



**HRT – Male Patients**

Nayan Patel, PharmD

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**Goals of Testosterone Therapy**

- Improve/maintain secondary sexual characteristics
- Improve libido and erections
- Increase energy and well-being
- Improve muscle mass and strength
- Improve bone mineral density



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**Contraindications to Testosterone Therapy**

- Breast or prostate cancer
- Lump/hardness on prostate exam by DRE
- PSA >3 ng/ml that has not been evaluated for prostate cancer
- Severe untreated BPH (AUA/IPSS >19)
- Erythrocytosis (hematocrit >50%)
- Hyperviscosity
- Untreated obstructive sleep apnea
- Severe heart failure (class III or IV)



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### Testosterone for the Following Reasons May be Harmful

- To improve strength/athletic performance
- For physical appearance
- To prevent aging



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### How Do You Give Testosterone?

- Start at standard dose
- Check levels
- Therapeutic target
  - Serum testosterone in mid-normal range for healthy, young men
- Target in older men
  - Considerable disagreement among experts
  - Total T in the lower part of the normal range for younger men
  - 400-500 ng/dl



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### Testosterone Replacement

- **Intramuscular preparations**
- Transdermal patch
- Transdermal/Trans-mucosal gel/cream
- **Oral agent**
- Testosterone pellet
- Buccal testosterone tablets



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### Intramuscular Injection

- Short-acting:
  - Testosterone propionate
- Intermediate-acting:
  - Testosterone enanthate
  - Testosterone cypionate
- Long-acting:
  - Testosterone undecanoate



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### Testosterone Enanthate or Cypionate Injections (IM)

- T levels are supraphysiologic, then gradually drop to hypogonadal range
  - Peaks and valleys
  - Fluctuation of mood or libido
- Relatively inexpensive if self-administered
- Start at 75-100 mg IM weekly
  - Or 150-200 mg IM every other week
- Pain at injection site
- Excessive erythrocytosis (esp in older pts)



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### Testosterone Patch

- Less increase in hemoglobin than IM shots
- Ideal if the patient can tolerate
- Skin irritation/redness/rashes
- Patch falls off while exercising



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### Testosterone Pellets

- 4-6 200-mg pellets implanted subQ
- Serum T peaks at 1 month and then is sustained in normal range for 4-6 months
- Requires surgical incision for insertion
- Infection risk
- Pellets may spontaneously extrude



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### Buccal, Bioadhesive T Tablet

- Normalizes T and DHT
- 30 mg to buccal mucosa twice daily q12h
- Gum-related adverse events in 16%
  - Gum irritation
    - Examine gums and oral mucosa for irritation
  - Alteration in taste



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### Testosterone Gel

- Starting dose 5-10 grams daily
- Skin tolerates it well
- Potential transfer to others by skin contact
  - Cover the application site
  - Wash hands with soap and water after application
  - Wash skin before skin-to-skin contact with others
  - T levels maintained when skin washed 4-6 hours after application



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### Testosterone Gel

- Trans-mucosal application of a very low dose testosterone gel/cream
  - Apply on anal mucosal area
    - Highly absorbed & fast
    - Less fear of skin to skin transfer to someone else
    - Generally requires 10% to 15% of the full topical dose only



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### Monitor other Hormones

- No perfect system for testosterone replacement
  - Either causes increased estradiol levels or
  - Increase in DHT or
  - Both



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### Maintaining Estrogen

- Control aromatase enzyme activity
- Control the rate of reaction for testosterone converting to estradiol



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### Aromatase

- *Aromatase* found in the liver, fat and skin
- Zinc deficiency increases *aromatase* activity
- High insulin level increases the aromatase activity
- Zinc found in oysters, red meat and nuts
- Zinc (and magnesium) depleted by alcohol
- *Aromatase* production also increase with age (we don't know why).
- Drugs: Aromatase inhibitors – Anastrozole (Arimidex®), Letrozole (Femara®), Exemestane (Aromasin®)
- Chrysin is a natural aromatase blocker



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### Progesterone in Men

- Progesterone stimulates the leydig cell to secrete testosterone
  - Progesterone and 17-OH progesterone induce a depolarizing effect on the leydig cell plasma membrane , where DHEA-S, estradiol, testosterone, and cortisol do not
- Leydig cells are able to synthesize testosterone from progesterone and pregnenolone.
- Progesterone may be useful in benign prostatic hypertrophy (BPH)
  - Progesterone is a 5 alpha reductase inhibitor
  - Progesterone reduces PSA
  - Progesterone has an inhibitory effect on luteinizing hormone (LH)



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### DHT Blockers

- Finasteride
- Dutasteride
- Saw Palmetto
- Stinging Nettle Roots
- Pygeum Africanum
- Green tea extract (EGCG)
- **BE CAREFULL! On using DHT blockers.**



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### Typical Rx for Andropause

- Testosterone/P4 (9:1) 5mg to 15mg gel from QD to BID to be applied to anal mucosal area
- Other Testosterone/P4 (9:1) option is 5% to 10% topical gel QD to BID
- Pregnenolone/DHEA 25/25mg to 50/50mg SR caps daily
- Chrysin/zinc 250/30mg to 250/50mg caps QD
- DHT blocker like saw palmetto w/nettle root and pygeum 320mg QD (Rarely)
- Anastrozole 0.1mg to 0.25mg QD is added if chrysin/Zinc is not effective



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### Secondary Hypogonadal Patient

- Low levels of testosterone can be treated with:
  - HCG 250iu daily for 30days and/or
  - Clomiphene 25mg caps daily
  - Combination capsule
    - Progesterone 25mg
    - pregnenolone 10mg
    - DHEA 5mg
    - 7-Keto DHEA 5mg
    - anastrozole 0.05mg
    - Methyl B-12 0.5mg
    - B6 2mg

40.05mg Per cap daily

Add OTC daily or combine with RX capsule



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### Young Male Patient

- With previous use of testosterone or related products:
  - HCG 2500iu QOD for 16days
  - Clomiphene 50mg daily for 30days
  - Tamoxifen 20mg daily for 45 days
  - Re-evaluate the need of testosterone after 60 days



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### Side Effects

- Breast tenderness
- Gynecomastia
- Compromised fertility
- Change in testicle size
- Skin reactions
- Fluid retention
- Acne/oily skin
- Increased body hair



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### Conclusions

- Control Insulin levels to obtain the best results from your testosterone therapy.
- Androgen therapy can be great benefit to your patients as long as they are closely monitored for all the side effects of the therapy



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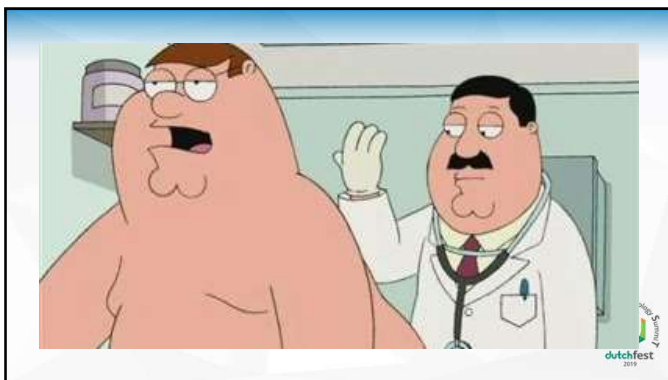
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