chronic Disease

ED: An Early Warning Sign

"A canary in a coal mine"



ADAM.

ED shares many risk factors for heart disease and warrants a cardiac risk assessment in most patients

Evaluation & Diagnosis

Organic:

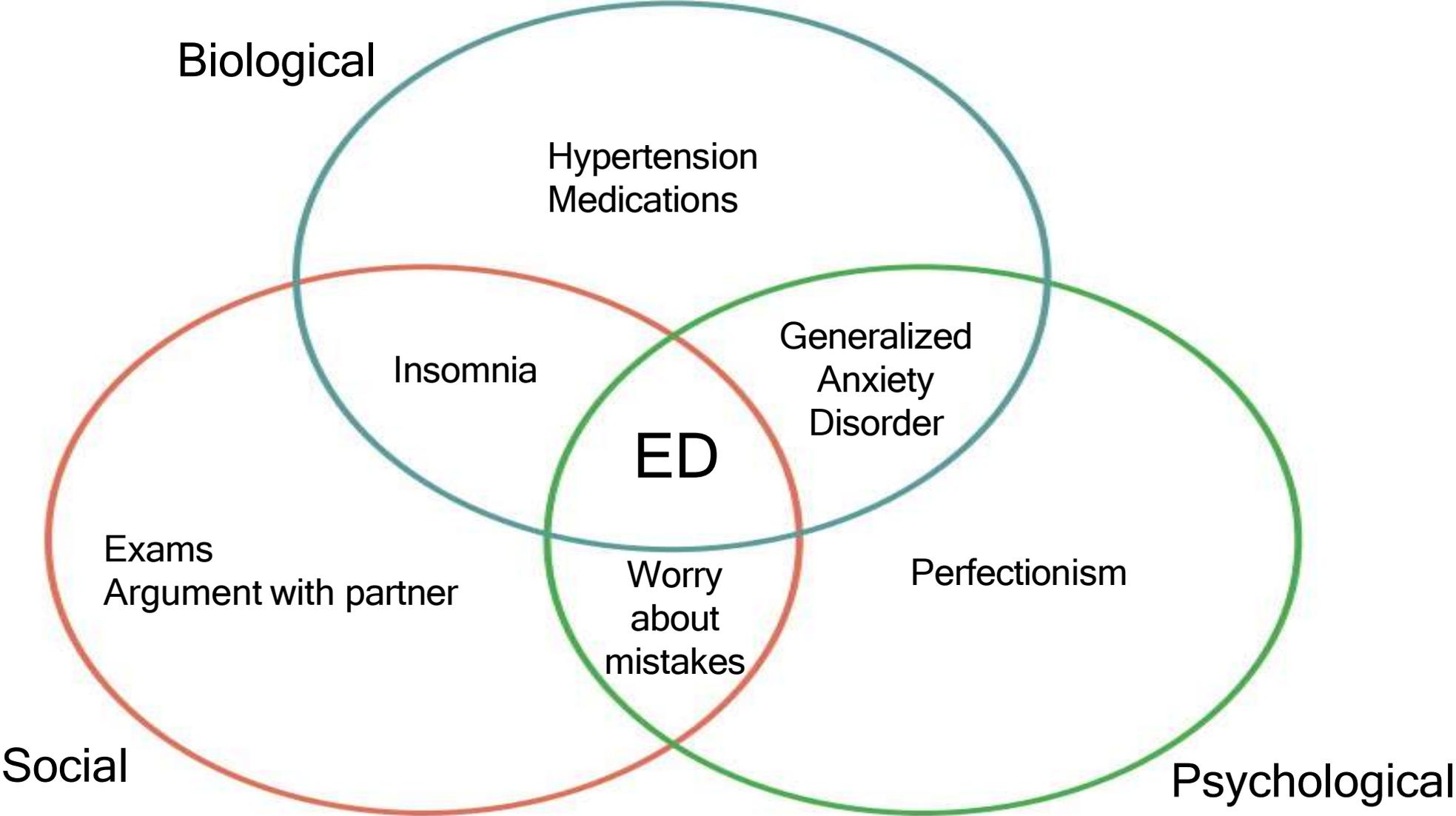
- Aging (over 60% of individuals older than 70)
- Gradual onset
- Risk factors present
- Consistent lack of erection (nocturnal, intercourse, masturbation)

Psychogenic:

- Typically younger in age
- Sudden onset
- Absence of risk factors
- Situational/intermittent problem
- Nocturnal or early morning erections maintained
- Psychological factors (stress, anxiety, depression)

For most patients with ED, a combination of organic and psychogenic components are involved

Biopsychosocial Model of ED



Evaluation & Diagnosis

- Medical, Sexual, Psychological History
- Validated Questionnaires
 - International Index of Erectile Function (IIEF)
 - Sexual Health Inventory for Men (SHIM) - screen for testosterone deficiency
- Physical Examination
 - HR, BP, weight/Edmonton Obesity Staging System (EOSS)
 - Penis: size, plaques, foreskin
 - Testis: size, masses, consistency
 - Peripheral pulses, sensation
- Laboratory Investigations
 - Hg A1c/fasting glucose
 - Lipid profile
 - Testosterone (if signs/symptoms of low testosterone, especially low libido)

Challenges in Assessing Erectile Dysfunction Across Diverse Populations

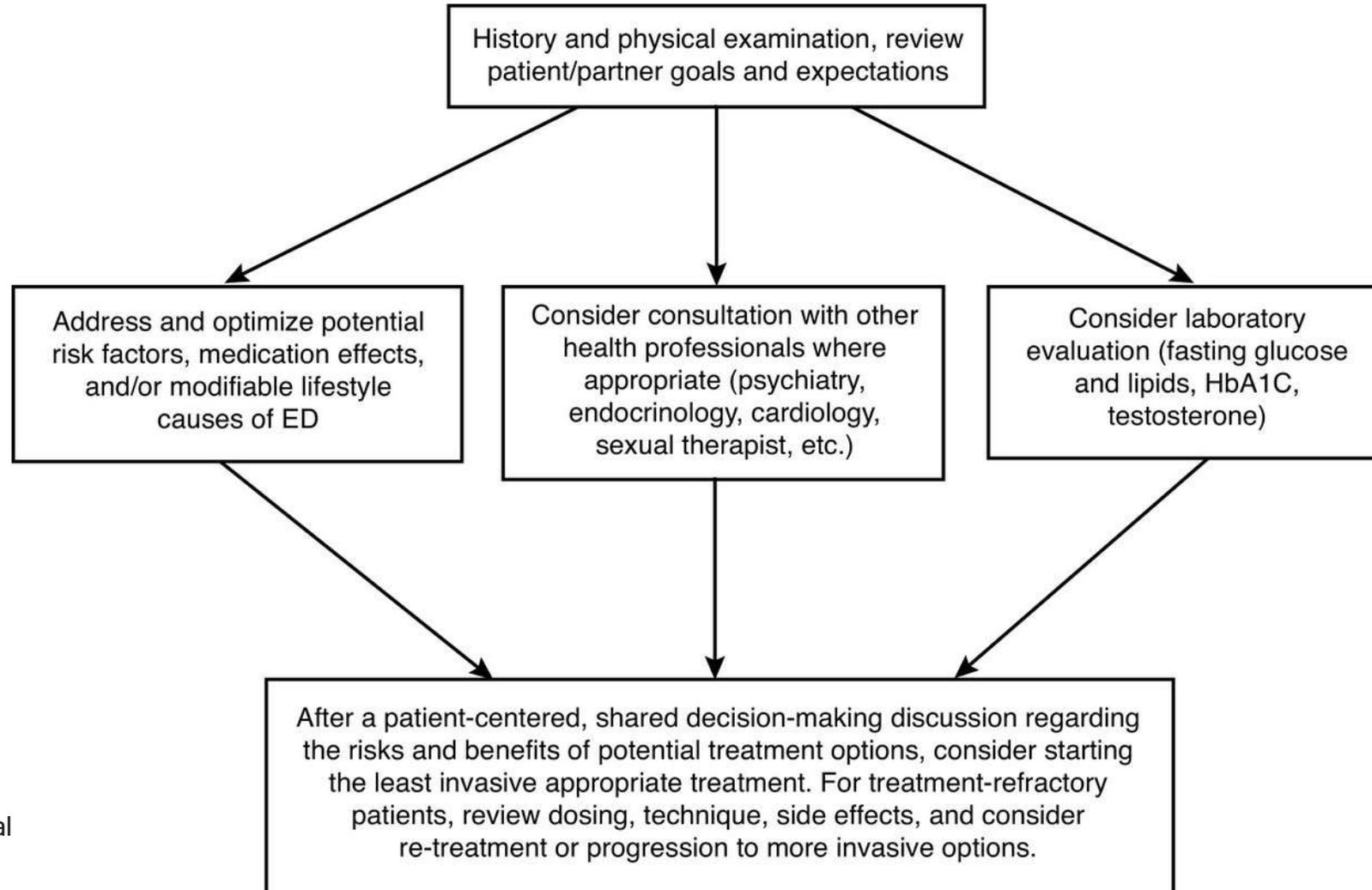
- Even when other variables are controlled, individuals of non-white backgrounds are less likely to pursue healthcare for sexual dysfunction
- Assessing ED in gay patients may be challenging due to
 1. Gaps in provider training in inclusive care
 2. Underrepresentation in research
 3. Heteronormative sexual health questionnaires
- Heteronormative tools like the IIEF may not accurately reflect the experiences of 2SLGBTQIA+ individuals, as they assume the patient is the penetrating partner, which isn't applicable to all

Evaluation & Diagnosis

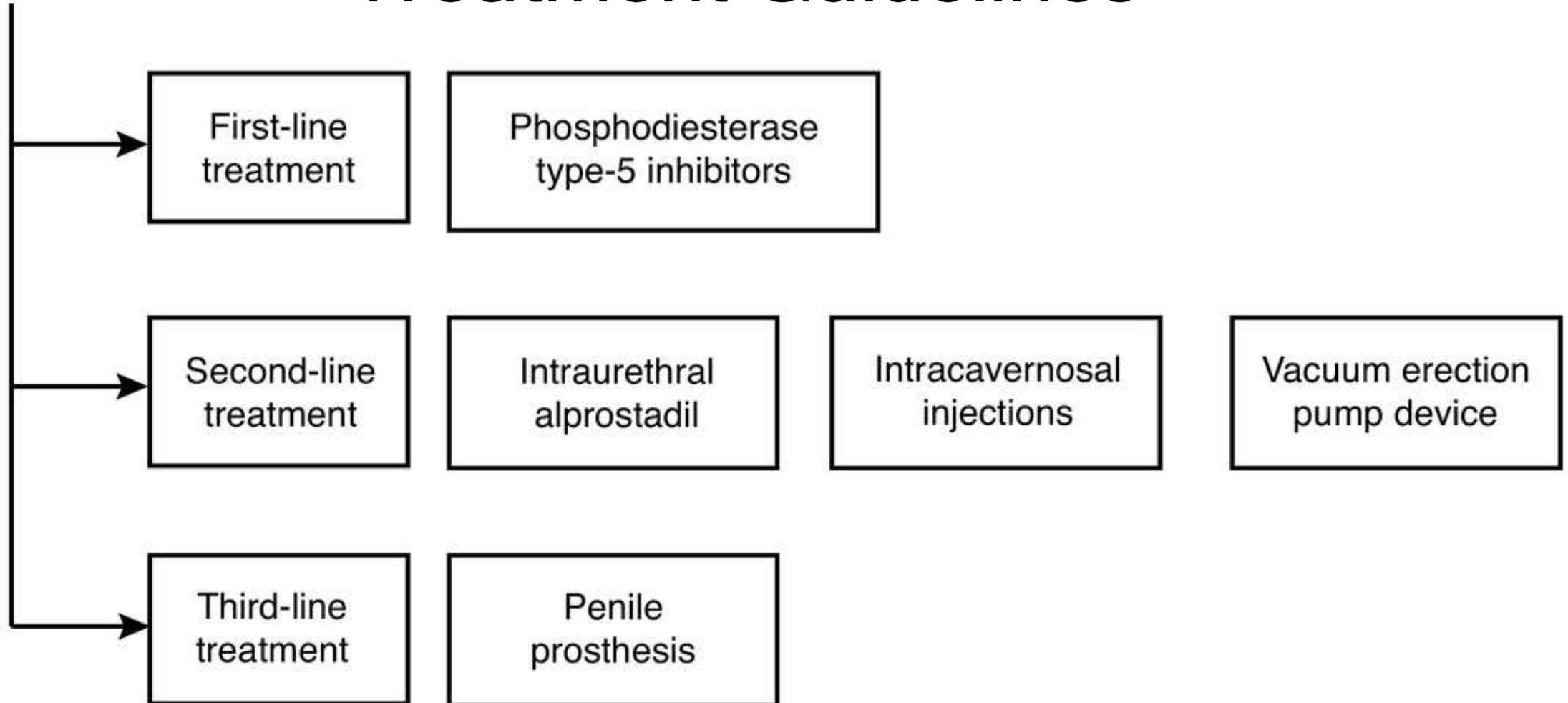
Specialized Testing (not routinely used):

- Penile Duplex US with injection of vasoactive agent
 - Arterial inflow, venous outflow (leak), rigidity of erection
 - Not routinely required
- Nocturnal Penile Tumescence
 - Presence, frequency, rigidity of erections
 - Distinguish between organic vs. psychological cause
- Angiography (internal pudendal system)
 - Focal traumatic stenosis
- Thermographic Imaging (Experimental)
 - Measures temperature changes due to vascular flow

Canadian Urological Association (CUA) Treatment Guidelines



Canadian Urological Association (CUA) Treatment Guidelines



Lifestyle Modification

- Smoking Cessation
- Exercise
- Improve nutrition
- Weight loss
- Limit Alcohol intake
- Control hypertension/cholesterol



Medical Therapy of ED: PDE5i

Brand Name	Generic Name	Date Released	Date Generic Released	On-Demand vs Daily
Viagra®	Sildenafil	1998	2017	On-Demand
Cialis®	Tadalafil	2003	2018	Both
Levitra® TM	Vardenafil	2003	2018	On-Demand
Stendra	Avanafil	2012	Not yet generic	On-Demand

Contraindicated in individuals taking nitroglycerine (nitrates) or known hypersensitivity

Medical Therapy of ED PDE5i – Daily



2.5 mg (1/2 tab)
may be all that
is needed

Contraindicated in individuals taking nitroglycerine (nitrates) or known hypersensitivity

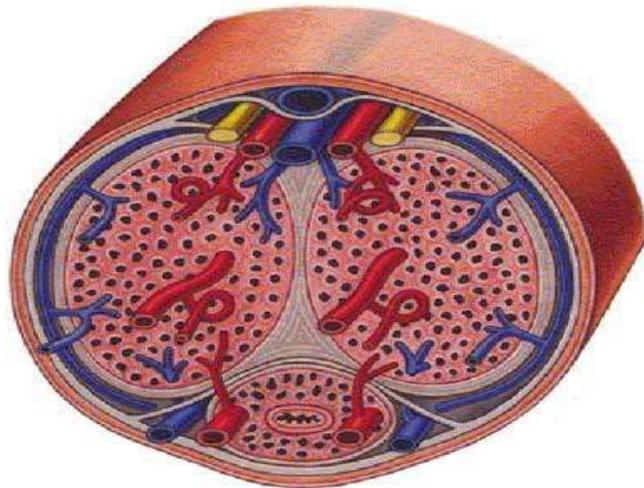
PDE5 Inhibitors: Pharmacokinetic Comparison

Name	Dosage (mg)	Tmax (hours)	T _{1/2} (hours)
Sildenafil (Viagra®)	25-100	1	3-5
Tadalafil (Cialis®)	5-20	2	18
Vardenafil (Levitra®)	5-20	1	3-5
Avanafil (Stendra®)	50-100	0.5-1.5	~6

Tadalafil's longer T_{1/2} allows for daily dosing option

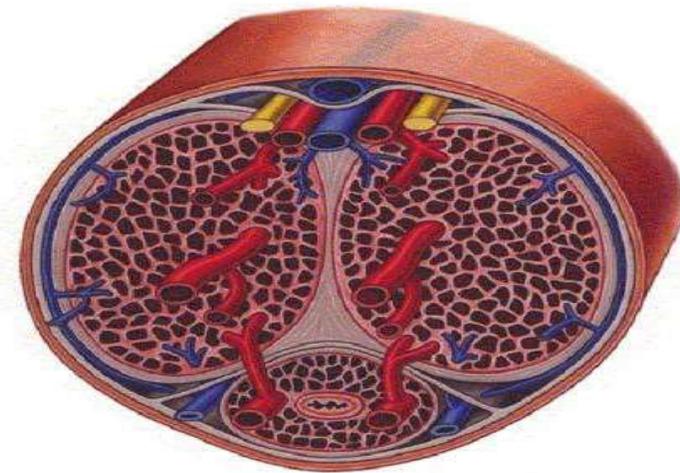
Mechanism of Erections: Vascular Circulation

Smooth muscles contracted >
vasoconstriction > low blood flow



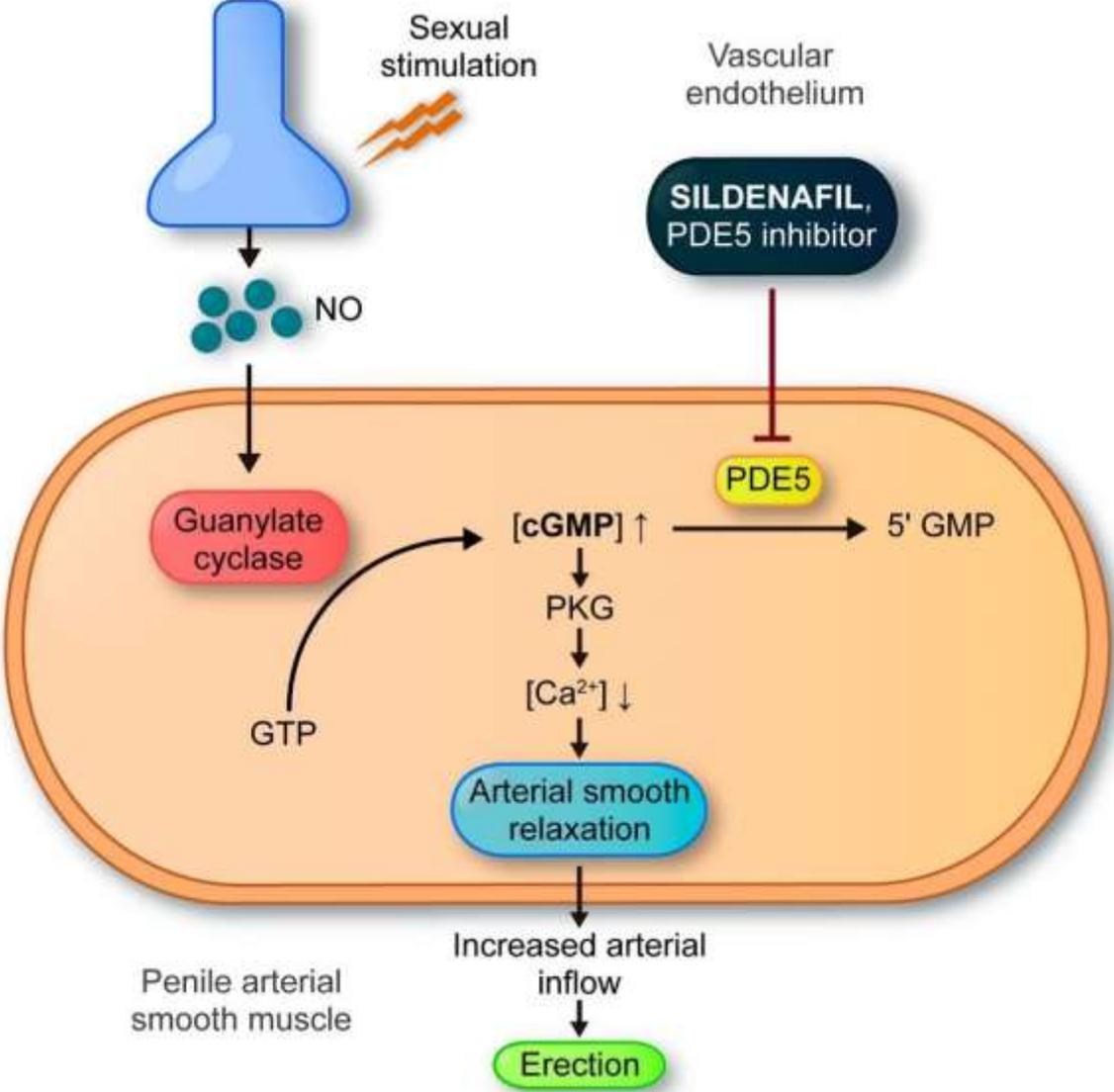
Flaccid Penis

Smooth muscles relaxed >
vasodilation > high flow



Erect Penis

Mechanisms of Smooth Muscle Cell Relaxation with PDE5i



Common Side Effects of PDE5i

- Headache
- Dyspepsia
- Rhinitis
- Flushing of face/skin
- Vision changes (sildenafil)
- Dizziness
- Myalgias/back pain (tadalafil)

Contraindications to PDE5i

- Absolute (life-threatening):
 - Use of Nitrate medication
- Relative (caution should be used):
 - History of MI, stroke, or life-threatening arrhythmia in the past 6 months
 - Resting hypotension or hypertension
 - History of heart failure or unstable angina
 - Concomitant administration of alpha-blockers

Things to consider with PDE5i use

- NOT contraindicated in patients with:
 - History of stable CV disease/MI (except if absolute or relative contraindications exist)
 - Patients on alpha-blockers for BPH (historical)
 - Young patients with psychogenic ED (may help)
- Does NOT cause priapism
 - Still mentioned on product monograph

PDE5i: Patient Education is Critical to Success

- Take 60 min in advance of sex
- Sildenafil/Vardenafil: need to take on an empty stomach
- Mental and physical stimulation required
 - Not a “magic” erection pill, best if partner aware
 - Anxiety can counteract effects of medication
- Try medication several times before giving up on it
- Efficacy of the 3 drugs varies from patient to patient
 - Try at least 2 drugs before deeming ineffective
- Warn patient about side-effects and contraindications
- Reassure patients regarding the safety of the medication



Androgens and Testosterone Replacement

- May be useful in individuals with ED and low testosterone (especially if other symptoms of testosterone deficiency exist, i.e. low libido)
- Consider testing testosterone in individuals not responding to PDE5i
- Should NEVER be given to individuals trying to conceive (causes infertility)

Testosterone Deficiency Syndrome

A. More specific symptoms and signs

- Incomplete or delayed sexual development, eunuchoidism
- Reduced sexual desire (libido) and activity
- Decreased spontaneous erections
- Breast discomfort, gynecomastia
- Loss of body (axillary and pubic) hair, reduced shaving
- Very small (especially <5 ml) or shrinking testes
- Inability to father children, low or zero sperm count
- Height loss, low trauma fracture, low bone mineral density
- Hot flushes, sweats

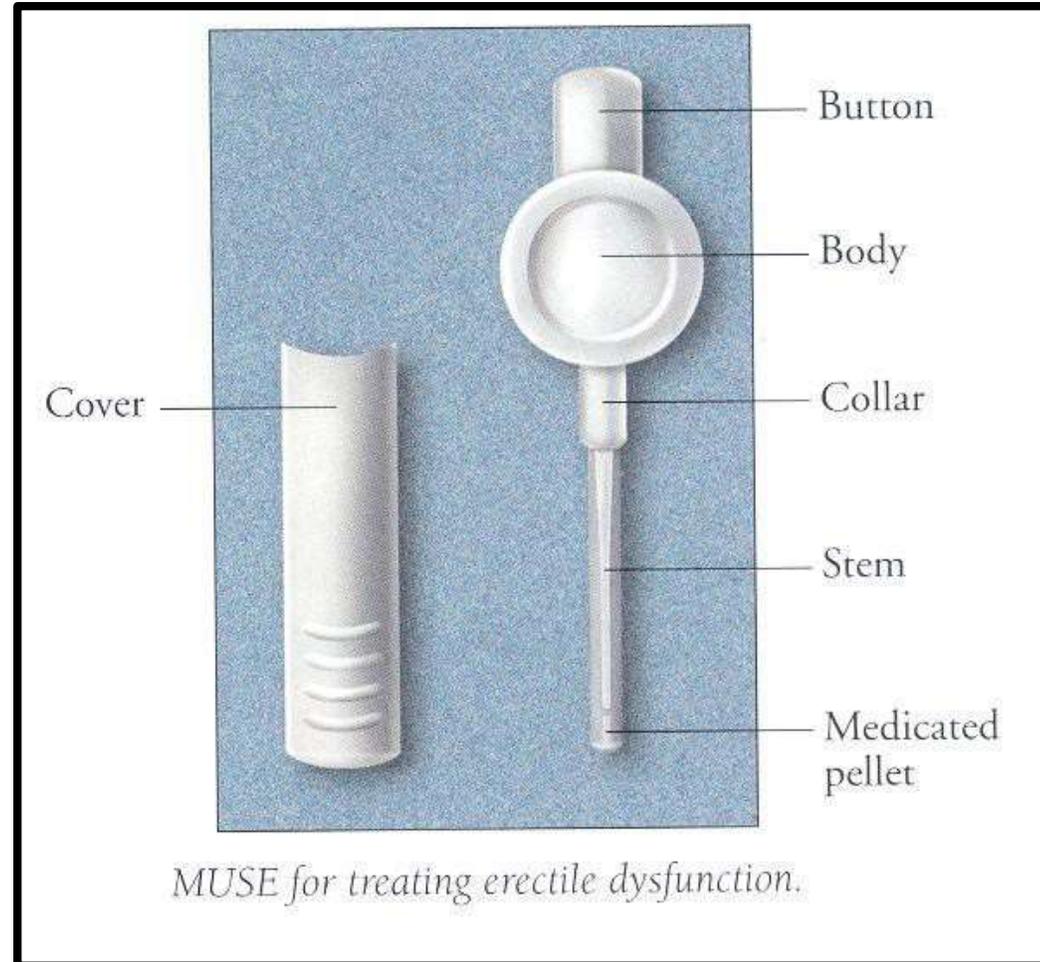
B. Other less specific symptoms and signs

- Decreased energy, motivation, initiative, and self-confidence
- Feeling sad or blue, depressed mood, dysthymia
- Poor concentration and memory
- Sleep disturbance, increased sleepiness
- Mild anemia (normochromic, normocytic, in the female range)
- Reduced muscle bulk and strength
- Increased body fat, body mass index
- Diminished physical or work performance

Testosterone Deficiency Syndrome

- Initial Evaluation for TDS
 - Morning serum Total T, FSH, LH, Prolactin
 - Prostate Specific Antigen (PSA), CBC, Digital Rectal Exam (DRE) if considering therapy
- Treatment (indicated for symptoms of TDS + Low T)
 - Topical gel (Androgel, Testim)
 - IM (injection every two weeks typically)
 - Other agents (Oral, Nasal, Patch)
- Monitoring (q3-6 months initially)
 - Symptom assessment and CBC, PSA, DRE

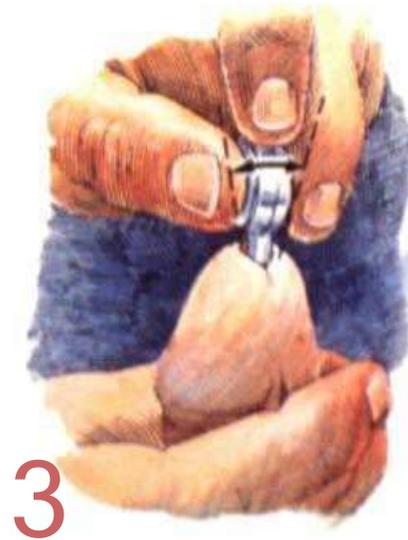
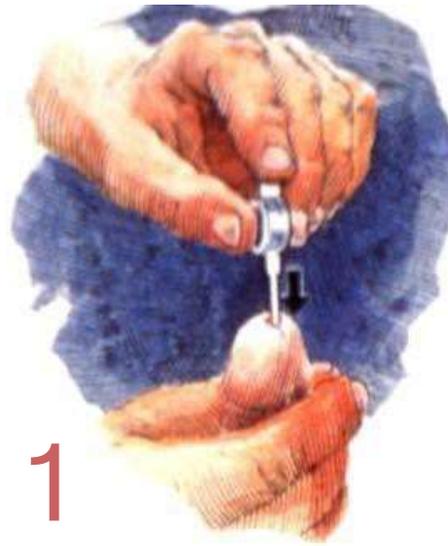
MUSE Intraurethral Suppository (PGE-1)



MUSE

Problems:

- Limited efficacy
- Pain
- Priapism



Vacuum Erection Device

- Cumbersome
- Limited efficacy
- Non-pharmacologic
 - Can be used in patients on nitrates



OSBON
ERECAID[®]
Non-Prescription Vacuum Therapy System

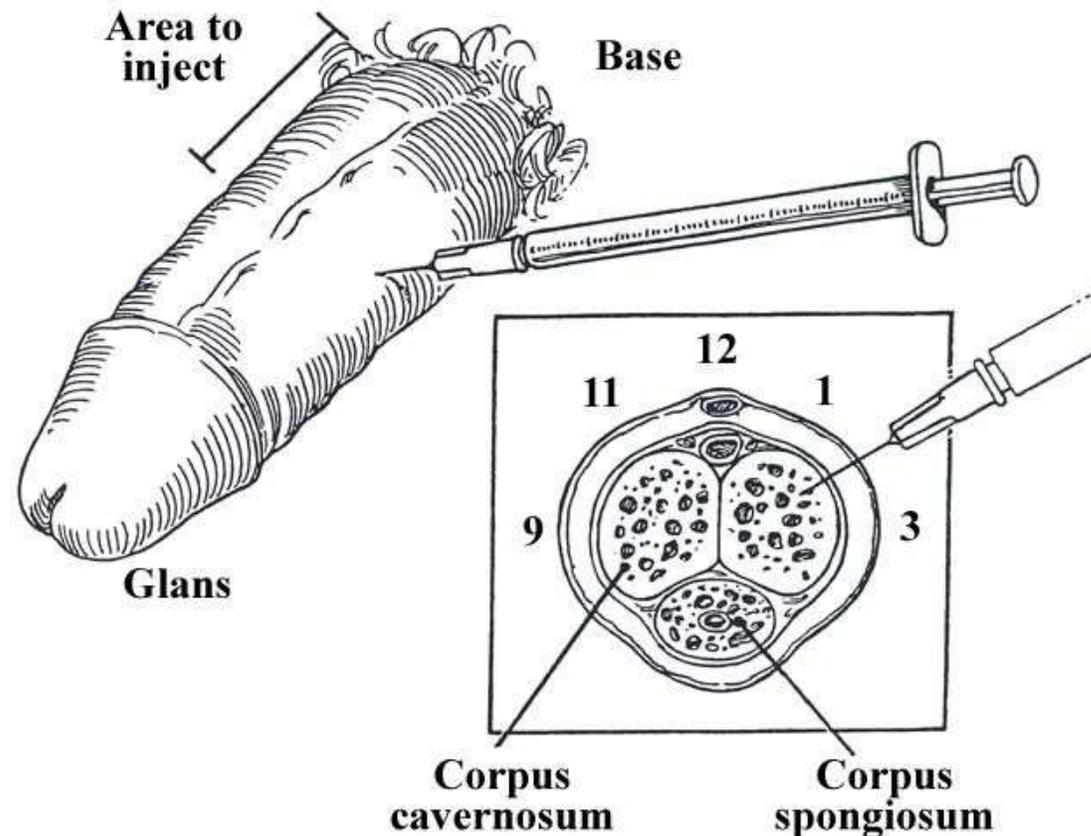


User Guide

NOW AVAILABLE WITHOUT
PRESCRIPTION

 **timmm**
medical technologies, inc.
At your side with better solutions

Intracavernosal Injection Therapy (ICI)



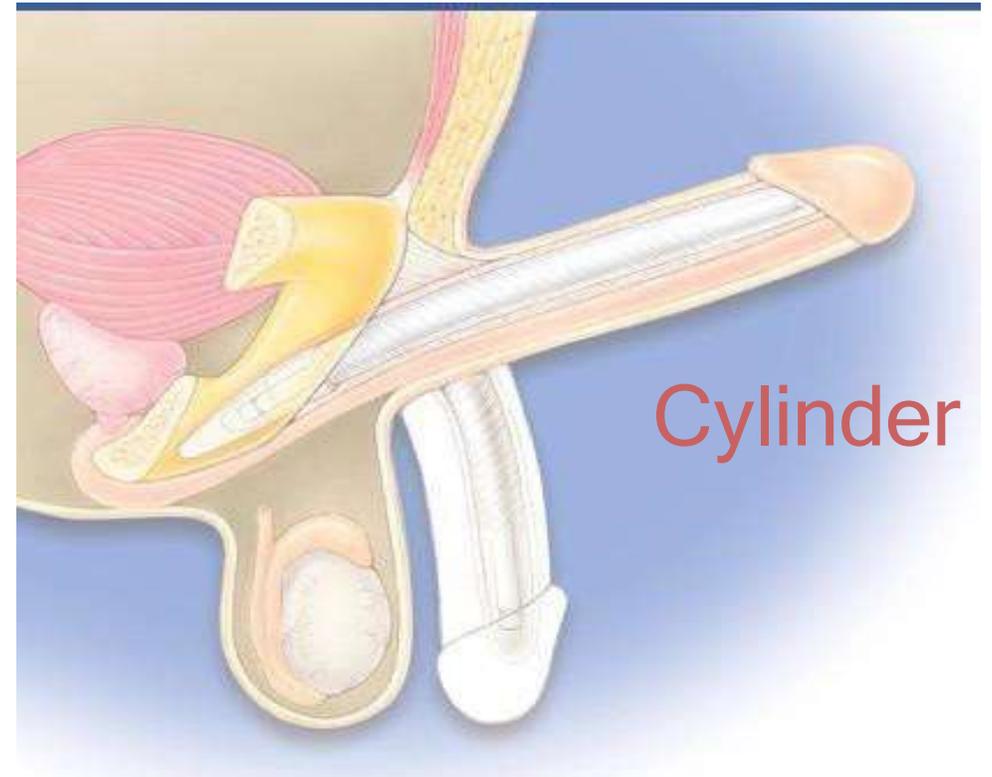
Caverject
(Alprostadil)

Triple
P/Trimix: PGE-
1
Phentolamine
Papaverine

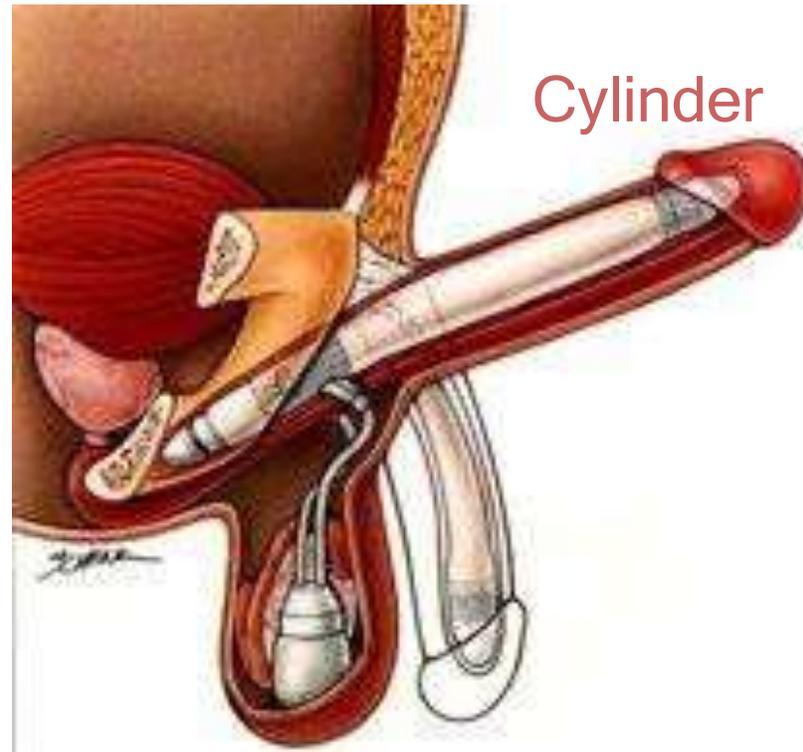
Penile Implants/Prosthesis



Non-inflatable (malleable) Penile Implant



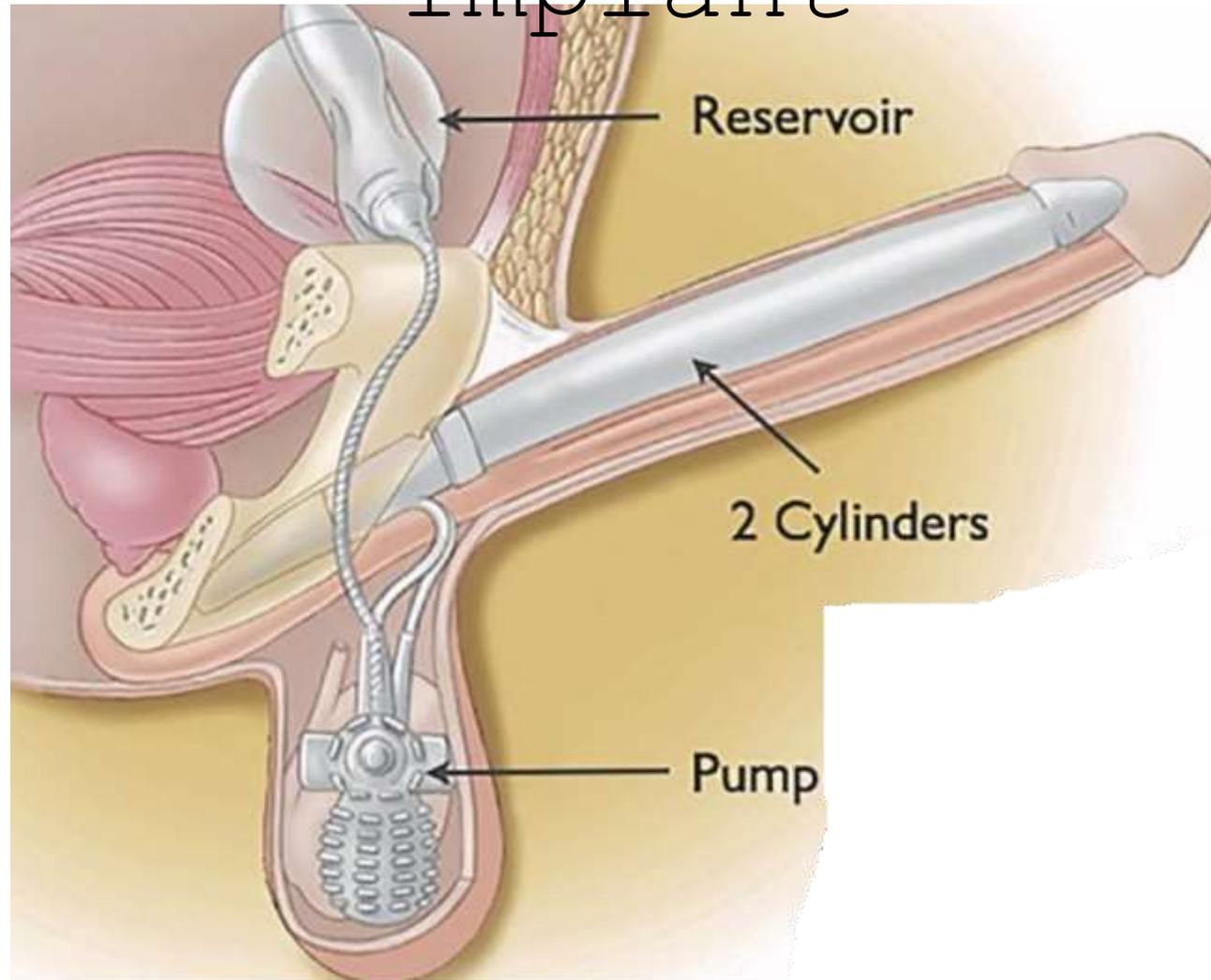
Inflatable 2-Piece Penile Implant



Cylinder

Pump &
Reservoir

Inflatable 3-Piece Penile Implant



Risks of Penile Implants

- Infection: usually requires complete removal
- Perforation: in the OR
- Malfunction: 5% in 10 years
- Urethral injury
- Erosion

Barriers to Access in Penile Prosthesis Procedures in Canada

- Full coverage for both malleable and inflatable penile prostheses in Alberta, Manitoba, New Brunswick, and Newfoundland.
- No coverage in Saskatchewan; other provinces show variable coverage.
- In centers lacking full coverage, patients faced median out-of-pocket costs of \$5000 for a malleable device and \$6000 for an inflatable device.

Penile Prosthesis in Female to Male Transgender Patients

Candidates should be at least 1-year post-phalloplasty, have no urethral issues, and a sensate neophallus.

- Challenges: Anatomical differences in the neophallus, such as lack of corporal crura and tunica albuginea, increase risks of malposition, distal erosion, and complications related to vascular supply and scarring.
- Complications: High rates of explant and revision.
- Innovations: Transgender-specific implants (ZSI 475 FtM) with large base for pubic bone fixation and realistically shaped appearance show promise but data is limited.

Novel Treatments in ED

- Low Intensity Shockwave (widely available with some clinical studies)
- Stem Cells (experimental)
- Platelet Rich Plasma (experimental)
- Cosmetic and girth enhancing treatments - Himplant® (experimental)

Summary

- ED is common, and usually has an organic component
- Always consider occult CV disease
- A variety of treatment options exist
 - PDE-5i therapy useful in most, patient education is key
- Urology referral appropriate for PDE-5i failures or if contraindications exist
- Testosterone therapy useful in select cases where patient has both symptoms and a low serum testosterone level