



## Sports Medicine Update for the Osteopathic Family Physician:

Scrotal and Testicular Concerns in Athletics

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Bradley Sandella, DO  
Christiana Care Health System  
August 9<sup>th</sup>, 2019

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## DISCLOSURE

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Neither I, Bradley Sandella, DO, nor any family member(s), have any relevant financial relationships to be discussed, directly or indirectly, referred to or illustrated with or without recognition within the presentation.

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## Objectives

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- Testicular anatomy
- Testicular conditions / scrotal trauma
  - Testicular torsion
  - Epididymitis
- Evaluation and management
  - Protection
  - Solitary testicle

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## Testicular Development

- Male gonad
  - Begins to develop at week 4
  - Descends after 3<sup>rd</sup> month
    - Hormones
      - Insulin-like peptide hormone
      - Testosterone
    - Pass through abdomen in 3<sup>rd</sup> trimester
      - Through the process vaginalis
  - Structures



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## Testicular Conditions

- Mechanism – blunt force trauma\*
  - Scrotal structures > penile structures
    - 90% are isolated testicle injuries\*
      - <2% are bilateral
    - 5% with associated penile injury
  - Peak age for scrotal trauma is 10-30 years of age\*\*

\*Hutter et al 2013  
\*\*Fenton LZ 2016

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## Differential Diagnosis

- Contusion
- Testicular torsion / Appendix testis torsion
- Epididymitis
- Hernia / testicular dislocation
- Varicocele
- Hydrocele
- Testicular fracture / rupture
- Scrotal edema

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## Testicular Contusion

- Direct Testicular Trauma
  - Can cause a contusion
    - Ice and elevate for 24 hrs.
    - If pain persists consider torsion.
    - If the mass expands think of fractured testicle.
    - If you can not feel the epididymis separate from the testicle think epididymitis.

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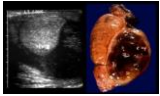
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## Testicular Rupture

- Rupture of the tunica albuginea and extravasation of seminiferous tubules
- Mechanism – direct blow with compression of the scrotum against the pelvis or thigh
- Evaluate for a hematocele



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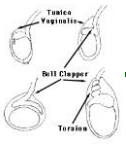
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## Testicular Torsion



- Twisting of the spermatic cord
- Can occur at any age
  - Most commonly occurs in adolescent males
    - 65% of cases between 12-18 years of age\*
    - Overall incidence of 1 in 4000 males before 25 years of age\*
  - 4 – 8% of cases result from trauma\*\*



\*Barada JH, Weingarten JL, Cronie WJ. 1989  
\*\*Hunter SR 2013

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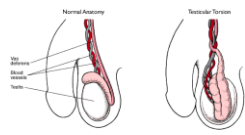
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## Testicular Torsion

- Urological Emergency
  - When blood flow to the testicle is compromised, infarction and atrophy can occur within 6 to 12 hours



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## Testicular Torsion



<b>Symptoms</b>	<b>Signs</b>
<ul style="list-style-type: none"><li>■ Acute onset of pain – diffuse and unilateral</li><li>■ Tenderness for less than 6 hours</li><li>■ Nausea and vomiting</li><li>■ Fever – reported in 1 out of 4*</li><li>■ No dysuria, urinary urgency / frequency, hematuria</li></ul>	<ul style="list-style-type: none"><li>■ Scrotal edema</li><li>■ Horizontal testicular lie</li><li>■ “Blue dot sign”</li><li>■ Phren’s sign</li><li>■ Absence of the cremasteric reflex<ul style="list-style-type: none"><li>■ Torsion of the appendix</li><li>■ 99% sensitive*</li></ul></li></ul>

\* Black, TL, 2001  
Kadiish HA, Bohte RG., 1998  
Madden C 2010

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## Testicular Torsion

- Evaluation
  - Needs immediate evaluation
    - Early stage – testicle is firm, swollen, and tender
  - Urgent surgical evaluation
    - Surgical exploration – gold standard
  - Labs
    - Do not provide much additional information
      - Urinalysis is typically normal
  - Diagnostic studies
    - High frequency doppler
    - Radionuclided testicular scintigraphy with 99mTc

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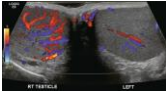
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## Testicular Torsion

- Evaluation
  - Diagnostic studies
    - High frequency doppler
      - Sensitivity: 86-100%\*
      - Specificity: 97-100%\*
    - Radionuclided testicular scintigraphy with 99mTc
      - Sensitivity: 98-100%\*
      - Specificity: 98-100%\*



\*Black, TL: 2001      #POFPS44

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## Testicular Torsion

- Treatment
  - Manually untwisted – detorsion
    - Typically the testis rotate toward the midline
      - 66% rotate medially
      - Success rate is 26-80%\*
  - Surgical treatment\*\*
    - Treatment within 6 hours – 90% success
    - Treatment within 12 hours – 50% success
    - Treatment within 24 hours – 10% success
    - Treatment after 24 hours – minimal

Rupp TJ, Schraga ED, et al.  
Wampler SH, Lianes M. 2010  
Hunter SRT 2013      #POFPS44

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## Return to Play

- Healing of the surgical wounds
- Resolution of pain
- Use of a protective cup for high risk sports
- Counselling on Sperm banking

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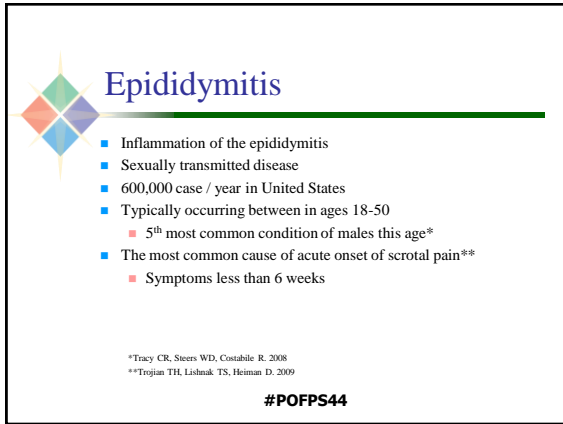
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**Epididymitis**

- Inflammation of the epididymitis
- Sexually transmitted disease
- 600,000 case / year in United States
- Typically occurring between in ages 18-50
  - 5<sup>th</sup> most common condition of males this age\*
- The most common cause of acute onset of scrotal pain\*\*
  - Symptoms less than 6 weeks

\*Tracy CR, Steers WD, Costabile R. 2008  
\*\*Trojan TH, Lishnak TS, Heiman D. 2009

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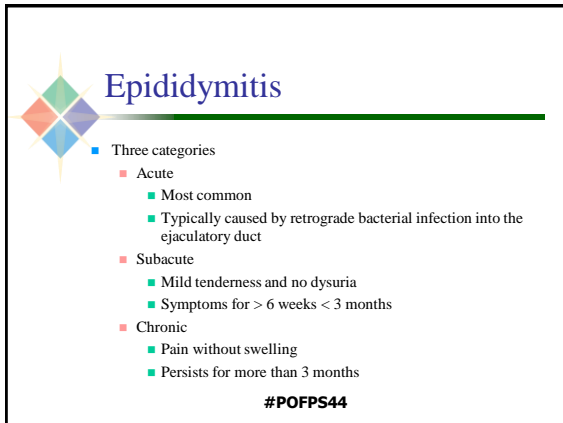
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**Epididymitis**

- Three categories
  - Acute
    - Most common
    - Typically caused by retrograde bacterial infection into the ejaculatory duct
  - Subacute
    - Mild tenderness and no dysuria
    - Symptoms for > 6 weeks < 3 months
  - Chronic
    - Pain without swelling
    - Persists for more than 3 months

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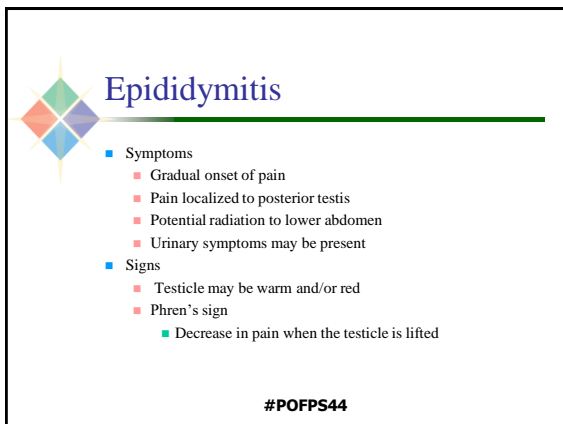
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**Epididymitis**

- Symptoms
  - Gradual onset of pain
  - Pain localized to posterior testis
  - Potential radiation to lower abdomen
  - Urinary symptoms may be present
- Signs
  - Testicle may be warm and/or red
  - Phren's sign
    - Decrease in pain when the testicle is lifted

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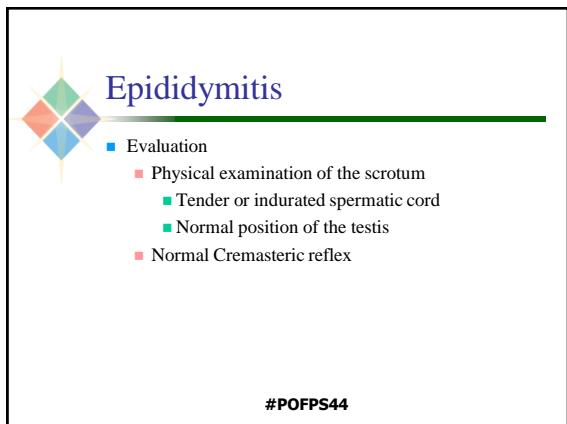
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**Epididymitis**

- Evaluation
  - Physical examination of the scrotum
    - Tender or indurated spermatic cord
    - Normal position of the testis
  - Normal Cremasteric reflex

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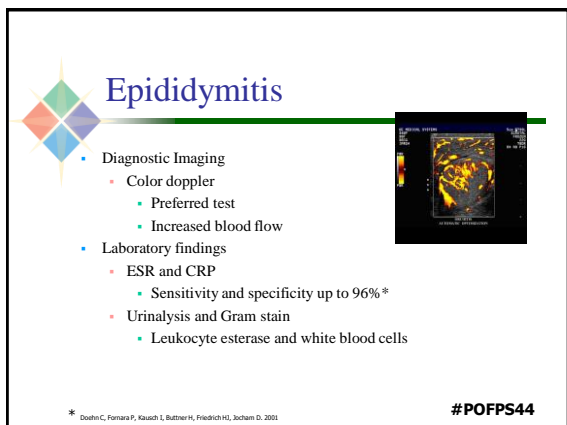
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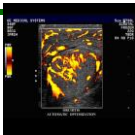
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**Epididymitis**

- Diagnostic Imaging
  - Color doppler
    - Preferred test
    - Increased blood flow
- Laboratory findings
  - ESR and CRP
    - Sensitivity and specificity up to 96%\*
  - Urinalysis and Gram stain
    - Leukocyte esterase and white blood cells



\* Doehri C, Fornara P, Kaush L, Buttner H, Friedrich HJ, Jocham D. 2001

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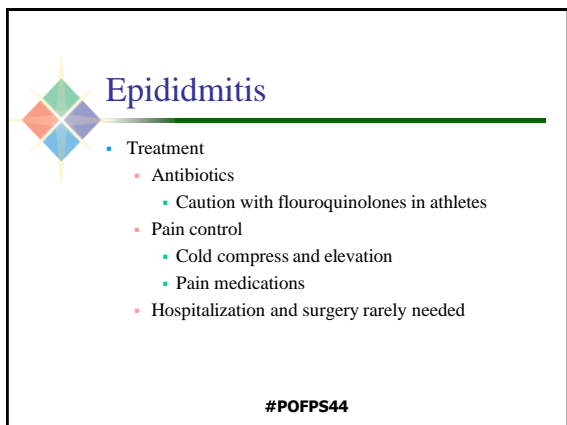
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**Epididymitis**

- Treatment
  - Antibiotics
    - Caution with flouroquinolones in athletes
  - Pain control
    - Cold compress and elevation
    - Pain medications
  - Hospitalization and surgery rarely needed

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## Torsion vs. Epididymitis

	Testicular Torsion	Epididymitis
Age of onset	12-18 y/o males	18-50 y/o males
Presence of pain	Acute onset, severe pain	Gradual onset with varying levels of pain
Presence of swelling	Present	Present
Urinary symptoms (dysuria, hematuria)	Not present	Often present
Prehn's sign	Negative for pain relief	Positive for pain relief
Cremasteric reflex	Absent	Present
Urinalysis	Normal	Possible leukoesterase and white blood cells seen
Appearance of scintigraphy	Decreased perfusion	Increased perfusion
Appearance of ultrasound	Absence or decreased blood flow	Increased blood flow
Treatment of choice	Surgery	Antibiotics
Severity of condition	Medical emergency	Urgency

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## Protective Equipment

- No data exist to support use of an athletic cup
- Design and manufactures are not regulated
  - National Operating Committee on Standards in Athletic Equipment
    - Regulates most protective athletic equipment



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## Preventative Screening

**Clinical Summary of U.S. Preventive Services Task Force Reaffirmation Recommendation**

This document is a summary of the 2011 recommendation of the U.S. Preventive Services Task Force on screening for testicular cancer in adolescent and adult males. It is intended for use by primary care clinicians. This summary was first published in *Annals of Internal Medicine* in April 2011 ([www.annals.org](http://www.annals.org); PMID 2154482-489).

<b>Population</b>	Adolescent and Adult Males
<b>Recommendation</b>	Do not screen for testicular cancer.
<b>Screening Tests</b>	There is <del>insufficient</del> evidence that screening asymptomatic patients by means of self-examination or clinician examination has greater yield or accuracy for detecting testicular cancer at more curable stages.
<b>Interventions</b>	Management of testicular cancer consists of orchiectomy and may include other surgery, radiation therapy, or chemotherapy, depending on stage and tumor size. Regardless of disease stage, over 90% of all newly diagnosed cases of testicular cancer will be cured.
<b>Balance of Harms and Benefits</b>	Screening by self-examination or clinician examination is unlikely to offer meaningful health benefits, given the very low incidence and high cure rate of even advanced testicular cancer. Potential harms include false-positive results, anxiety, and harms from diagnostic tests or procedures.
<b>Relevant USPSTF Recommendations</b>	Recommendations on screening for other types of cancer can be found at <a href="http://www.uspreventiveservicestaskforce.org">http://www.uspreventiveservicestaskforce.org</a> .

For a summary of the evidence systematically reviewed in making these recommendations, the full recommendation statement, and supporting documents, please go to <http://www.uspreventiveservicestaskforce.org>.

**Disclaimer:** Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

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## Testicular Tumor

- Most common solid malignancy in males aged 20-35 years of age
- Incidence has increased over the last century\*
- Roughly 1 in 300 males affected
- Mortality rate is 1 in 5,000
  - 5 year survival rate of 90-95%\*
  - Early detection and accurate treatment are key

\* Sachdeva K, Harris JE, et al.

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## Testicular Tumors

- Two broad categories
  - Germ cell tumors (GCTs)
    - Constitute more than 90% of the tumors
    - Seminoma is the most common
    - Incident increases after puberty
  - Non-germ cell tumors (Non-GCTs)
    - Yolk sac tumors and teratoma
    - Rare in adults and usually occur in children



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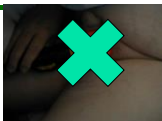
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## Testicular Tumors

- Risk Factors
  - Cryptorchidism
  - Prior germ cell tumor
- Symptoms
  - Painless mass – commonly
    - Occasionally dull ache or heaviness is reported
    - If there is sharp pain – consider bleeding or hematoma
- Signs
  - Small, non-tender palpable lesion at the posterior aspect of the effected testicle



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## Testicular Tumors

- Diagnostic imaging
  - Scrotal ultrasonography
    - Hypoechoic signal
  - MRI
    - Demonstrate a mass that is relatively isointense on T1 imaging and enhancement with intravenous gadolinium on T2 imaging\*

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## Testicular Tumors

- Laboratory testing
  - Tumor markers
    - Alpha fetoprotein (AFP)
    - Human chorionic gonadotropin (HCG)
    - Lactate Dehydrogenase (LDH)
  - Useful in monitoring progression
    - Can not be used for screening or making a diagnosis

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## Testicular Tumors

- Treatment
  - Surgery and /or adjunct therapy
- Return to play
  - May return to athletes without restrictions
    - Once surgical wounds heal
    - Protective cup is recommended
  - Risk counseling for playing with solitary organ

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 **SCROTAL MASSES**

- **Varicocele**
- **Spermatoceles**
- **Hydrocele**

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 **SCROTAL MASSES**

- **Varicocele**
  - Enlargement of the veins within the scrotum
    - Typically not serious condition
  - Can cause low sperm production and decreased sperm quality, which can cause infertility
  - Common in up to 20% of males.



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 **SCROTAL MASSES**

- **Spermatocele**
  - Abnormal sac (cystic) that develops in the epididymis
    - Extravasation of sperm due to trauma or infection.
  - Noncancerous
  - Can become large and painful
    - Requiring surgical treatment



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## SCROTAL MASSES

- **Hydrocele**
  - Cystic mass surrounding the testicle and epididymis.
  - Caused by decreased absorption of tunica vaginalis secretion.
  - Due to trauma - 50% of the time
    - Considering infection or malignancy.
      - Think Malignancy if no source



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## The Value of Ultrasound

**Table 1**  
Accuracy of ultrasonography for blunt scrotal trauma

Injury Type	Sensitivity	Specificity	PPV	NPV
Testicular rupture	100%	65%	73%	100%
Hematocele	87%	89%	95%	72%
Testicular hematoma	71%	79%	45%	91%
Testicular avulsion	100%	97%	50%	100%
Epididymal injury	57%	85%	50%	88%

Data from Guichard G, El Ammari J, Del Coro C, et al. Accuracy of ultrasonography in diagnosis of testicular rupture after blunt scrotal trauma. Urology 2008;71(1):52-6.

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## TAKE HOME POINTS

1. Testicular torsion require emergent medical attention
2. Ultrasound is the imaging modality of choice for testicular and scrotal injuries
3. Full return to activity after a testicular injury is expected

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## Practice and Research Gaps

### Top 3 Gaps and Recommendations

1. Recommendation for the use of genital protective equipment in sports participation
2. Outcomes on fertility after scrotal injury
3. Disconnect on recommendations on testicular screening exams during pre-participation exams

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