

Benign Prostatic Hyperplasia

Presented by

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Capital Nursing Education

Made possible by a grant from Shield HealthCare



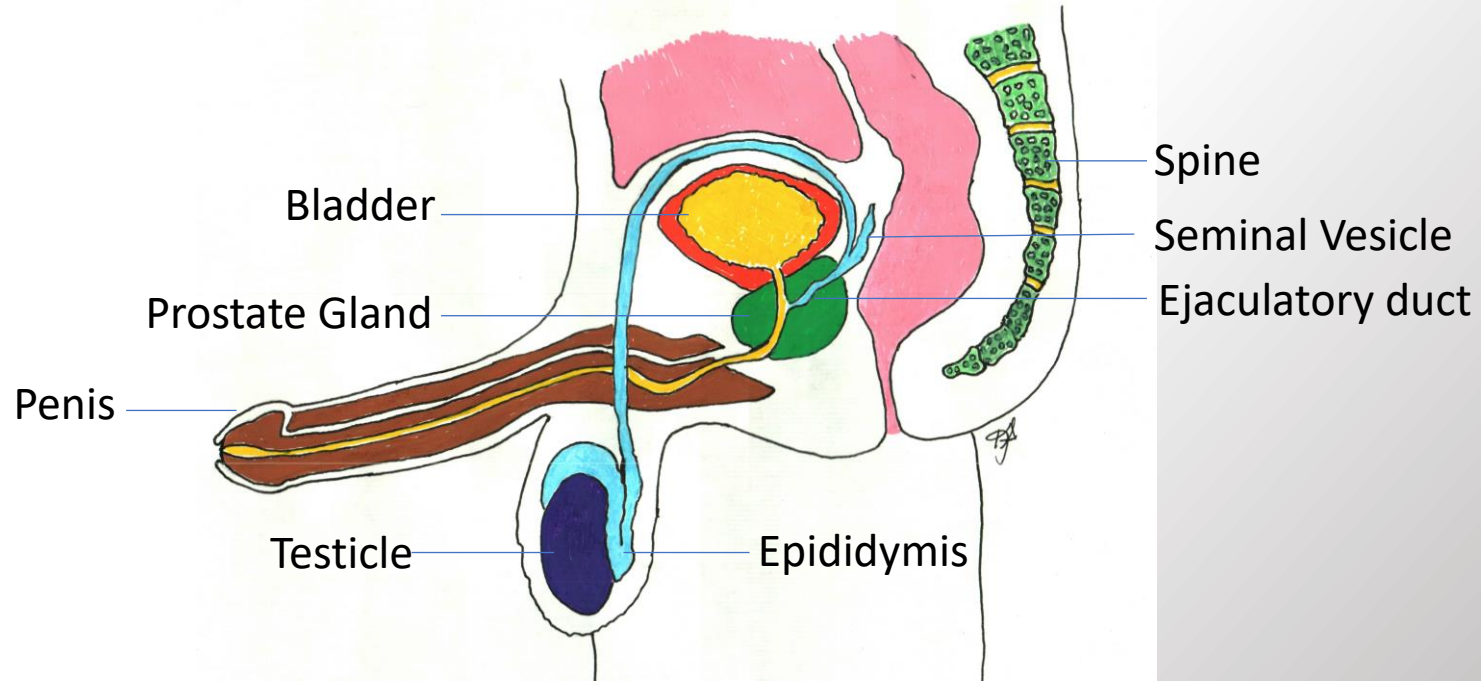
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Objectives

- Review of the male reproductive system
- Discuss how the prostate functions
- Learn the symptoms of BPH
- Review the different tests (Lab, Scans, Exam) to determine problems with the prostate
- Discuss the treatments utilized
- Review the different type of surgical interventions

Male Reproductive System



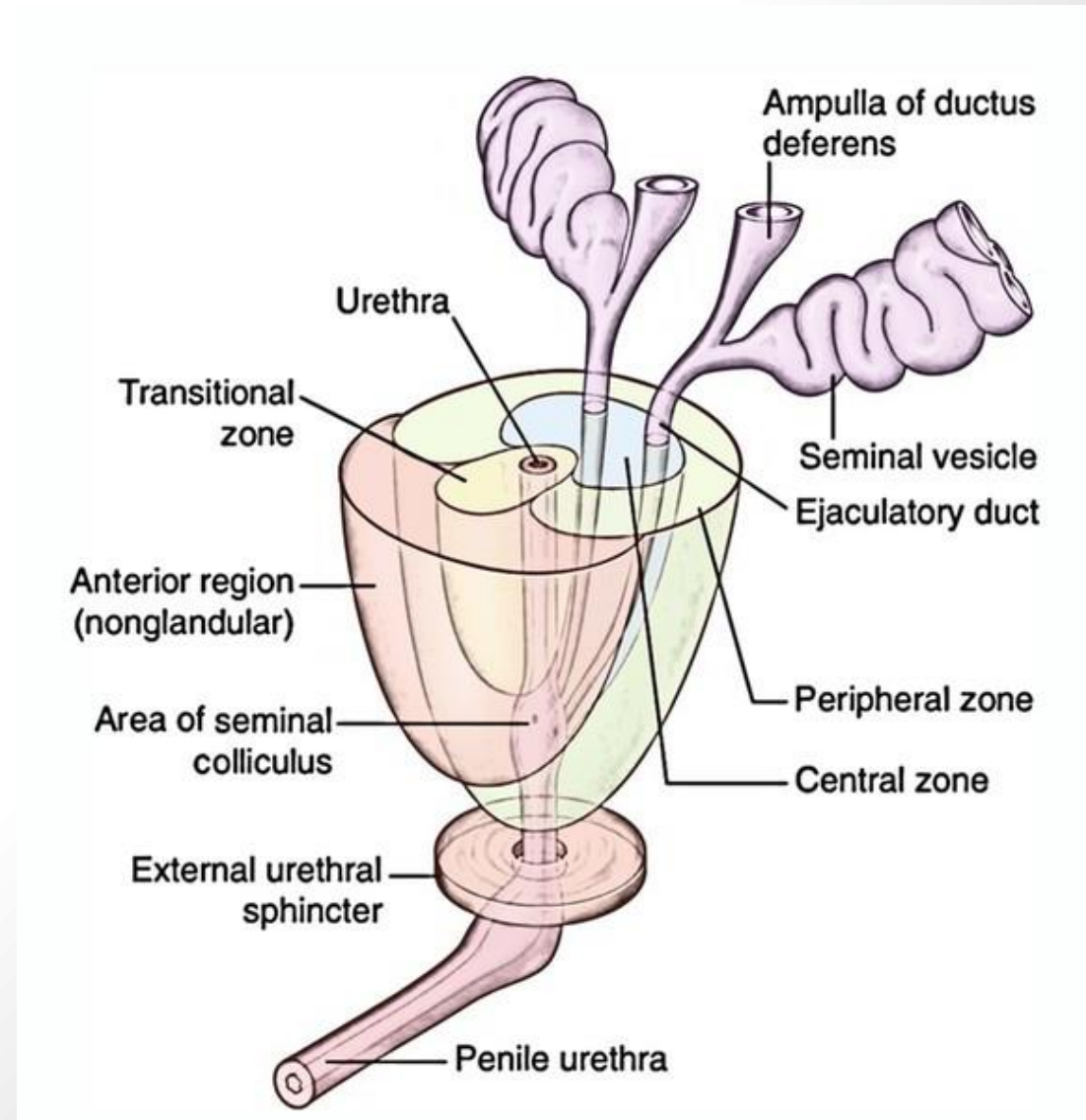
Prostate Gland

Weight: 3 g

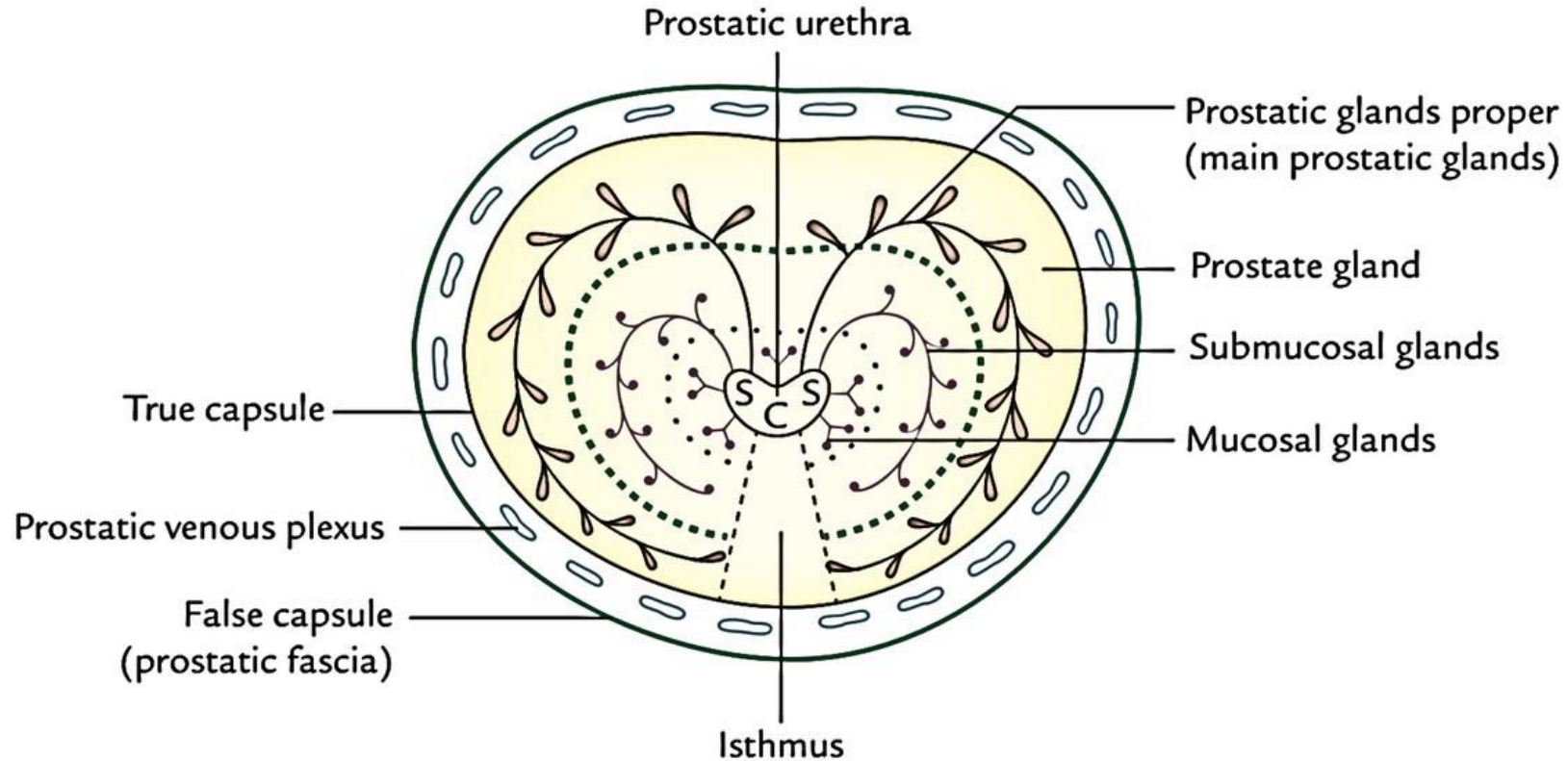
Width (at base): 4cm

Length: 3cm

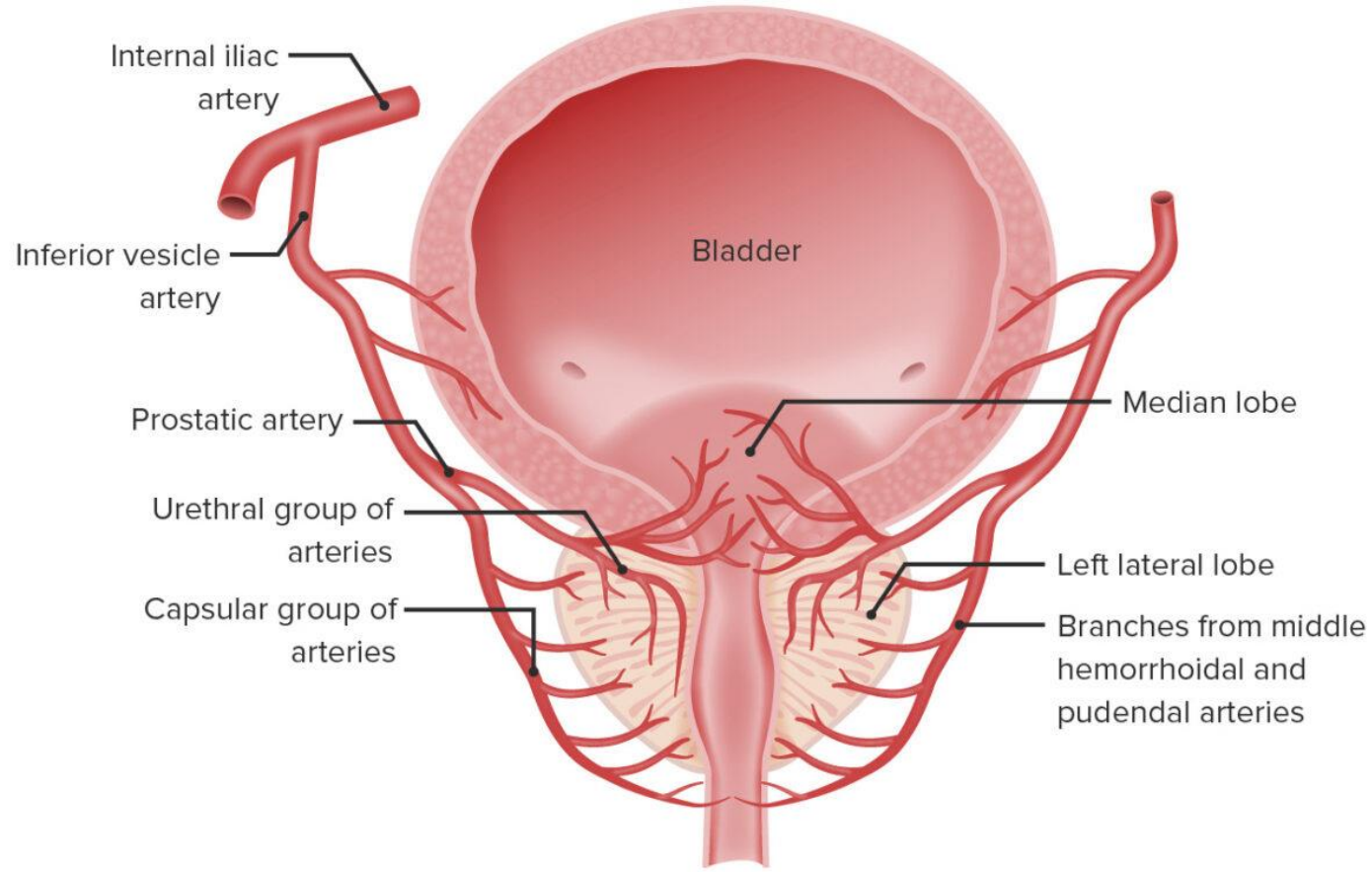
Thickness: 2cm



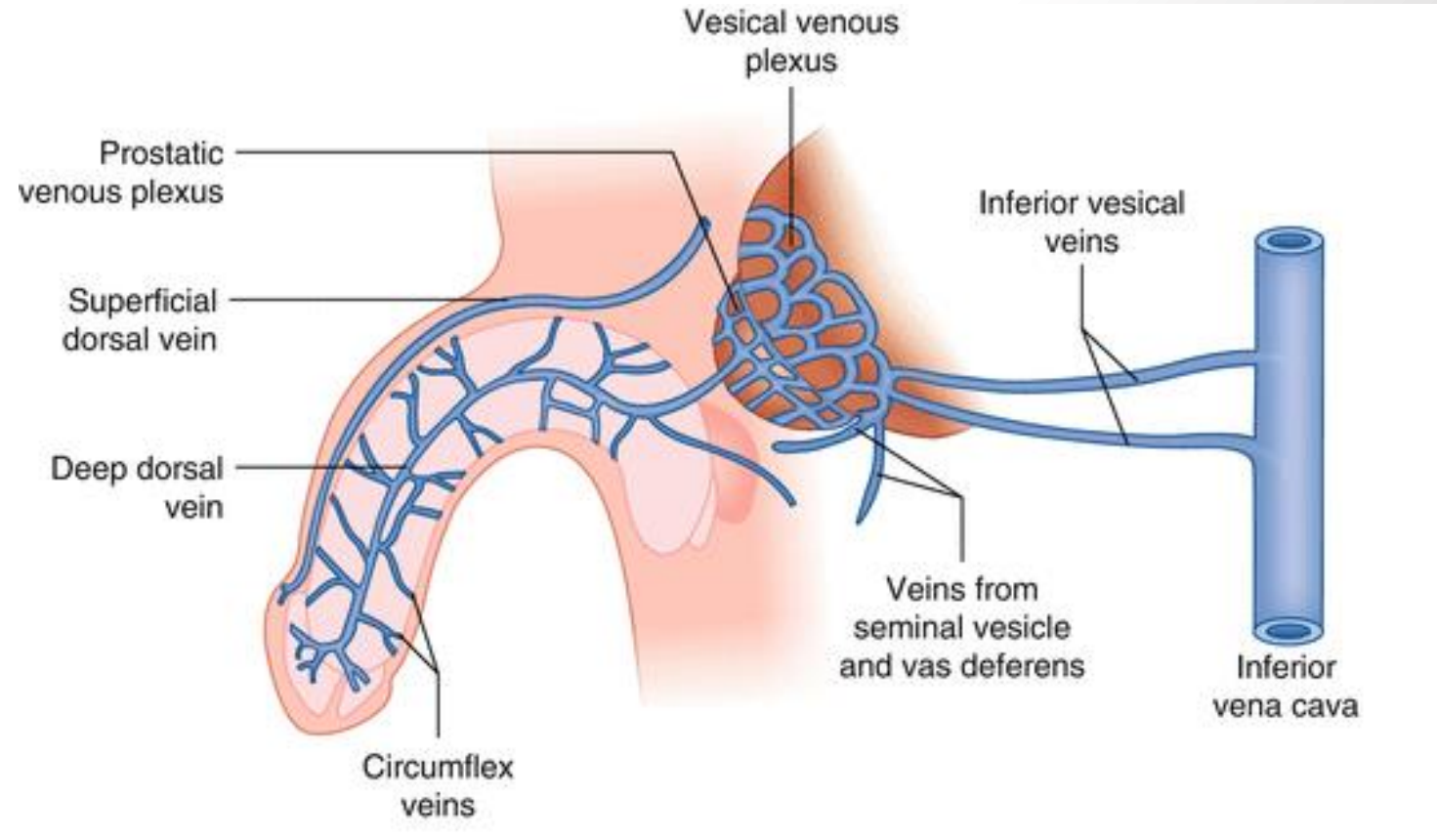
Structural Zones of the Prostate Gland



Arterial Supply to Prostate



Venous Plexus



- https://media.springernature.com/original/springer-static/image/chp%3A10.1007%2F978-981-10-3695-8_5/MediaObjects/421428_1_En_5_Fig8_HTML.gif

Lymphatic Drainage

- Internal iliac
- External iliac
- Sacral groups of the lymph nodes

The Functions of the Prostate

- Production of fluid for semen
 - Fluid from prostate
 - Sperm cells from testicles
 - Fluid from seminal vesicle
 - Secretions from bulbourethral gland

All these fluids are mixed in the urethra to make Semen

Closing of the Urethra During Ejaculation

- During ejaculation, the prostate and the bladder's sphincter muscle
- During urination, the central zone muscles close prostate ducts

Hormone Metabolism

- Testosterone is transformed to DHT (dihydrotestosterone)

Changes in the Prostate with Age

- In Youth
 - small, mostly fibromuscular stroma and rudiments of ducts
- At Puberty
 - rise in size
 - Proliferation of prostatic follicles
- 3rd decade
 - atypical epithelial infoldings
- 4th decade
 - epithelial infoldings slowly vanish
 - amyloid concretions appear in the follicles

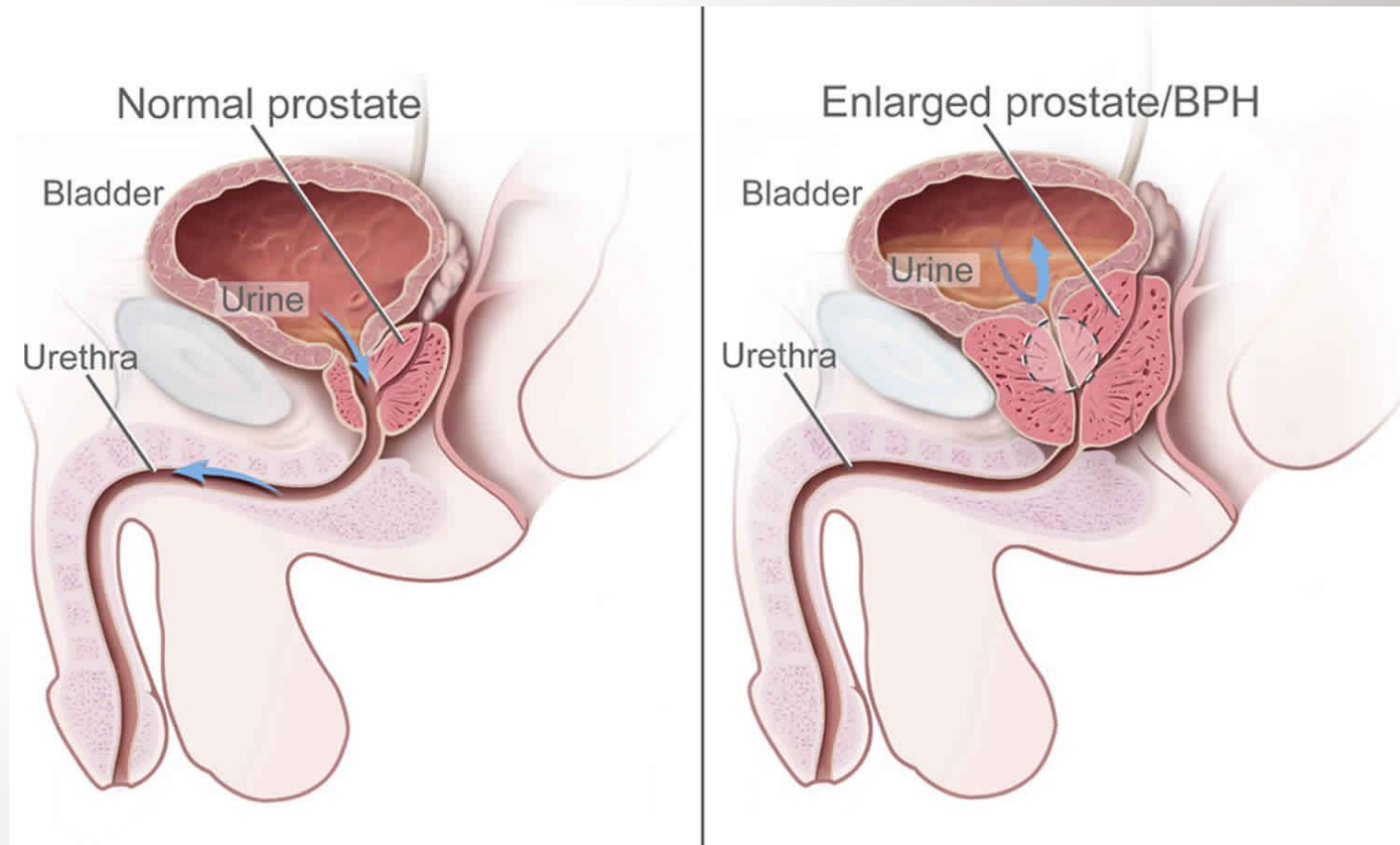
Then.....

Changes in the Prostate with Age

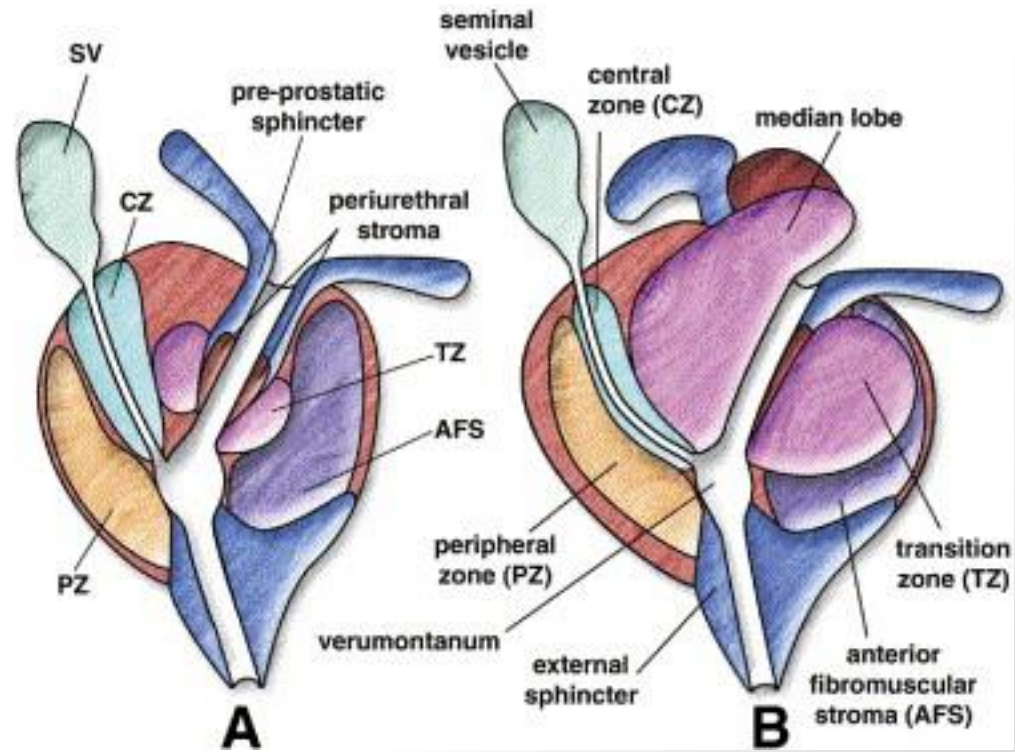
- 5th decade
 - Prostatic hypertrophy
 - May have senile atrophy

Benign Prostatic Hyperplasia (Hypertrophy)

- Prostate enlargement without cancer
- Also called
 - Benign Prostatic Hypertrophy
 - Benign Prostatic Obstruction



Enlargement



Causes of Enlarged Prostate

- Speculations
 - Excess of certain hormones
 - High level of DHT (Dihydrotestosterone)
 - Estrogen

Symptoms of BPH

- A weak or interrupted urinary stream
- Sudden urgency to urinate
- Frequent urination
- Inability to completely empty the bladder during urination
- Trouble initiating urine flow even when bladder feels full
- Intermittency, the need to stop and start several times when passing urine
- Nocturia, the need to wake up at night more than two times to pass urine

Referral to Urologist

- Young patients
- Abnormal rectal exam, PSA, or Urinalysis
- History of extensive urethral instrumentation or stricture
- Poor response to medical therapy

Risk Factors for BPH?

- Men over the age of 50 as the risk for BPH rises with age
- Men whose fathers had BPH
- Men who are overweight or obese
- Men who don't stay active
- Some men with erectile dysfunction

Complications of BPH (May Include)

- Acute urinary retention
- Chronic, or long lasting, urinary retention
- Hematuria
- UTIs
- Bladder damage
- Kidney damage
- Bladder stones

Diagnosing BPH

- AUA (American Urological Association) Symptom Score Index
- Physical Exam
 - Digital Rectal Examination DRE
- Urine Tests
 - Urine flow study
 - Urodynamics (possibly)
 - Urinalysis
- Scans
 - Cystoscopy
 - Transrectal ultrasound
 - Transabdominal ultrasound
 - Prostate MRI
- Blood Tests
 - PSA

The American Urological Association (AUA) Symptom Score Questionnaire

Question	None	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always	Your score
Incomplete emptying: Over the past month, how often have you had a sensation of not emptying your bladder completely after you finished urinating?	0	1	2	3	4	5	
Frequency: Over the past month, how often have you had to urinate again less than 2 hours after you finished urinating?	0	1	2	3	4	5	
Intermittency: Over the past month, how often have you found that you stopped and started again several times when you urinated?	0	1	2	3	4	5	
Urgency: Over the past month, how often have you found it difficult to postpone urination?	0	1	2	3	4	5	
Weak-stream: Over the past month, how often have you had a weak urinary stream?	0	1	2	3	4	5	
Straining: Over the past month, how often have you had to push or strain to begin urination?	0	1	2	3	4	5	
Nocturia: Over the past month, how many times did you most typically get up to urinate from the time you went to bed at night until the time you got up in the morning?	0	1	2	3	4	5	

Symptom Score

(Add up the points for all questions to determine the severity of your symptoms)

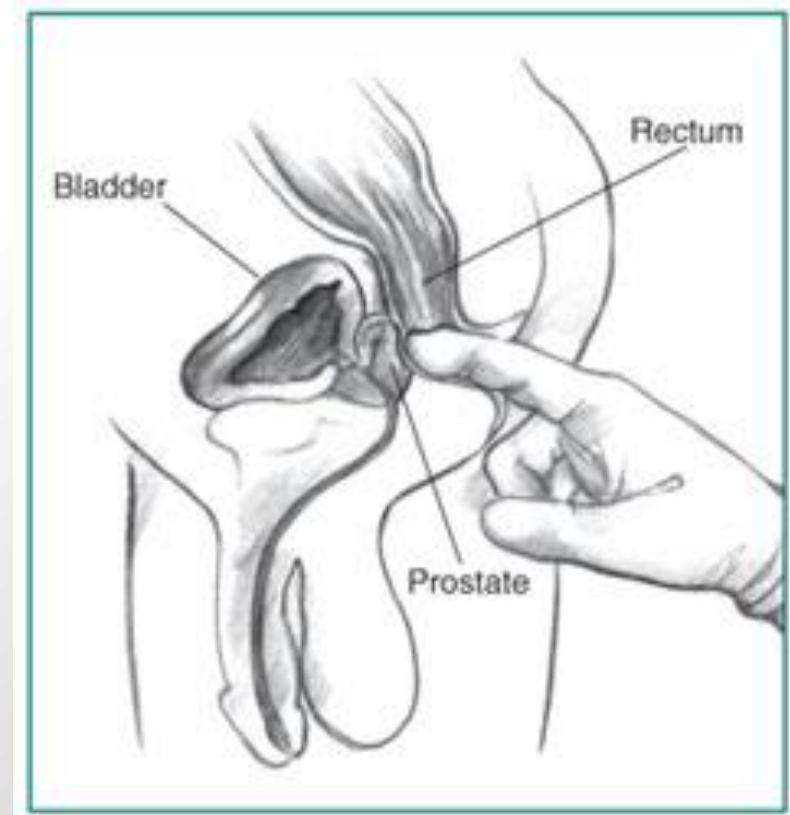
Total score

If you scored 8 points or higher, you should consult your physician.

Symptom Score (Severity) — 0 to 7 (Mild), 8 to 19 (Moderate), 20 to 35 (Severe)

Digital Rectal Examination (DRE)

- Feeling for
 - Enlargement
 - Tenderness
 - Lumps
 - Hard spots



Urine Tests

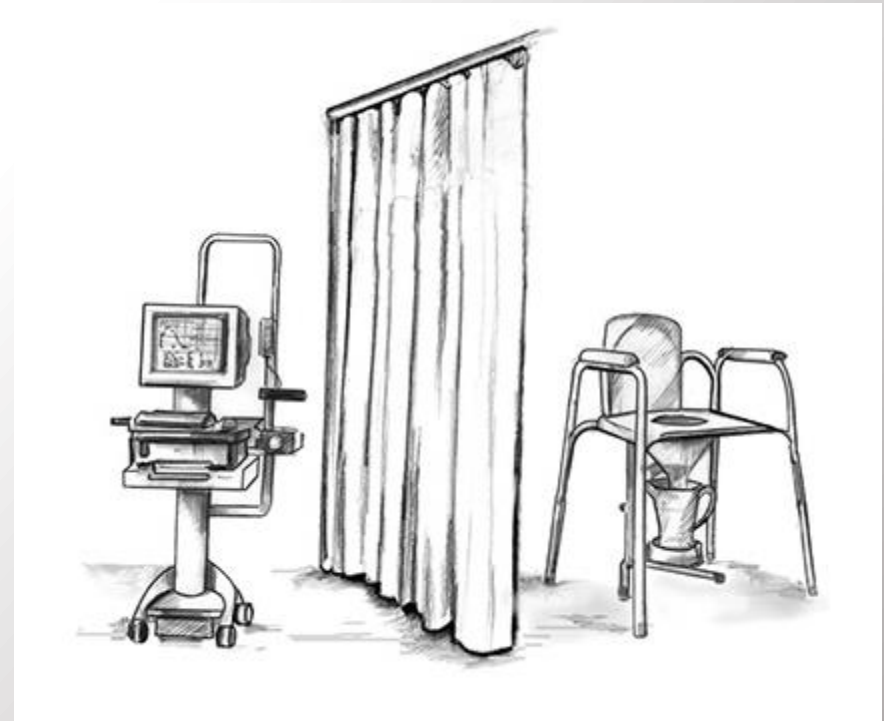
- Urinalysis
- Uroflowmetry
- PVR (Post-void residual volume)
- Urodynamic pressure flow study

Urinalysis

- Blood
- Infection
- Glucose
- Protein

Urine Flow Study (Uroflowmetry)

- Measures the flow of urine
 - Volume
 - Rate of flow
 - Time to empty



Post-Void Residual Volume

- Volume left in bladder
 - 50-100 ml in elderly
 - >200 is abnormal
- **Most common cause of retention in men is BPH**
- Other causes may include
 - Prostatitis
 - Cystitis
 - Urethritis
 - Vulvovaginitis
 - Medications
 - Cortical spinal or peripheral nerve lesions

Urodynamic Pressure Flow Study

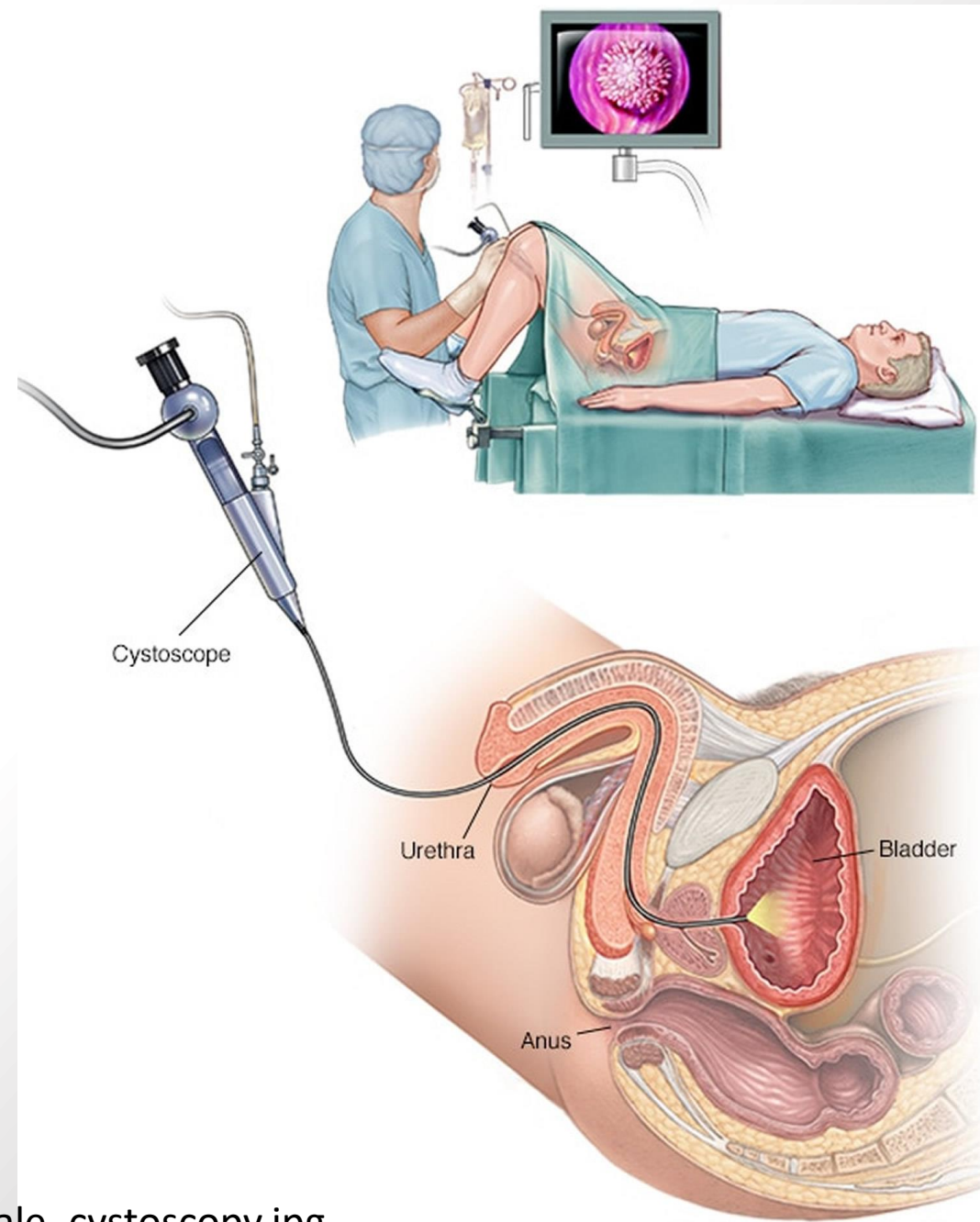
- Most definitive tests
 - Etiology of voiding dysfunction
 - Lower urinary tract symptoms
- Cystometrogram
 - Filling and storage phase
- Voiding pressure flow study
 - Voiding phase
 - Diagnosis of obstruction
- Pressure-flow studies
 - Low detrusor pressure and high flow rate=unobstructed
 - High detrusor pressure and low flow rate=obstructed
 - Low detrusor pressure with low flow rate=poor detrusor contractility

Scans

- Cystoscopy
- Transrectal ultrasound
- Transabdominal ultrasound
- Prostate MRI

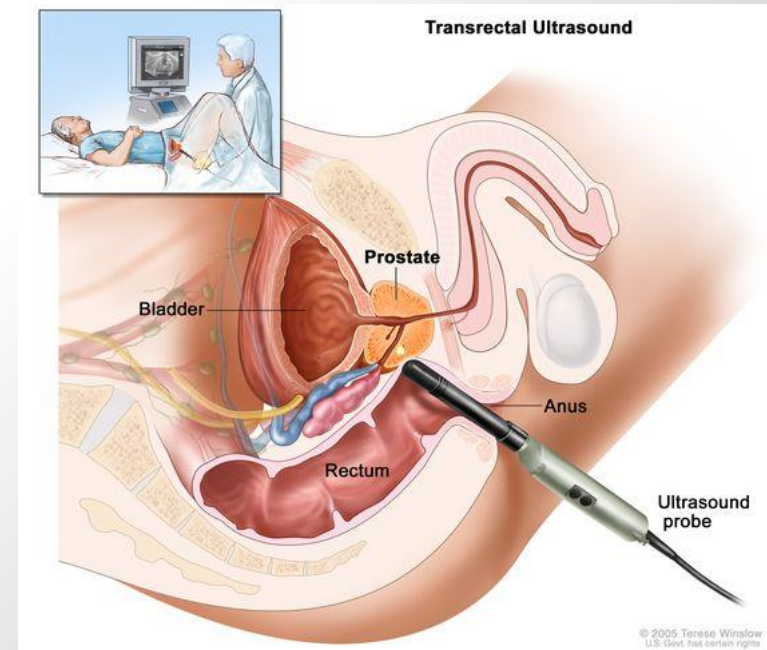
Cystoscopy

- Evaluate patient with
 - Hematuria
 - History of risk factors for urethral stricture
 - Bladder trabeculation



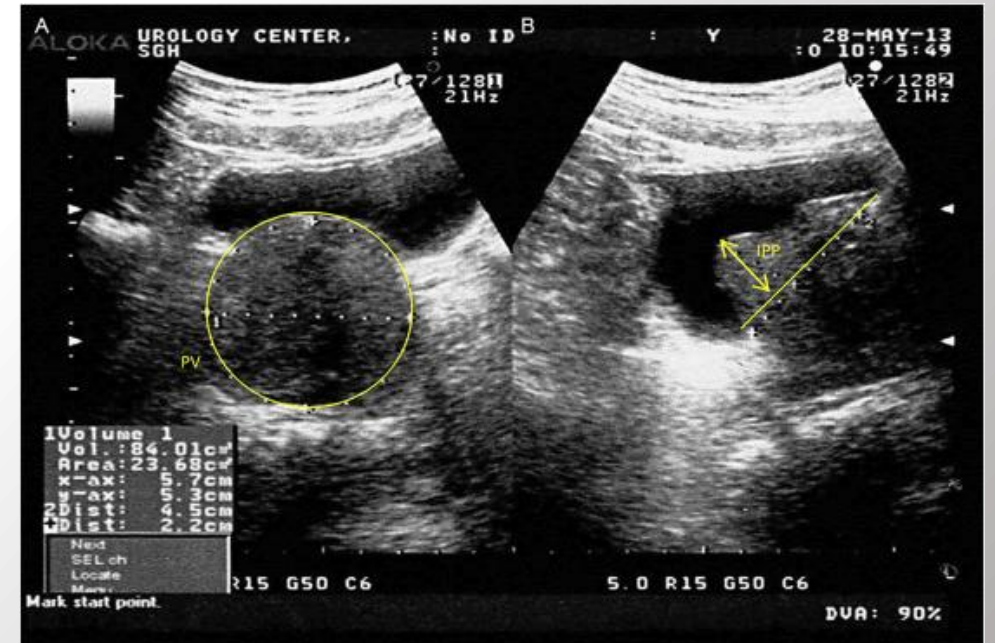
Transrectal Ultrasound

- Evaluate patient's rectum and prostate
- Also called
 - Endorectal ultrasound
 - ERUS
 - TRUS



Transabdominal Ultrasound (TAUS)

- Prostate adenoma (PA)
 - Distorts the bladder neck
 - Changes the shape of prostate
- IPP (Intravesical prostatic protrusion)
 - Measure from tip to base
 - Grade 1 = < 5mm
 - Grade 2 = > 5-10 mm
 - Grade 3 = > 10 mm
- 100% specificity/100% positive predictive value for diagnosis of BPH
- IPP with TAUS and uroflowmetry = diagnosis without a doubt

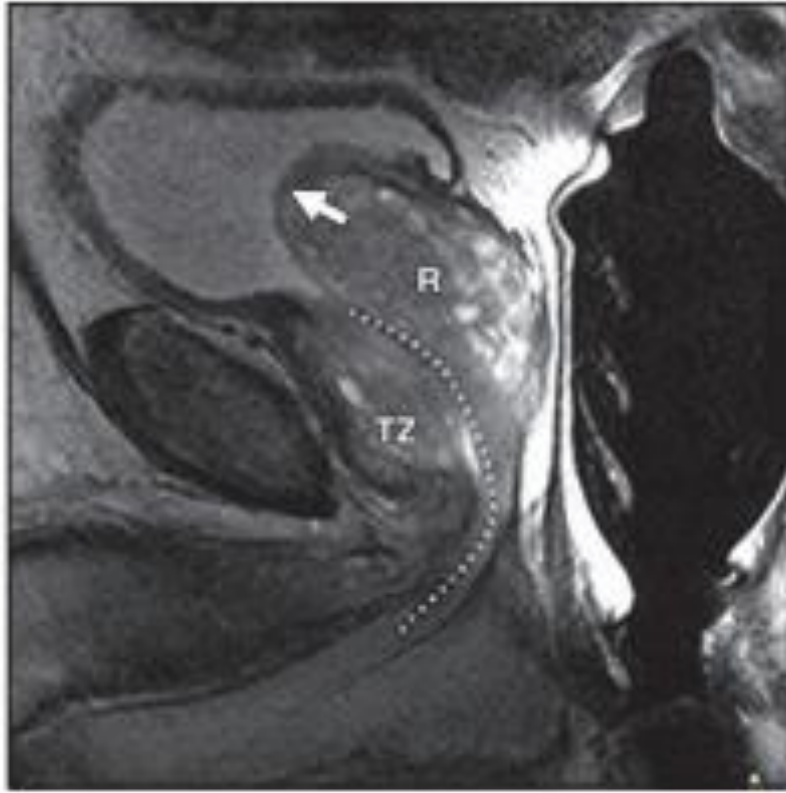


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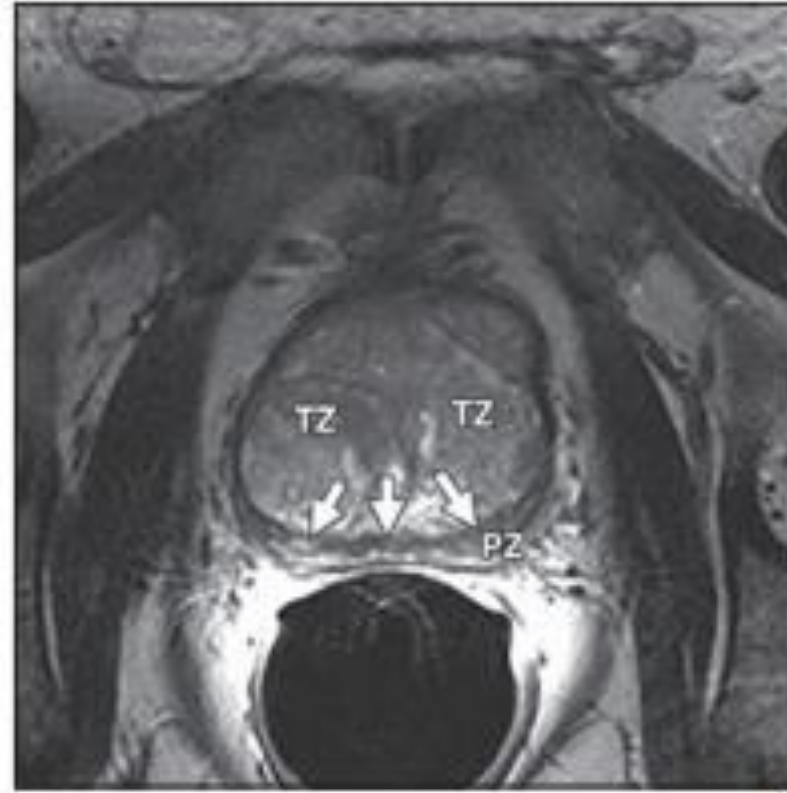
Prostate MRI

- BPH types on MRI
 - Type 0 = or < 25 cm³ prostate with little or no zonal enlargements
 - Type 1 = bilateral transition zone (TZ) enlargement
 - Type 2 = retrourethral enlargement
 - Type 3 = bilateral TZ and retrourethral enlargement
 - Type 4 = pedunculated enlargement
 - Type 5 = pedunculated with bilateral TZ and/or retrourethral enlargement
 - Type 6 = subtrigonal or ectopic enlargement
 - Type 7 = Other combination of enlargements

MRI Prostate



A



B

Blood Tests

- PSA-Prostate-specific antigen
 - Screen for prostate cancer
 - BPH can cause a rise in PSA
 - Prostatitis can cause a rise in PSA
- PSA blood test should be done
 - Routine physical exams for men > 50 and African American men, or men with family hx, at 40

Main Types of Treatments for BPH

- Active surveillance
- Lifestyle changes
- Prescription drugs
- Less Invasive surgery
- More invasive surgery

Active Surveillance

- How much it effects a man's daily life
- Does it effect quality of life
- Continue with regular checkups
- If it becomes a problem, surgery will be recommended

Lifestyle Changes

- Reduce intake of liquids
- Avoid caffeinated beverages and alcohol
- Avoid or monitor use of decongestants or antihistamines
- Bladder training
- Pelvic floor muscle exercises
- Prevent or treat constipation

Prescription Drugs

- Alpha blockers
 - Uroxatral, Cardura, Rapaflo
- 5-alpha reductase inhibitors
 - Proscar, Avodart
- Phosphodiesterase-5 inhibitors
 - Tadalafil (Cialis)
- Combination drug therapy

Minimally Invasive Surgery May Be Recommended

- Symptoms are moderate to severe
- Medication has not relieved symptoms
- Urinary tract obstruction, bladder stone, hematuria, kidney problems
- Prefer to have definitive treatment

Minimally Invasive Surgery May NOT Be Recommended

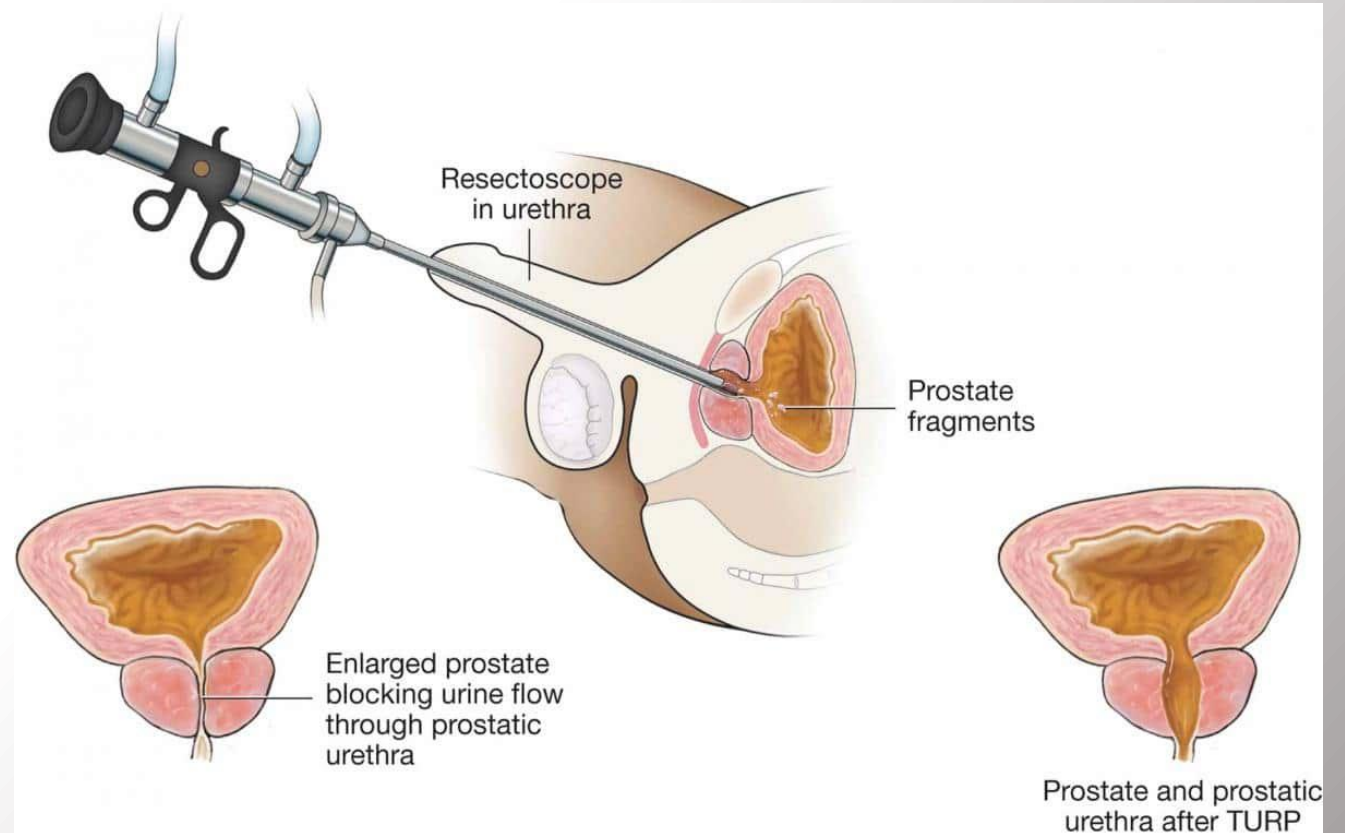
- Untreated UTI
- Urethral stricture disease
- History of prostate radiation therapy or urinary tract surgery
- Neurological disorder i.e., Parkinson's or MS

Possible Side Effects to any Prostate Procedure

- Retrograde ejaculation
- Difficulty with urination
- UTI
- Bleeding
- Erectile dysfunction
- Very rarely, incontinence

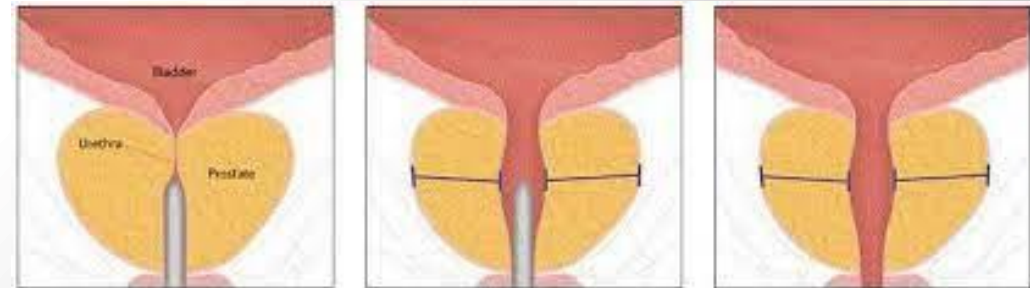
Transurethral Resection of the Prostate (TURP)

- Removal of all but the outer part of the prostate
- Relieves symptoms quickly
- Stronger urine flow
- May need catheter temporarily



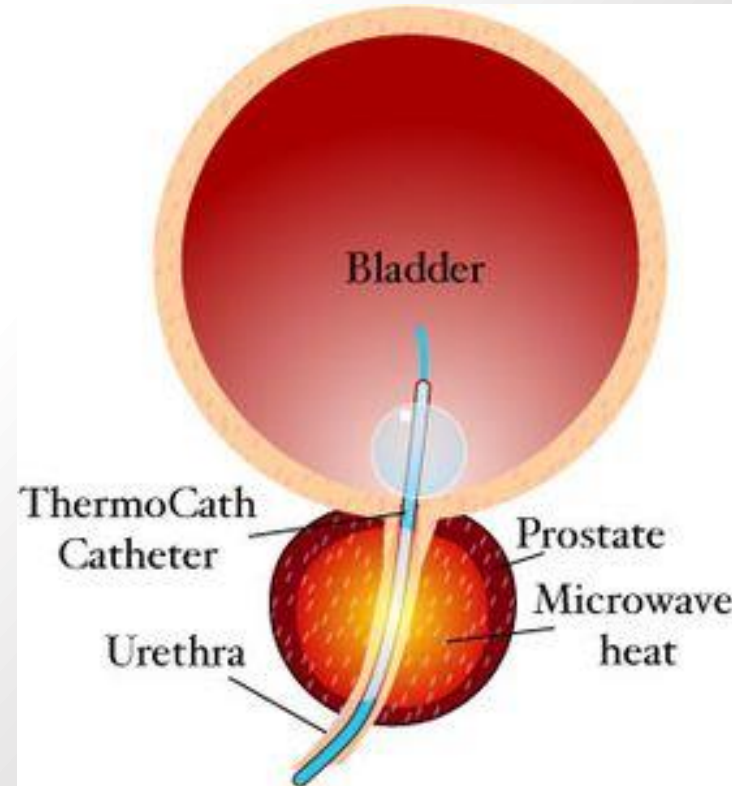
Transurethral Incision of the Prostate (TUIP)

- Small cuts in the prostate gland
- Urine may pass easier
- Best for small or moderately enlarged prostate
- Best if health risks for surgery



Transurethral Microwave Thermotherapy (TUMT)

- Computer-regulated Microwaves
- Heats and destroys excess tissue
- Not a cure
- Reduces urinary problems



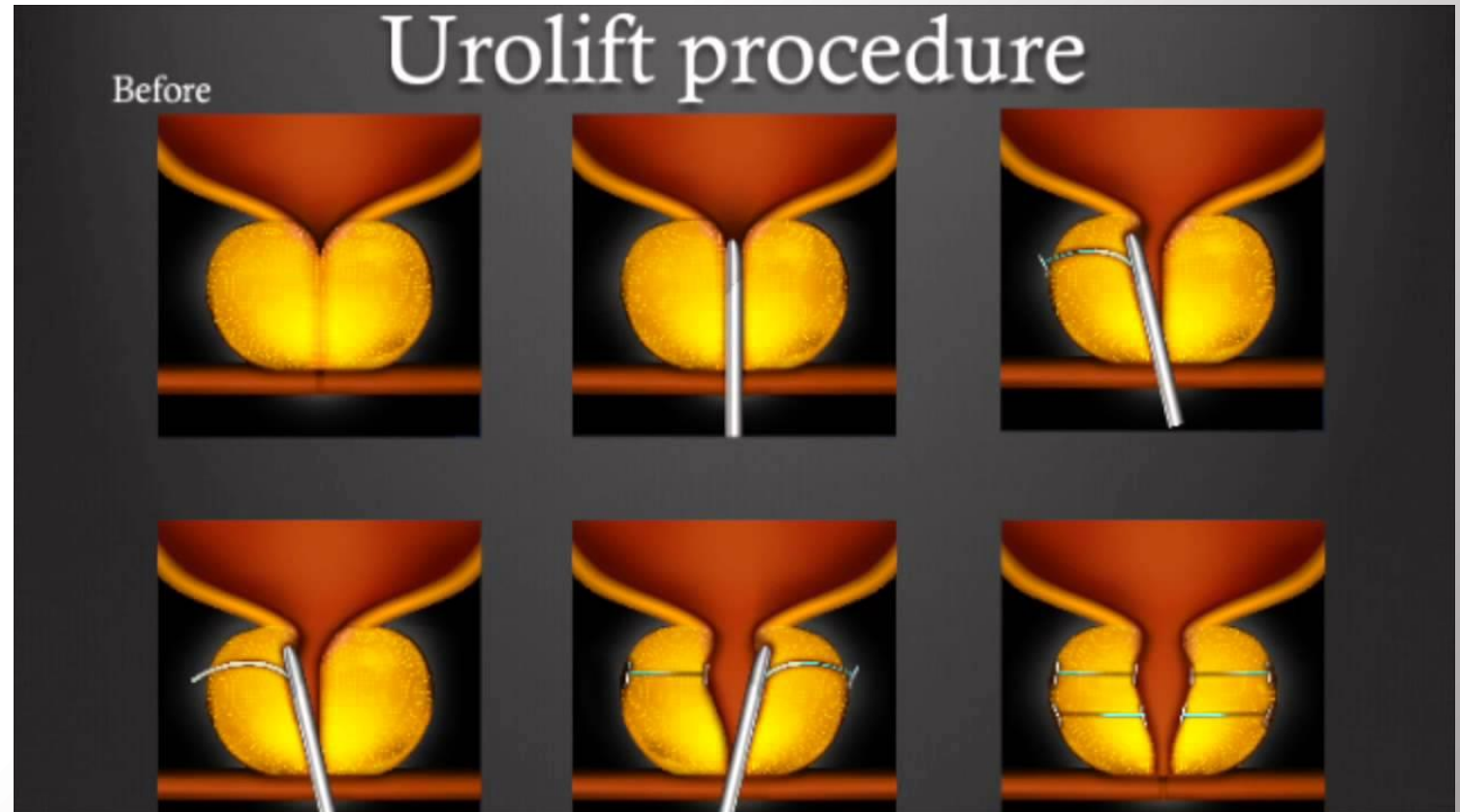
Transurethral Needle Ablation (TUNA)

- Uses low level radiofrequency energy via needles
- Destroys prostate tissue
- Widens the urinary channel
- May improve urine flow



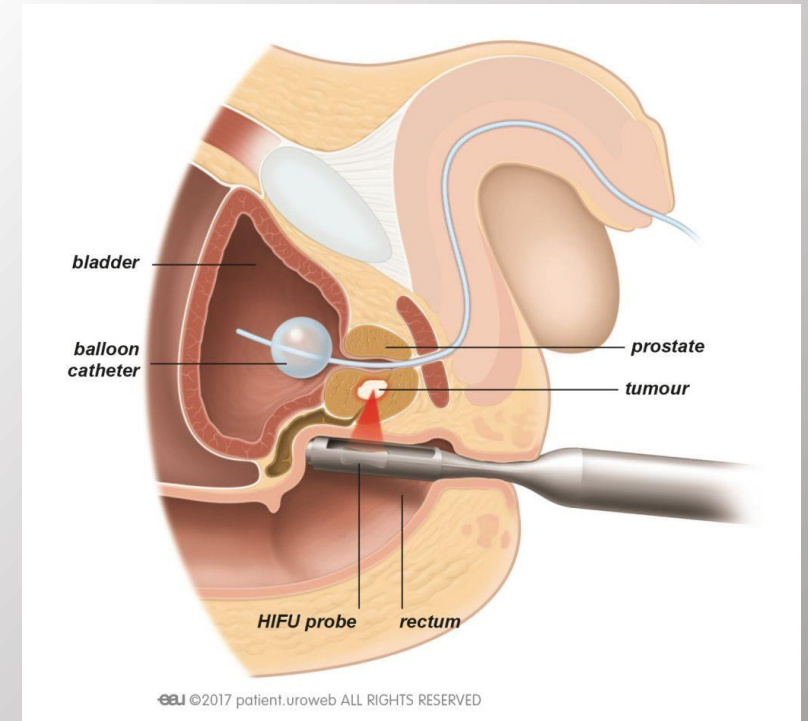
UroLift

- Places tiny implants
- Holds the enlarged prostate tissue out of the way
- Improves urine flow



High-intensity Focused Ultrasound

- Ultrasound produces precise ablation or unwanted prostate tissue
- Available in US as of Dec 2021
- Two systems (Transrectal) are now approved by the FDA
 - **SonaCare Medical** and **EDAP-TMS**
- **Profound Medical** has transurethral approach



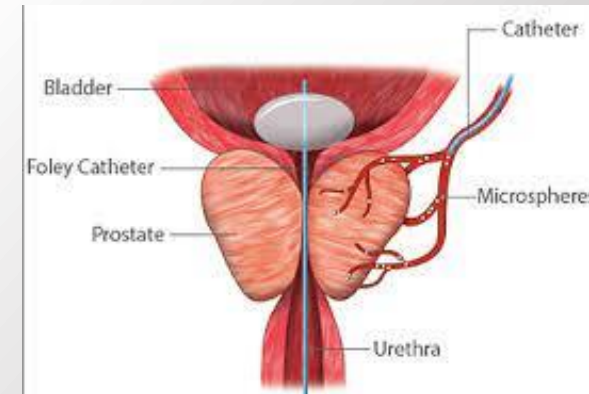
Holmium Laser Enucleation of the Prostate (HoLEP)

- Minimally invasive version of open surgery
- Reserved to large prostates
- No incision
- Specialized type on being done in select centers in US
- Duplicates open surgery
- Shorter time with indwelling catheter



Prostate Artery Embolization

- IR inserts hollow wire into the artery
- Injects material to slow or stop blood flow to the prostate
- Shrinks or softens
- Relatively new, not widely available



<https://www.google.com/imgres?imgurl=http%3A%2F%2Fwww.bocaradiology.com%2Fmen%2Fimages%2Fpae%2Fbladder2.png&imgrefurl=http%3A%2F%2Fwww.bocaradiology.com%2Fmen%2Fpae.html&tbnid=4tZaqli8suUipM&vet=12ahUKEwiwzcDO-Jz2AhWhKzQIHRAJBcgQMygAegUIARDTAQ..i&docid=z2Z46nMsvCl5iM&w=358&h=240&q=prostate%20artery%20embolization&ved=2ahUKEwiwzcDO-Jz2AhWhKzQIHRAJBcgQMygAegUIARDTAQ>

Transurethral Vaporization of the Prostate (TUVP)

- Resectoscope via urethra with lens, and light
- Electrical current destroys prostate tissue
- Heat seals small blood vessels, reducing the risk of bleeding
- Great for men with larger prostates to avoid open surgery



Transurethral Water-Jet Ablation (TWJA)

- High-pressure water jets
- Destroys excess prostate tissue
- One night stay to irrigate bladder
- Catheter indwelling for about 48 hours



https://www.google.com/imgres?imgurl=https%3A%2F%2Fwww.urologysanantonio.com%2Fwp-content%2Fuploads%2F2015%2F11%2FRezum-Prostate-BPH-Before-After.jpg&imgrefurl=https%3A%2F%2Fwww.urologysanantonio.com%2Fbph-enlarged-prostate%2Frezum&tbid=i-J7oDVlJFbgXM&vet=12ahUKEwiF4Yqs-pz2AhWcGTQIHc51AJIQMygOegQIARBe..i&docid=zK5ap-8_9fWPIM&w=525&h=263&q=transurethral%20water-jet%20ablation%20of%20the%20prostate&ved=2ahUKEwiF4Yqs-pz2AhWcGTQIHc51AJIQMygOegQIARBe

Open Surgery

- Very Large Prostates
- Open incision
- Removes enlarged tissue
- Leaves outer capsule

Simple Prostatectomy

- Laparoscopic or robotic-assisted surgery
- Removes entire prostate gland
- Long term cure
- Home with catheter for 1-2 weeks

After Treatment

- For most, symptoms of BPH improve
- Sexual function may take time to fully return
- Some may experience
- Side effects vary with the type of treatment, and most are temporary
 - retrograde ejaculation
 - infection
 - bleeding
 - Incontinence
 - Erectile dysfunction
- Some need further or new treatment after initial treatment

Prevention of Recurrence of BPH

- After treatment, may need medicine to control residual or new symptoms
- May need repeated treatment to rid of symptoms
- Older men may be able to control BPH symptoms to the end of life.

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Affiliations 1Department of Radiology, University of Chicago School of Medicine, Chicago, Illinois, USA. sguneyli@uchicago.edu.

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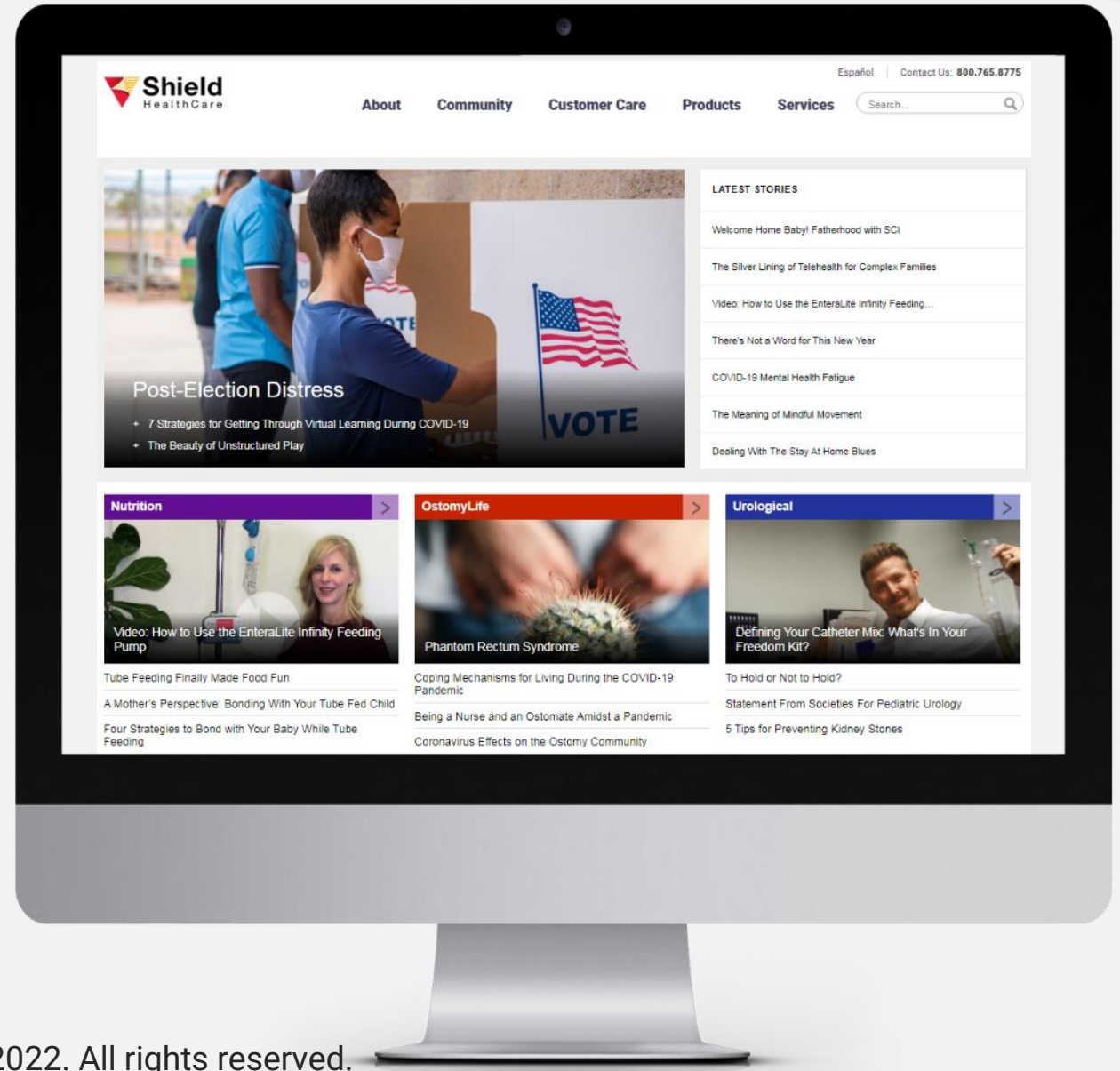
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