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Fisiopatologia, Diagnosi e Gestione della Disfunzione Erettile

Prof. Antonio Aversa

Dipartimento Medicina Sperimentale

Sapienza Università di Roma

2009 International Consultation on Sexual Dysfunction/Paris ED-Definition

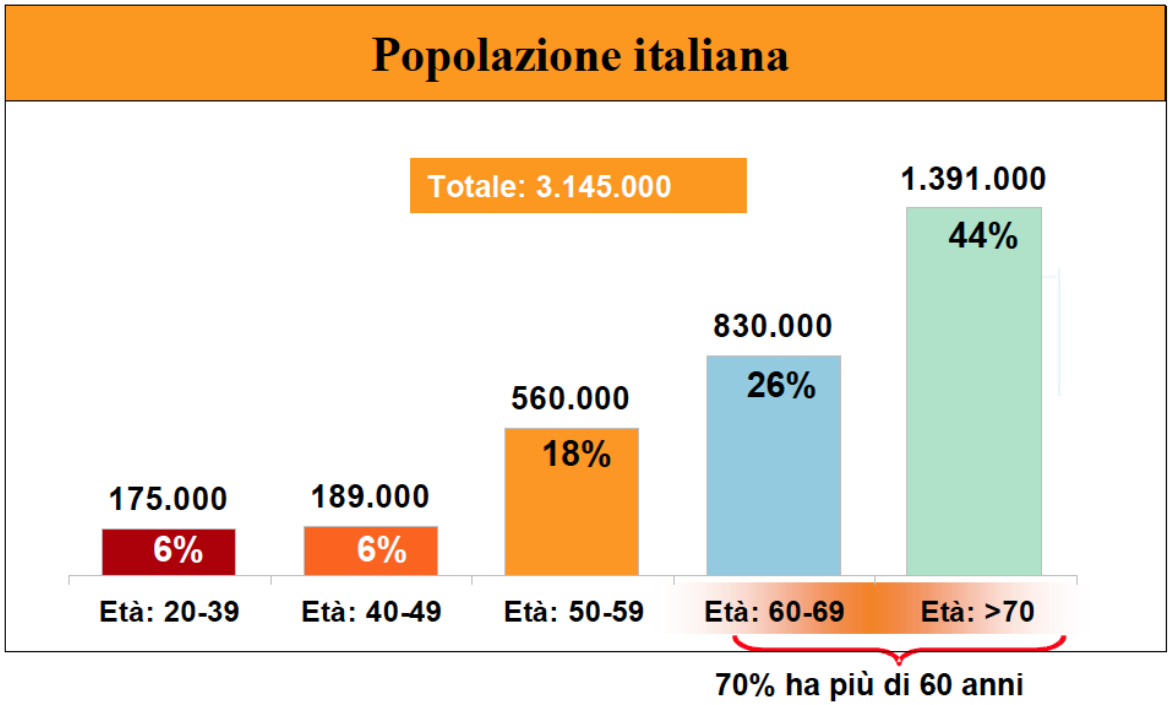
* Erectile Dysfunction is defined as a man's consistent or recurrent inability to attain and/or maintain penile erection sufficient for sexual activity

* A three-month duration of symptoms is accepted for establishment of the diagnosis

* In some instances of trauma or surgically induced ED, the diagnosis may be made prior to three months

* Diagnostic measurements cannot substitute for the patient's self-report in classifying the dysfunction or establishing the diagnosis

Disfunzione Erettile: epidemiologia



- Circa il 13% della popolazione maschile italiana (anche single e vedovi) soffre di DE
- Sono stati considerati pazienti che soffrono sia di episodi ricorrenti, sia occasionali

ISTAT 2001, Parazzini et al. Eur Urol 2000; 37: 43-49

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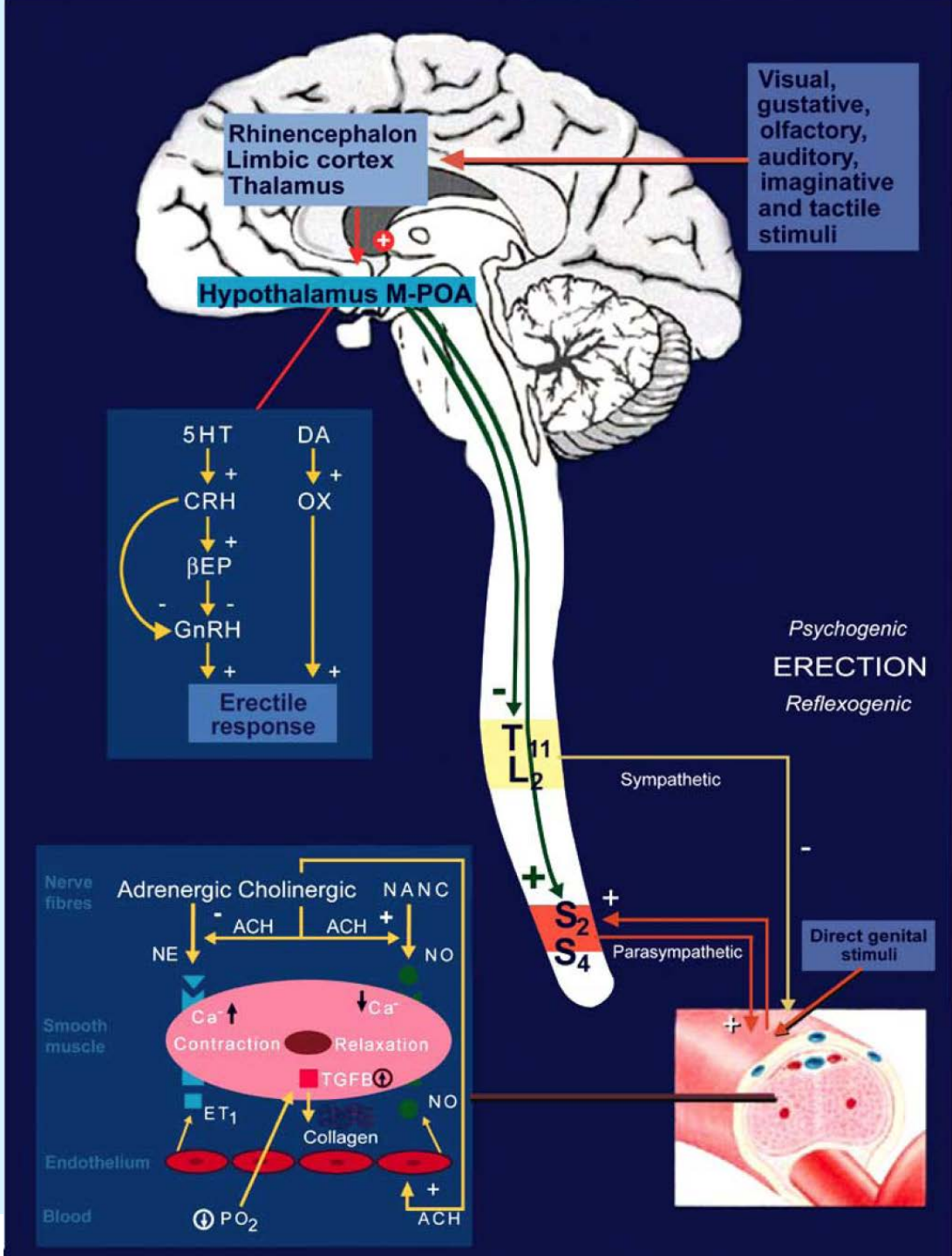

Aversa et al. Current Pharmaceutical Design, 2006, Vol. 12, No. 27

Erectile dysfunction

Rany Shamloul, Hussein Ghanem

Lancet 2013; 381: 153–65

Panel 1: Main organic causes of erectile dysfunction

Neurogenic

- Central (cerebral or spinal cord): for example, cerebral insult, multiple sclerosis, and spinal cord injury
- Peripheral: afferent (sensory neuropathy, eg, diabetes mellitus and polyneuropathy of various other causes)
- Efferent (autonomic neuropathy or after radical pelvic surgery)

Endocrinological

- Diabetes mellitus, hypogonadism, and hyperprolactinaemia

Vasculogenic

- Arterial: macro or micro angiopathy (eg, atherosclerosis and trauma)
- Venous: failure of the corporal veno-occlusive mechanism
- Sinusoidal: failure to relax (eg, fibrosis)

Drug-induced depression

- Drugs: for example, some antihypertensives, antidepressants, antiandrogens, and major tranquillisers
- Cigarette smoking, alcoholism, and recreational drug use (eg, marijuana and heroin)

Systemic diseases and general ill health

- For example, liver, renal, respiratory, and cardiovascular disease

Local penile(cavernous) factors

- For example, cavernous fibrosis after priapism or due to other reasons, Peyronie's disease, and penile fracture

Panel 2: Factors related to the development of psychogenic erectile dysfunction[39]

Predisposing factors

- Traumatic past experiences
- Strict upbringing
- Inadequate sex education
- Physical and mental health problems

Precipitating factors

- Acute relationship problems
- Family or social pressures
- Major life events, such as pregnancy, childbirth, or loss of a job

Maintaining factors

- Relationship problems
- Physical or mental health problems
- Absence of knowledge of availability of various treatment options

Note: religious and cultural differences might influence the factors that affect the development of psychogenic erectile dysfunction.

Erectile dysfunction

Rany Shamloul, Hussein Ghanem

Lancet 2013; 381: 153–65

Panel 3: Drugs and recreational substances commonly associated with erectile dysfunction

Antiandrogens
- Gonadotropin-releasing hormone agonists (leuprolide, goserelin, lupron, and zoladex)
- Chemotherapy (cyclophosphamide and busulfan)
- Flutamide
- Ketoconazole
- Spironolactone
- H_2 blockers
- Cimetidine

Antihypertensives
- Thiazide diuretics
- β blockers
- Calcium channel blockers

Antiarrhythmics
- Digoxin
- Amiodarone
- Disopyramide

Statins
- There is controversial evidence about the effects of atorvastatin on erectile function[56,57]

Psychotropic drugs
- Tricyclic antidepressants
- Selective serotonin reuptake inhibitors
- Phenothiazines
- Butyrophenones

Recreational substances
- Marijuana
- Opiates
- Cocaine
- Nicotine
- Alcohol

Panel 4: Risk factors and comorbidities associated with erectile dysfunction

- Age
- Poor physical and psychological health
- Lifestyle factors
  - Sedentary lifestyle
  - Obesity
  - Cigarette smoking
  - Alcohol misuse
  - Recreational drug use (eg, marijuana and heroin)
- Metabolic risk factors and metabolic syndrome
  - Diabetes mellitus
  - Hypertension
  - Dyslipidaemia
  - Hypogonadism

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Questionario IIEF 5

L'International Index of Erectile Function - 5 (IIEF-5) è stato creato allo scopo di fornire un questionario sensibile e specifico per valutare la funzione erettiva. Nel rispondere si deve tener conto della attività sessuale relativa agli ultimi sei mesi

A) Negli ultimi sei mesi come è stata la sua capacità di raggiungere e mantenere l'erezione?
0- praticamente inesistente
1- molto bassa
2- bassa
3- moderata
4- alta
5- molto alta

B) Negli ultimi sei mesi dopo la stimolazione sessuale quanto spesso hai raggiunto un'erezione sufficiente alla penetrazione?
0- non ho avuto alcuna attività sessuale
1- quasi mai o mai
2- poche volte (molto meno della metà delle volte)
3- qualche volta (circa la metà delle volte)
4- la maggior parte delle volte (più della metà delle volte)
5- quasi sempre o sempre

C) Negli ultimi sei mesi durante il rapporto sessuale quanto spesso è riuscito a mantenere l'erezione dopo la penetrazione?
0- non ho tentato di avere rapporti sessuali
1- quasi mai o mai
2- poche volte (molto meno della metà delle volte)
3- qualche volta (circa la metà delle volte)
4- la maggior parte delle volte (più della metà delle volte)
5- quasi sempre o sempre

D) Negli ultimi sei mesi durante il rapporto sessuale quanto è stato difficile mantenere l'erezione fino alla fine del rapporto?
0- non ho tentato di avere rapporti sessuali
1- estremamente difficile
2- molto difficile
3- difficile
4- abbastanza difficile
5- facile

E)Negli ultimi sei mesi quando ha avuto un rapporto sessuale quanto spesso ha provato piacere?
0- non ho tentato di avere rapporti sessuali
1- quasi mai o mai
2- poche volte (molto meno della metà delle volte)
3- qualche volta (circa la metà delle volte)
4- la maggior parte delle volte (più della metà delle volte)
5- quasi sempre o sempre

Sommando i punteggi ottenuti (indicati a fianco della risposta scelta), si ottiene il risultato finale.
Da 22 a 25 l'attività sessuale è da considerarsi normale.
Da 17 a 21 siamo in presenza di disfunzione erettiva lieve.
Da 12 a 16 si manifesta una disfunzione erettile lieve-moderata.
Da 8 a 11 si tratta di una disfunzione erettile moderata.
Da 5 a 7 siamo in presenza di una grave disfunzione erettile.

Medical History

* A detailed medical history may provide suggestive evidence for or against the role of spesific organic or psychogenic factors
* The potential role of underlying or comorbid medical conditions (e.g., atherosclerosis, diabetes)
* Use of concomittant medications; medications can cause to ED or may be important contrandications for spesific treatments

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Erectile dysfunction

Rany Shamloul, Hussein Ghanem

Lancet 2013; 381: 153–65

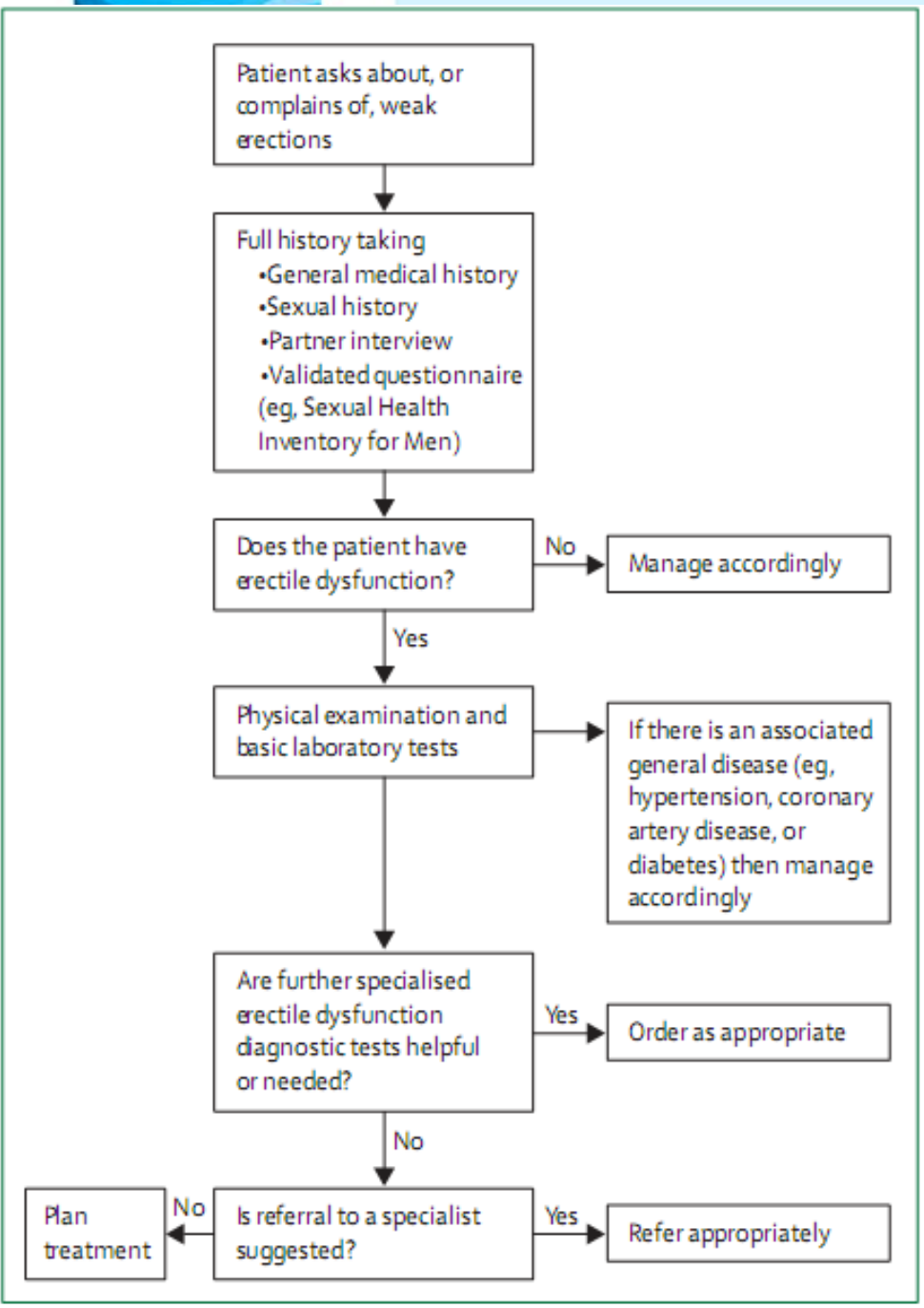


Figure 2: Algorithm for the diagnosis of erectile dysfunction

Panel 5: Physical examinations in erectile dysfunction

General

- Secondary sex characteristics
- Pulses and sensations
- Scars from previous surgery or trauma

Local

- Penis: size, scars, fibrosis, urethral meatus, and elasticity
- Scrotum: testicular size and consistency
- Rectal exam: size and consistency of the prostate and seminal vesicles, and assessment of anal sphincter tone and bulbocavernous reflex

Panel 6: Indications for referral to a specialist in erectile dysfunction

- Deep-rooted psychiatric problems
- CNS disorders
- Complex endocrine disorders
- Severe cardiovascular disease
- Lifelong erectile dysfunction
- Penile fibrosis (Peyronie's disease or post-priapism)
- Congenital penile anomalies (eg, hypospadias)
- Failure to respond to phosphodiesterase type 5 inhibitors

Physical Examination and Laboratory Testing for Men with ED

Hussein M. Ghanem, MD,* Andrea Salonia, MD,† and Antonio Martin-Morales, MD‡

Table 1 General and local examination for men with erectile dysfunction

General examination

- Blood pressure and heart rate and rhythm measurement
- Male secondary sex characters
- Gynecomastia and breast tenderness
- Peripheral pulses
- Rule out obvious abdominal masses (e.g., aortic aneurysm)
- Vibratory sensation
- Waist circumference
- Scars from previous surgery or trauma

Local examination

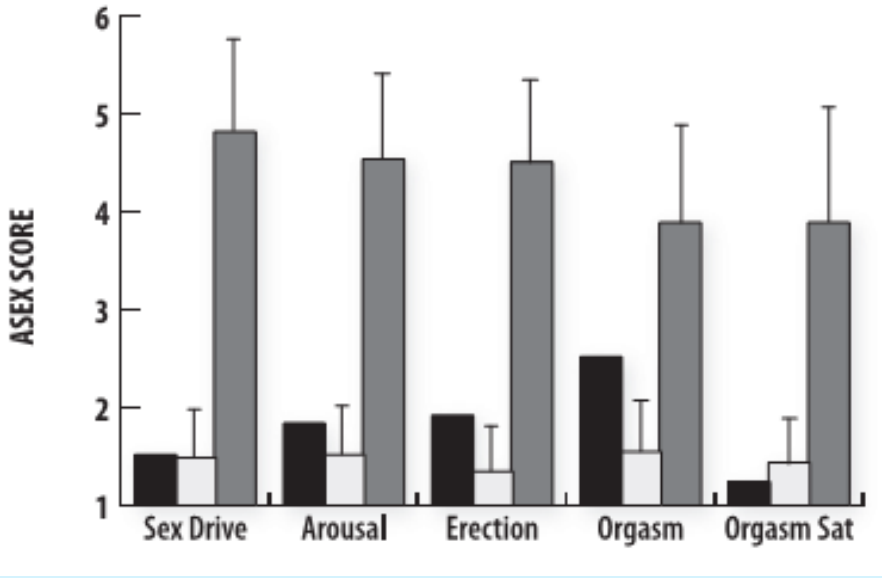
- Penis: size, lesions, scars, fibrosis, and position of meatus
- Scrotum: testicular size and consistency
- Digital rectal examination: prostate and seminal vesicles
- Perianal sensation and rectal sphincter tone (optional)
- Bulbocavernous reflex (optional)

Persistent Sexual Side Effects of Finasteride for Male Pattern Hair Loss

Michael S. Irwig, MD* and Swapna Kolukula, MB BS†

*Center for Andrology and Division of Endocrinology, The George Washington University, Washington, DC, USA; †Department of Medicine, Greater Baltimore Medical Center, Baltimore, MD, USA

	Before	After	*P* value
Sexual function before and after finasteride use			
Sexual frequency per month (SD)	25.8 (18.0)	8.8 (7.1)	<0.0001
ASEX questionnaire total score (SD)	7.4 (2.3)	21.6 (3.4)	<0.0001
Finasteride information			
Mean age began, years	25.8		
Length of use			
<1 month	7 (10)		
1–3 months	11 (15)		
3–6 months	7 (10)		
6–12 months	9 (13)		
1–5 years	24 (34)		
Over 5 years	13 (18)		
Duration of persistent sexual side effects from finasteride cessation to interview date			
3–6 months	5 (7)		
7–11 months	4 (6)		
1–2 years	30 (42)		
3–5 years	18 (25)		
6 or more years	14 (20)		



DE - Fattori di rischio

- Stile di vita

Ciclismo amatoriale (<3h/sett) OR 0.61
Ciclismo agonistico (>3h/sett) OR 1.72

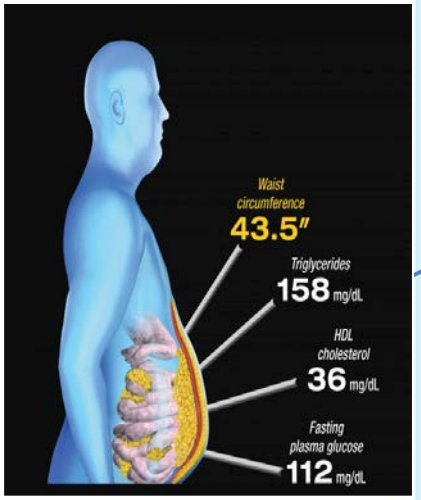
Marceau et al. Int J Impot Res 13:298-302, 2001

Relationship between Co-morbidities and Prevalence of Hypogonadism n=2.162

Medical Condition	Prevalence of Hypogonadism (95% C.I.)
Obesity	52.4 (47.9 - 56.9)
Diabetes	50.0 (45.4 - 54.5)
High Blood Pressure	42.4 (39.6 - 45.2)
Hyperlipidemia	40.4 (37.6 - 43.3)

Mulligan T et al. Int J Clin Pract, 2006

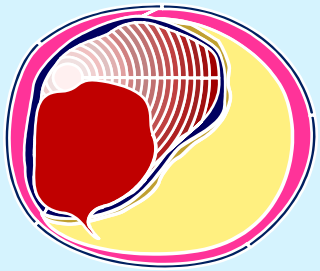
Obesità Viscerale: un fattore di rischio Cardiovascolare indipendente associato ad altre componenti di sindrome metabolica



Intra-abdominal obesity

CV risk factors

- Inflammation
- Insulin-resistance
- Dyslipidemia
- Hypertension
- Glucose intolerance
- Endothelial dysfunction



Cardiovascular disease

Antihypertensives and Male Sexual Dysfunction

Cardiovascular risk, drugs and erectile function – A systematic analysis

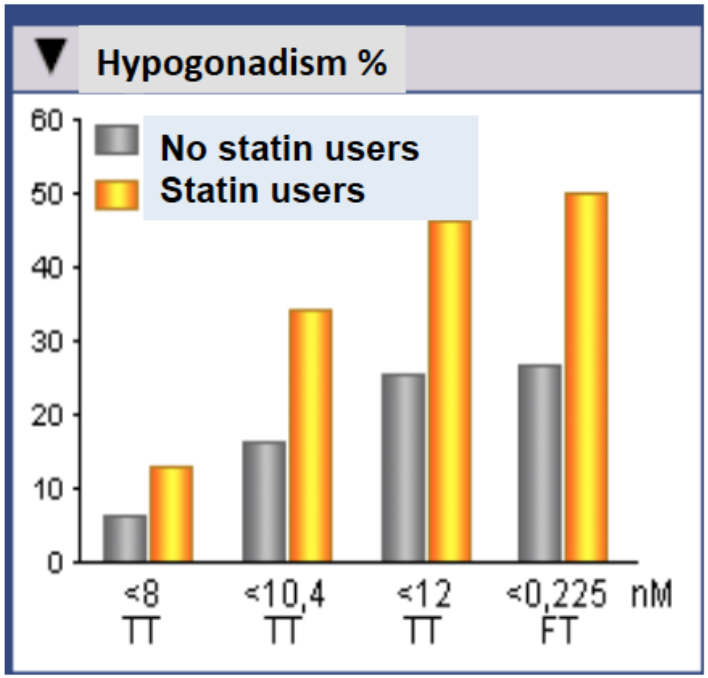
Results of these trials demonstrate that only **thiazide diuretics and beta-blockers except nebivolol** may adversely influence erectile function.

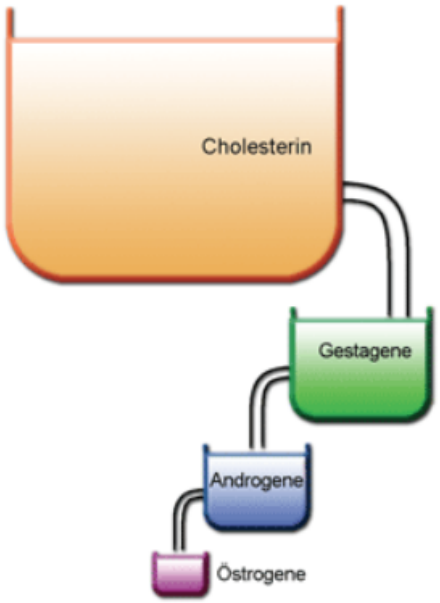
ACE-inhibitors, angiotensin receptor blockers and calcium-channel-blockers are reported to have no relevant or even a positive effect on erectile function.

Level of Evidence 1b

M. Baumhäkel, N. Schlimmer, M. Kratz, G. Hacket, G. Jackson, M. Bohm
Int J Clin Pract, March 2011, 65, 3, 289–298

The Effect of Statin Therapy on Testosterone Levels in Subjects Consulting for Erectile Dysfunction

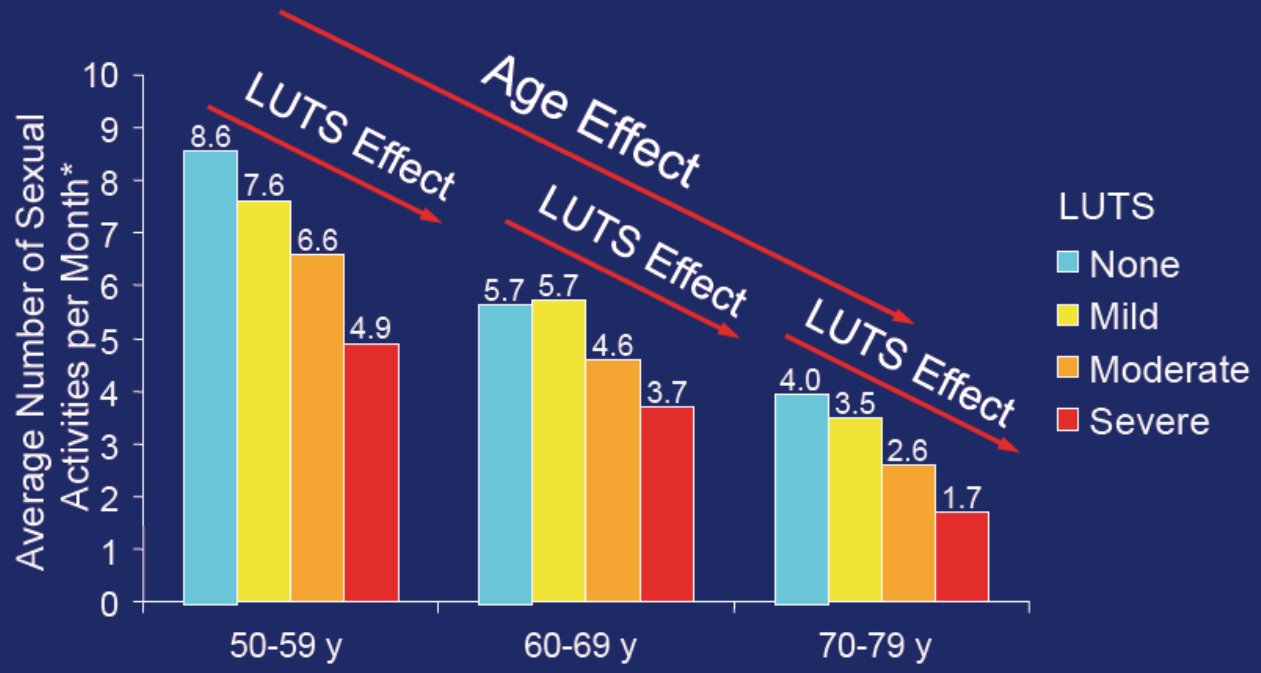




Prevalence of hypogonadism in relation to different threshold values for total testosterone (TT) and for free testosterone (FT) in statin- and non statin users

Source: CoronaG, et al: The effect of statin therapy on testosterone levels in subjects consulting for erectile dysfunction. J Sex Med. 2010 Apr;7(4 Pt 1):1547-56

MSAM-7: Sexual Activity Declines With Increasing Severity of LUTS Independent of Age



Rosen R et al, Eur Urol, 2003

Sexual Activity, Erectile Dysfunction, and Incident Cardiovascular Events

Susan A. Hall

Am J Cardiol 2010;105:192–197

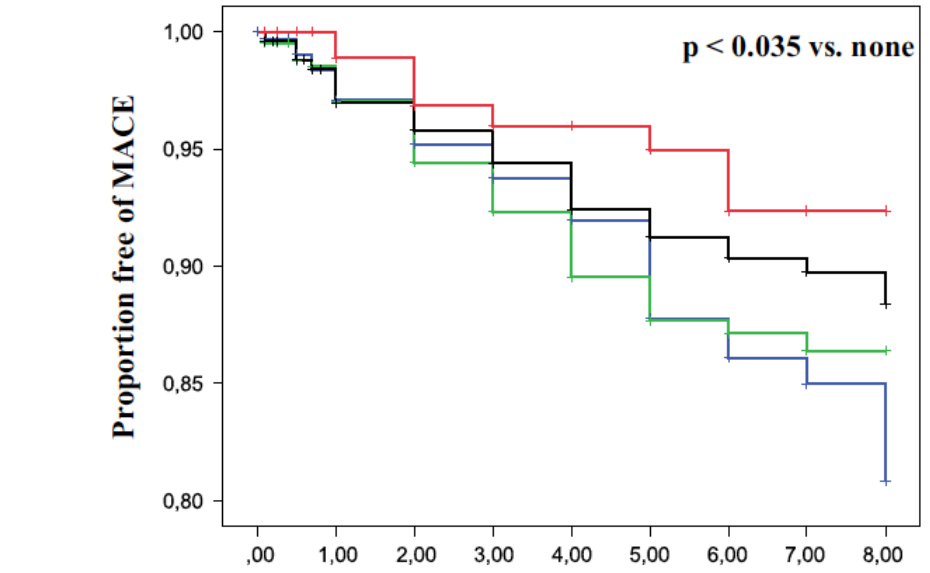
A low frequency of sexual activity (once a month or less vs >2 times weekly) was associated with increased risk of CVD (hazard ratio 1.45, 95% confidence interval 1.04 to 2.01).

In conclusion, our results suggest that a low frequency of sexual activity predicts CVD independently of ED and that screening for sexual activity might be clinically useful.

Frequency of sexual activity and cardiovascular risk in subjects with erectile dysfunction: cross-sectional and longitudinal analyses

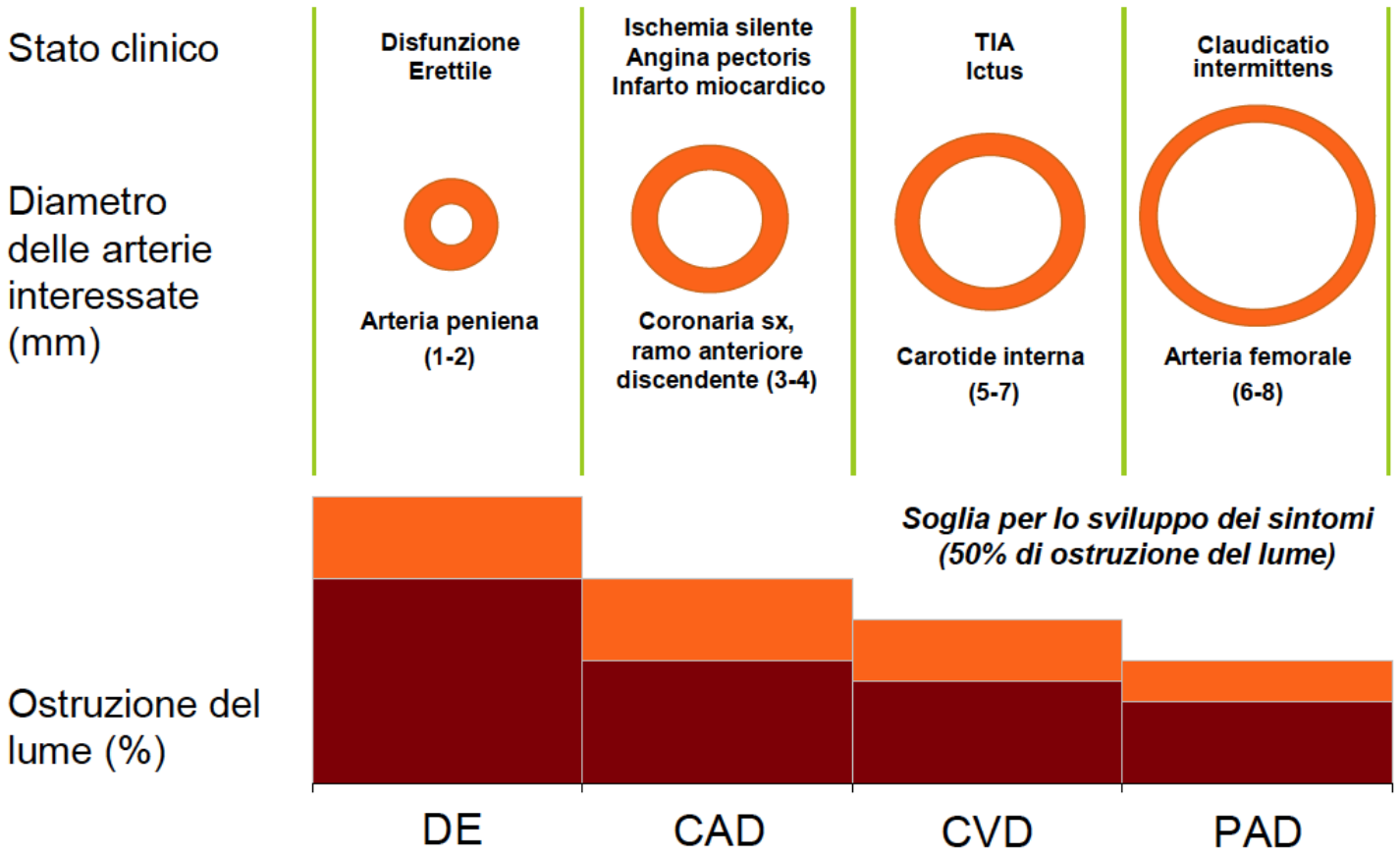
[1,5]G. Corona, [1]G. Rastrelli, [3]M. Monami, [1]E. Maseroli, [4]E. A. Jannini, [2]G. Balercia, [5]A. Sforza, [6]G. Forti, [7]E. Mannucci and [1]M. Maggi

Figure 4 Risk of incident major adverse cardiovascular events (MACE), as derived from Kaplan–Meier curves, according to frequency of sexual intercourse (number for month).



Andrology, 2013, 1, 864–871

La DE come marker di malattia cardiovascolare



The Princeton III Consensus

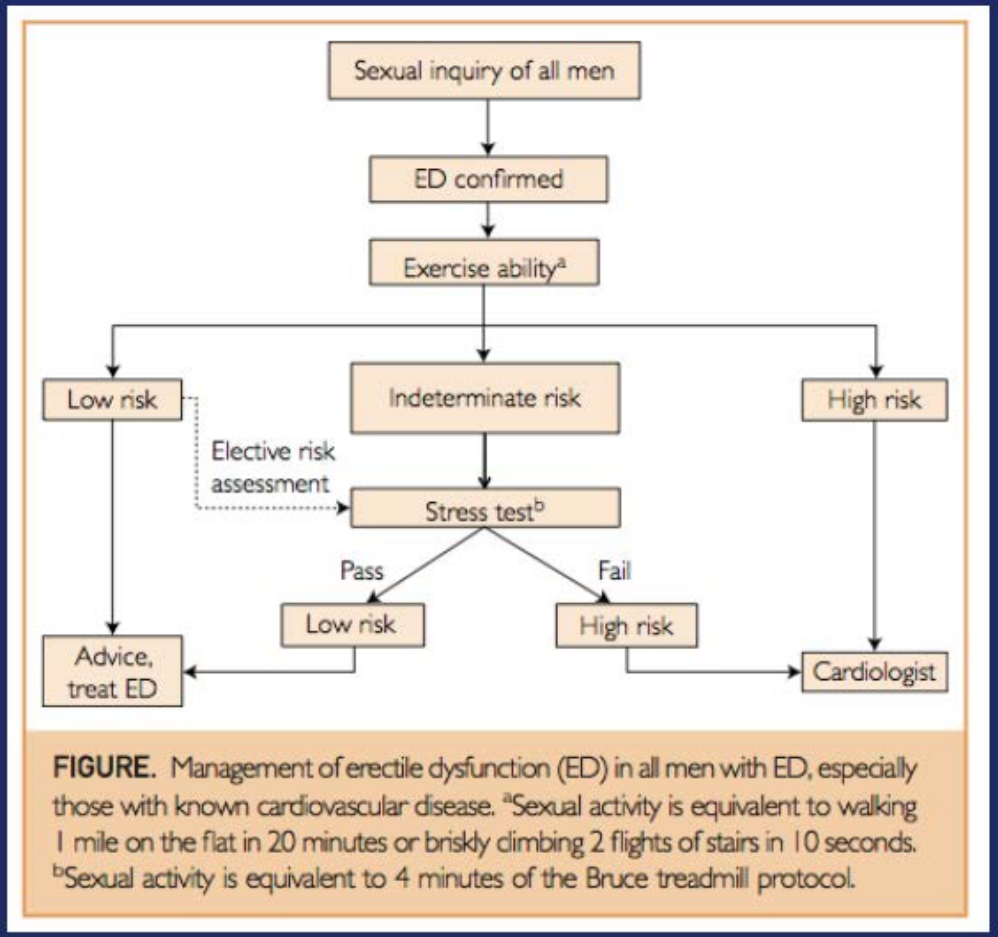


FIGURE. Management of erectile dysfunction (ED) in all men with ED, especially those with known cardiovascular disease. [a]Sexual activity is equivalent to walking 1 mile on the flat in 20 minutes or briskly climbing 2 flights of stairs in 10 seconds. [b]Sexual activity is equivalent to 4 minutes of the Bruce treadmill protocol.

Nehra A et al: Mayo Clin Proc, 2012

Physical Examination and Laboratory Testing for Men with ED

Hussein M. Ghanem, MD,* Andrea Salonia, MD,† and Antonio Martin-Morales, MD‡

Table 2 Laboratory tests

Tests for risk factors for ED

- Laboratory assessment for diabetes (HbA1c or FBS)
- Total testosterone
- Prolactin
- Lipid profile

Optional tests

- Thyroid hormones
- PSA
- EKG and stress echocardiogram
- Luteinizing hormone
- Sex hormone binding globulin

ED = erectile dysfunction; EKG = electrocardiogram; FBS = fasting blood sugar; PSA = prostate-specific antigen

Valutazione dello stato vascolare

Ecocolordoppler penieno
basale e dopo test farmacologico

Farmaci utilizzati: alprostadil, papaverina, fentolamina

Parametri di normalità

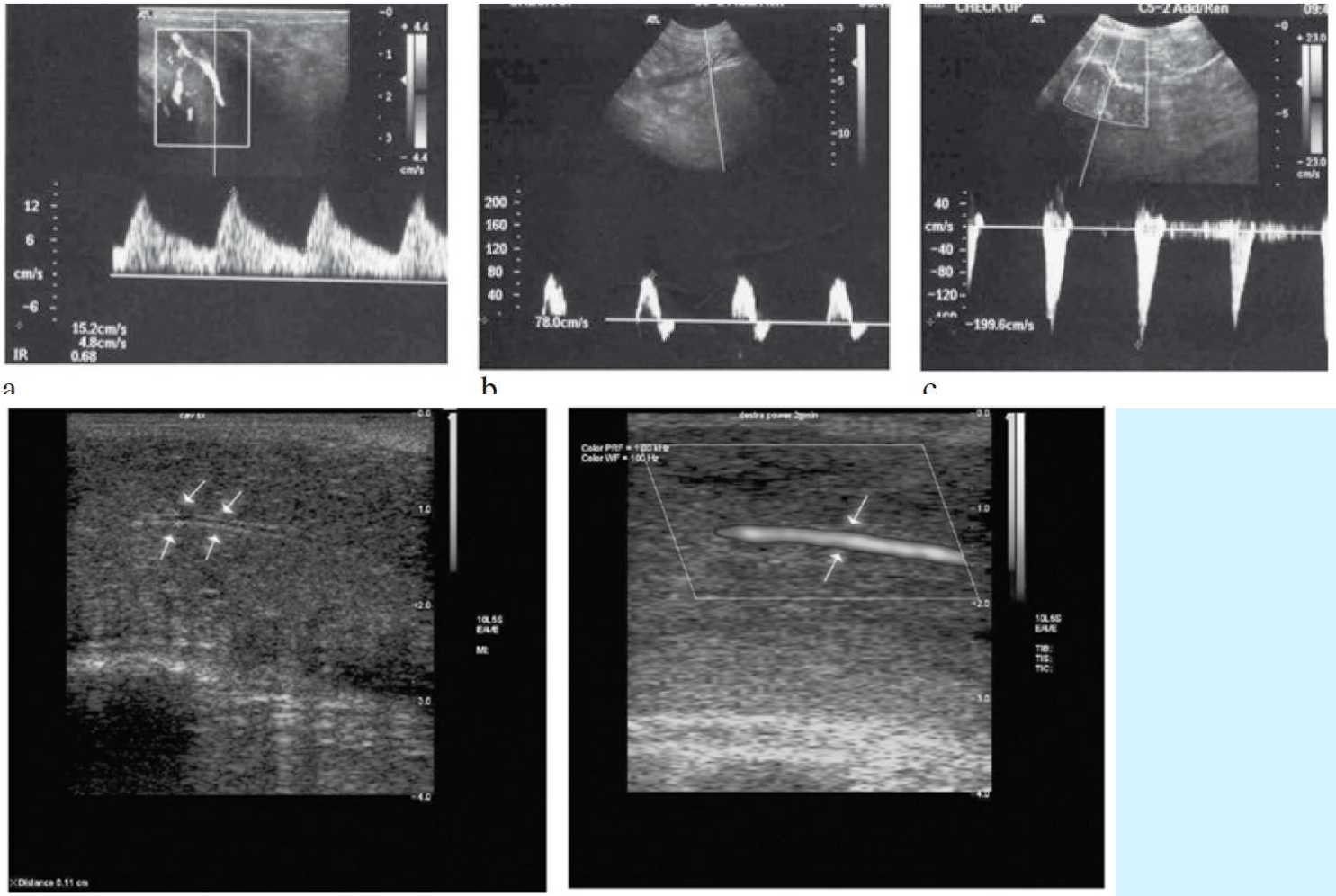
Velocità di picco sistolico (VPS): > 35 cm/sec

Velocità telediastolica (EDV): < 5 cm/sec

Indice di resistenza (VPS-EDV/VPS): > 0.90

The Role of Penile Color-Duplex Ultrasound for the Evaluation of Erectile Dysfunction

Antonio Aversa, MD, PhD,* and Lelio Mario Sarteschi, MD†



J Sex Med 2007;4:1437–1447

The Role of Penile Color-Duplex Ultrasound for the Evaluation of Erectile Dysfunction

Antonio Aversa, MD, PhD,* and Lelio Mario Sarteschi, MD†

Table 1 Frequent etiologies of ED as diagnosed by penile blood flow studies (from [8], modified)

Etiology of ED	Use of D-PCDU	Reference
Arteriogenic	Y	Pescatori et al. [21]
Venogenic	Y/N*	Lue et al. [34]
Psychogenic	Y/N	Aversa et al. [32]
Neurogenic	Y	Broderick [23]
Hypogonadism	Y	Corona et al. [4]
Peyronie's disease	Y	Kendirci et al. [59]

*Y/N means that the diagnostic utility of D-PCDU for those etiologies is not considered evidence-based.
ED = erectile dysfunction; D-PCDU = dynamic penile color-duplex ultrasound.

J Sex Med 2007;4:1437–1447

RIGISCAN

MONITORAGGIO DELLE EREZIONI NOTTURNE

1 anello alla base ed 1 al solco balanoprepuziale

N. erezioni, circonferenza, rigidità per tre notti

Parametri di normalità

Tre episodi erettili notturni con una durata per episodio di almeno 10 minuti, con un incremento della circonferenza peniena > di 3 cm alla base e > di 2 cm alla punta e con una rigidità > del 70%

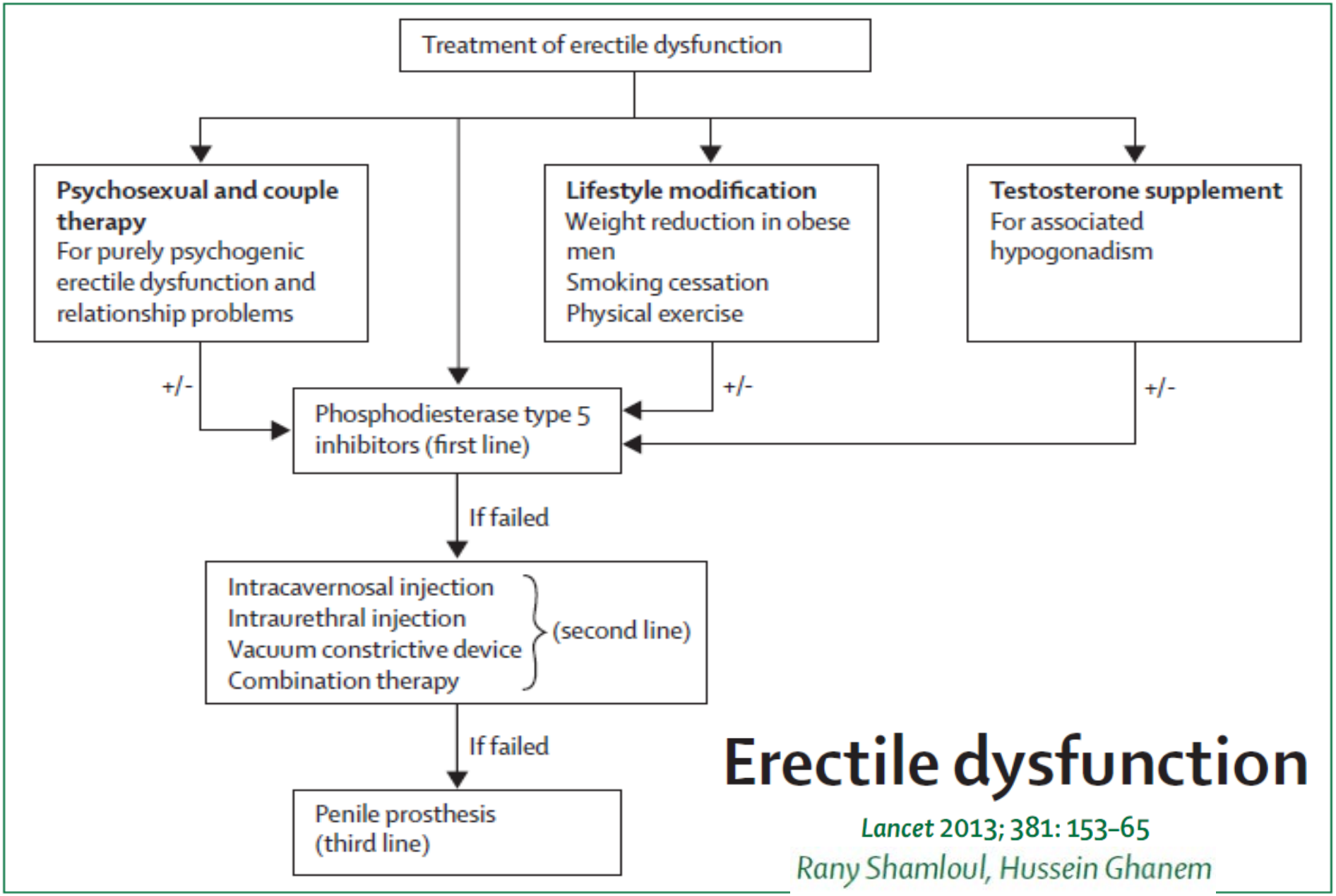
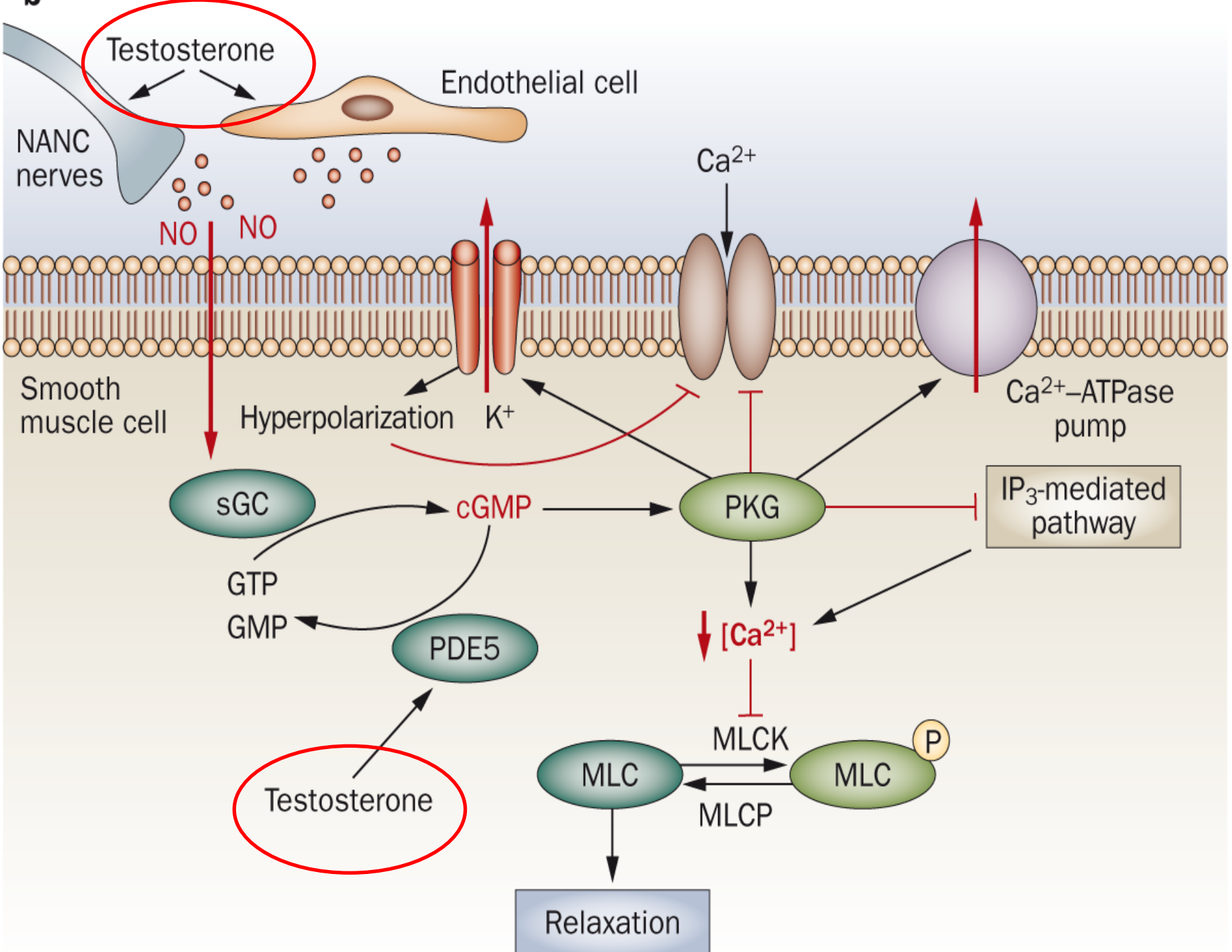
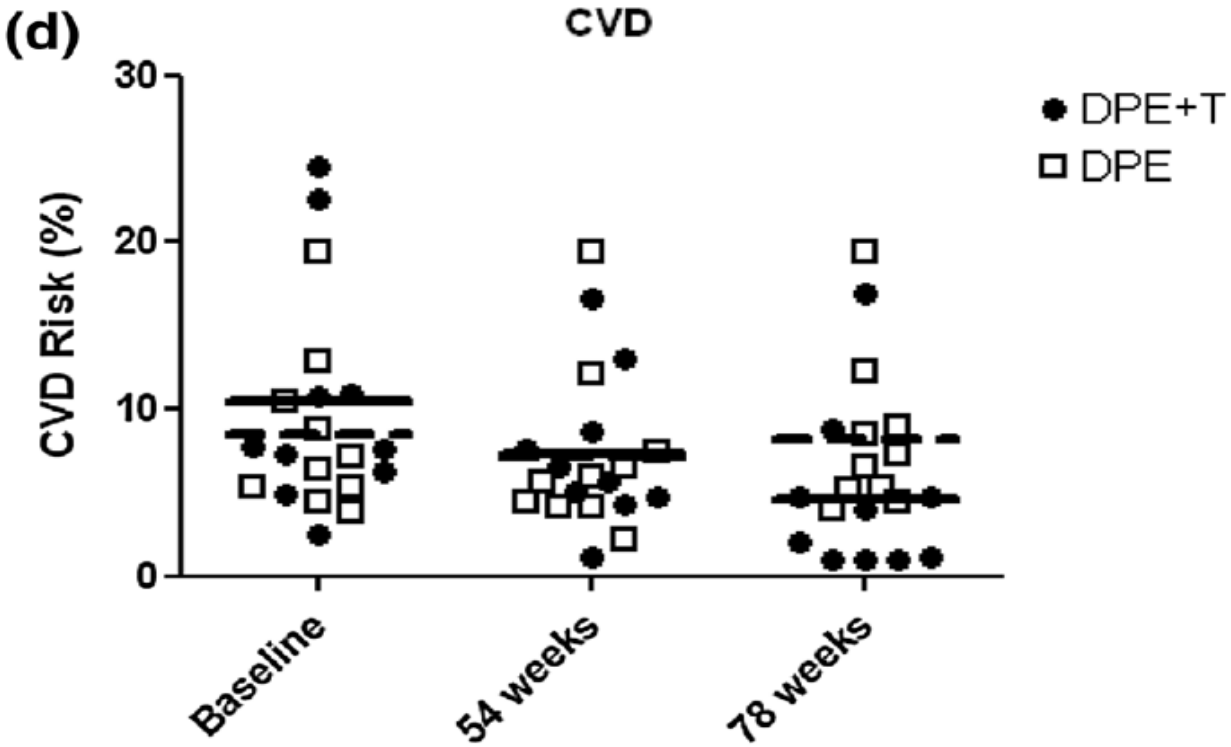


Figure 4: **Algorithm for the treatment of erectile dysfunction**
Lifestyle modification, testosterone supplementation, and psychosexual therapy can all be associated with medical treatment for erectile dysfunction.


Testosterone
Endothelial cell
NANC nerves
NO
NO
Ca^{2+}
Smooth muscle cell
Hyperpolarization
K^+
Ca^{2+}–ATPase pump
sGC
cGMP
PKG
IP_3-mediated pathway
GTP
GMP
PDE5
$[Ca^{2+}]$
MLCK
MLC
MLC
P
MLCP
Testosterone
Relaxation

Effects of testosterone undecanoate replacement and withdrawal on cardio-metabolic, hormonal and body composition outcomes in severely obese hypogonadal men: a pilot study

D. Francomano, R. Bruzziches, G. Barbaro, A. Lenzi & A. Aversa



Total T ($r^2 = 0.43$; $p < 0.005$); **d** the variation of cardiovascular (CV) risk (%) as evaluated by Progetto Cuore ($p < 0.01$ vs. control group and baseline)

Guidelines on Male Sexual Dysfunction: Erectile Dysfunction

Konstantinos Hatzimouratidis[a,*], *Edouard Amar*[b], *Ian Eardley*[c], *Francois Giuliano*[d], *Dimitrios Hatzichristou*[a], *Francesco Montorsi*[e], *Yoram Vardi*[f], *Eric Wespes*[g]

EUROPEAN UROLOGY XXX (2010) XXX–XXX

Table 4 – Recommendations for the treatment of erectile dysfunction (ED)

Recommendations	LE	GR
Lifestyle changes and risk factor modification must precede or accompany ED treatment.	1b	A
Pro-erectile treatments must be given at the earliest opportunity after radical prostatectomy.	1b	A
If a curable cause of ED is found, treat the cause first.	1b	B
PDE5-Is are first-line therapy.	1a	A
Daily administration of PDE5-Is may improve results and restore erectile function.	1b	A
Inadequate/incorrect prescription and poor patient education are the main causes of a lack of response to PDE5-Is.	3	B
Testosterone replacement restores efficacy in hypogonadic nonresponders to PDE5-Is.	1b	B
Apomorphine can be used in mild to moderate ED, psychogenic ED, or in patients with contraindications to PDE5-Is.	1b	B
A vacuum constriction device can be used in patients with stable relationship.	4	C
Intracavernous injection is second-line therapy.	1b	B
Penile implant is third-line therapy.	4	C

LE = level of evidence; GR = grade of recommendation; PDE5-I = phosphodiesterase type 5 inhibitor.

Treatment is based on phosphodiesterase type 5 inhibitors (PDE5-Is), including sildenafil, tadalafil, vardenafil and avanafil. PDE5-Is have high efficacy and safety rates, even in difficult-to-treat populations such as patients with diabetes mellitus.

Commonly used oral PDE5 inhibitors: Pharmacological and pharmacokinetic properties

Characteristic	PDE5 inhibitor			
	Avanafil	**Sildenafil**	**Vardenafil**	**Tadalafil**
T_{max} (range)	***30–45 min***	30–120 min	30–120 min	Not reported
T_{max} (median)	***0.5-0.75 h***	1 h	1 h	2 h
Effect of food on T_{max}	***Delayed by 1.25 h***	Delayed by 1 h	Delayed by 1 h	None
Plasma protein binding	***99%***	96%	95 %	94%
Half-life	***6–17 h***	3–5 h	4–5 h	17.5 h (mean)
Accumulation in plasma	***None***	Not reported	None	Not reported
Effect on exposure/clearance, of:				
Age	***None***	Reduced clearance	Reduced clearance	Reduced clearance
Mild renal impairment	***None***	None	None	Increased exposure
Moderate renal impairment	***None***	None	None	Increased exposure
Severe renal impairment	***No data***	Increased exposure	Increased exposure	Increased exposure
Mild hepatic impairment	***None***	Increased exposure	Increased exposure	None
Moderate hepatic impairment	***Reduced exposure***	Increased exposure	Increased exposure	None
Severe hepatic impairment	***Not studied***	Not studied	Not studied	Limited data

Avanafil SmPC 2013; Sildenafil SmPC June 2013; Vardenafil SmPC April 2013; Tadalafil SmPC April 2013

PDE, phosphodiesterase

Selectivity profiles of PDE5 inhibitors

	PDE1	PDE6	PDE11	
Target tissues	• Heart • Brain • Vascular smooth muscle	• Retina	• Skeletal muscle • Prostate • Liver • Kidney • Pituitary • Testes	
	Selectivity vs PDE5 (fold-difference activity)[1]			**Reported off-target AEs**
Avanafil	>10,192	121	>19,231	One case of cyanopsia in clinical trial program[2]
Sildenafil	375	**16**	4875	Cyanopsia (0.8% with 50 mg and 1.4% for 100 mg vs 0.03% placebo[3,4]
Vardenafil	1012	**21**	5952	Cyanopsia (uncommon)[5]
Tadalafil	10,500	550	**25**	Back pain and myalgia (2–3%)[6]

1.Wang et al. J Sex Med 2012; 2.Belkoff et al. BJU Int 2013; 3.Giuliano et al. Int J Clin Pract 2010; 4.Sildenafil SmPC June 2013; 5.Vardenafil SmPC April 2013; 6.Tadalafil SmPC April 2013

PDE, phosphodiesterase

CLINICAL GUIDELINES | Annals of Internal Medicine

Ann Intern Med. 2009;151:650-661.
For author affiliations, see end of text.
This article was published at www.annals.org on 20 October 2009.

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Oral Phosphodiesterase-5 Inhibitors and Hormonal Treatments for Erectile Dysfunction: A Systematic Review and Meta-analysis

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Source:

Fold increase in SEP3 vs. placebo:

Tsertsvadze et al., 2009
sildenafil

2. In 16 trials enrolling men with a wide spectrum of diseases, the WMs were 69% for sildenafil vs. 36% for placebo.

1.91

Tsertsvadze et al., 2009
vardenafil

2. In 13 trials enrolling men with a wide spectrum of diseases, the WMs were 68% for vardenafil vs. 35% for placebo.

1.94

Tsertsvadze et al., 2009
tadalafil

2. In 15 trials enrolling men with a wide spectrum of diseases, the WMs were 69% for tadalafil vs. 33% for placebo.

2.09

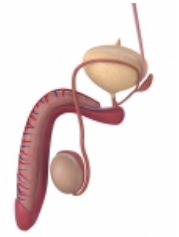
Cui et al., 2014
avanafil

Total events	156	56	**2.78**

Avanafil triplica le chance di avere un rapporto soddisfacente

Effetti sistemici dei PDE5 inibitori

Urogenital System

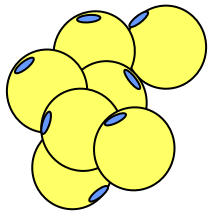


- Vascular relaxation and erection
- Premature ejaculation
- LUTS/BPH

PDE5i

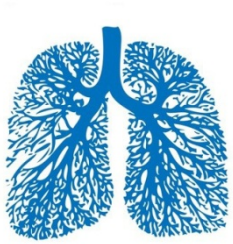
PDE5

Adipose tissue



Increased aromatase activity, adipogenesis, and insulin sensitivity

Pulmonary vascular system

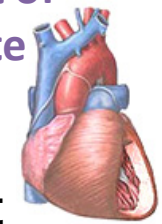


Vascular relaxation, improvement of pulmonary hypertension

Muscle

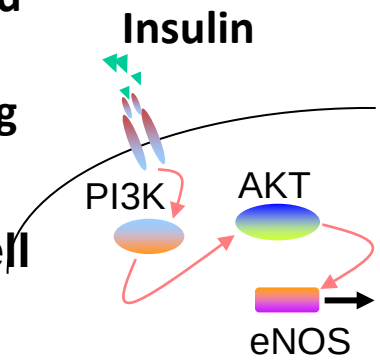
Improvement of insulin sensitivity

Improvement of cardiomyocyte stiffness and contractility



Heart

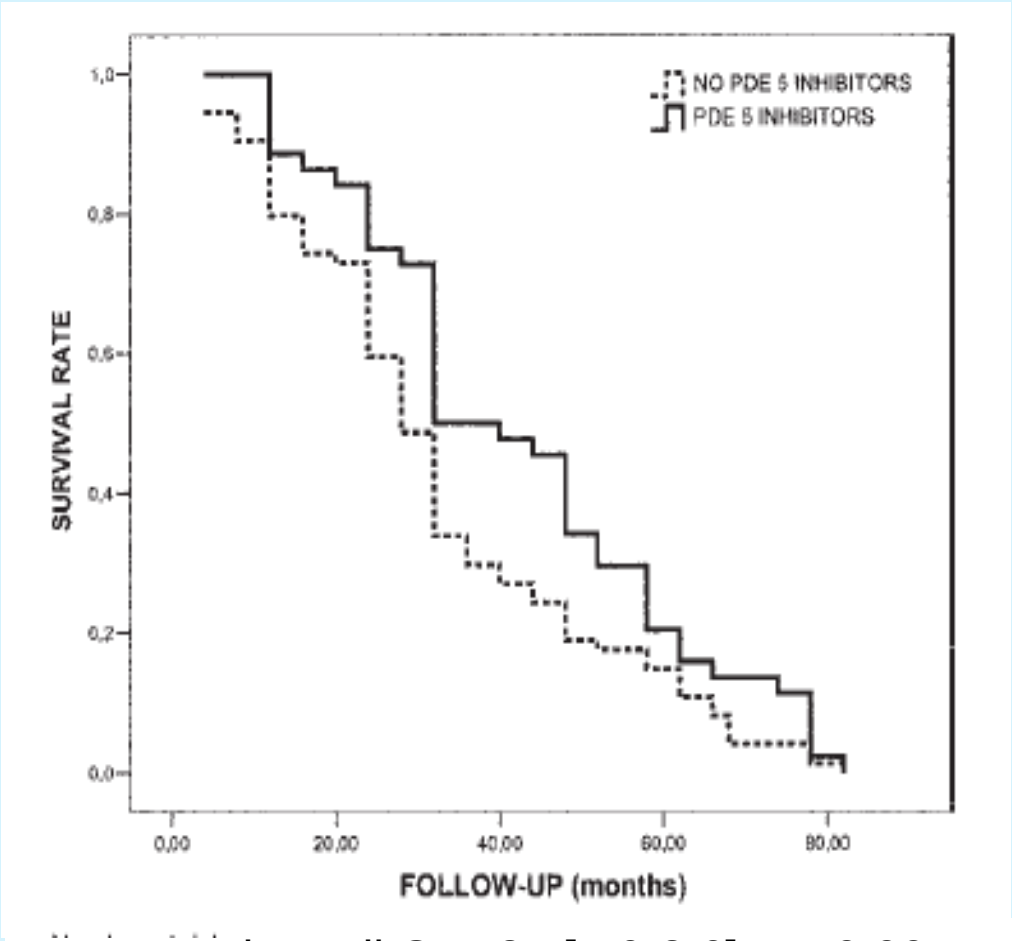
Increased eNOS activity, improved insulin signalling



Endothelial cell

Armani et al , Trends Endocrinol Metab, 22: 404-11, 2011

Incidenza di MACE (curva di Kalplan-Meier) in funzione del uso di PDE5i



Regressione di Cox 2.1[1.6-2.6]; p< 0.001

Gazzaruso et al., JACC. 2008;21:2040

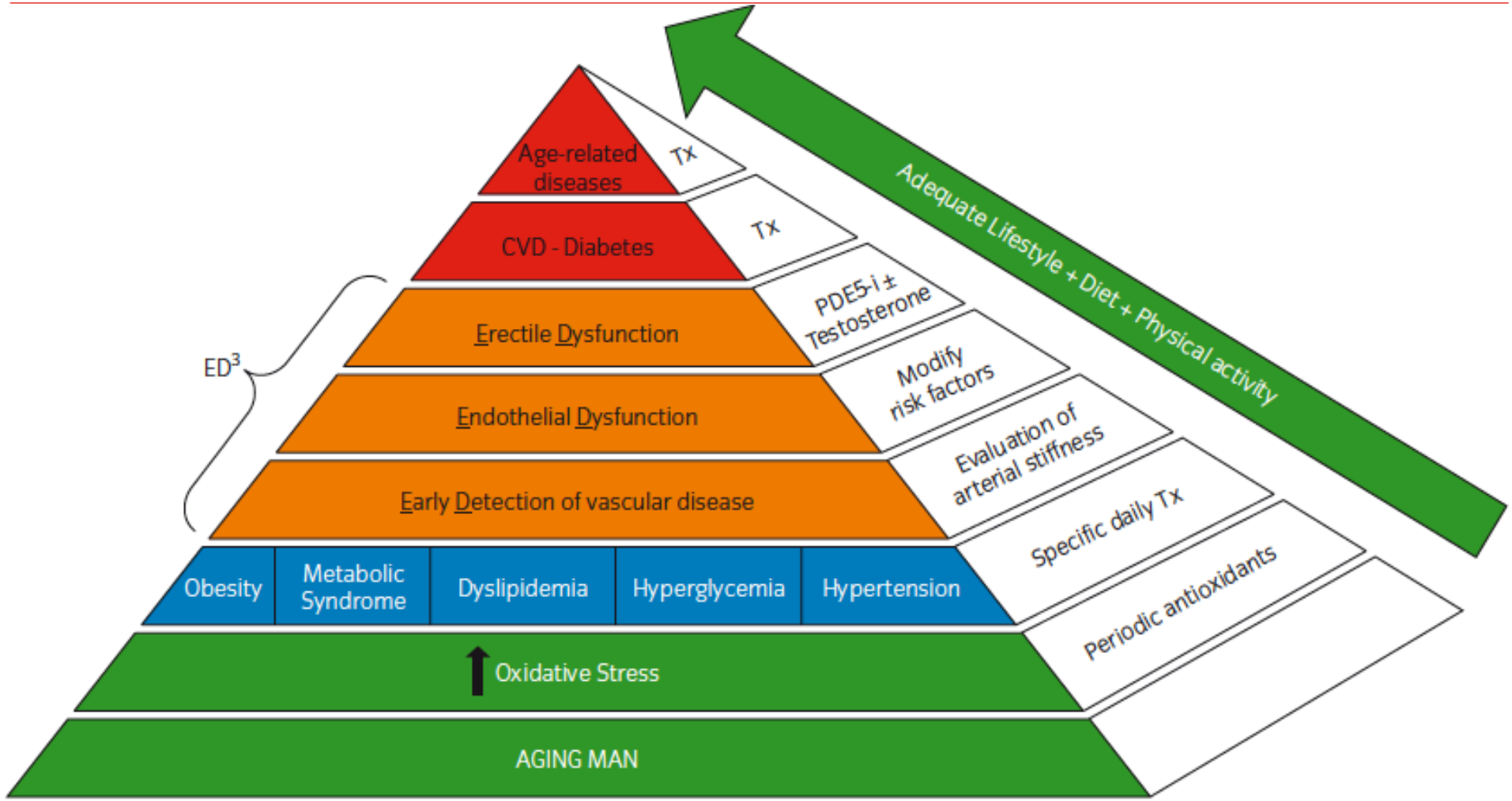
International Journal of Urology (2010) 17, 38–47 doi: 10.1111/j.1442-2042.2009.02426.x

Review Article

Endothelial dysfunction and erectile dysfunction in the aging man

Antonio Aversa,[1] Roberto Bruzziches,[1] Davide Francomano,[1] Marco Natali,[1] Pietro Gareri[2] and Giovanni Spera[1]

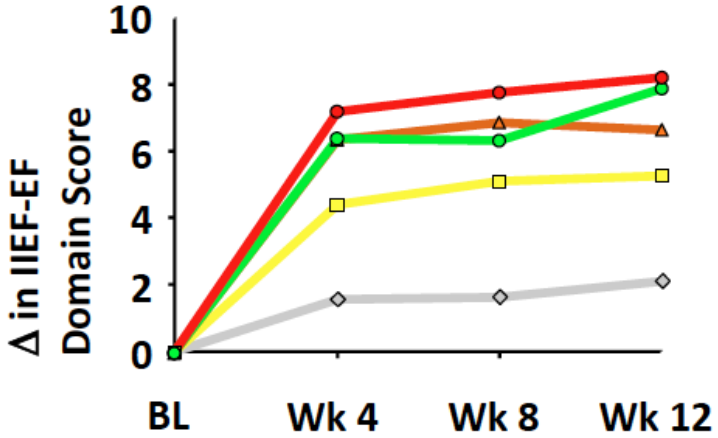
[1]Department of Medical Pathophysiology, 'Sapienza' University of Rome, Rome and [2]Operative Unit 'Elderly Health Care', ASP Catanzaro, Italy



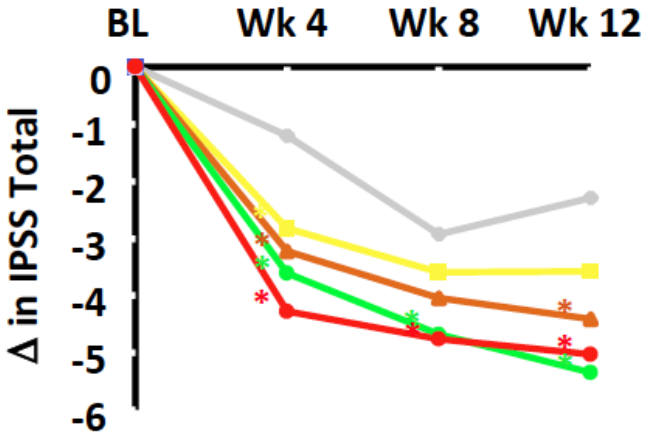
Once a Day Dosing (OAD) of Tadalafil Improves Both ED and LUTS in the Same Patient

IIEF-EF Domain Score and IPSS Total Changes Over Time: BPH/ED Population

All p <0.001 for tadalafil vs. placebo at Weeks 4, 8, and 12



*p <0.05 for tadalafil vs. placebo

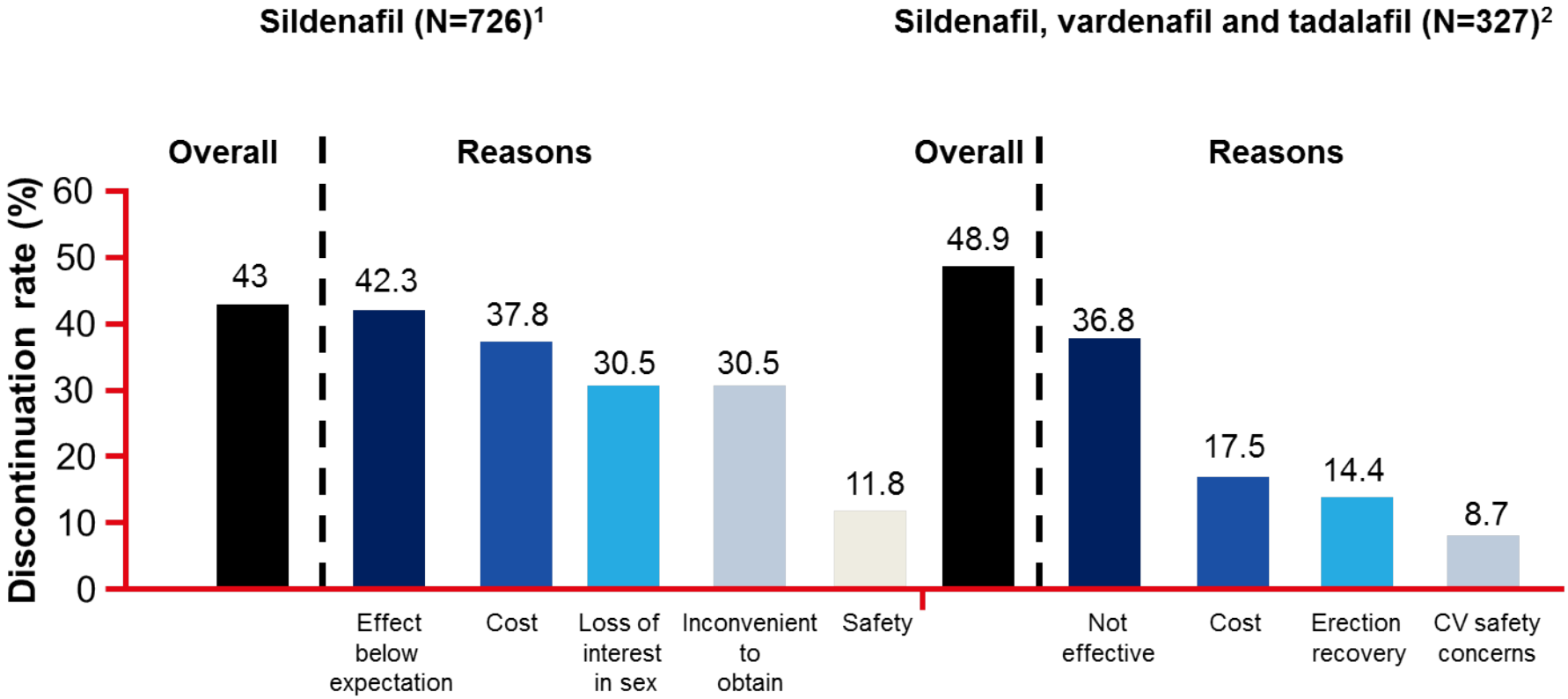


Data are least-squares means from ANCOVA analysis. BL = baseline. Wk = week.

Placebo · Tadalafil 2.5 mg · Tadalafil 5 mg · Tadalafil 10 mg · Tadalafil 20 mg

Porst H et al,European Urology 2009 , 56 ,727-736

Discontinuation rates for PDE5 inhibitors



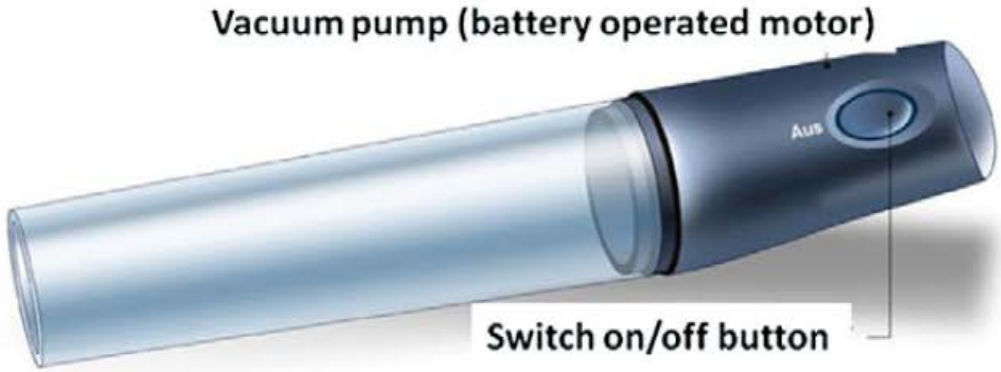
1.Jiann et al. Int J Impot Res 2006; 2.Carvalheira et al. J Sex Med 2012

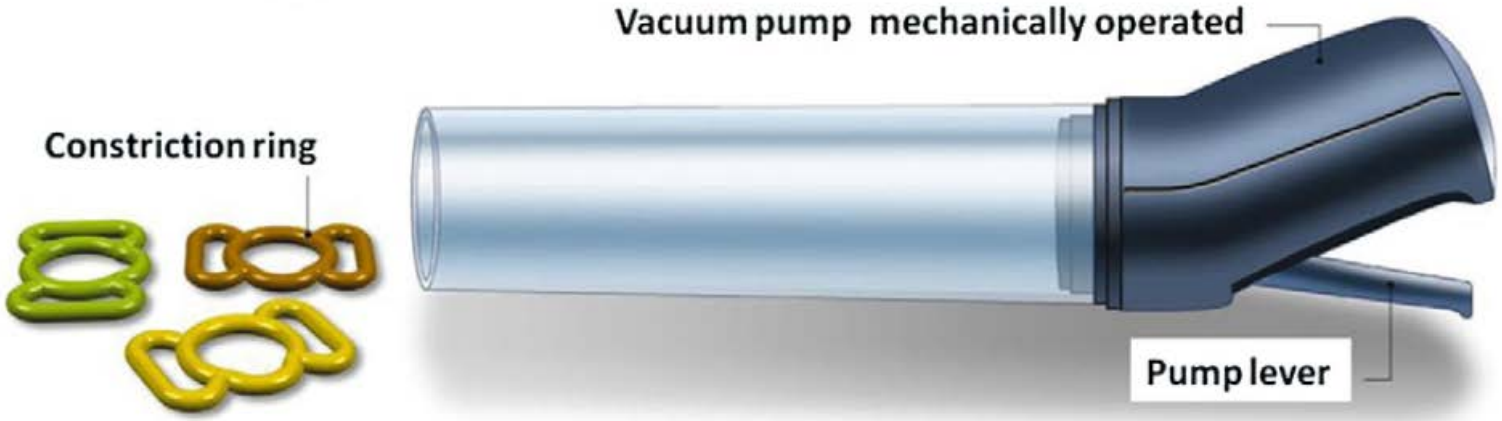
ALTRE OPZIONI TERAPEUTICHE

- Terapia farmacologica sistemica e locale
- Vacuum device
- Dispositivi di costrizione venosa
- Psicoterapia
- Impianto di protesi peniene
- Interventi di rivascolarizzazione arteriosa
- Interventi di legatura venosa

SOP Conservative (Medical and Mechanical) Treatment of Erectile Dysfunction

Porst et al. ISSM Standards Committee for Sexual Medicine J Sex Med 2013;10:130





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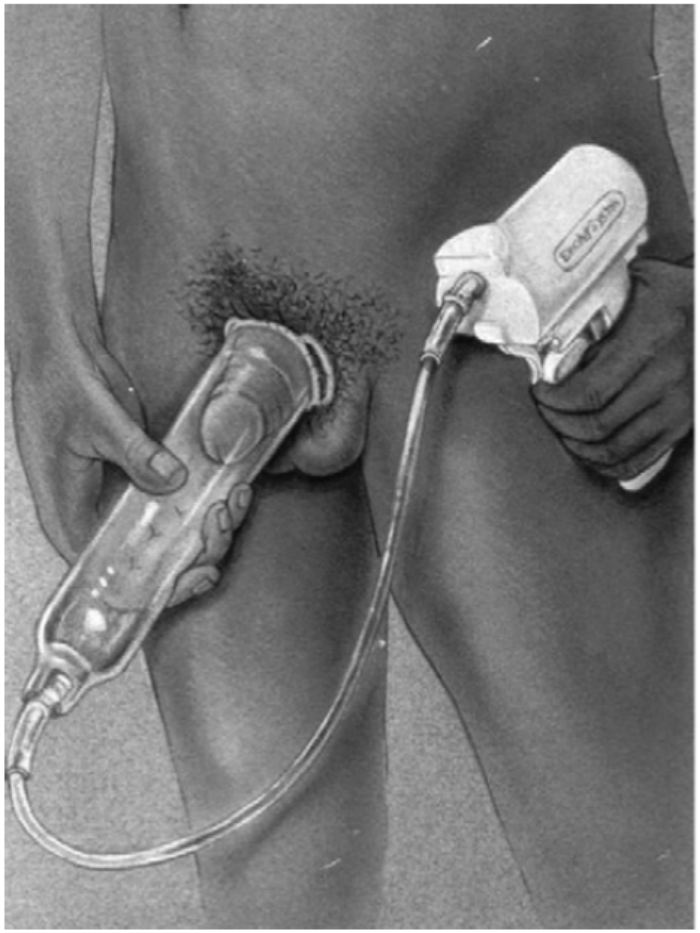

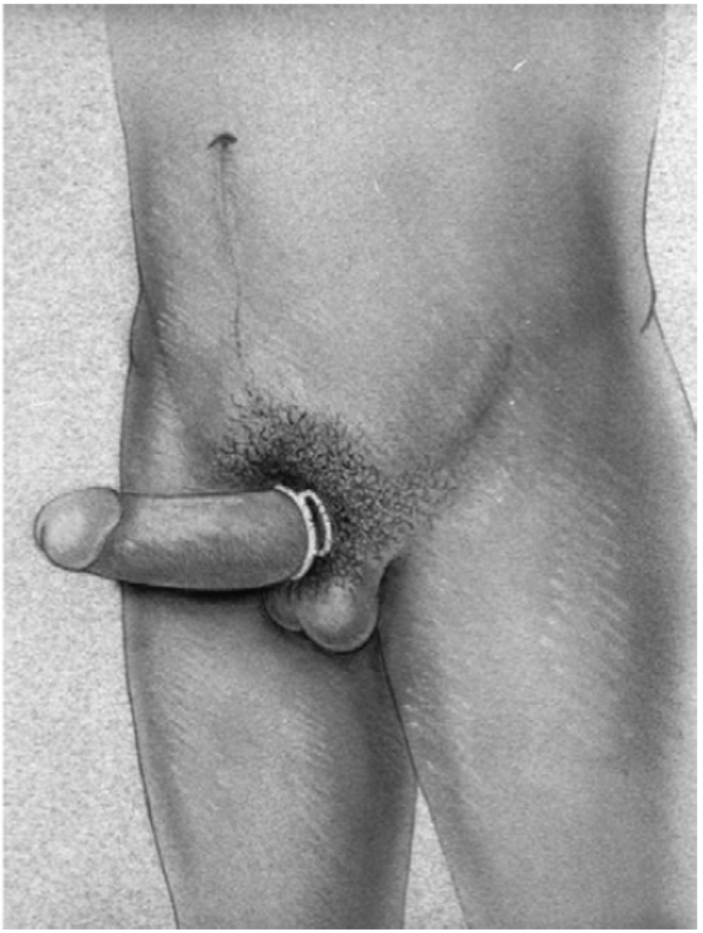

DISFUNZIONE ERETTILE

Terapia farmacologica locale

INTRACAVERNOSA	INTRAURETRALE	TRANSDERMICA
PGE-1	PGE-1	PGE-1
Papaverina	Papaverina	Papaverina
Fentolamina	Prazosin	Nitroglicerina
Linsidomina		Minoxidil
Moxisylyte		
VIP		
Altre		

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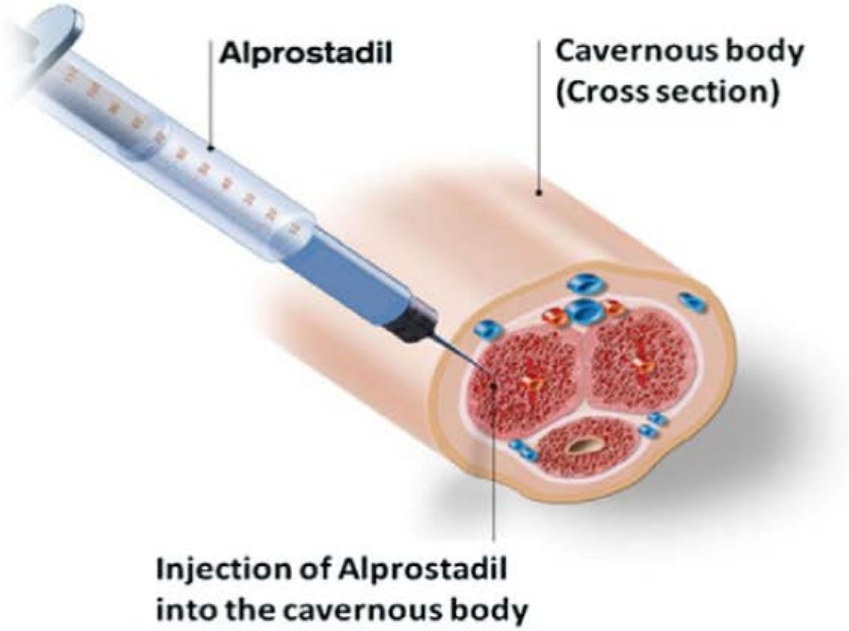

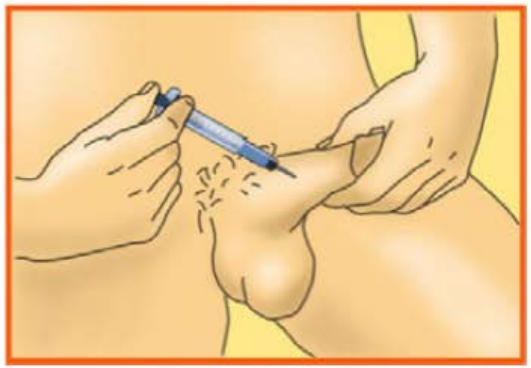

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Porst et al. ISSM Standards Committee for Sexual Medicine J Sex Med 2013;10:130

MUSE (= **M**edical **U**rethral **S**ystem for **E**rection):
Einmalsystem zur Verabreichung von Alprostadil (PGE1) in die Harnröhre