



Late onset hypogonadism e síndrome metabólico

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Late onset hypogonadism e síndrome metabólico

A ONU prevê um crescimento da população mundial de 4x entre 1950 e 2050

- De 2,5 para 10 bilhões de indivíduos

A OMS estima a triplicação da população com mais de 65 anos entre 2000 e 2050

- 1,5 bilhões de indivíduos

Atualmente na Europa, a esperança de vida é o dobro de há 100 anos atrás

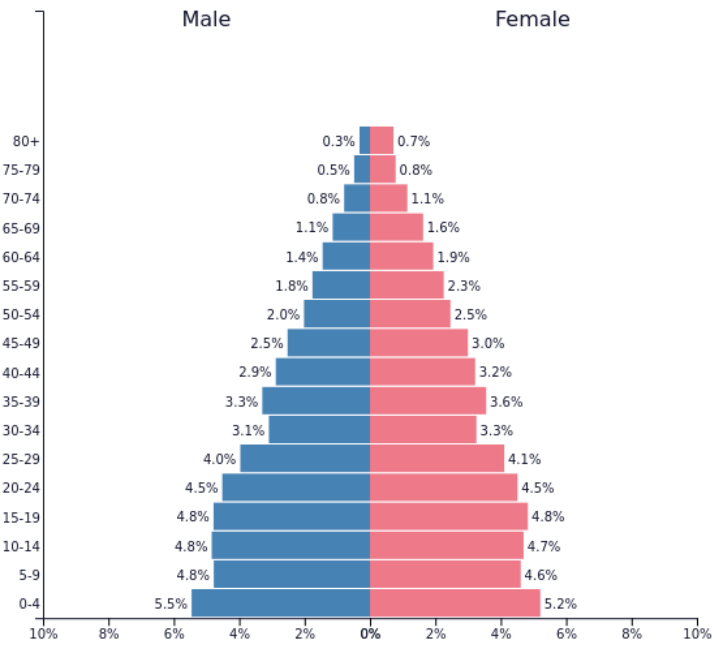
- 81 anos ♀ e 74 anos ♂

Envelhecimento provoca uma redução na eficiência fisiológica com atrofia gradual e progressiva de vários órgãos e sistemas

- Alteração na secreção de várias hormonas

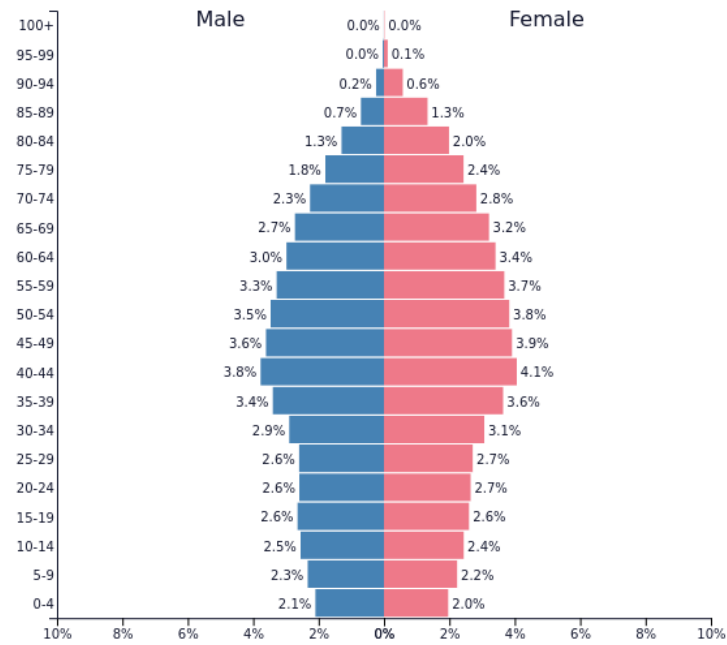


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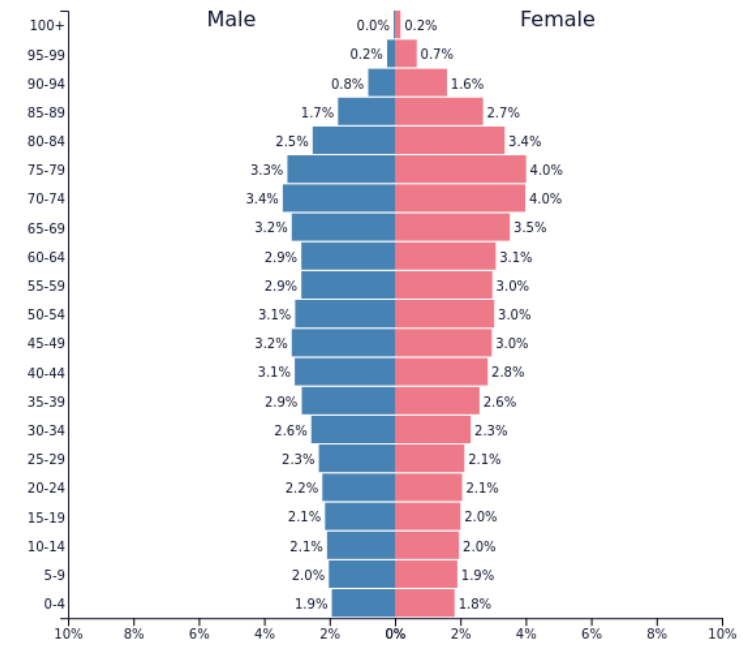
Portugal - 1950
Population: 8,416,969

PopulationPyramid.net



Portugal - 2017
Population: 10,264,797

PopulationPyramid.net

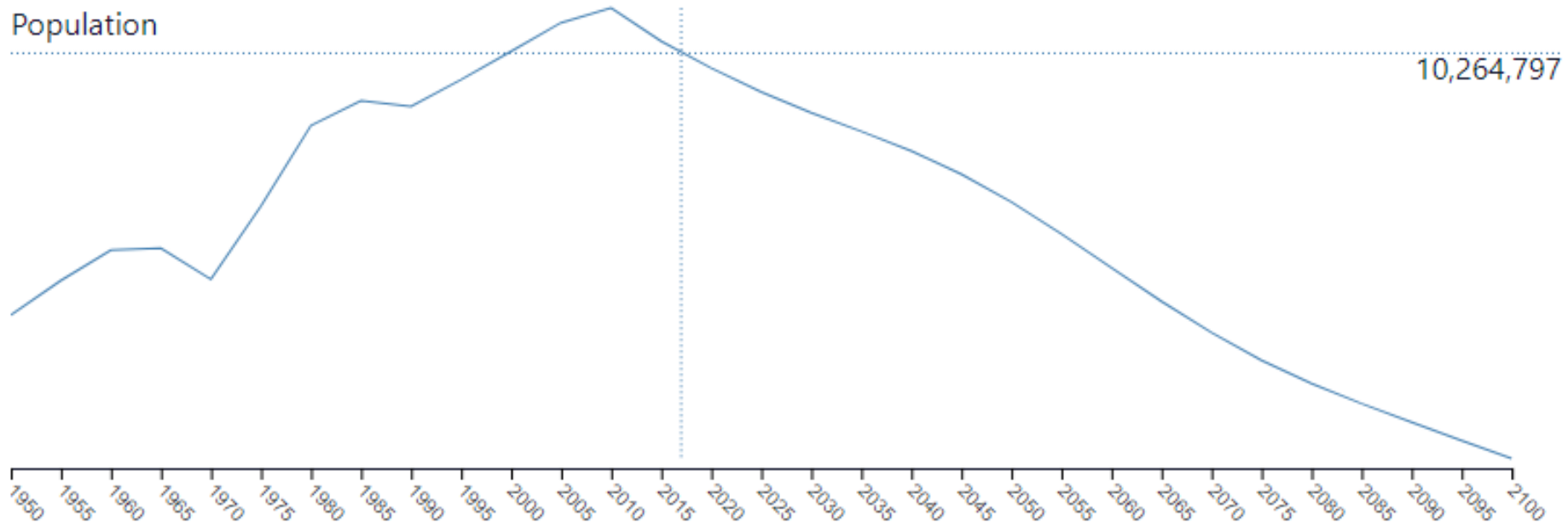


Portugal - 2050
Population: 9,215,550

PopulationPyramid.net



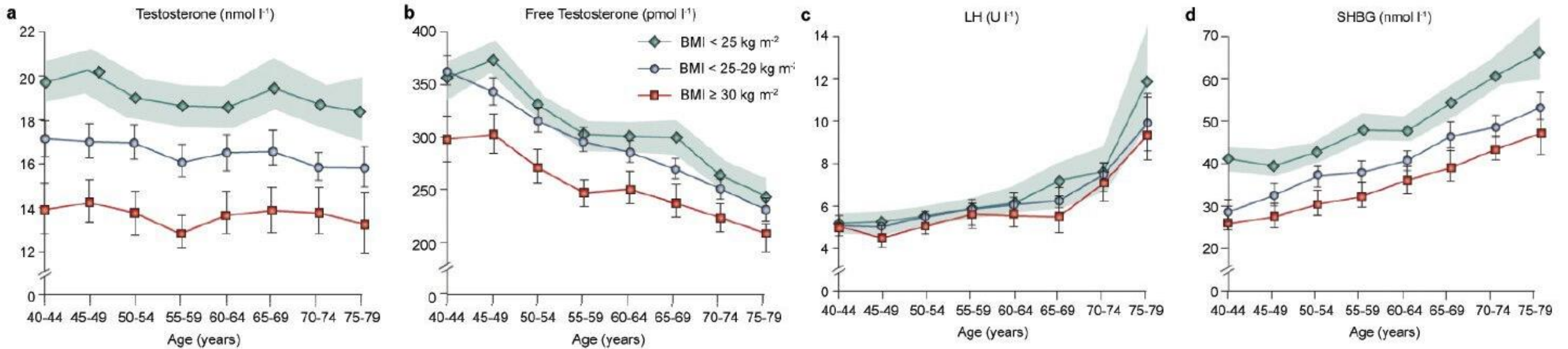
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PopulationPyramid.net

Portugal - 2017
Population: 10,264,797

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EMAS, n: 3320

○ Wu et al, 2008



Late onset hypogonadism e síndrome metabólico

O hipogonadismo tardio (HT) consiste num síndrome clínico acompanhado da diminuição dos valores de testosterona

Resulta do envelhecimento, da falência testicular e do eixo hipotálamo-hipofisário (misto)

- *Tuttelmann F et al, 2010*

Tem uma prevalência de 2-6% entre 40-79 anos

- Envelhecimento
- Obesidade
- Co-morbilidades (diabetes, doença cardiovascular, DPOC e síndrome metabólico)

- *MMAS 2004*

- *Wu F et al, 2010*

Excluir doença aguda (traumatismo craniano e doença cardiovascular - AVC, EAM)

- Diminui a síntese de testosterona de vários dias a semanas

Excluir metadona, tramadol, corticoterapia crónica e medicação que predispõe a hiperprolactinémia (neurolépticos)



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Os sintomas mais prevalentes do HT:

- Diminuição da libido e da frequência da atividade sexual
- Disfunção erétil
- Diminuição da massa muscular e
- Alterações do humor

O diagnóstico de HT é mais frequente na presença de 3 sintomas sexuais:

- Diminuição dos pensamentos eróticos
- Diminuição das ereções matinais e
- Disfunção erétil

TT < 8 nmol/L (231 ng/dl)

8 (231 ng/dl) < TT < 11 nmol/L (317 ng/dl)

- TL < 220 pmol/L (11,5 ng/dl)

Table 3: Clinical symptoms and signs suggestive for androgen deficiency

Clinical symptoms and signs suggestive for androgen deficiency:
Reduced testis volume
Male-factor infertility
Decreased body hair
Gynaecomastia
Decrease in lean body mass and muscle strength
Visceral obesity
Metabolic syndrome
Insulin resistance and type 2 diabetes mellitus
Decrease in bone mineral density (osteoporosis) with low trauma fractures
Mild anaemia
Sexual symptoms:
Reduced sexual desire and sexual activity
Erectile dysfunction
Fewer and diminished nocturnal erections
Cognitive and psychovegetative symptoms:
Hot flushes
Changes in mood, fatigue and anger
Sleep disturbances
Depression
Diminished cognitive function

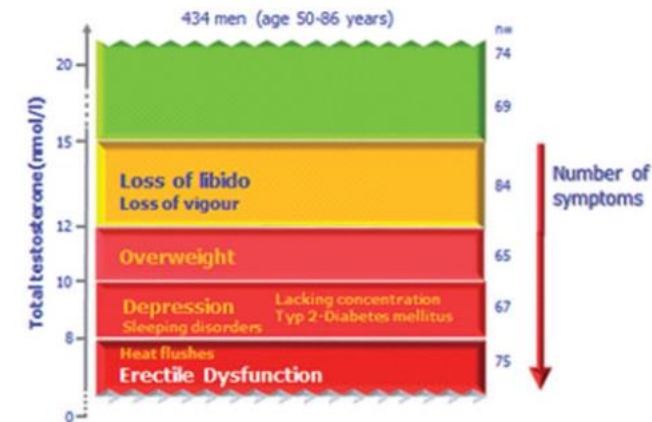
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Recommendations	LE	GR
Restrict the diagnosis of testosterone deficiency to men with persistent symptoms suggesting hypogonadism (Tables 3 and 4).	3	C
Measure testosterone in the morning before 11.00 hours, preferably in the fasting state.	2	A
Repeat total testosterone on at least two occasions with a reliable method. In addition, measure the free testosterone level in men with: <ul style="list-style-type: none"> - Total testosterone levels close to the lower normal range (8-12 nmol/L), to strengthen the laboratory assessment. - Suspected or known abnormal sex hormone-binding globulin (SHBG) levels. 	1	A
Assess testosterone in men with a disease or treatment in which testosterone deficiency is common and in whom treatment may be indicated. This includes men with: <ul style="list-style-type: none"> - Sexual dysfunction. - Type 2 diabetes. - Metabolic syndrome. - Obesity. - Pituitary mass, following radiation involving the sellar region and other diseases in the hypothalamic and sellar region. - Treatment with medications that cause suppression of testosterone levels - e.g. corticosteroids and opiates. - Moderate to severe chronic obstructive lung disease. - Infertility. - Osteoporosis or low-trauma fractures. - HIV infection with sarcopenia. 	2	B
Analyse LH serum levels to differentiate between primary and secondary forms of hypogonadism.	2	A

4.5.4.1. Recommendations for screening men with adult-onset hypogonadism

Recommendations	LE	GR
Screen for testosterone deficiency only in adult men with consistent and multiple signs and symptoms listed in Table 3.	3	C
Young men with testicular dysfunction and men older than 50 years of age with low testosterone should additionally be screened for osteoporosis.	2	B

Testosterone levels and symptoms



- EAU, 2017
- ISSAM, 2015



Late onset hypogonadism e síndrome metabólica

O síndrome metabólico (SM) define-se pela presença de pelo menos 3 condições clínicas

- *Alberti et al, 2009*

O SM aumenta o risco de eventos cardiovasculares em 3x e de *DM* tipo 2 em 5x

- *Stern M et al, 2004*

Afecta 25% dos adultos europeus

- *Grundy S et al, 2008*

TABLE 2. 2009 Harmonious definition of metabolic syndrome²⁰

Any three of the following is required for diagnosis	
Obesity	Population- and country-specific
Triglycerides	≥150mg/dL or on medication
HDL	<40 mg/dL in men or <50 mg/dL in women
BP	≥130/85 mm Hg or on medication
Fasting glucose	≥100 mg/dL or taking medication





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VOLUME 24 · NUMBER 24 · AUGUST 20 2006

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Metabolic Syndrome in Men With Prostate Cancer Undergoing Long-Term Androgen-Deprivation Therapy

Milena Braga-Basaria, Adrian S. Dobs, Denis C. Muller, Michael A. Carducci, Majnu John, Josephine Egan, and Shehzad Basaria

20 men with PCa undergoing ADT for at least 12 months (ADT group)

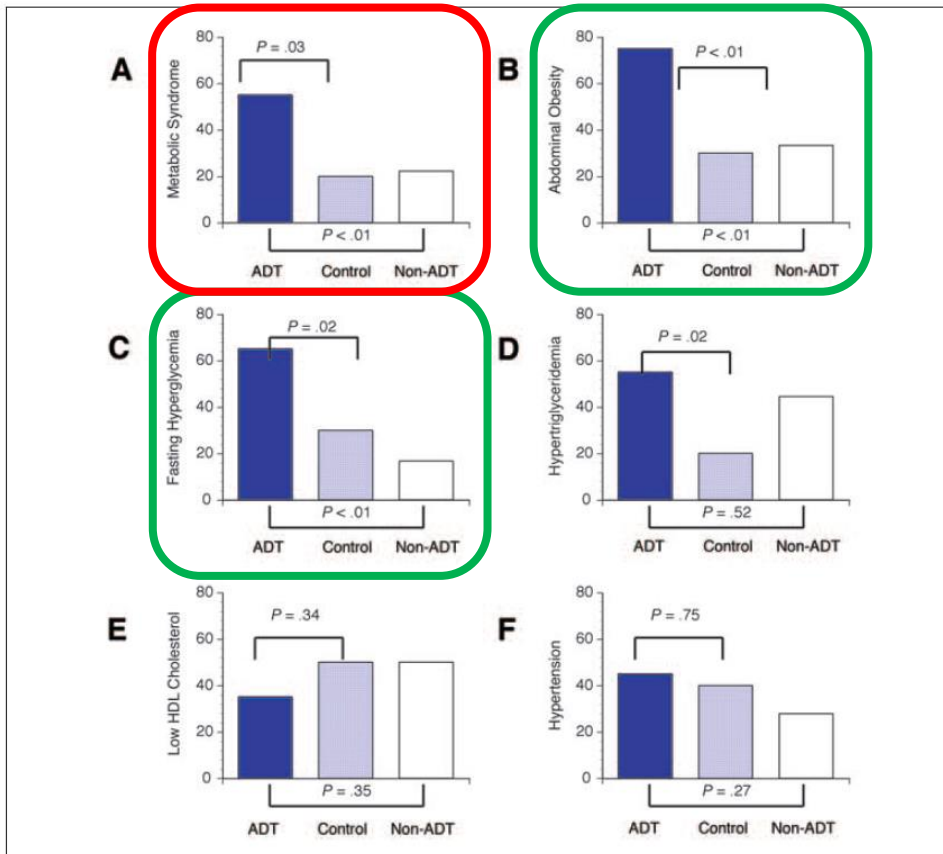
18 age-matched men with nonmetastatic PCa who had received local treatment (non-ADT group)

20 age-matched controls (control group)

Men in the non-ADT and control groups were eugonadal

◦ *Braga-Basaria et al, 2006*

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Prevalence of metabolic syndrome was higher in the ADT group

Men on ADT had a higher prevalence of abdominal obesity and hyperglycemia

Conclusion

Metabolic syndrome was present in more than 50% of the men undergoing long-term ADT, predisposing them to higher cardiovascular risk



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SciMedCentral

Journal of Endocrinology, Diabetes & Obesity

Review Article

Hypogonadism in Metabolic Syndrome: Cause or Consequence? Lesson from Genetic Hypogonadism and Disorders of Gender Identity

Antonio Mancini^{1*}, Sebastiano Raimondo¹, Chantal Di Segni¹, Giovanni Gadotti¹, Elena Giacchi², Marcella Zollino³, Giovanni Neri³, Marco Bonomi⁴, Luca Persani^{4,5} and Alfredo Pontecorvi¹

Special Issue on

Low T or True Male Hypogonadism

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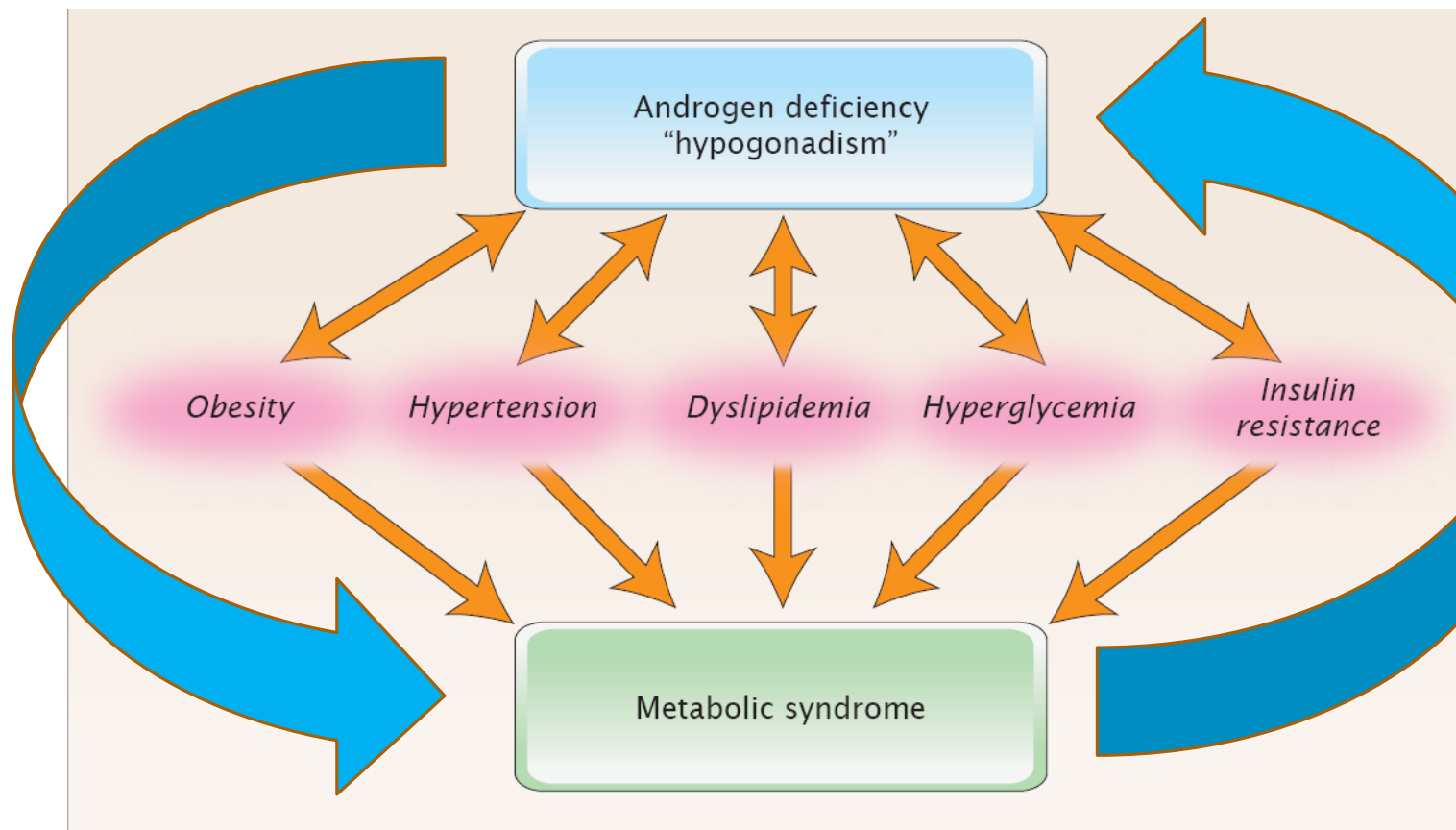
OPEN ACCESS

Case 1	Secondary hypogonadism
Case 2	45 X, male
Case 3	Mosaic Klinefelter
Case 4	Klinefelter's syndrome
Case 5	F to M transsexual
Case 6	M to F transsexual

In conclusion, hypogonadism is surely associated with MS, with a possible causative role or, at least, as a worsening factor

○ Mancini et al, 2014

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- *O síndrome metabólico*
 - *Estado inflamatório de “baixo grau” com produção de citocinas que deprimem eixo hipotálamo-hipofisário*
 - *Obesidade central promove “aromatização” da testosterona em estradiol*

◦ *Traish et al, 2008*



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Fifty-two—Week Treatment With Diet and Exercise Plus Transdermal Testosterone Reverses the Metabolic Syndrome and Improves Glycemic Control in Men With Newly Diagnosed Type 2 Diabetes and Subnormal Plasma Testosterone

Armin E. Heufelder, Farid Saad, Mathijs C. Bunck, Louis Gooren [✉](#)

First published: 12 November 2009 [Full publication history](#)

DOI: 10.2164/jandrol.108.007005 [View/save citation](#)

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✉ Department of Endocrinology, VU University Medical Center, De Boelelaan 1117, 10881 HV Amsterdam, the Netherlands (e-mail: louisjgooren@gmail.com).



[View issue TOC](#)
Volume 30, Issue 6
November-December 2009
Pages 726-733

32 hypogonadal men ($TT < 12.0$ nmol/L) with the MetS received supervised diet and exercise

- 16 received it in combination with testosterone gel (50 mg) once daily

Conclusion

81.3% of the patients randomized to D&E plus testosterone no longer matched the criteria of the MetS, whereas 31.3% of the D&E alone participants did

- Heufelder et al, 2009



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[Int J Endocrinol.](#) 2014; 2014: 527470.

Published online 2014 Feb 12. doi: [10.1155/2014/527470](https://doi.org/10.1155/2014/527470)

PMCID: PMC3945028

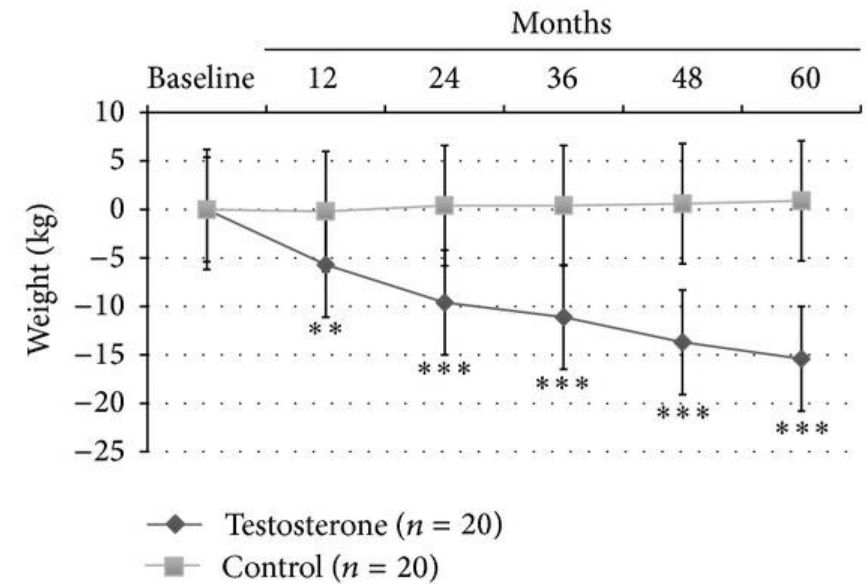
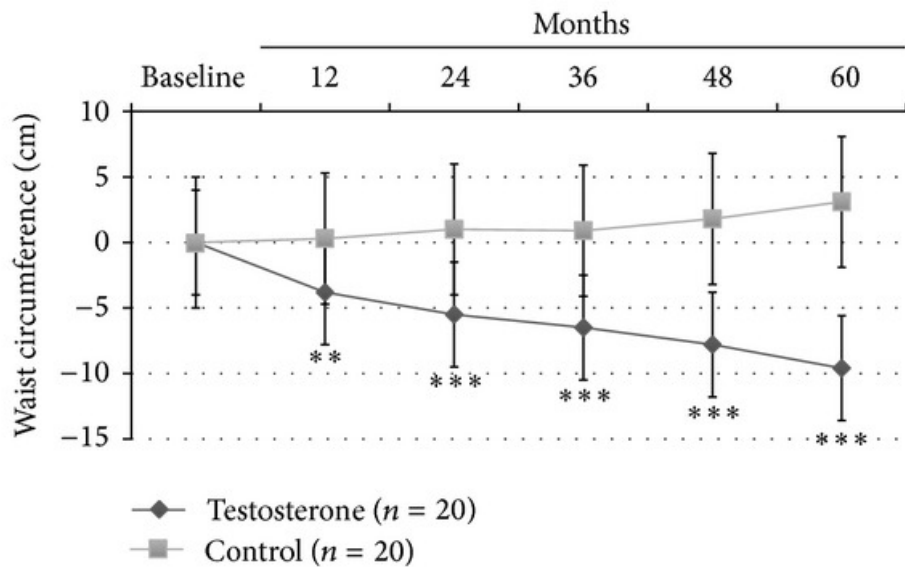
Effects of Five-Year Treatment with Testosterone Undecanoate on Metabolic and Hormonal Parameters in Ageing Men with Metabolic Syndrome

20 hypogonadal men (mean T = 241 ng/dL–8.3 nmol/L) with metabolic syndrome were treated with T-undecanoate injections every 12 weeks for 60 months

20 matched subjects in whom T was unaccepted or contraindicated served as controls

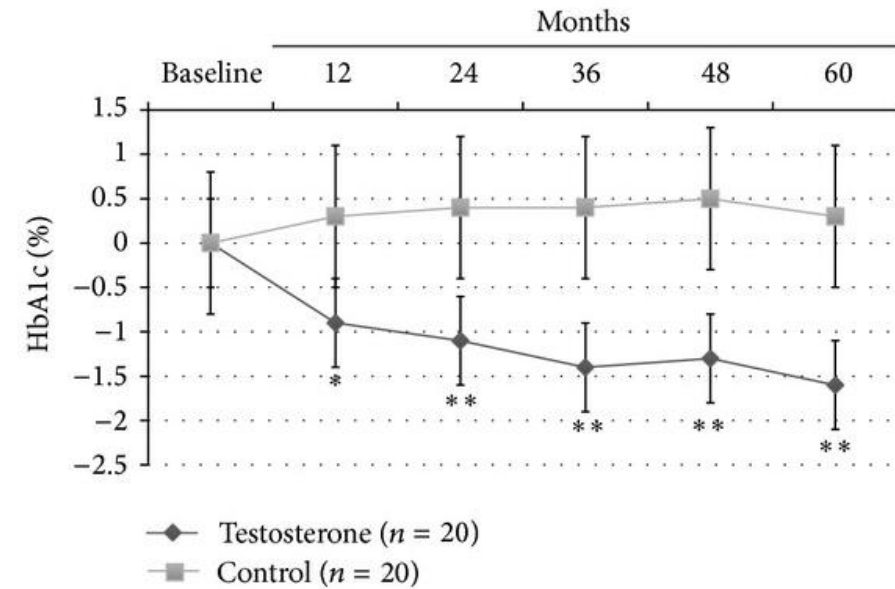
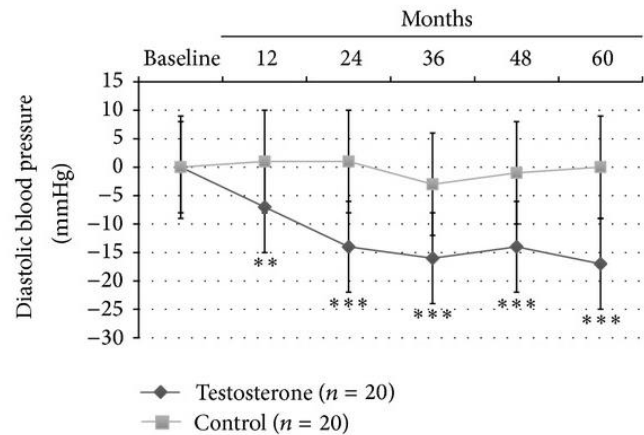
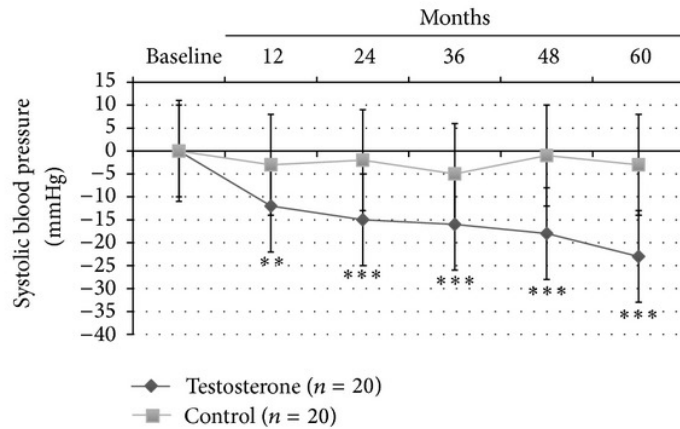
◦ *Francomano et al, 2014*

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○ Francomano et al, 2014

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○ *Francomano et al, 2014*



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PMCID: PMC3945028

Effects of Five-Year Treatment with Testosterone Undecanoate on Metabolic and Hormonal Parameters in Ageing Men with Metabolic Syndrome

In conclusion, this study demonstrates that TU in hypogonadal men with MS has favorable effect on body composition and metabolic parameters, after five-years replacement

- *Francomano et al, 2014*

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Table 5: Indications for testosterone treatment

Delayed puberty (constitutional or congenital forms (hypogonadotropic hypogonadism, Kallmann's syndrome))
Klinefelter syndrome with hypogonadism
Sexual dysfunction and low testosterone
Low bone mass in hypogonadism
Adult men with low testosterone and consistent and preferably multiple signs and symptoms of hypogonadism following unsuccessful treatment of obesity and comorbidities (listed in Table 4)
Hypopituitarism
Testicular dysfunctions and hypogonadism
Type 2 diabetes mellitus with hypogonadism

Total testosterone level (nmol/l)	Advice
<8	Patient is likely to benefit from replacement
>12	No replacement required
8–12	Repeat measurement with sex-hormone-binding globulin and albumin to calculate free testosterone, or free testosterone by equilibrium dialysis, may be helpful



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Free & Bioavailable Testosterone calculator

These calculated parameters more accurately reflect the level of bioactive testosterone such as albumin. The SHBG-bound fraction is biologically inactive because of the



Consistent testosterone management for the long-term

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Albumin

SHBG

Testosterone

Free Testosterone

Bioavailable Testosterone

Disclaimer: Results from this calculator should NOT be solely relied upon i

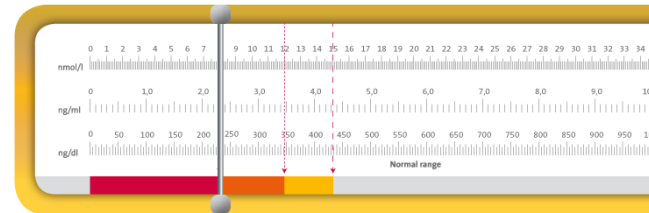
WARNING! The calculated free and bioavailable testosterone are reliable i testosterone) or mesterolon

This calculator was developed at the Hormonology department, University Hospi

Testosterone Conversion

Quickly and easily convert testosterone levels between different measurement units.

Either move the slider below the scale or type a testosterone level and chose what measurement unit you wish to convert to.



Or type the unit to be selected:

Bioavailable Testosterone calculator

[View More by This Developer](#)

By Niedertronic

This app is only available on the App Store for iOS devices.



Description

The Bioavailable Testosterone calculator calculates bioavailable and free testosterone from total testosterone, sex hormone binding globulin (SHBG) and albumin. It is intended to be used by qualified healthcare professionals.

[Niedertronic Web Site](#) [Bioavailable Testosterone calculator Support](#)

...More

Free

Category: Medical
Released: Mar 27, 2009
Version: 1.0
Size: 0.0 MB
Language: English
Seller: Craig Niederberger
© 2009 Craig Niederberger
Not yet rated

Compatibility: Requires iOS 2.0 or later. Compatible with iPhone, iPad, and iPod touch.

Customer Ratings

Current Version:
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iPhone Screenshot

Late onset hypogonadism e síndrome metabólica

Existe uma correlação forte entre baixos níveis de TT e mortalidade cardiovascular

- Yeap BB et al, 2014

A mortalidade dos doentes com HT e SM está aumentada

- Pye et al, 2014

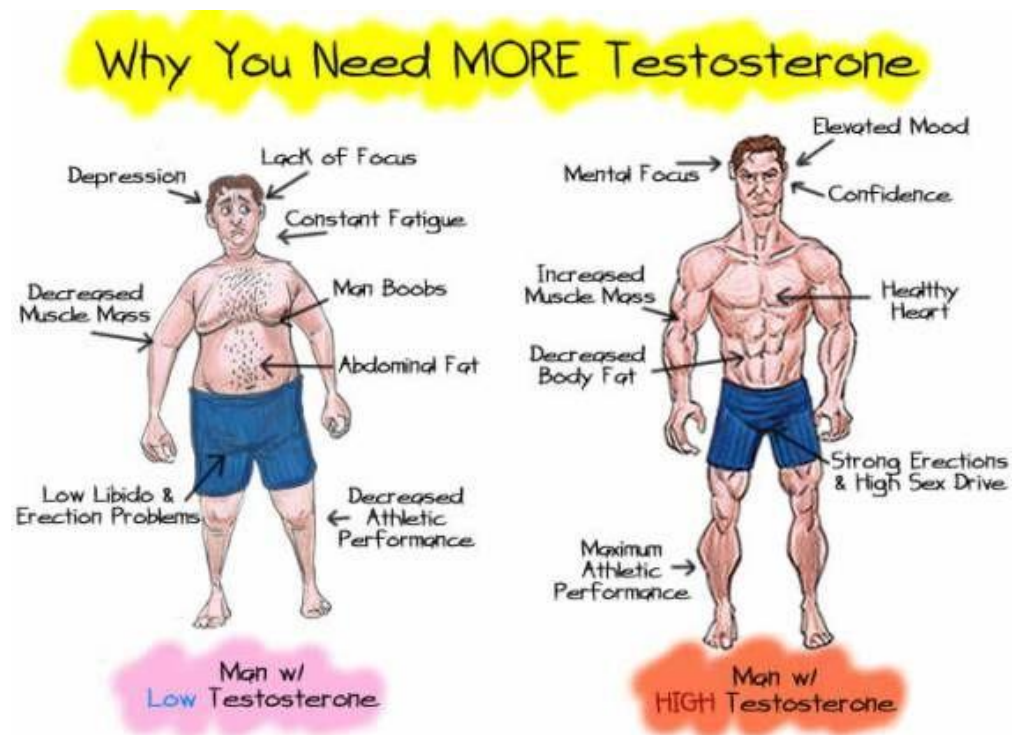
A administração de testosterona no HT melhora o perfil dos componentes do SM diminuindo a morbi/mortalidade associada

- Araújo AB et al, 2011

A administração de testosterona no HT melhora a densidade óssea, a eritropoiese, a função cognitiva, a libido, a atividade sexual e aumenta a massa muscular

- Melhoria na resposta aos I5PDE na DE

- BSSM, 2010



QoL e longevidade!



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