"Restoring Function: Surgical Solutions for Erectile Dysfunction and Urinary Control After Prostate Cancer Treatment

April 2025

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Lahey Hospital & Medical Center

Introduction

Khushabu Kasabwala, MD

- Genitourinary Reconstruction
- Lahey Hospital and Medical Center (Burlington, MA)

Education

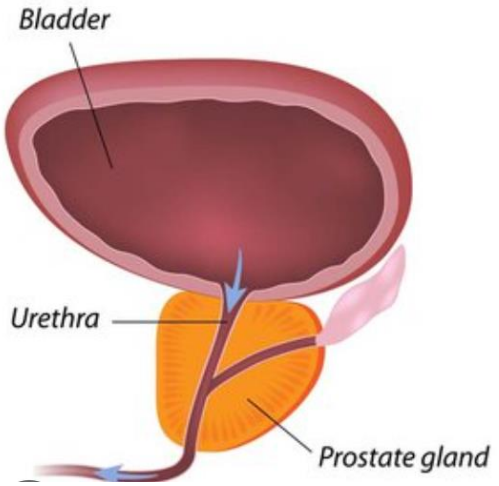
- BS, Boston University (2009)
- MD, Rutgers – NJ Medical School (2014)
- Urology Residency: NYP – Weill Cornell (2020)
- Fellowship: Genitourinary Reconstruction, University of Minnesota (2021)

Objectives

1. Explain the impact of prostate cancer treatment on erectile function and urinary control.
2. Describe surgical options for managing erectile dysfunction, including penile implants.
3. Discuss surgical treatments for urinary incontinence, such as artificial urinary sphincters and slings.
4. Review expected outcomes, risks, and recovery from these procedures.

Prostate Cancer Background

- **Prostate –** gland that makes fluid for semen
- **Prostate cancer** is the most common cancer in men
  - ~1 in 8 men will be diagnosed with prostate cancer during their lifetime
- Prostate cancer treatment options:
  - Surgery – Radical prostatectomy
  - Radiation – Brachytherapy, XRT
  - Ablative therapy – HIFU, Cryotherapy
  - Hormone therapy
  - Chemotherapy



American Cancer Society

Impact of Prostate Cancer Treatment

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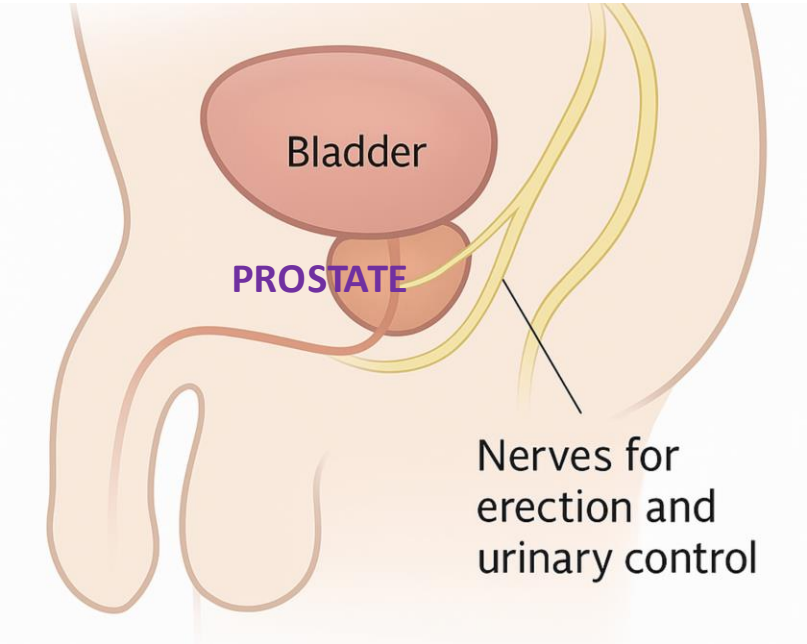
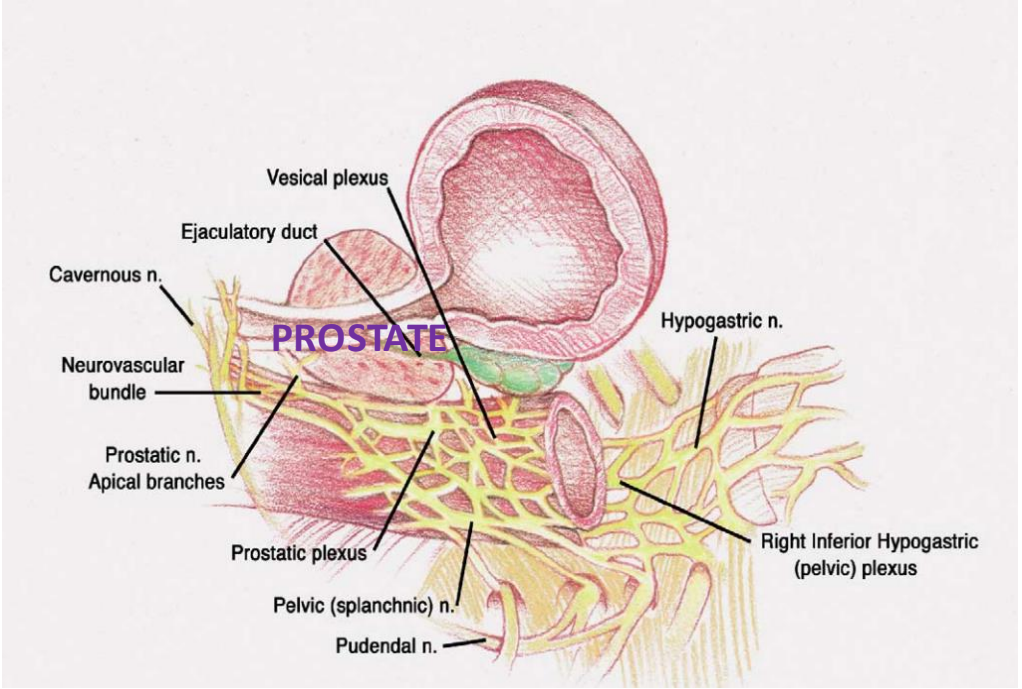
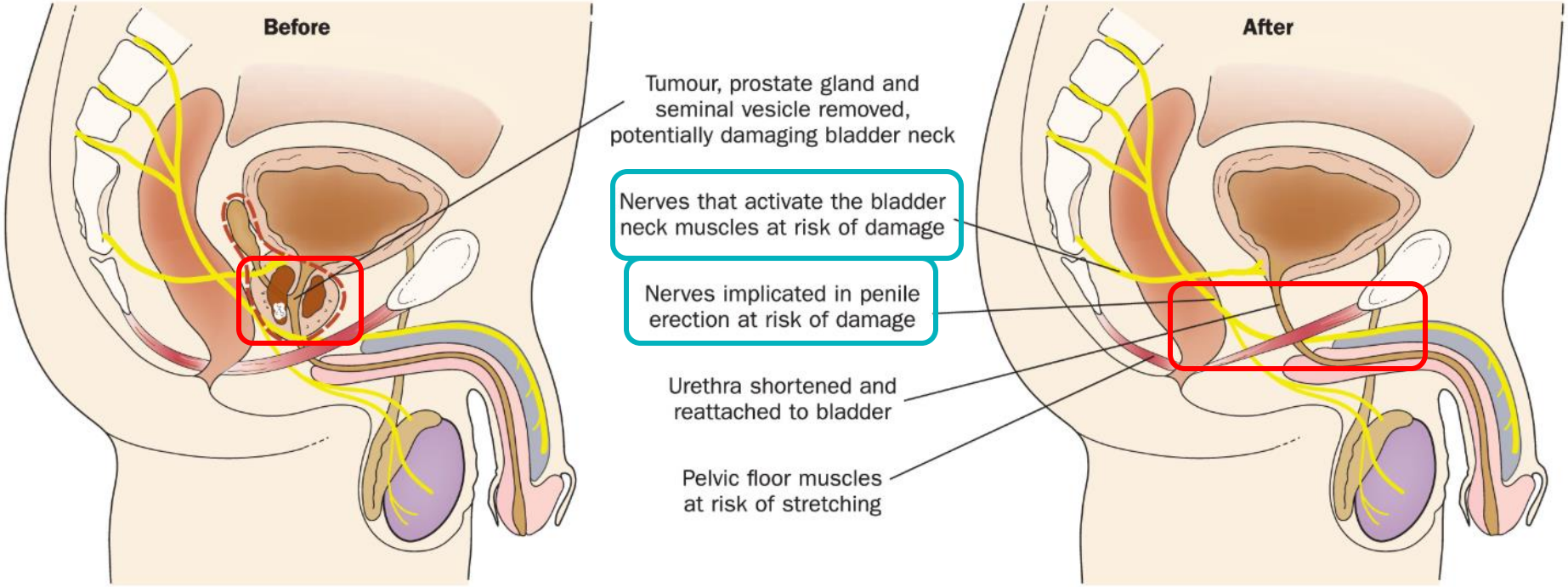
Anatomy of Prostate Cancer Treatment





Tewari et al., European Urology 2003

Prostatectomy For Prostate Cancer



https://www.britishjournalofnursing.com/content/product-focus/pathway-for-post-prostatectomy-urinary-incontinence-impact-on-patient-confidence-and-satisfaction/

What Happens after Prostate Cancer Treatment

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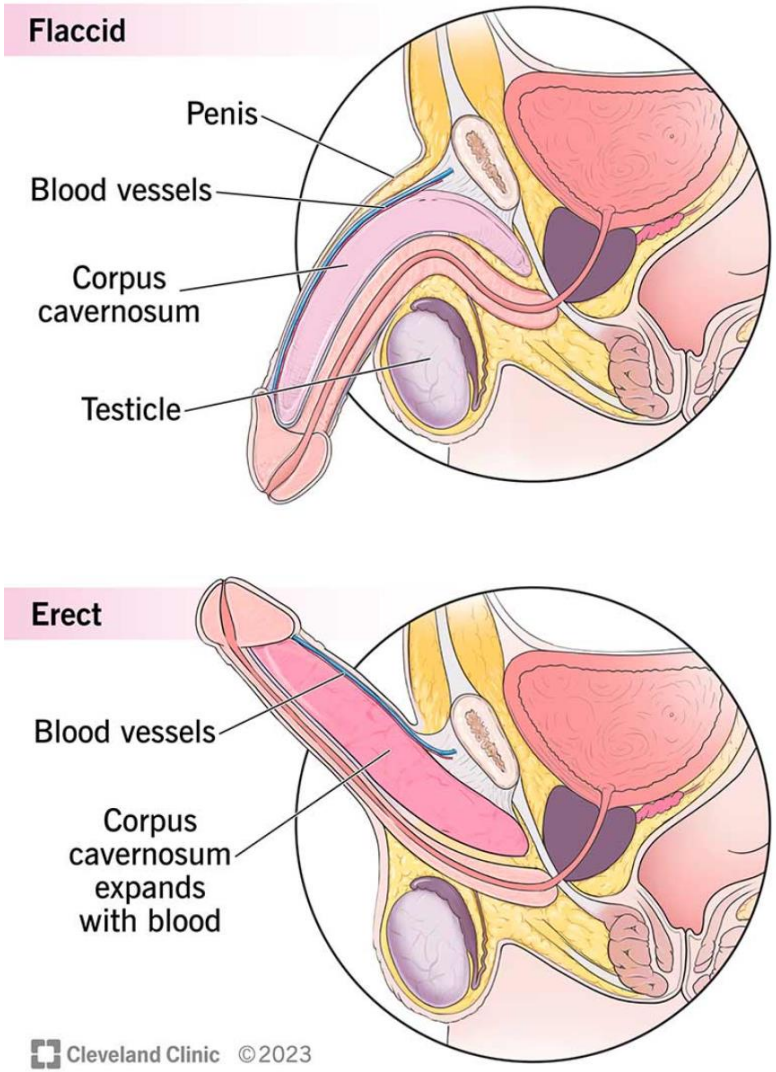
Mechanism of Erectile Dysfunction



Cavernosal nerve injury

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Loss of erections

↓

Cavernosal hypoxia ← **Arterial injury**

↓

Smooth muscle apoptosis > Collagen accumulation > **fibrosis**

→ Veno-occlusive dysfunction

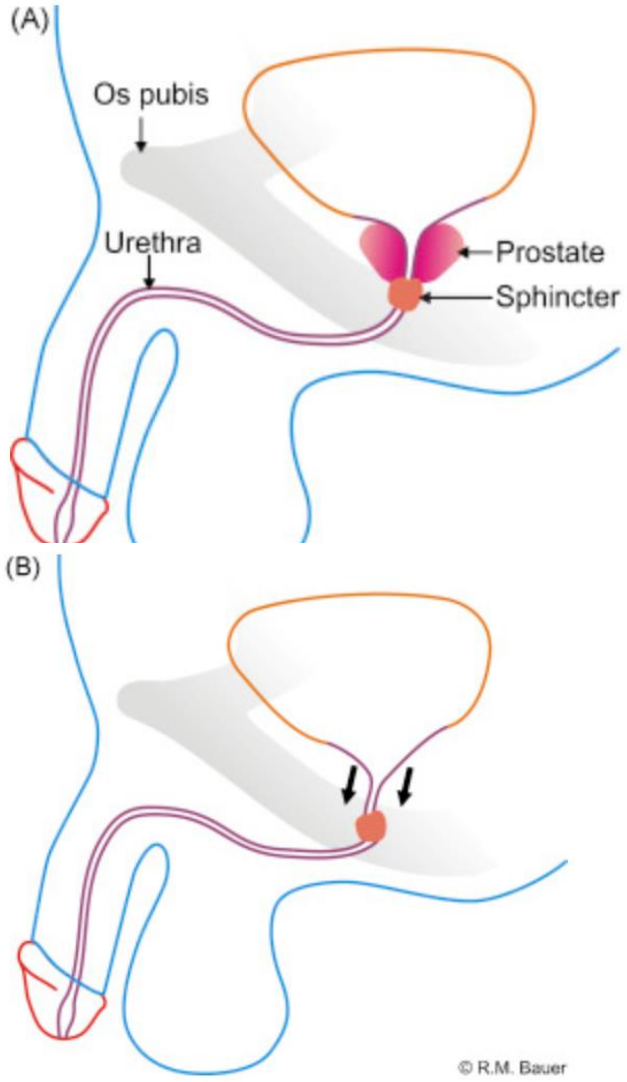
Hyun, JS, World J Mens Health 2012

https://my.clevelandclinic.org/health/diseases/10035-erectile-dysfunction

Erectile Dysfunction After Prostate Cancer

- **Erectile dysfunction (ED) after prostate surgery – 10-100%, after RT 40-60%**
  - ED definition varies in studies: "no erections" at all – "90% erection"
  - Use of robotic and laparoscopic surgery, nerve sparing techniques have improved outcomes
- **Factors that matter:**
  - Pre-op: Age, medical problems, smoking, baseline erectile function
  - Intra-op: Nerve sparing (cancer stage/grade), number/type of treatments, surgeon experience
  - Post-op: Physical activity
- Recovery can take up to 24 months post treatment
  - May not return to pre-treatment levels
  - ~5% of patients may need surgical management after prostatectomy, 0.3% after RT

Mechanism of Urinary Dysfunction



Nerve injury to external and internal sphincter

Disruption of the pelvic support strictures

Poor urethral sphincter control

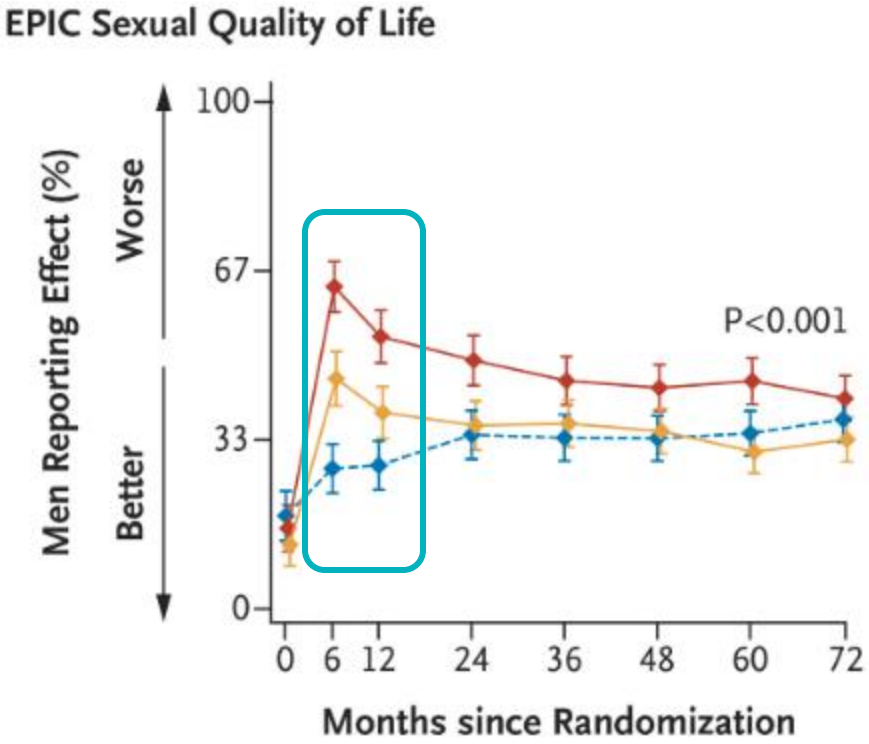
Stress urinary incontinence

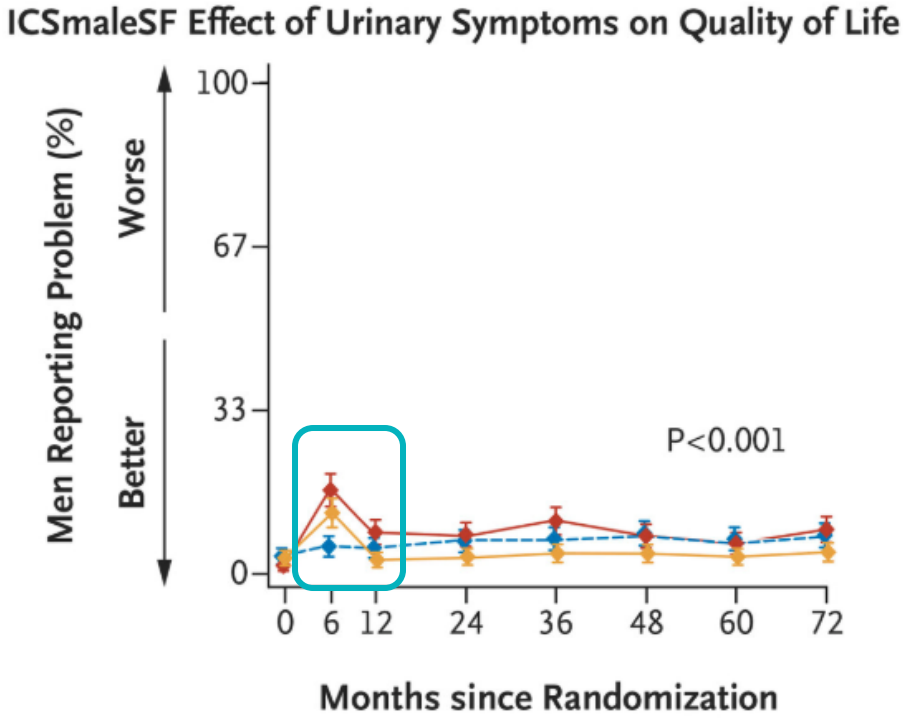
Urinary Incontinence After Prostate Cancer

- Urinary incontinence after prostate surgery – 2% to 65.5%
  - Depends on:
    - **preoperative continence status**
    - body mass index (BMI), age, urethral length, prostatic volume
    - surgeons experience and surgical technique
  - Newer technology including use of robotic and laparoscopic surgery and other better techiques have improved outcomes
- Recovery can take up to 12 months post treatment
  - If symptoms severe, treatment can be sought 6 months post-op
  - 3-6% of men require an anti-incontinence surgery after prostate cancer treatment

Quality of Life after Prostate Cancer

- Sexual and urinary dysfunction can affect quality of life for months post treatment





Radical prostatectomy
Radical radiotherapy
Active monitoring

Donovan et al.; NEJM 2016

Management of Erectile Dysfunction

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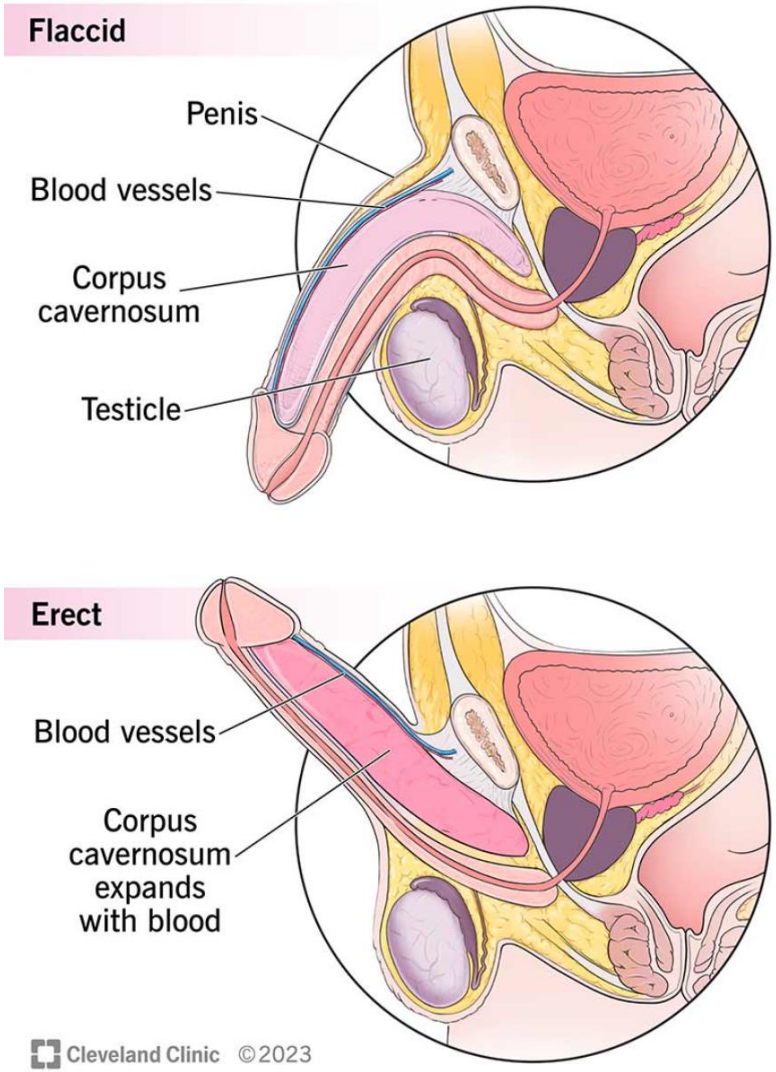
Management of Erectile Dysfunction



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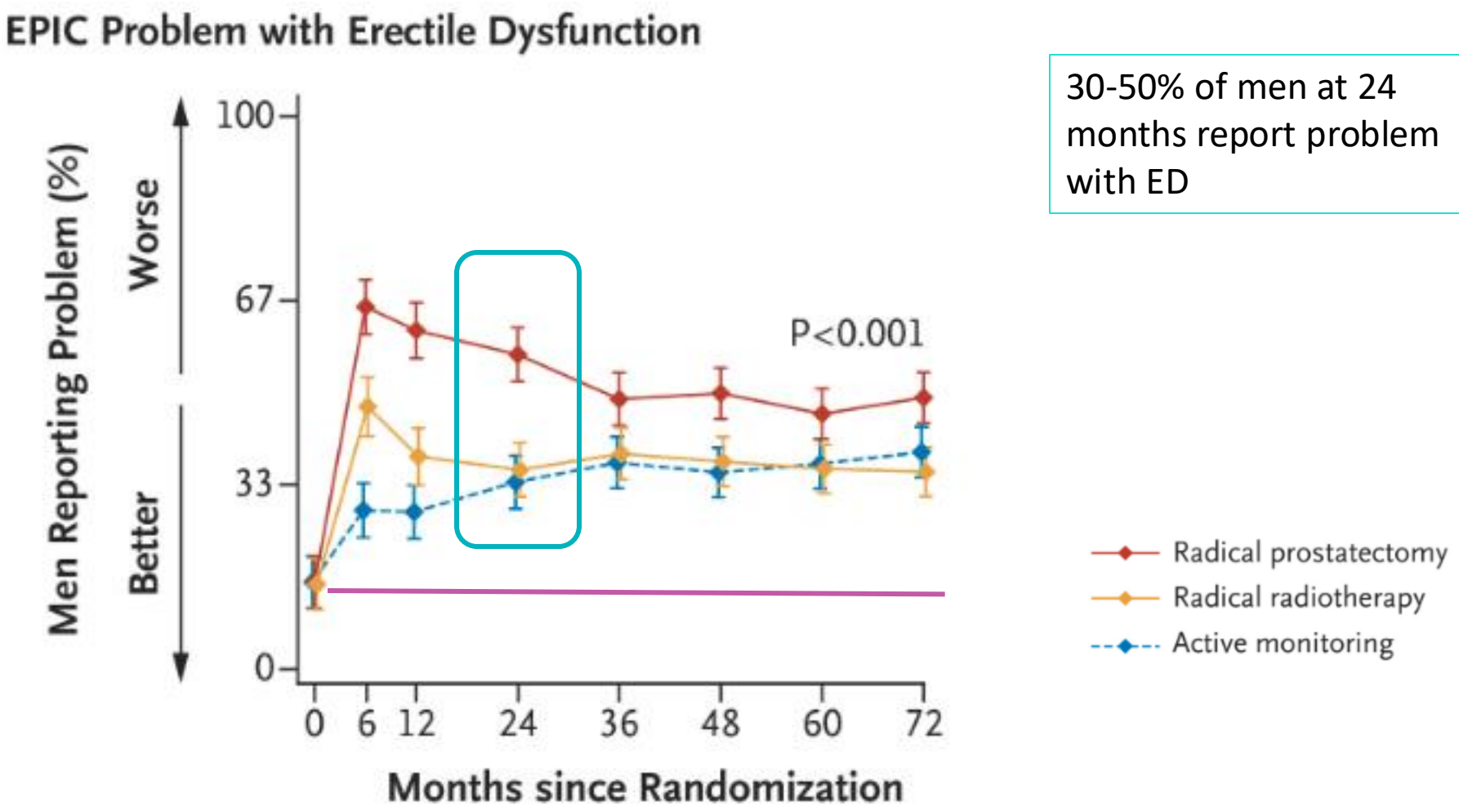
Management of Erectile Dysfunction



30-50% of men at 24 months report problem with ED

Donovan et al.; NEJM 2016

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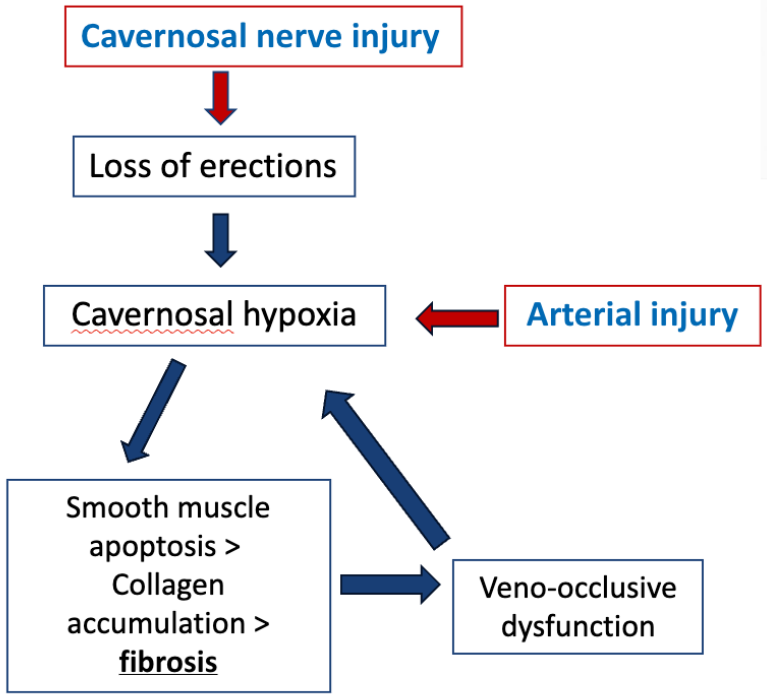
Management of Erectile Dysfunction

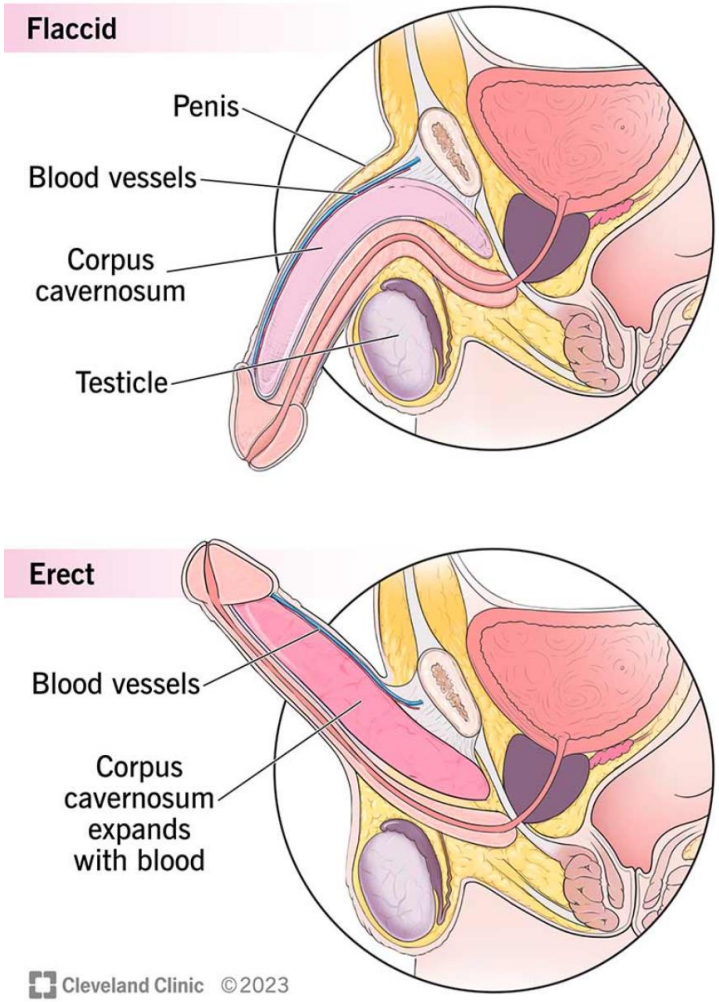


Vacuum Erection Device (VED) (Pre-treatment, Post-Treatment)

Phosphodiesterase 5 inhibitors - PDE-5i (Pre, Post)

Intracavernosal Injections - ICI (Post)

Management of Erectile Dysfunction



Surgery – Penile Prosthesis (Post)

Surgical Management of Erectile Dysfunction

Malleable Prosthesis	Inflatable Prosthesis
"Rod" - bendable silicone rods	"The pump" - 3 pieces
Bend up for an erection	Pump up for an erection
Faster surgery, less complications	Longer surgery, more complications
Penis always feels "erect"/firm	Penis will be flaccid when not in use

Inflatable Penile Prosthesis

- Inflatable penile prosthesis

Pros and Cons of a Penile Prosthesis

Pro

- Ability to achieve an adequate erection "on-demand"
- Avoid use of medications, injections
- Decreased performance anxiety

Cons

- Possible out of pocket cost
- Need to undergo surgery (lasts ~10 years)
- Do not increase penile length or sensitivity

Penile Prosthesis Surgery

	Inflatable Penile Prosthesis
Good Candidates	• Failed use of other treatments (meds, injections) • Pre-op medical conditions well controlled (HbA1c <8) • Must be able to hold blood thinner for surgery • Have good hand dexterity (or partner can)
Anesthesia	General Anesthesia (1-2 hour surgery) Often outpatient (discharged same day)
Pre-op Considerations	1. Start pre-op antibiotics, use antibiotic wash
Post-op Considerations	1. Home implant partially inflated x1 week 2. Limited activity 6 weeks 3. Frequent post-operative checks (1, 6 week)
Risks	**<5%:** Infection, bleeding, injury to surrounding structures (urethra, bladder, bowel, penis, blood vessels) **Rare:** herniation, erosion, migration, cold glans, chronic pain, SST deformity (drooping glans), device malfunction

Life after a Penile Prosthesis

- Higher rate of revision surgery in inflatable device (14%)
  - 23.2% of devices may experience mechanical failure within 10 years
    - Higher for those that have: history of radiation, comorbid conditions (smoking, HTN, vascualar disease)

- Satisfaction rate for patient and partner >90%
  - 77% reported good sexual function, lower depression scores
  - Higher for inflatable vs malleable (7.7% of malleable pts eventually underwent inflatable PP)
  - No difference in satisfaction according to brand of implant

Luna et al.; J Sex Med 2022
Cayan et al.l J Sex Med 2019

Management of Urinary Incontinence

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Urinary Issues after Prostate Cancer Therapy

Stress Urinary Incontinence

- Leakage of urine when during activities that involve effort and exertion (coughing, standing up, lifting weights, walking, bending)

Climacturia

- Leakage of urine during sexual activity

Urge Urinary incontinence

- *Leakage of urine after strong urge to go ("cant make it to the bathroom fast enough")*
- *Often a result of bladder damage (usually after radiation)*

Management of Stress Urinary Incontinence

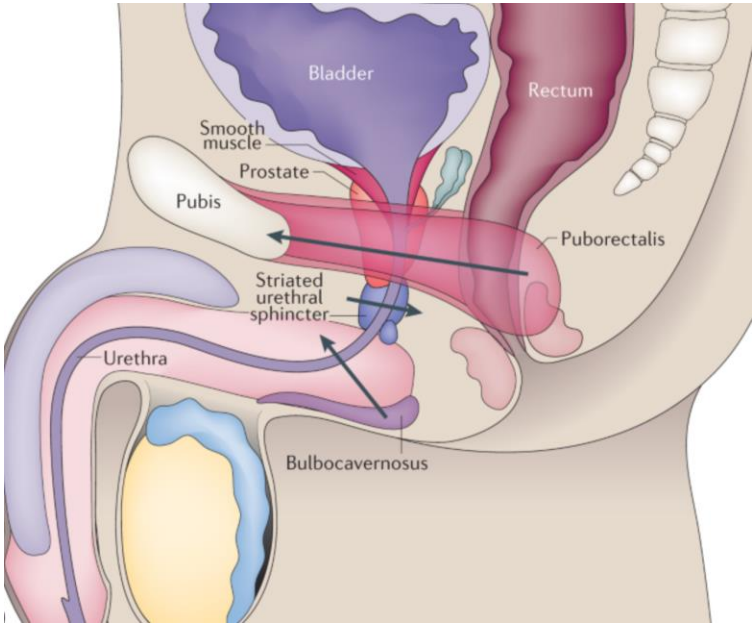
Nerve injury to external and internal sphincter

Disruption of the pelvic support strictures

Poor urethral sphincter control

Stress urinary incontinence

Pelvic floor physical therapy - Kegels (Pre-treatment, Post-Treatment)



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Measuring Stress Urinary Incontinence

Pad Weight Test

- 24 pad weights

Number of pads

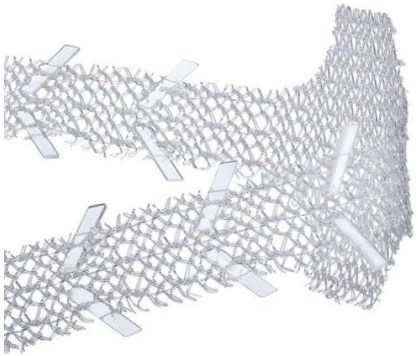
- 0-1 mild
- 1-2 moderate
- 2+ moderate - severe

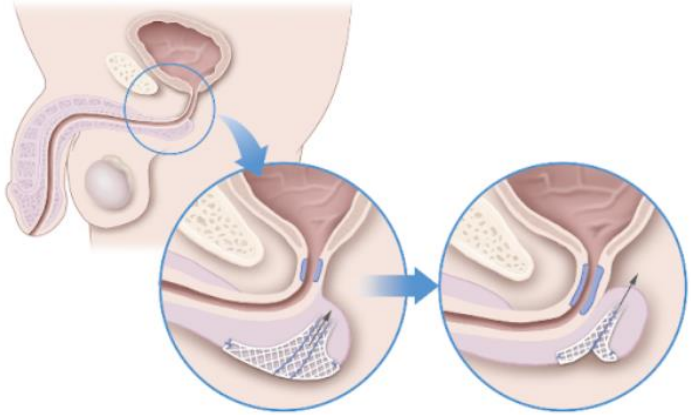
Standing Cough Test (with full bladder + 4 coughs)

G0= no leakage
G1= leak drops on cough 3,4
G2= leak drops on cough 1,2
G3= drops become stream
G4= immediate stream

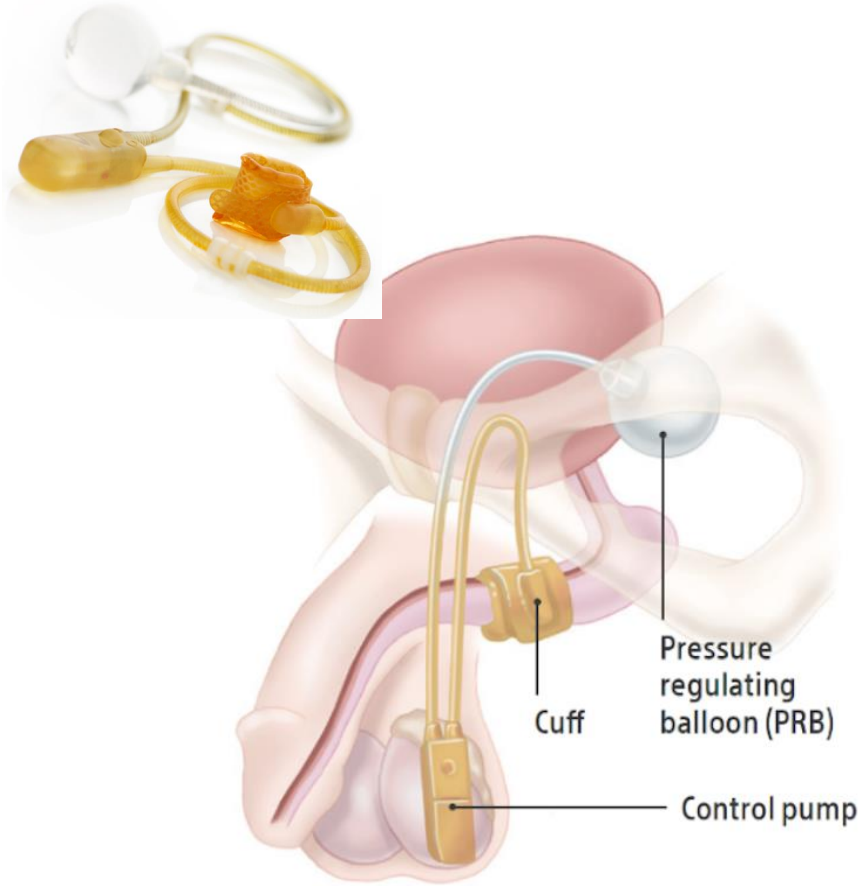
Surgical Management of Urinary Incontinence

Urethral Sling



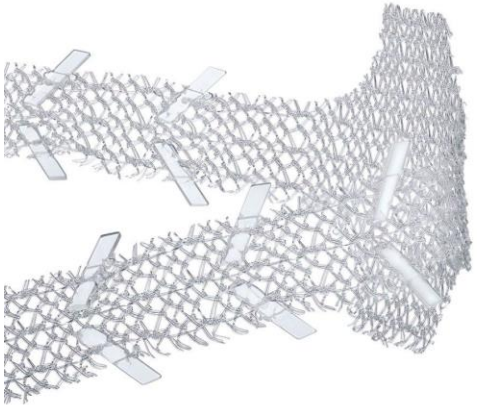


Artificial Urinary Sphincter (AUS)



Surgical Management of Urinary Incontinence

Urethral Sling



Artificial Urinary Sphincter (AUS)

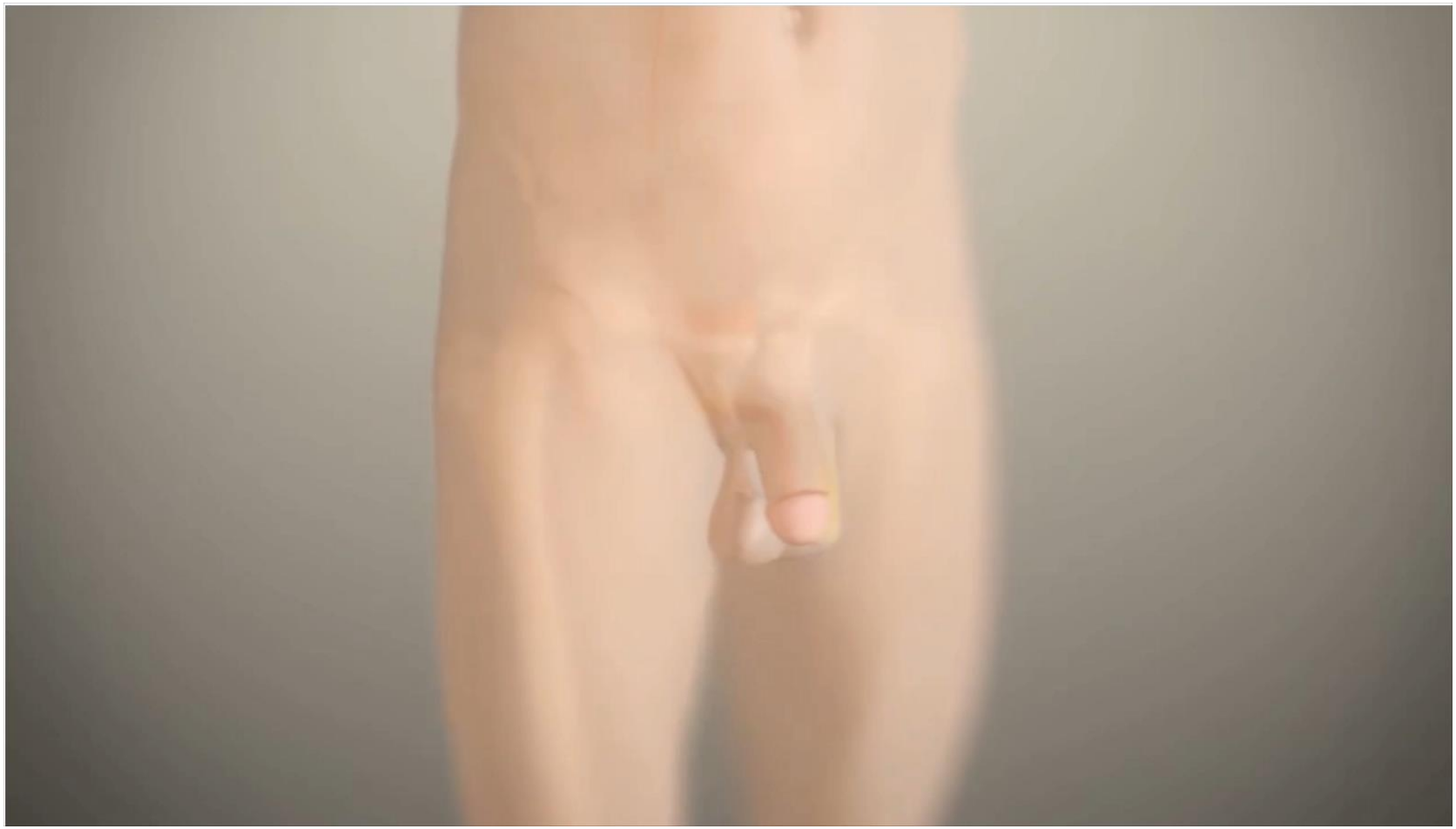
Mild to moderate urinary incontinence (<=2 pads/day), climacturia	Moderate to severe urinary incontinence (>2 pads a day)
No history of radiation or prior urethral surgery	Can place after radiation and urethral surgery (though high risk)
Passive	Activate to void
Works immediately	Needs healing time prior to use (6 weeks)
Top risk: urinary retention	Top Risk: erosion, infection, mechanical

Surgical Management of Urinary Incontinence

Treatment	Best For	Dry Rate	Improvement Rate	Durability	Key Notes
Artificial Urinary Sphincter (AUS)	Moderate to severe SUI	~60–80% dry	~85–90% improved	10+ years	Gold standard, needs manual control, high satisfaction
Urethral Sling	Mild to moderate SUI	~40–60% dry	~70–85% improved	5–10 years	No activation needed, less ideal for severe cases

Artificial Urinary Sphincter

- Using the AUS Device

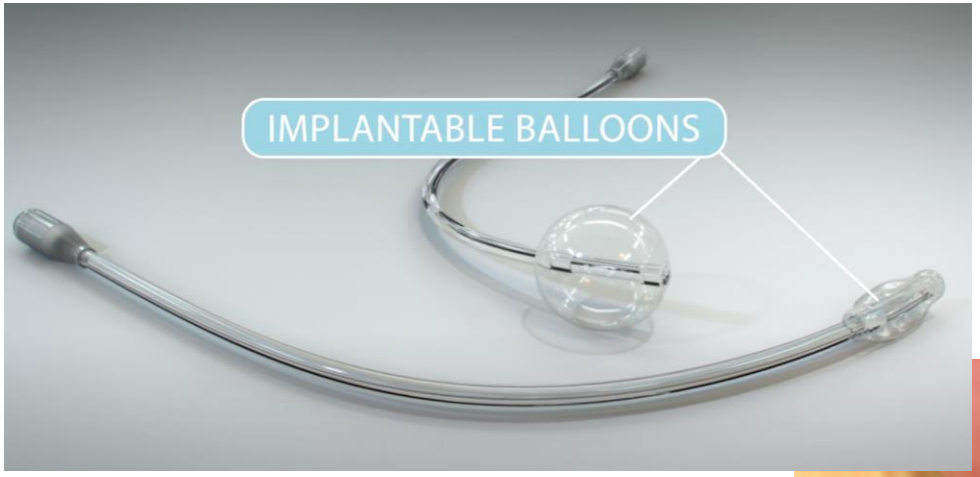


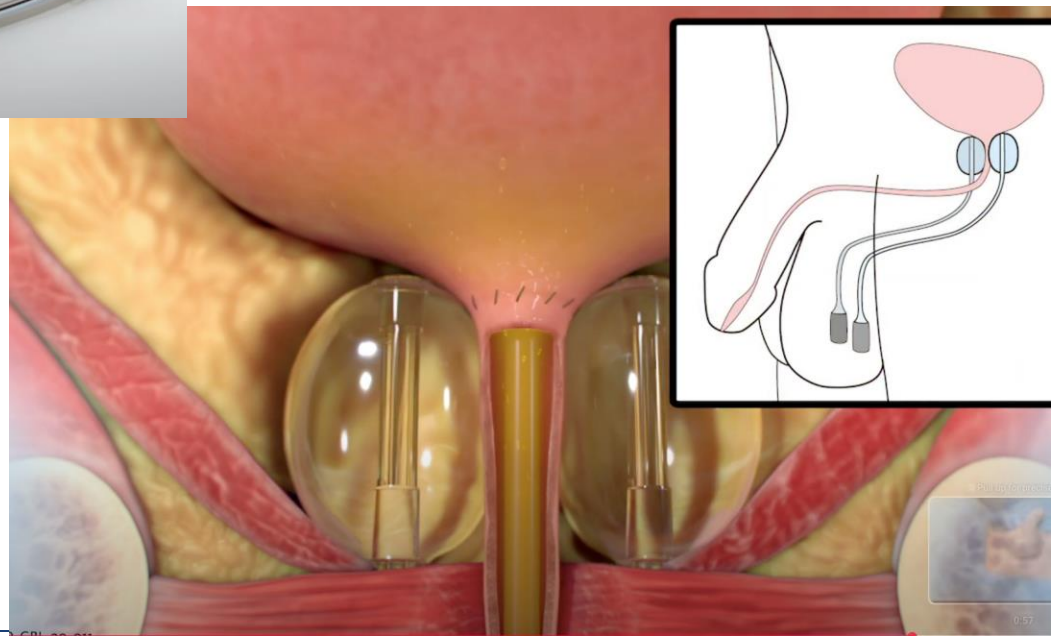
Artificial Urinary Sphincter Surgery

	AUS
Good Candidates	• Atleast 6 months after PCa treatment • Failed use of other treatments (Kegels) • Continue to have moderate to severe UI • Pre-op medical conditions well controlled (HbA1c <8) • Must be able to hold blood thinner for surgery • Have good hand dexterity
Anesthesia	General Anesthesia (1-2 hour surgery) Often outpatient (discharged same day)
Pre-op Considerations	1. Have office cystoscopy (rule out scar tissue, bladder tumor, stone, eval function of sphincter)
Post-op Considerations	1. Implant deactivated x6 weeks (still will leak) 2. Continue with antibiotics 3. Frequent post-operative checks (2, 6 week)
Risks	**<5%:** Infection, bleeding, injury to surrounding structures (urethra, bladder, bowel, penis, blood vessels) **Rare:** herniation, erosion, migration, recurrent incontinence, device malfunction

Surgical Management of Urinary Incontinence

ProACT





Life after an Artificial Sphincter

- Socially dry rate (0-1 ppd): 82%
  - Reduction of pads per day by 3-4
- Satisfaction rate >80%
  - Satisfaction remained high for 4 years post-op

- Reintervention rates: for erosion, infection, atrophy, or mechanical failure, etc
  - 43% at 5 years
  - 60% at 10 years
  - Mechanical Failure: 36% at 10 years
  - Higher for those that have: history of radiation, urethral reconstruction, comorbid conditions

James et al.; I Jour of Urol 2014
Lenfant et al.. J Urol 2025

Conclusions

- Prostate cancer treatment will affect sexual and urinary quality of life for most men
  - Recovery can take 1-2 years and many never recover to pre-op condition.
- Non-surgical and surgical options exist for both ED and urinary incontinence
- Many patients that do need to undergo surgical management can obtain high quality of life and satisfaction rates

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Thank you!
Questions?

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