


Endocrine Care of Men With Klinefelter’s Syndrome

A focus on testosterone options

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You may ask...what is an endocrinologist/andrologist?

- Medical doctors
- Specialise in managing hormone conditions
- Andrology – specifically relates to men’s reproductive health

Klinefelter’s syndrome (KS)

- Genetic condition (1:650 approx.)
- Extra X chromosome resulting in 47, XXY male (instead of 46, XY)
- Wide variety of signs/symptoms
- However in common:
 - Testes don’t grow in puberty
 - Reduced testosterone production, most often during puberty
 - Lack of sperm

Endocrine care for men with KS

- Multidisciplinary
 - GP
 - Allied Health
 - Endocrinologist* (**adult endo)
 - Fertility Specialist
 - Psychologist
- Focus shifts according to life stage*

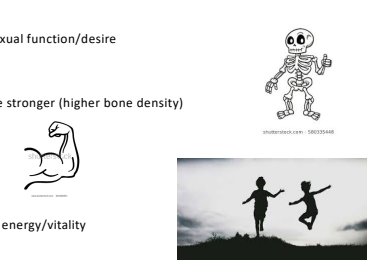
Management issues according to life stage

- Life is a continuum - individualisation of care
- Goals of care differ over time
 - Testosterone options & timing
 - Fertility
 - Cardiovascular health
 - Bone health
 - Prostate health

Infancy and childhood	<ul style="list-style-type: none"> • Speech therapy and language development considerations • Physical development considerations • Education and behavioural support
Puberty	<ul style="list-style-type: none"> • Timing of testosterone replacement therapy • Fertility preservation • Psychosocial and educational support
Adulthood	<ul style="list-style-type: none"> • Fertility planning • Testosterone replacement therapy • Cardiovascular risk reduction • Bone mineral density preservation • Psychosocial and sexual health considerations
Older men	<ul style="list-style-type: none"> • Fracture risk reduction • Cardiovascular risk reduction • Prostate cancer considerations • Psychosocial and sexual health considerations

What does testosterone do in men?

- Completes sexual maturity
 - Hair growth, deeper voice, sexual function/desire
- Bones
 - Need testosterone to become stronger (higher bone density)
- Muscles
 - Strength and leanness
- A sense of wellbeing
 - Harder to quantify, increased energy/vitality



Puberty & Transition to Adulthood

- Men with KS need lifelong testosterone treatment once the testosterone is low
- Timing of testosterone replacement varies
 - Goals
 - Complete puberty
 - Optimise peak bone density & general wellbeing
 - Fertility considerations
 - Taking testosterone (any formulation) turns off sperm production

Options for Testosterone replacement for Australian men

- Injections
- Capsules
- Transdermal - Gels, cream or patch applied to the skin
- All formulations require blood tests to monitor the testosterone levels

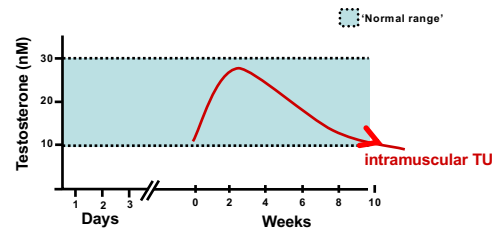


Testosterone - Injections

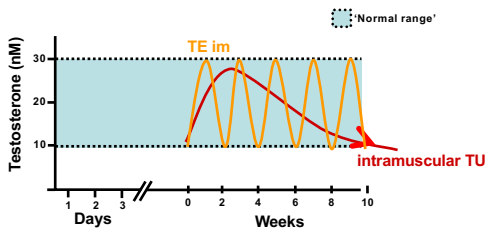
- Testosterone Undecanoate (Reandron® in Australia)
 - 1000mg, deep intramuscular injection approx. every 3 months
 - Timing is adjusted based on blood levels

Advantages	Disadvantages
<ul style="list-style-type: none"> • Long acting – Convenient • Compliance 	<ul style="list-style-type: none"> • Long acting – can't reverse it • Cannot self administer – need to see the doctor each time • Injection site pain • Deep injection – not suitable for some men with bleeding problems or on some blood thinners

Testosterone Preparations



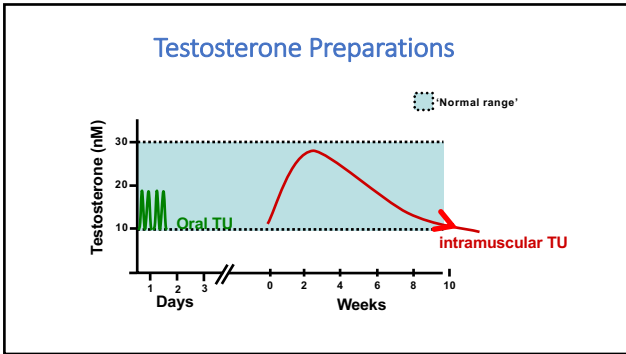
Testosterone Preparations



Testosterone - Capsules

- Testosterone Undecanoate (eg Andriol® in Australia)
 - By mouth, 2-3 times a day

Advantages	Disadvantages
<ul style="list-style-type: none"> • Self administer 	<ul style="list-style-type: none"> • Take 2-3 x day • Levels change quickly • Absorption depends on food intake • Hard to get adequate levels



Testosterone - Transdermal

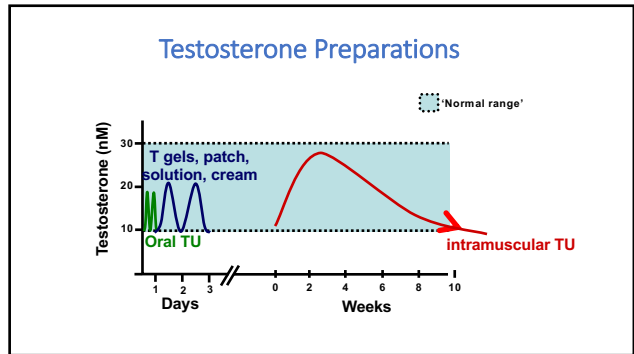
- Testosterone Gel (Testogel® 1%, sachet or pump pack)
- Testosterone Cream (Androforte® 5%)
 - Applied daily to skin of abdomen or upper arm
 - Dose varies for each man

Advantages	Disadvantages
<ul style="list-style-type: none"> • Convenience • Self administer • "gentle" – mimics daily variation of physiological testosterone 	<ul style="list-style-type: none"> • Apply every day • Must cover the area to reduce risk of transferring to others eg spouse, children • No shower/swimming for 2-4 hrs after applying • Skin irritation

Testosterone – Transdermal patch

- Androderm®

Advantages	Disadvantages
<ul style="list-style-type: none"> • Convenient • Self administer • "gentle" – mimics daily variation of physiological testosterone 	<ul style="list-style-type: none"> • Apply every day • Skin irritation • Only 2 strengths – hard to adjust dose



Which testosterone is best?

- All formulations replace testosterone
- The best type for a man with KS depends on his individual circumstances
 - Considerations:
 - Convenience
 - Compliance
 - Lifestyle
 - Safety
- Can trial a formulation – important to keep discussing with your doctor.

Safety

- Testosterone is necessary lifelong treatment in men with KS
 - Blood levels of testosterone are monitored – not a "set and forget" treatment
 - Blood count (haematocrit) also needs monitoring
 - Too much can be as bad as not enough

Fertility

- Dr Elzeiny will discuss in detail later today
- Starting Testosterone does not seem to affect chances of fertility later in life
 - **Prior to fertility attempts, testosterone must be stopped**
 - For at least 6 months for most formulations
 - At least 12 months for injectable long acting

Adulthood

- Cardiovascular health
 - KS often associated with central obesity
 - Can lead to diabetes, high cholesterol, high blood pressure and heart disease
 - Screening for the development of risk factors (GP/endocrinologist)
 - Counselling about good nutrition and exercise
 - Management of risk factors
 - Avoid excess testosterone
 - No to smoking (that's for everyone!)

Adulthood

- Bone health
 - Strong bones need:
 - Testosterone
 - Calcium (from the diet ideally)
 - Vit D
 - Weight bearing exercise
 - Men with KS have a higher risk of thin bones over time
 - Timing of diagnosis & testosterone exposure are relevant
 - Sometimes a bone mineral density test is needed to assess this
 - Sometimes other "bone building" drugs are needed in older men to reduce the risk of bone fractures

Adulthood

- Prostate
 - Men with KS are less likely to have prostate cancer
 - Testosterone does not cause prostate cancer
 - Still require screening from approx. age 50 like non-KS men
- Other medical issues that have been associated (**very low risk** but as your doctor, I need to be aware...)
 - Underactive thyroid, coeliac disease and Lupus
 - Deep vein thrombosis (leg clots)
 - Breast Cancer

Summary

• Endocrine care of men with KS:

- Multidisciplinary
 - GP
 - Allied Health
 - Endocrinologist
 - Testosterone, heart and bone health, preventative screening and management
 - Fertility Specialist
 - Psychologist
- Focus shifts according to life stage

