Managing The Effects of Prostate Cancer Treatment

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15th ANNIVERSARY
NASPCC
National Alliance of State Prostate Cancer Coalitions

Disclosures

- None

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Overview

- What Happens and Why?
  - The Side Effects of Prostate Cancer Treatment
  - Mechanism of ‘Injury’
- What Now?
  - Treatment options

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What to Expect

- Effects of Prostate Cancer Treatment
  - Function
    - Sexual Dysfunction
    - Urinary Dysfunction
  - Form
    - Penile length
    - Peyronie's Disease

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Setting Expectations

- Many factors play a role in risks and recovery
  - Erectile Function
    - baseline erectile function*
    - comorbidities (Diabetes, Hypertension, Hypercholesterolemia)
    - extent of cancer
    - nerve-sparing / surgical technique / type of Radiation
  - Urinary Function
    - prostate size / pelvic anatomy
    - baseline urinary symptoms
    - nerve-sparing / surgical technique / type of Radiation

Setting Expectations

- Change is slow
  - After Surgery
    - Recovery of Erectile Function after surgery may take up to 24 months
    - Recovery of Continence expected mostly in the first 12 months
  - After Radiation
    - 50% of patients may have ED at 5 years
    - Urinary problems may worsen or persist

Bennett N, Huang I. Inflatable penile prosthesis in the radical prostatectomy patient: a review. F1000 Research 2018 7:770.

Mahmood J, Shamah AA, Creed TM, et al. Radiation-induced erectile dysfunction: Recent advances and future directions. Adv. Rad Onc. 2016(1): 161-169.

What to Expect

Changes in Function - Sexual Dysfunction

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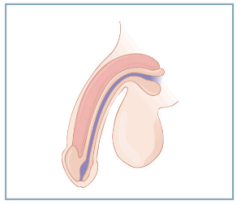
Sexual Dysfunction

- Ejaculatory Changes
  - Little to no fluid comes out with ejaculation
  - Possibility of Climacturia (urine being expelled with climax)
- Infertility
- Orgasm
  - Change in sensation
- Erectile Dysfunction:
  - Definition: **Persistent inability to achieve or maintain an erection firm enough to have sexual intercourse**
  - Reported as high as 90% after surgery for prostate cancer
  - Reported between 20-80% after radiation

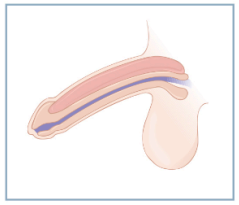
Hamilton Z, Mirza M. Post-prostatectomy erectile dysfunction: contemporary approaches from a US perspective. *Research and Reports in Urology*. 2014 (6):35-41

Mahmood J, Shamah AA, Creed TM, et al. Radiation-induced erectile dysfunction: Recent advances and future directions. Adv. Rad Onc. 2016(1): 161-169.

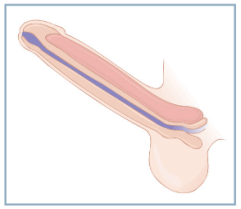
How Erections Work



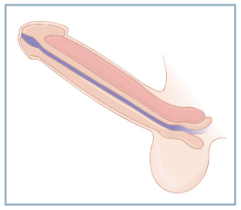
1. Initial Filling
With psychological or sexual stimulation, neurotransmitters cause penile smooth muscles to relax, increasing blood flow to the corporal bodies **(the 2 chambers within** the shaft of the penis).



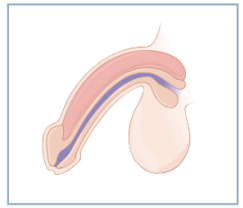
2. Partial Erection
Penile arteries expand to accommodate the increased blood flow needed to elongate and expand the penis.



3. Full Erection
The increased volume of blood within the penis is prevented from draining, thus expanding the penis to full erection.



4. Rigid Erection
Maximum rigidity is attained. The glans and spongiosum (tip of the penis and penis body) enlarge until penile veins are forcefully compressed. This increases engorgement and maintains maximum penile rigidity. Release of semen (ejaculation) occurs.



5. Return to Flaccid State
Muscle contractions result in increased blood outflow from the penis, thus decreasing penile length and girth until flaccid.

Courtesy: Boston Scientific

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Erectile Dysfunction

- Mechanism of ED
  - Prostatectomy –
    - normal anatomy and nerve supply to penis disrupted (neuropraxia)
      - pelvic plexus and cavernosal nerves affected
      - secondarily less blood supply (less oxygen to erectile bodies) — fibrosis
  - Radiation —
    - Three forms of damage
      - inflammation resulting in nerve damage
      - vascular damage affects blood flow
      - damage to smooth muscle causes atrophy

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Erectile Dysfunction

- Treatment options for ED
  - Spectrum: Range from minimally invasive up to surgical treatment
    - PDE-5 Inhibitors
    - Vacuum Erectile Device
    - Intraurethral suppository & Intracavernosal Injections
    - Penile Prosthesis
    - Experimental Treatments: Ultrasound, Stem Cell

Treatment Options for ED

- PDE-5 Inhibitors
  - Sexual Stimulation leads to Nitric Oxide production/release
  - This prompts production of cGMP
    - Drives blood flow into penis
  - These medications prevent the breakdown of cGMP

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Treatment Options for ED

- PDE-5 Inhibitors
  - Pros:
    - Least invasive
  - Cons:
    - Lag time
    - Tolerability
    - Contraindications to use
    - Variable efficacy

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Treatment Options for ED

- Vacuum Erectile Device
  - Plastic Cylinder
  - Vacuum pump
  - Tension Ring (constriction)
- Pros/Cons
  - Not invasive
  - pain/bruising
  - numbness/cold sensation
  - lack of spontaneity

Courtesy: Boston Scientific

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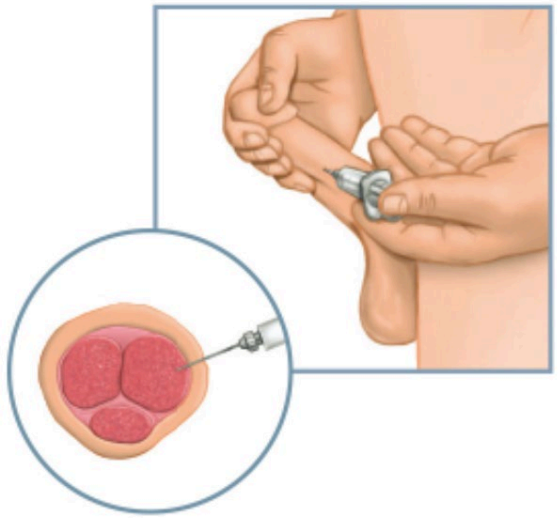
Treatment Options for ED

- Intraurethral Suppository
  - Small vasoactive pellet inserted into urethra - dissolves and prompts blood vessels to open up
  - Results in increased blood flow into penis
- Pros/Cons
  - Pain/burning
  - Variable efficacy
  - Cost-prohibitive

Courtesy: Boston Scientific

Treatment Options for ED

- Intracavernosal Injections
  - Act to relax smooth muscle in th
    - Allows / Stimulates arteries to and results in increased blooc



Courtesy: Boston Scientific

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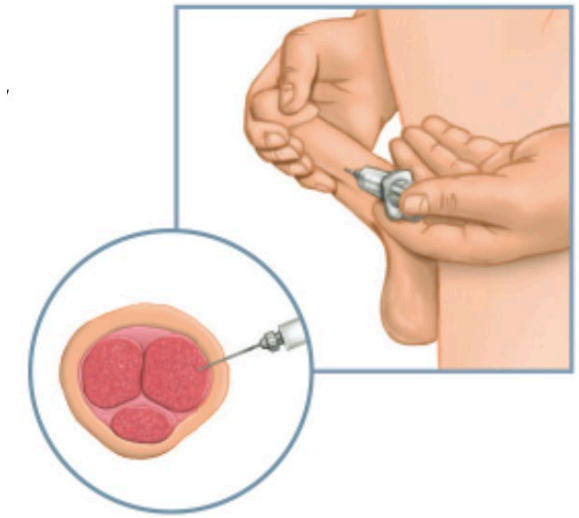
Treatment Options for ED

- Intracavernosal Injections
  - Pros/Cons
    - Predictable, Consistent
    - Penile pain
    - Risk of priapism
    - Can cause scarring, curvature
    - Lack of spontaneity
    - Dislike of needles



Courtesy: Boston Scientific

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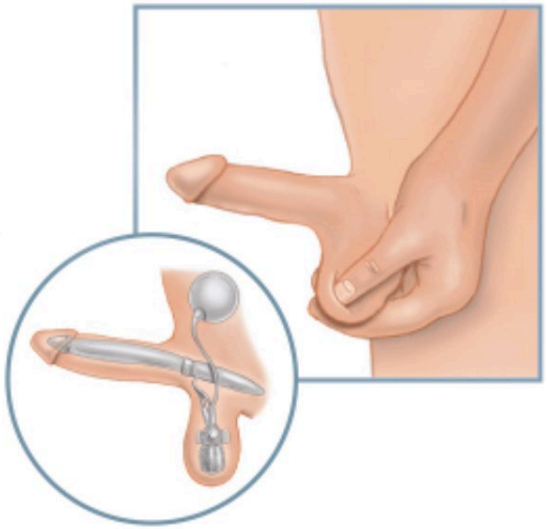
Treatment Options for ED

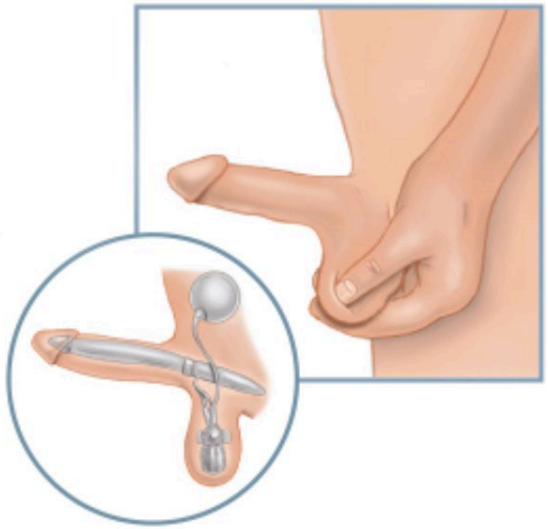
- Penile Prosthesis
  - Surgically implanted device
  - fully contained within body
  - Inflatable & Malleable Models



Courtesy: Boston Scientific

Treatment Options for ED

- Penile Prosthesis
  - Pros/Cons
    - Immediate Rigidity
    - No limit on duration of erection
    - No limit on frequency of use
    - Inherent limitations of expansio
    - Risks - infection, erosion, malfunction



Courtesy: Boston Scientific

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Treatment Options for ED

- Experimental Options
  - Ultrasound
    - Available commercially but no long-term data
  - Stem Cell Therapy
    - Still Early

Penile Rehabilitation

- Erections are a neurovascular event
  - PDE-5 inhibitors may be myogenic (stimulate increase in smooth muscle)
    - may also benefit fibrosis (scarring) of erectile bodies
    - decrease oxidative stress
  - Intracavernosal Injections
    - increased blood flow can benefit fibrosis of erectile bodies
  - Vacuum Erectile Device
    - data is mixed
- No solid evidence or standardized approach

Clavell-Hernandez J, Ermec B, Kadioglu A, Wang R. Perplexity of penile rehabilitation following radical prostatectomy. *Turk J Urol* 2019; 34(2): 77-82.

What to Expect

Changes in Function - Urinary Dysfunction

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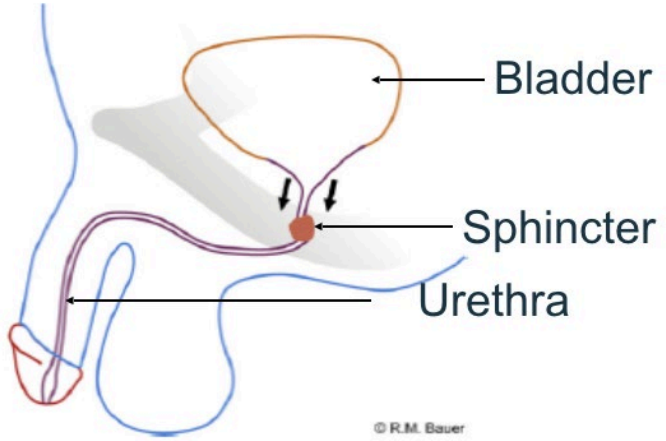
Urinary Dysfunction

- Normal Urination:
  - sphincter relaxes
  - bladder contracts
- **Incontinence**:
  any involuntary loss of urine



Courtesy: Boston Scientific

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Urinary Dysfunction

- After Surgery
  - Incontinence - usually Stress Incontinence (ranges 1-40% and even up to 80%)
- After Radiation
  - Bladder irritation - frequency, urgency & urge incontinence
  - Stress Incontinence also possible
  - Radiation Cystitis - irritative symptoms, blood in urine
- Scar tissue (Bladder neck contracture or urethral stricture)
  - Obstruction of urination - slow stream, trouble emptying

Singla N, Singla AK. Post-prostatectomy incontinence: Etiology, evaluation and management. *Turk J Urol*; 40(1): 1-8.

Hoyland K, Vasdev N, Abrof A, Boustead G. Post-radical prostatectomy incontinence: Etiology and Prevention. *Rev Urol* 2014(16): 181-188.

Urinary Dysfunction

- Mechanism
  - Prostatectomy – Multifactorial
    - Prostate itself part of proximal sphincter complex
    - Effect on Rhabdosphincter (distal sphincter)
      - direct impact on muscle and on its neurovascular supply
    - Impact on bladder - both innervation and anatomy
  - Radiation —
    - damages DNA of cancer cells but also adjacent normal tissues
    - results in free-radicals that cause secondary / indirect damage
      - This can affect bladder, sphincter(s), and urethra

Hoyland K, Vasdev N, Abrof A, Boustead G. Post-radical prostatectomy incontinence: Etiology and Prevention. *Rev Urol* 2014(16): 181-188.

Urinary Incontinence

- Types
  - Urge Incontinence (UI) & Overactive Bladder (OAB)
    - frequency, urgency, urge incontinence & night-time urination
    - typically managed medically, Botox or nerve stimulation if needed
  - Stress Incontinence (SUI)
    - involuntary loss of urine with exertion (laughing, coughing, sneezing)
    - Treatments range from conservative to surgical options

Stress Urinary Incontinence

- Treatment Options
  - Conservative Measures
  - Surgical:
    - Male Slings
    - Artificial Urinary Sphincter

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Treatment of SUI

- Conservative Measures:
  - Pelvic Floor Exercises (Kegels)
    - Repetitive voluntary contractions of urethral sphincter
    - Should be started early
  - Behavioral Modifications
    - Limiting bladder irritants (Caffeine, Alcohol)
  - Other (biofeedback, medications, bulking agents)
    - Less supportive evidence

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Treatment of SUI

- Other Conservative Measures:
  - Pads
  - Penile Clamps
  - Catheters

Courtesy: Boston Scientific

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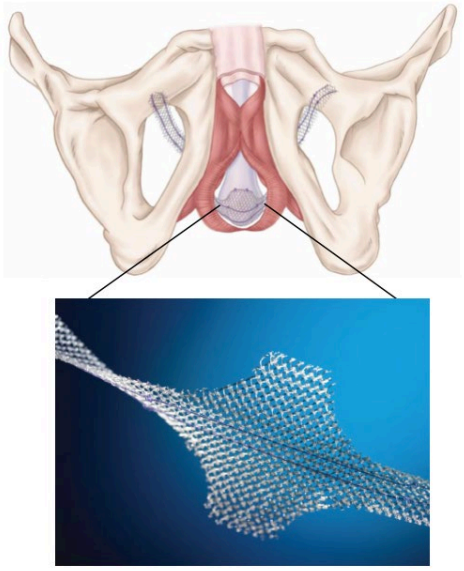
Treatment of SUI

- Male Slings:
  - Supports Urethra (like hammock)
  - Considered minimally invasive
  - Generally reserved for mild-moderat
  - Can cause pain/inflammation, erosic



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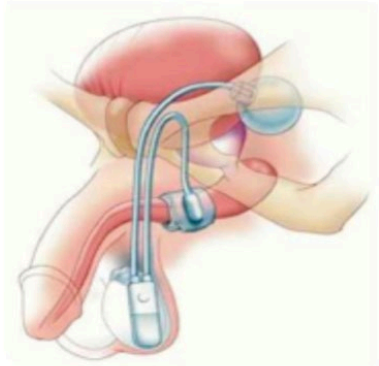
Treatment of SUI

- Artificial Urinary Sphincter
  - Inflatable fluid filled cuff
  - Wraps around and compresses ureth
  - Control pump deflates cuff so urine c
  - Used in Moderate-Severe SUI
  - Gold Standard



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Treatment of SUI

- Artificial Urinary Sphincter
  - Risks:
    - Infection of device
    - Erosion of device
    - Malfunction

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What to Expect

Changes in Form

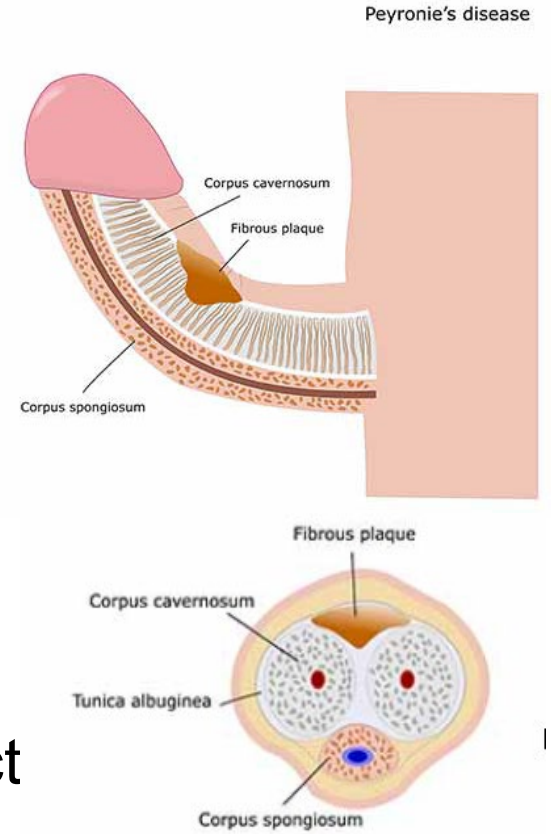
Changes with Treatment

- Penile Length
  - Hindsight is 20/20 - except with penile length
  - Evidence showing some penile shortening early after surgery
    - Length recovers progressively over 1 year
    - position of urethra in pelvis changes with healing
    - PDE-5 inhibitors may help prevent

Kadono Y, Machioka K, Nakashima K et al. Changes in penile length after radical prostatectomy: investigation of the underlying anatomical mechanism. *BJU Int* 2017: 120: 293-299

Changes with Treatment

- Peyronie's Disease
  - Plaque (Scar) forms
  - Can cause:
    - Painful erection
    - Curvature of the penis
  - Increased incidence after prostatect



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Tal R, Heck M, Teloken P et al. Peyronie's Disease Following Radical Prostatectomy: Incidence and Predictors. *J Sex Med* 2010 7(3): 1254-1261.

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Changes with Treatment

- Peyronie's Disease
  - Treatment:
    - Clostridial Collagenase
      - series of injections of enzyme to break up scar tissue
    - Surgical correction
      - Plication
      - Grafting
      - Penile prosthesis

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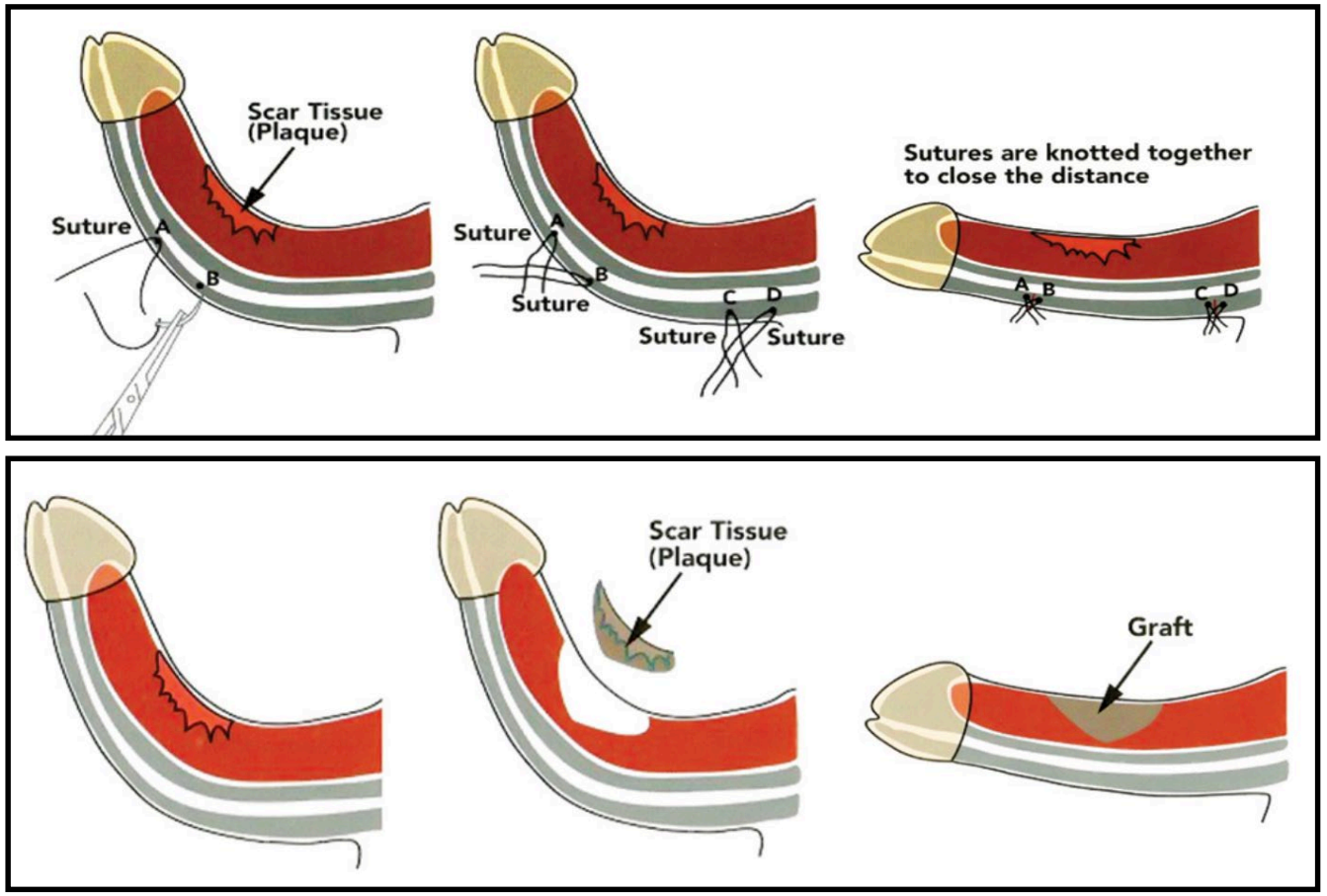
Changes with Treatment



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Take Home Points

- Side effects can and do occur
- Set realistic expectations
  - What can happen and when
  - Likelihood of recovery
  - Expected timeline for recovery

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Take Home Points

- There is life after prostate cancer
- There is **<u>Quality</u>** of life after Prostate Cancer

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Thank you!

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