


# Whats Up in the field of Erectile Dysfunction

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# Definition

- ▶ Erectile Dysfunction:
  - The inability to achieve or maintain an erection sufficient for satisfactory sexual performance

NIH Consensus Development Panel on Impotence. JAMA 270:83-90, 1993



# Epidemiology

- ▶ ED affects an estimated 2.3 million men in the UK alone
- ▶ ED affects at least 1 in every 10 men
- ▶ It is estimated that the prevalence of ED will double over the next 20 years or so

Aytac LA et al, BJU International 1999;84:50–56

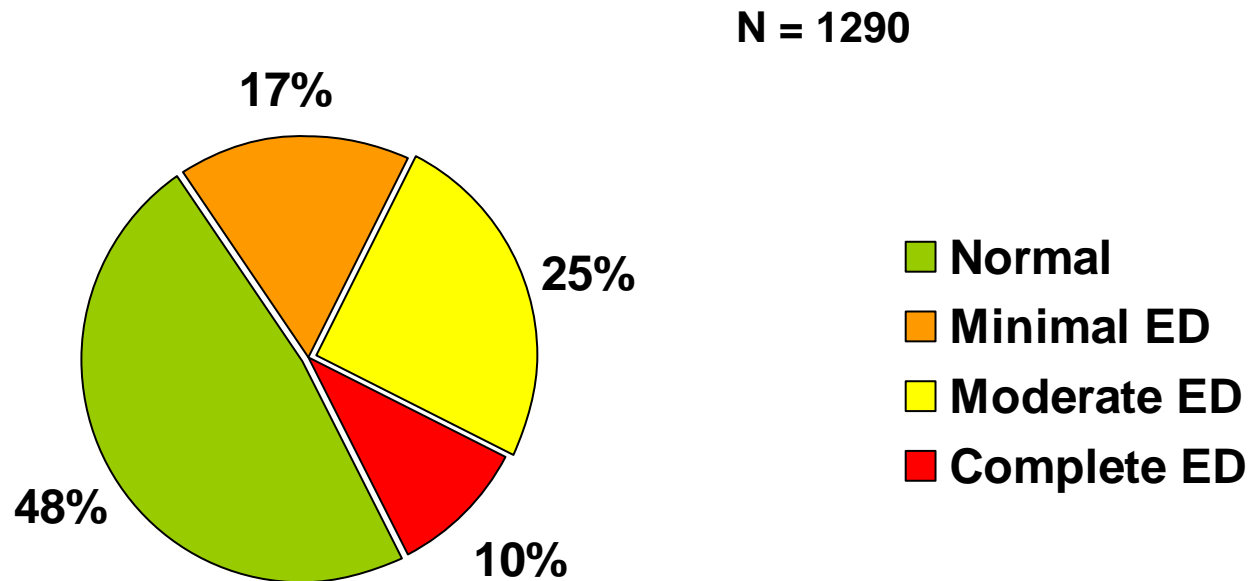
Impotence Explained. A couple's guide to Erectile Dysfunction. The Impotence Association.

Function

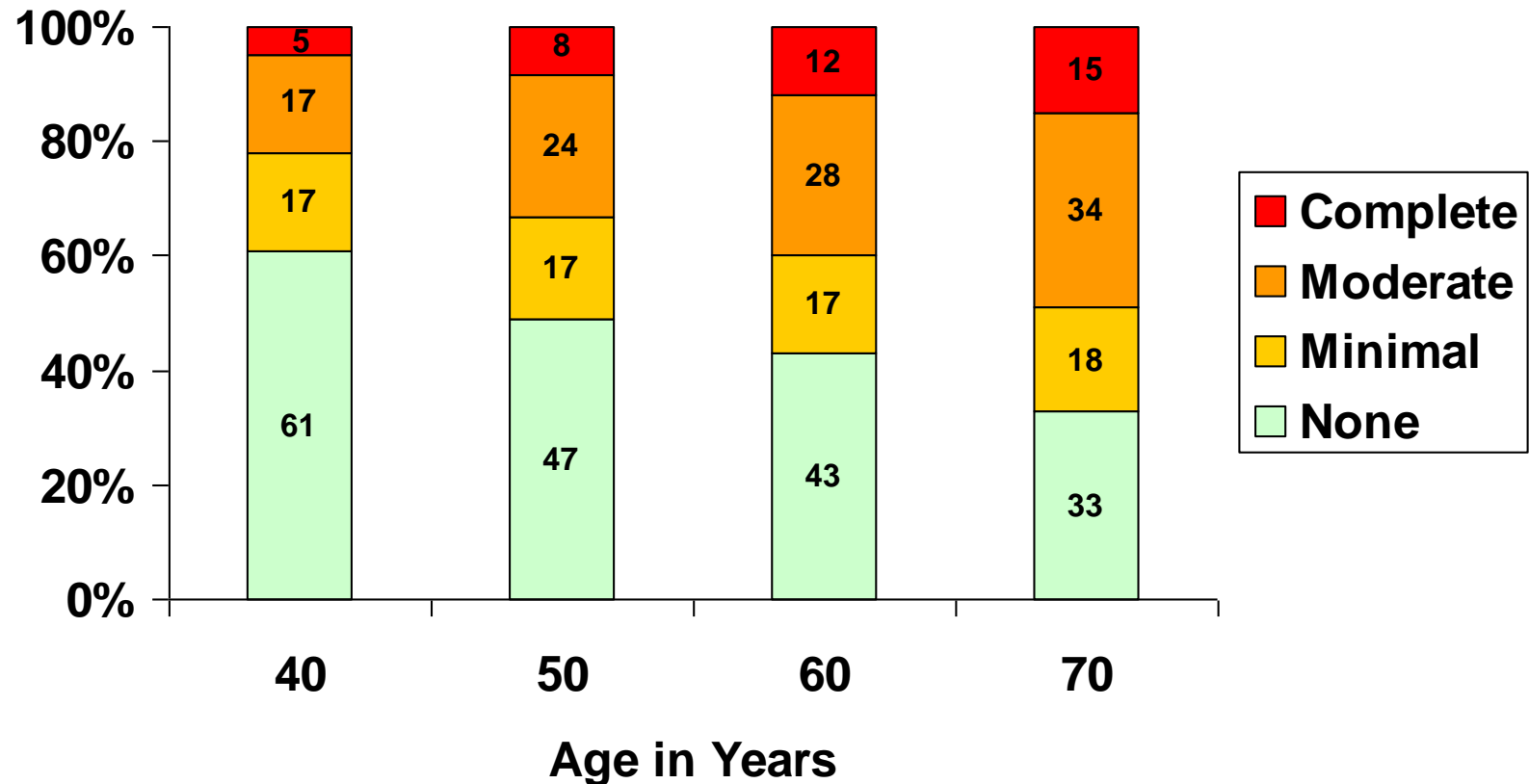
Adapted from Consortium for Improvement In Erectile

# Massachusetts Male Aging Study

- ▶ The prevalence of ED by severity, according to the Massachusetts Male Aging Study (MMAS), in men 40–70 years of age

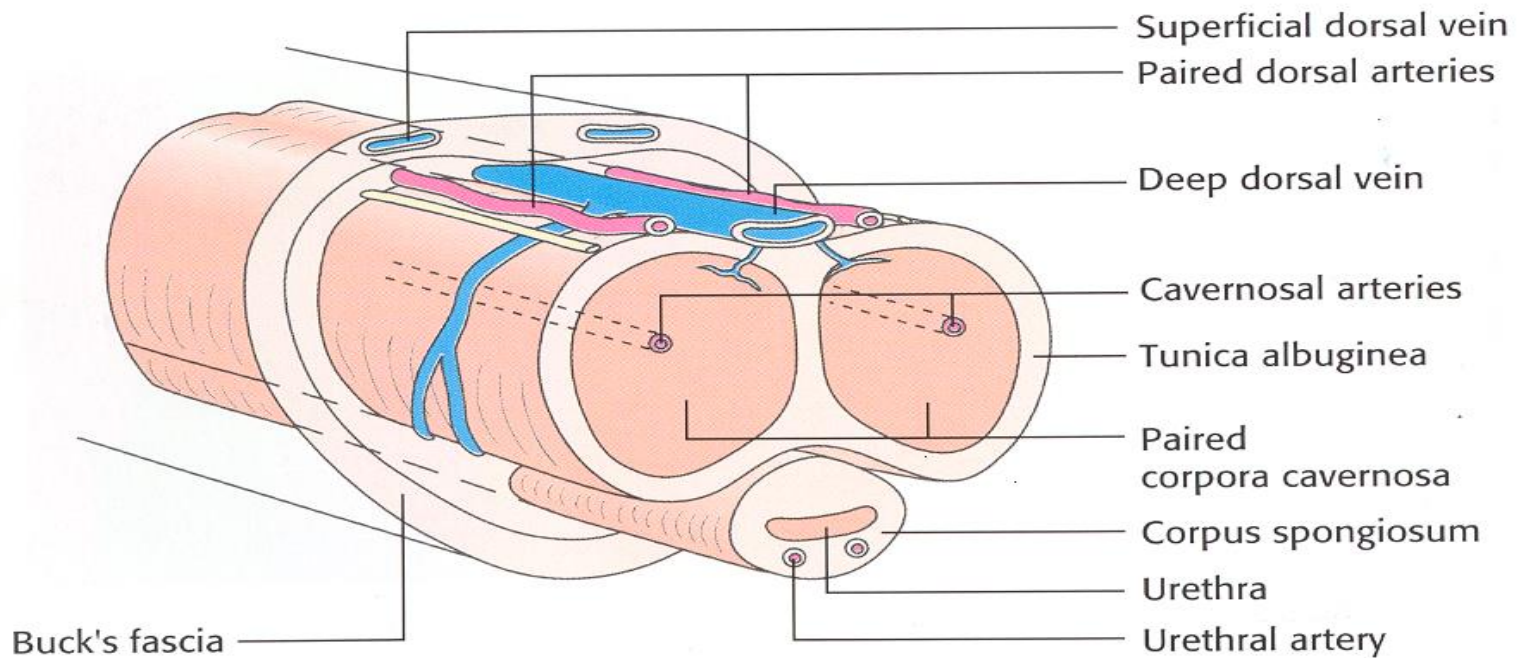


# Prevalence of ED by Age

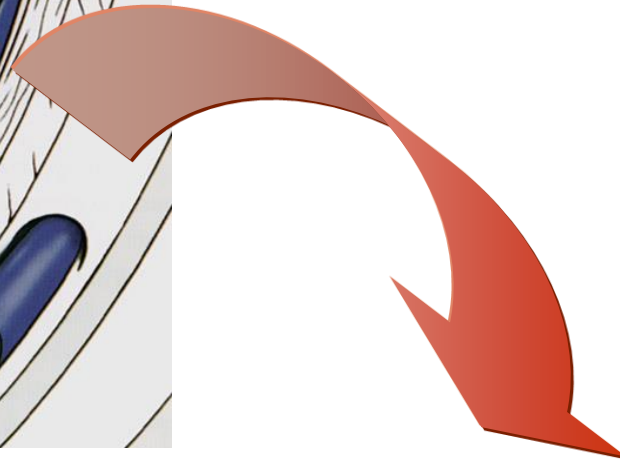
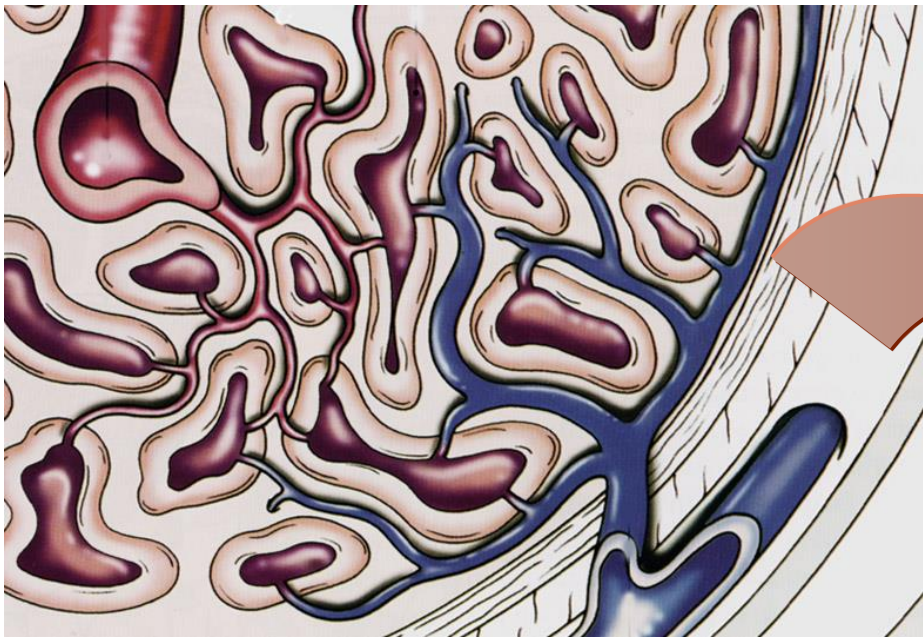


Feldman HA et al, J Urol; 1994; 151:54-61

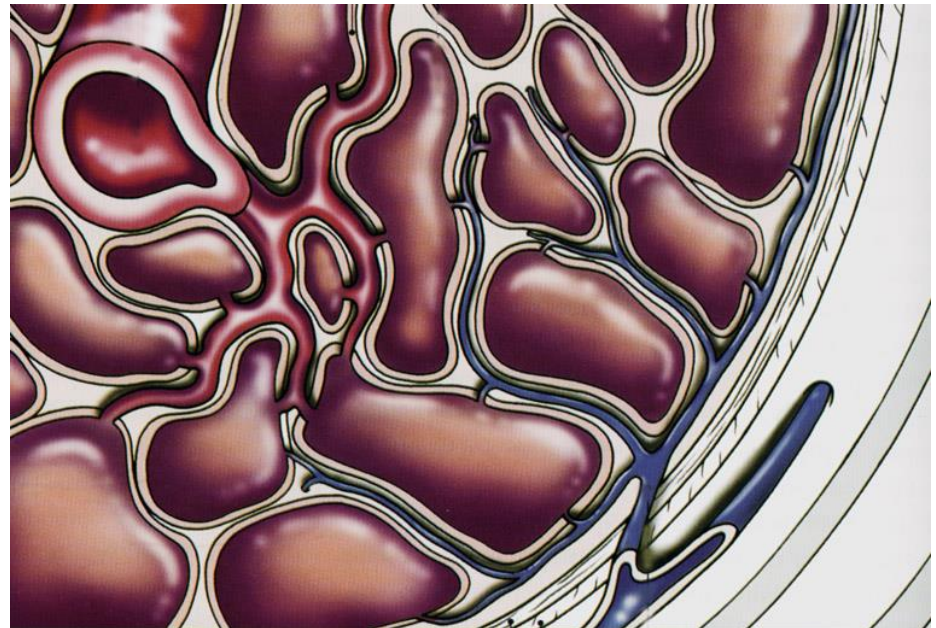
# Anatomy of the penis







Veno-occlusive  
mechanism of  
erection



# Innervation of the Penis

## ▶ Central Control

- Medial pre optic nucleus
- Paraventricular nucleus

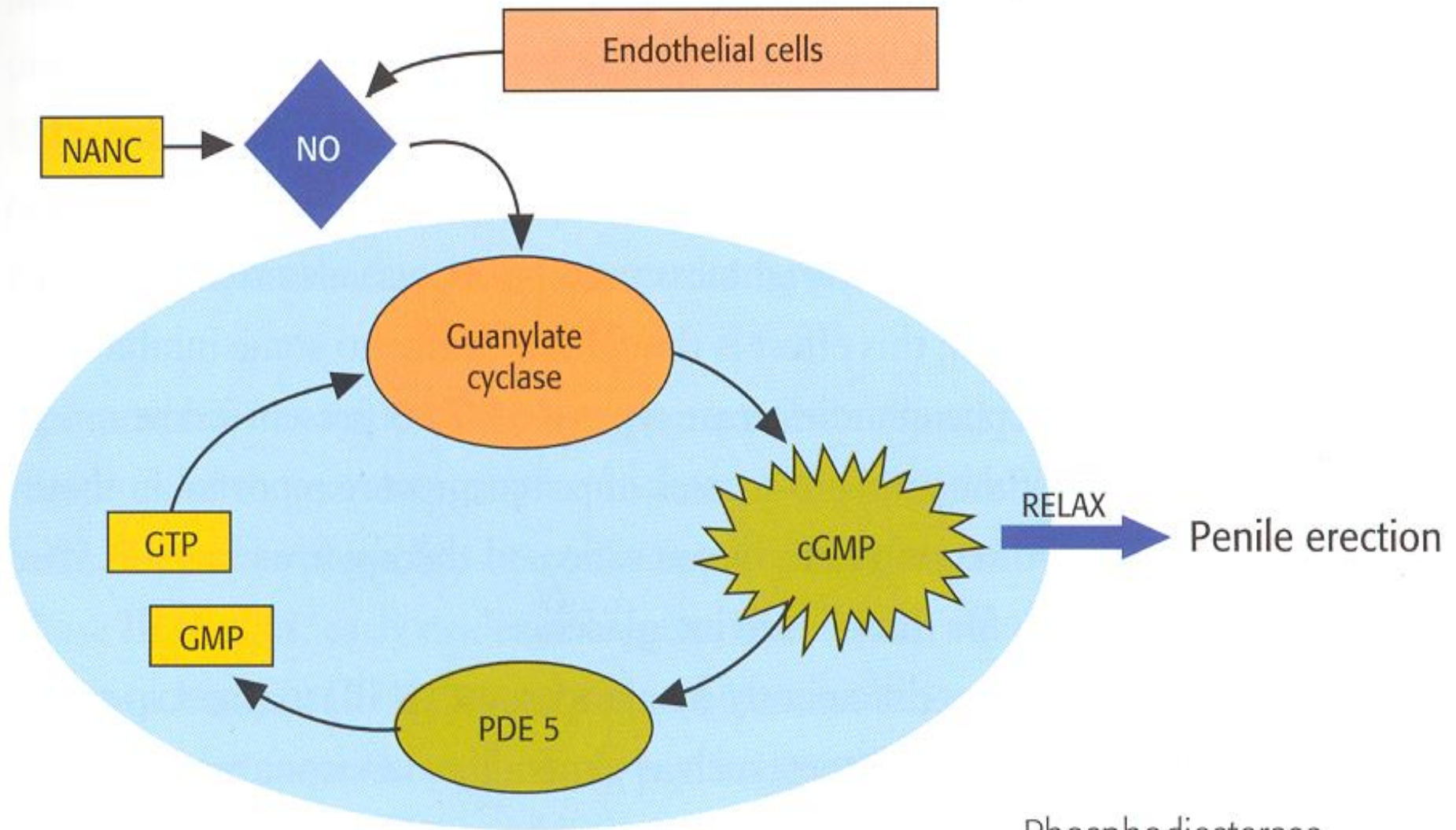
## ▶ Sympathetic

- Adrenergic
- Inhibitory

## ▶ Parasympathetic

- Cholinergic (NOS)
  - Excitatory
- 





NO Nitric oxide  
NANC Nonadrenergic–noncholinergic neurones  
GTP Guanosine triphosphate

Phosphodiesterase  
type 5 inhibition prevents cGMP  
breakdown and thereby enhances  
the normal erectile response.

# Drugs that may Cause ED

- ▶ Psychotropics
- ▶ Antidepressants
- ▶ Antihypertensives
- ▶ Antiandrogens
- ▶ Anti-cholinergic
- ▶ Drugs of abuse
- ▶ Others cimetidine, digoxin, metoclopramide, phenytoin & carbamazepine

# Organic Classification – approx 80%

## ▶ Endocrine

- hypogonadism
- hyperprolactinaemia
- hyperthyroidism
- hypothyroidism

## ▶ Neurogenic

- cerebral
- spinal cord
- peripheral

## ▶ Arterial

- atherosclerosis
- trauma
- iatrogenic

## ▶ Venous

## ▶ Iatrogenic

- drug
- surgery
- radiotherapy

# Erectile Dysfunction and its Risk Factors

Population:	All	Heart Disease	DM	↑BP
Complete ED <sup>*</sup>	10%	39%	28%	15%
Calculated by discriminate analysis				

# Diabetes Mellitus

## ▶ Neurogenic

- Autonomic neuropathy
- Peripheral neuropathy

## ▶ Arterial

- Atherosclerosis
- microangiopathy

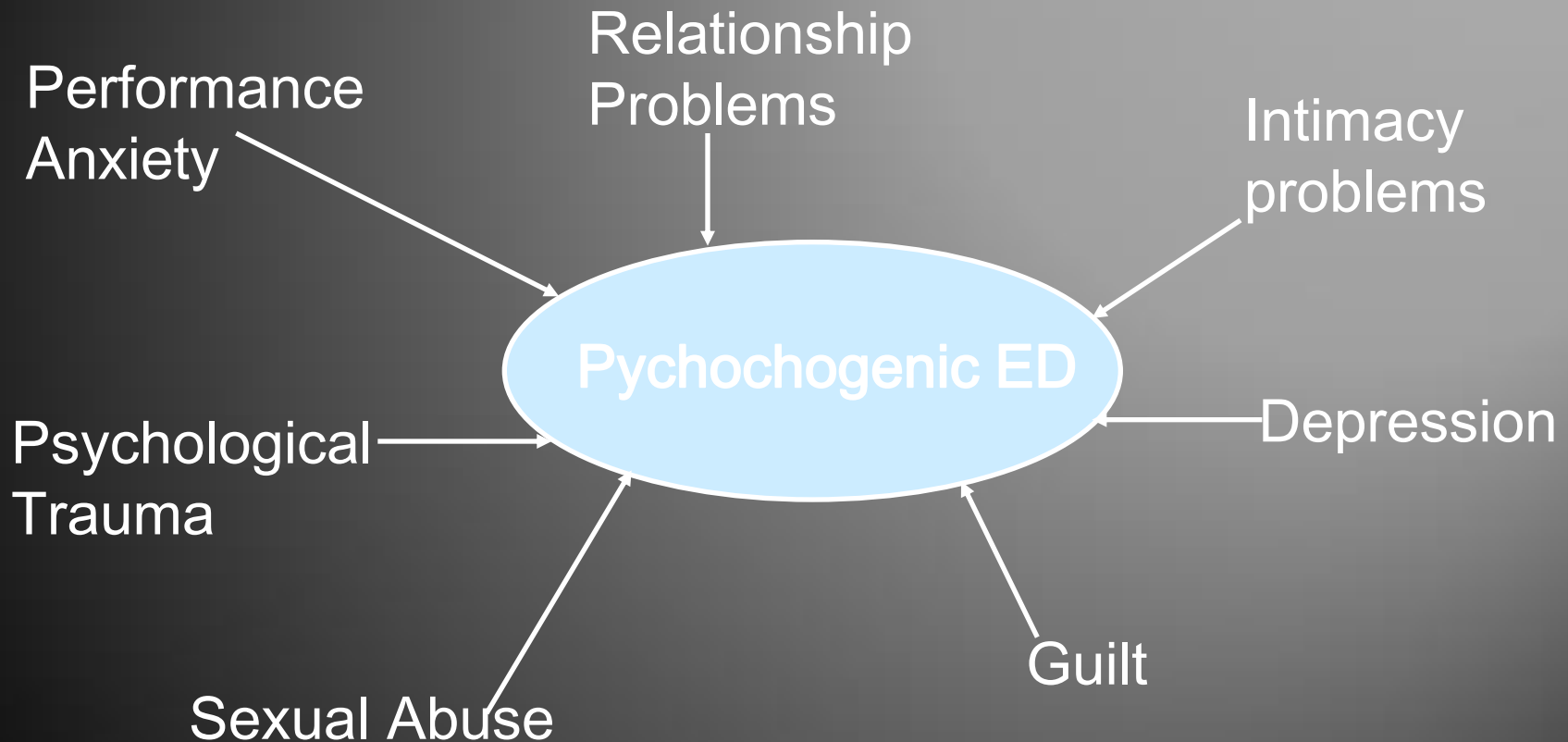
## ▶ Endothelial

- impaired endothelial-dependent smooth muscle relaxation

## ▶ Myogenic

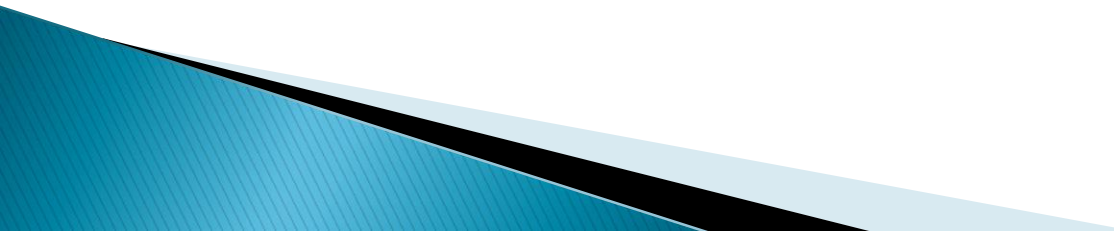
- impaired smooth muscle function

# Psychogenic Origin





# Diagnosis and Management

- ▶ History
  - ▶ Examination
  - ▶ Special Investigations
  - ▶ IIEF
- 

# Recommended Diagnostic Tests

- ▶ Fasting glucose or glycated haemoglobin (HbA<sub>1c</sub>) and lipid profile
- ▶ Or dipstick urinalysis
  - If not available from the previous 12 months
- ▶ Testosterone, Prolactin, Thyroxine
  - Only if indicated

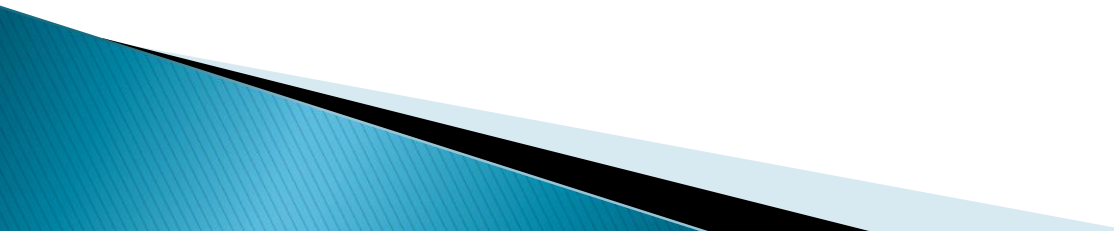
# International Index of Erectile Function

- ▶ 15 questions

- ▶ 5 domains

- Erectile function
- Orgasmic function
- Sexual desire
- Intercourse satisfaction
- Overall satisfaction

- ▶ Erectile Function Domain

- 6 questions
  - minimum score 1
  - maximum score 30
  - “normal” >25
  - “Mild” 22–25
  - “moderate” 11–21
  - “Severe” <11
- 

# Classic presentations

## Psychogenic

- ▶ Sudden onset
- ▶ Specific situation
- ▶ Normal nocturnal and early morning erection
- ▶ Relationship problems
- ▶ Problems during sexual development

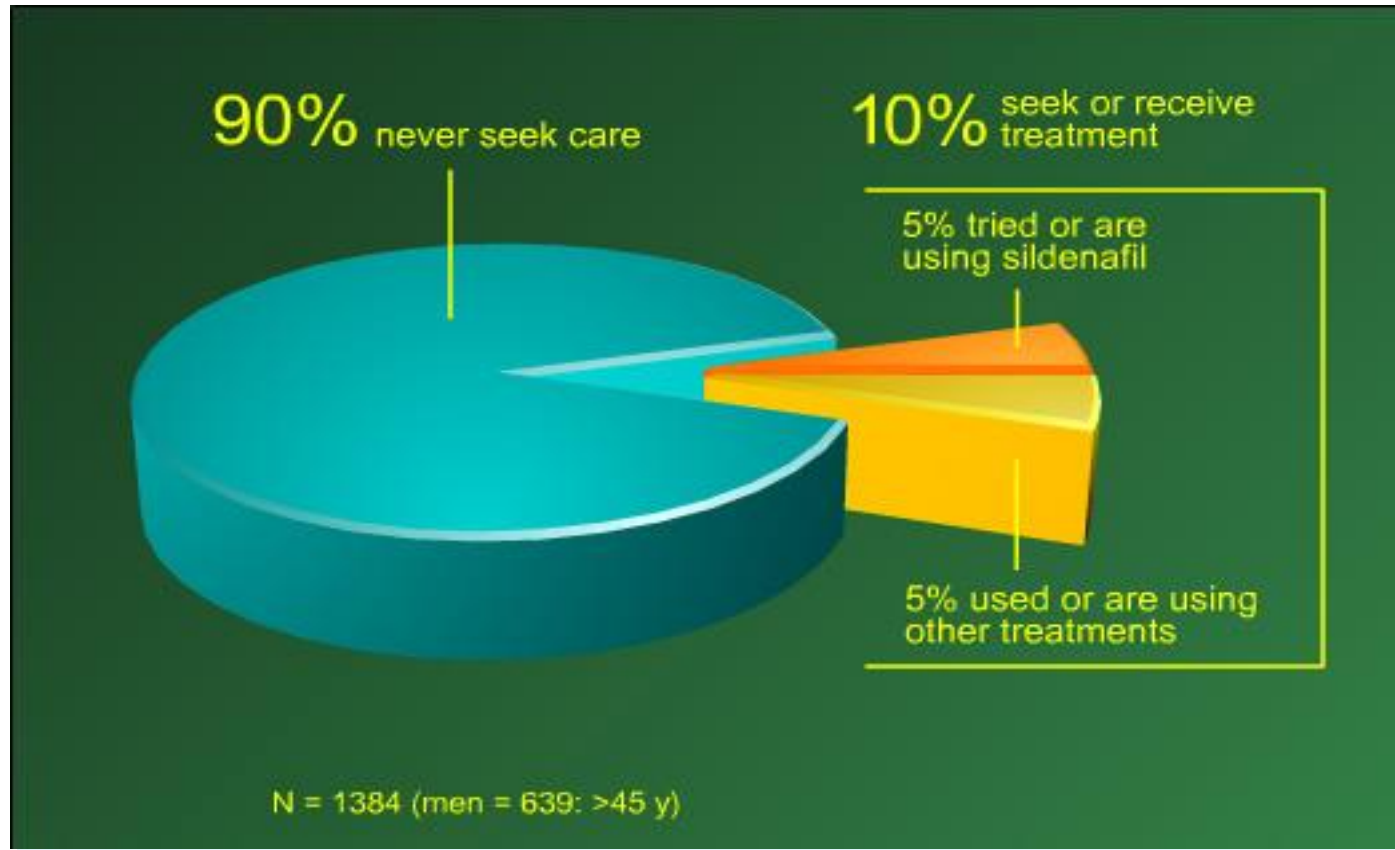
## Organic

- ▶ Gradual onset
- ▶ All circumstances
- ▶ Absent nocturnal and morning erection
- ▶ Normal libido and ejaculation
- ▶ Normal sexual development

# Treatment of ED

- ▶ Alter modifiable risk factors or causes
- ▶ Direct therapies

# Under treatment of ED



Adapted with permission from McKinlay JB. *Int J Impot Res.* 2000;12 (suppl 4):S6-S11.  
Based on data from the American Association of Retired Persons. *Modern Maturity Magazine*, Washington DC, 1999.

Adapted from Consortium for Improvement In Erectile Function




# Alter Modifiable Risk Factors or Causes

- ▶ Prescription or nonprescription drug use
  - Antihypertensives, antidepressants, antipsychotics, antiarrhythmics, antiandrogens, etc.
- ▶ Hormone replacement therapy (eg, hypogonadism, hyperprolactinemia)

# Life Style Modification

- ▶ Smoking Reduction
  - 85% of smokers have abnormal penile vasculature
- ▶ Obesity and Exercise
  - BMI  $>28.7$  gives 30% higher risk of ED than a BMI 25 or less
- ▶ Pelvic floor exercises
  - Some evidence that these may improve ED in men
- ▶ Regular Intercourse
  - Intercourse once a week may preserve vascular function “Use it or loose it”.

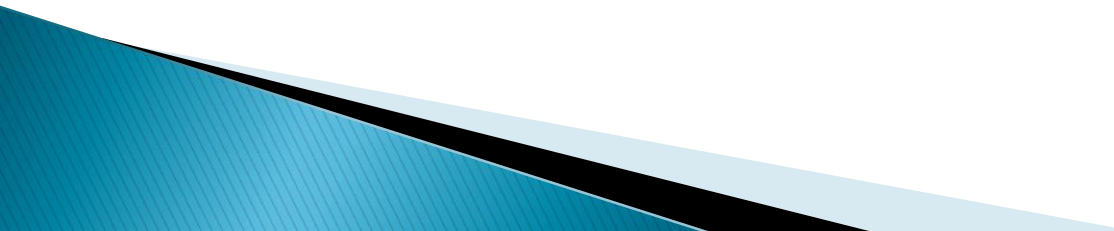
# Therapeutic Options

- ▶ Non-invasive Therapy
    - Oral medications
    - Intraurethral agent – MUSE
  - ▶ Intracorporal Injection Therapy
    - Caverject
  - ▶ Vacuum devices
  - ▶ Surgery
    - Prostheses
    - Vascular surgery
  - ▶ Androgen Replacement
    - for Hypogonadism
- 

# Hypogonadism

- ▶ Primary
  - Genetic (Klinefelters)
- ▶ Secondary
  - Age
  - Diabetes
  - Metabolic syndrome
  - Testicular Trauma
  - Infections : mumps, orchitis, HIV, STIs
  - Hormonal causes : Prolactinoma, steroids, Cannabis, Ketoconazole
  - Chemotherapy and Radiotherapy to the pelvis

# Tests for Hypogonadism

- ▶ Testosterone: morning sample x2
  - ▶ Sex hormone binding globulin
  - ▶ FBC
  - ▶ Fasting Lipids
  - ▶ Fasting Glucose
  - ▶ Thyroid
  
  - ▶ PSA
- 

# Treatment of Hypogonadism

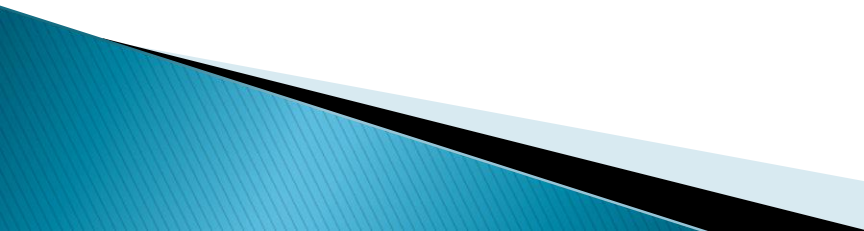
- ▶ Testosterone replacement
  - ▶ Oral
    - Tablet QDS
  - ▶ Buccal
  - ▶ Intramuscular
    - Nebido 1g 3monthly, Sustanon 1ml every 2–3 weeks
  - ▶ Implant
    - 4–6monthly
  - ▶ Transdermal
    - Gels, 5mg daily



# Symptoms

- ▶ Fatigue
- ▶ Loss of libido, Sex drive
- ▶ Loss of Morning erection
- ▶ PDE5 Failure
- ▶ Loss of muscle mass
- ▶ Increased central visceral fat
- ▶ Decreased mood or Depression

## Later symptoms

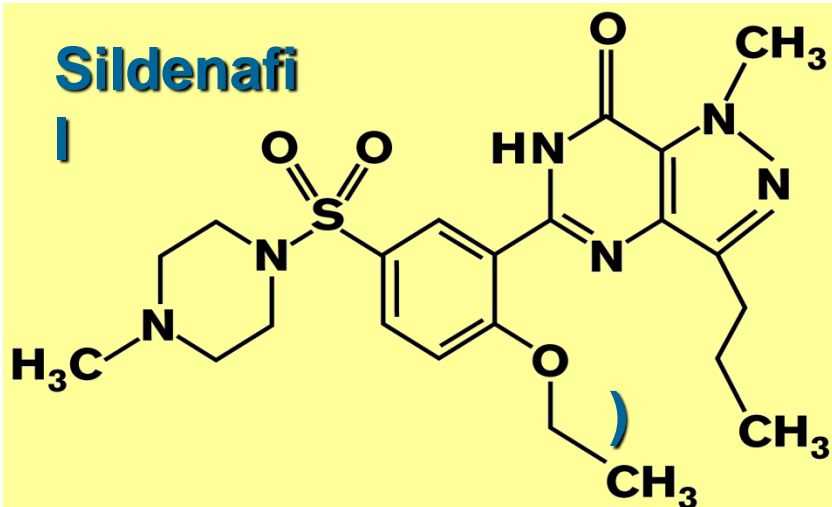
- ▶ Testicular atrophy
  - ▶ Reduced body hair
  - ▶ Gynaecomastia
  - ▶ Osteopenia
- 

# Oral Therapy Options

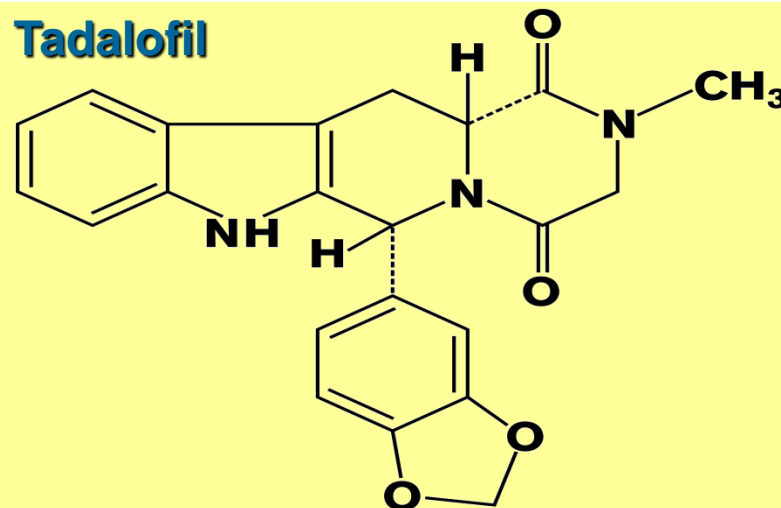
- ▶ PDE 5 Inhibitors
- ▶ On demand or Once daily preparation
  - Viagra
    - Well know and used
    - Onset of action 30–60 mins
    - Avoid alcohol and fatty food prior to taking medication
  - Cialis
    - Efficacy for 24 hours.
    - No limitations to food intake prior to taking dose
  - Levitra
    - Similar mode of action to Viagra

# PDE5 Inhibitors

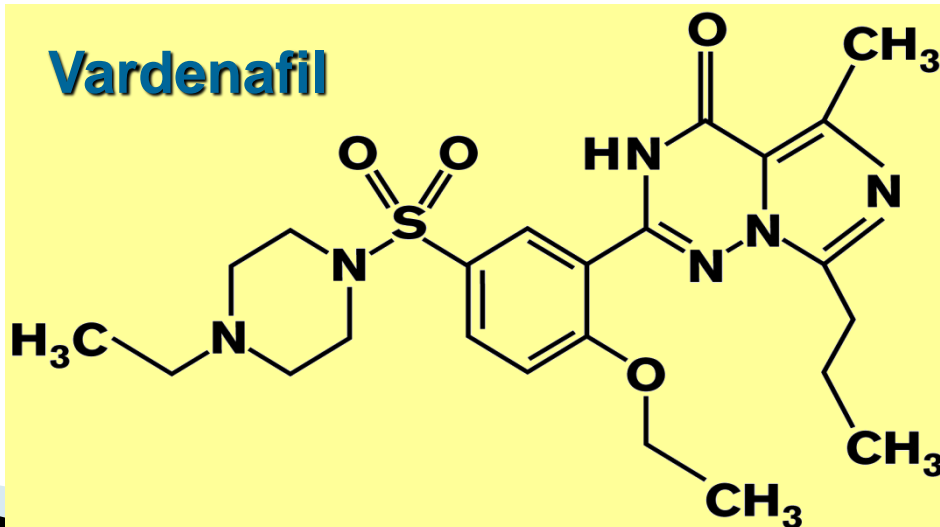
**Sildenafil**



**Tadalafil**



**Vardenafil**



# Oral therapies

- ▶ Dopamine antagonists
  - Apomorphine
    - Sublingual administration.
    - Quicker onset of action – 20mins
    - Can be used with nitrates but with caution

# Oral Therapies – Efficacy

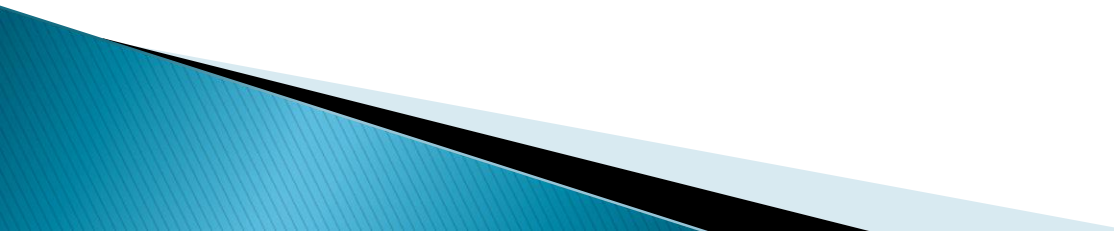
	<b>Improved Erection</b>	<b>Successful intercourse</b>
<b>Viagra 100mg</b>	<b>86%</b>	<b>75%</b>
<b>Cialis 20mg</b>	<b>81%</b>	<b>75%</b>
<b>Vardenafil 20mg</b>	<b>85%</b>	<b>72%</b>
<b>Uprima 3mg</b>		<b>50%</b>

# Oral therapies – Side effects

	Headache	Flushing	Dyspepsia	Nasal congestion Rinitis	Back pain	Myalgia
Viagra Sildenafil	16%	10%	7%	4%		
Cialis Tadalafil	14%		12%		6.5%	6%
Levitra Vardenafil	13%	10%	6%	5%		



# Cardiac Risk

- ▶ Nitrates are contraindicated with all PDE5 inhibitors.
  - ▶ Is the patient “Fit for Sex”
  - ▶ Blood pressure should be stable
  - ▶ At least 3 months post MI or CVA
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# Cardiac Risk with PDE5 inhibitor

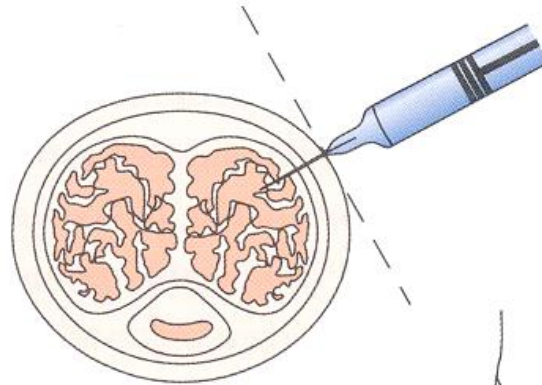
- ▶ Low Risk –
  - Controlled hypertension
  - Mild valve disease, mild stable angina,
  - post re-vascularisation
- ▶ Moderate Risk –
  - Recent MI or CVA
  - Congestive heart failure
  - Moderate stable angina
- ▶ High Risk
  - Uncontrolled angina
  - Uncontrolled hyper / hypotension
  - Recent MI / CVA
  - High risk arrhythmia, Hypertrophic cardiomyopathy.

# Injection therapy

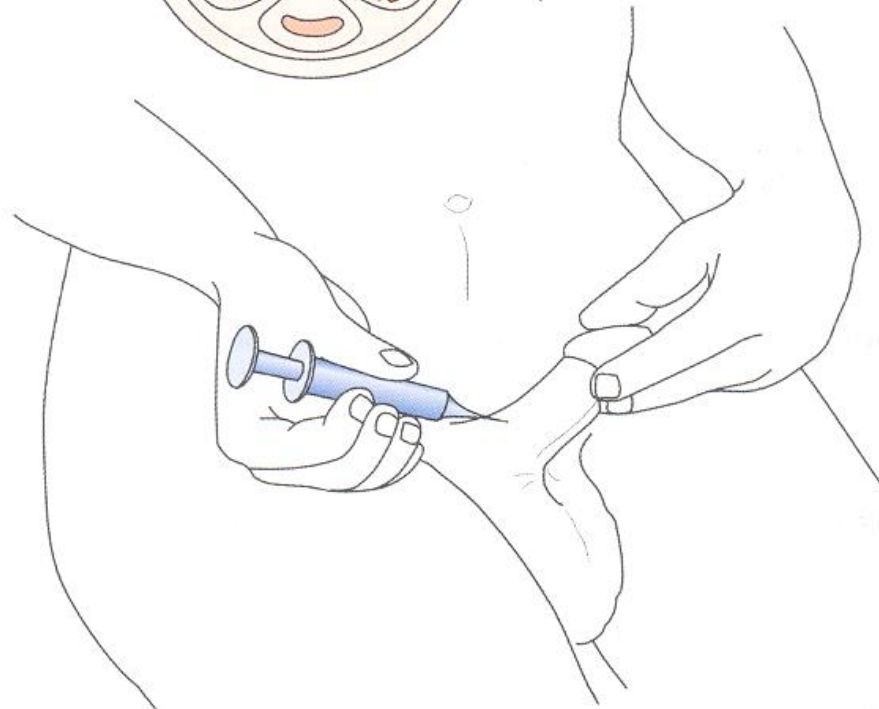
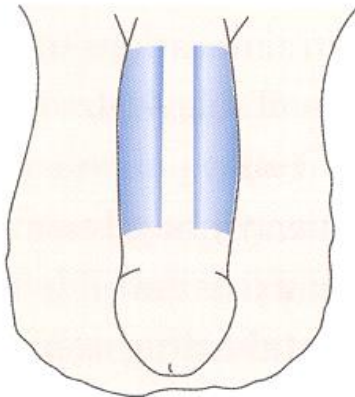
- ▶ Alprostadil
  - Caverject
  - Viridal Duo
- ▶ Vip & Phentolamine
- ▶ Dose is titrated upwards to achieve an adequate response. Max 60 micrograms.
- ▶ Studies demonstrate excellent efficacy with injection therapy

# Injection therapy

Cross-section showing  
injection sites and  
angle of needle insertion



Injection sites along  
the side of the penis

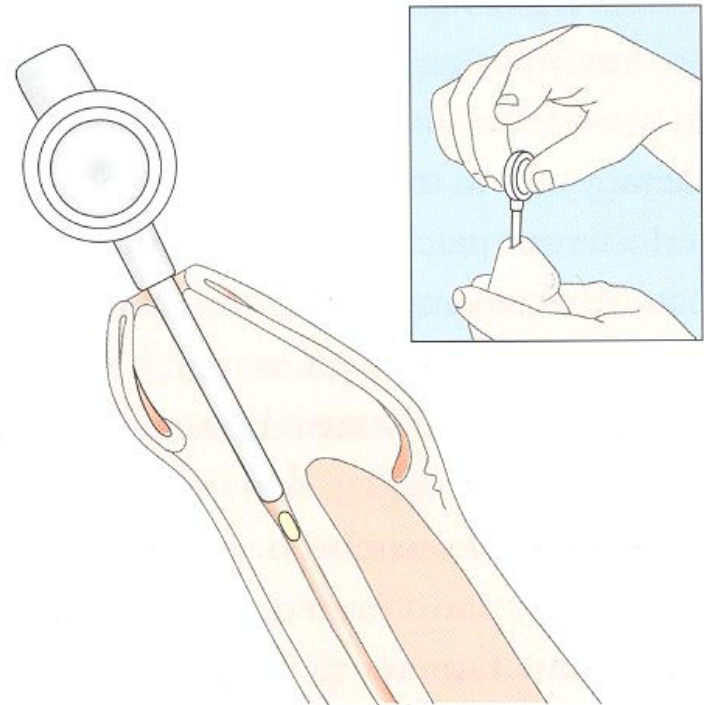


# Injection therapy – Side effects

	Alprostadil %	VIP & Phentolamine %
Priapism	0.5-1.3	< 0.5
Pain on Injection	17 -50	1
Heamatoma	3	3
Systemic side effects	1	10-50

# Intraurethral therapy – MUSE

- ▶ 125 –1000 mcgs
- ▶ Easy to use
- ▶ Efficacy 20–80% !
- ▶ Pain
  - Penile
  - Urethral
  - Testicular
- ▶ Vaginal discomfort 6%
- ▶ Priapism 0.4%
- ▶ Up to 123mcgs of alprostadil found in semen.
- ▶ 10 minutes to onset of erection



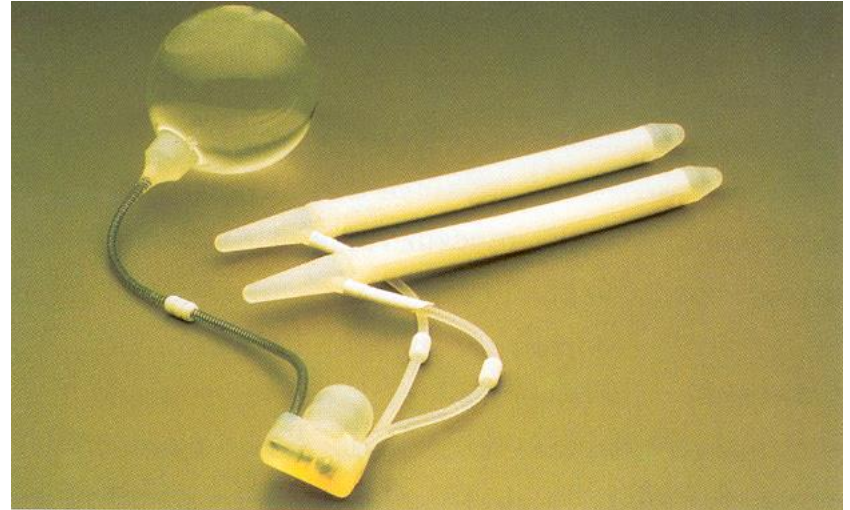
Intraurethral administration  
of alprostadil using the MUSE® system.

# Intraurethral therapy – MUSE

- ▶ Alprostadil pellet inserted into the urethra
- ▶ Once inserted takes approx 10 minutes to be absorbed. 125 – 1000 mcgs
- ▶ Early reports – 66% efficacy. Subsequent reports show a much reduced efficacy.
- ▶ Side effects
  - Pain 7%
  - Urethral Trauma 1%
  - Partner vaginal discomfort
  - Up to 123mcgs of alprostadil in seaman.

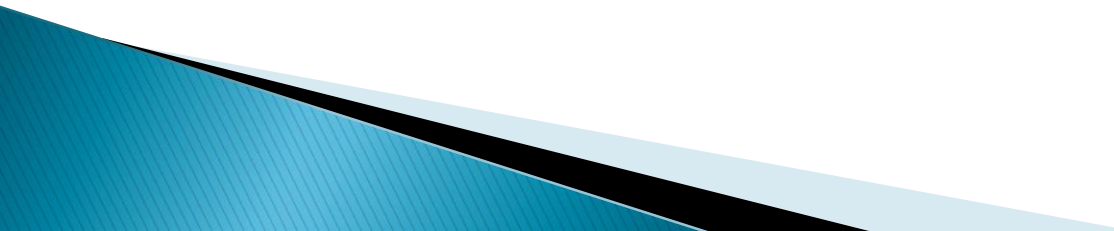
# Surgical Implants

- ▶ Last resort treatment as surgery involves dilatation of erectile tissue
- ▶ High incidence of infection and mechanical failure
- ▶ Patient selection
- ▶ High satisfaction for some patients when all other treatments have failed





# Conclusions

- ▶ ED is highly prevalent
  - ▶ ED incidence is age-related
  - ▶ ED is associated with significant co-morbidities
  - ▶ ED is currently significantly undertreated
  - ▶ ED can be effectively managed
- 

# Any Questions?

