



# Erectile Dysfunction

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# Agenda

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- Discuss physiology of ED
- Commonly associated disease states
- Treatment options

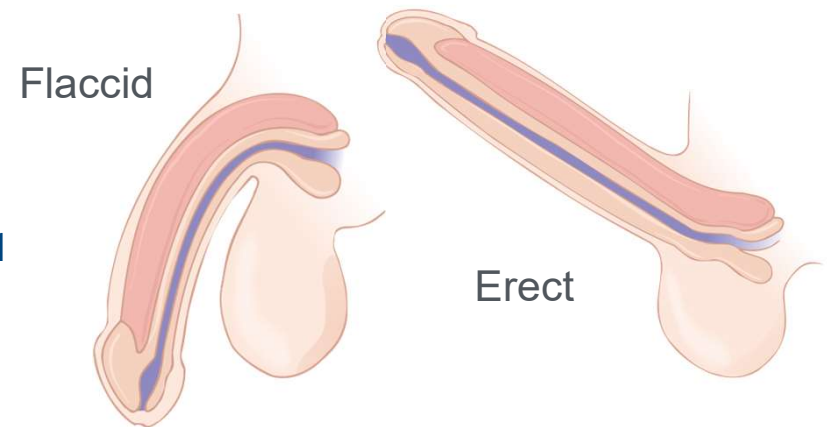
# Erectile dysfunction (ED)

## What is it?

- The inability to achieve or maintain an erection firm enough to have sexual intercourse<sup>1</sup>

## How common is it?

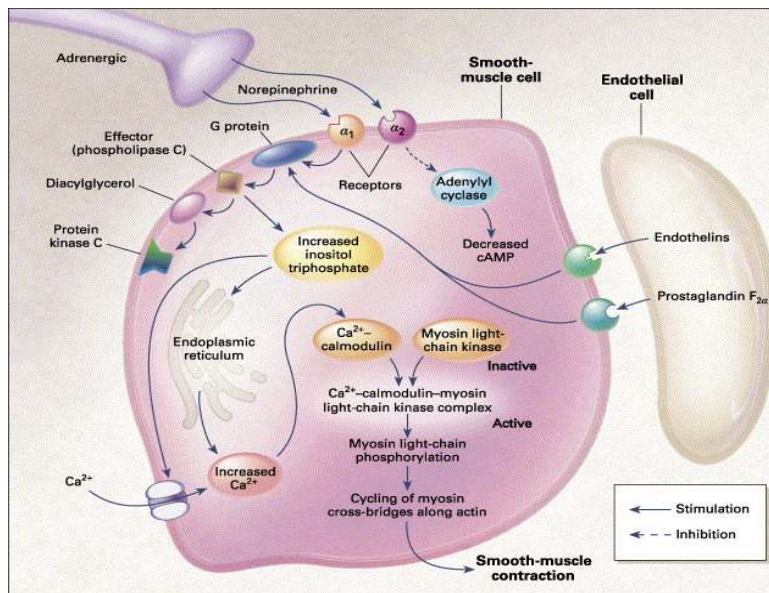
- About 1 in 5 American men 20 years or older experience ED in their lifetime<sup>2</sup>
- More than half of men over 40 have some degree of ED<sup>3</sup>
- Affects approximately 39 million American men<sup>4</sup>



# Physiology of Erections

Erections are complicated!

Erectile Pathway



- Nerves
- Cellular pathways
- Vascular

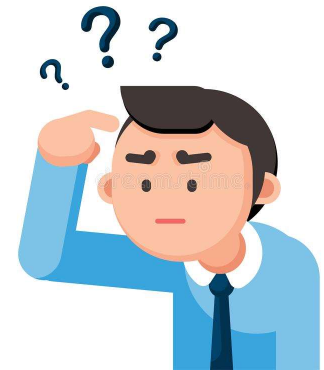
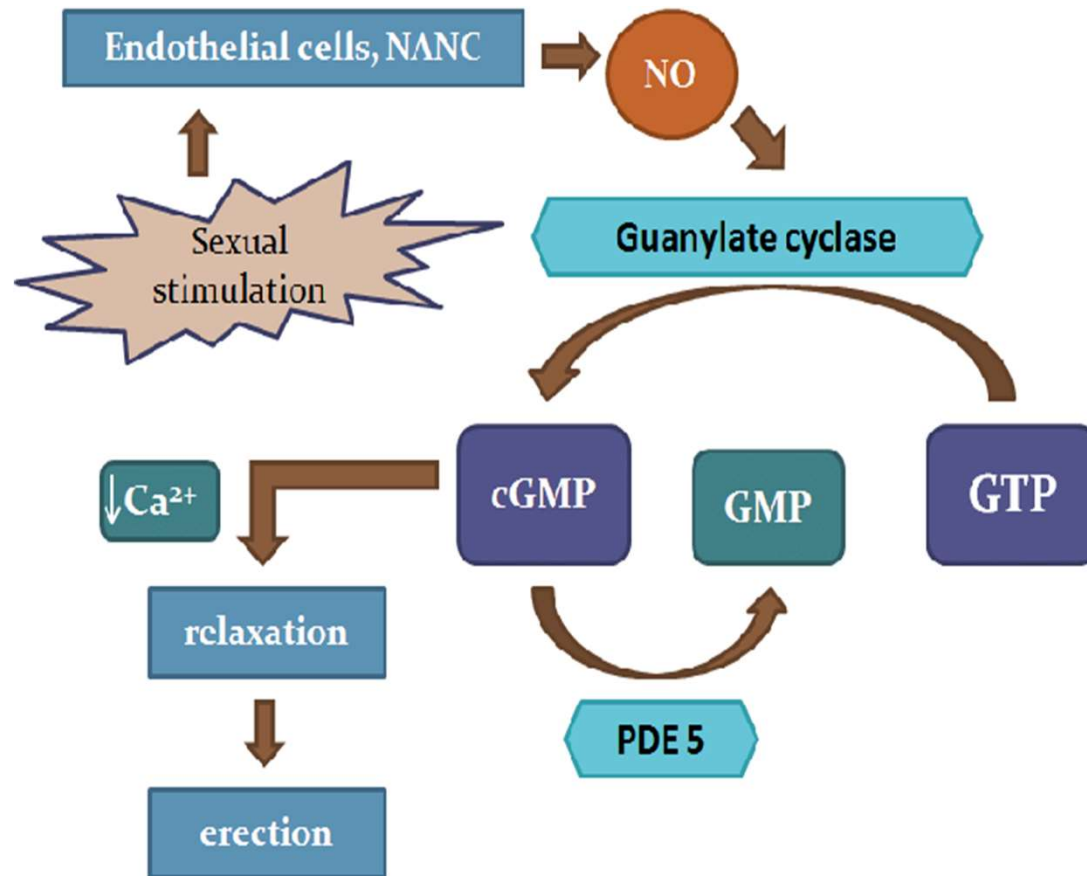
# Neural Role in Erections

## “Spark”

- Parasympathetic response
- Pelvic plexus and cavernous nerves
- Nerves initiate cellular pathway



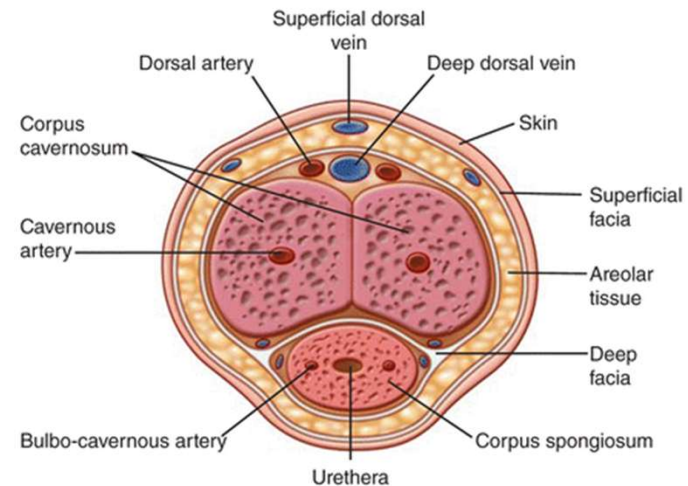
# Cellular Pathway



# Vascular Role In Erections: Arterial Flow

- Internal pudendal artery
  - 70% blood flow to penis in majority of men
  - Branches into cavernous, dorsal, bulbourethral arteries

- Corpora Cavernosum
  - Smooth muscle lined with endothelium



## Causes and comorbidities associated with ED<sup>6</sup>

Top three physical causes are:

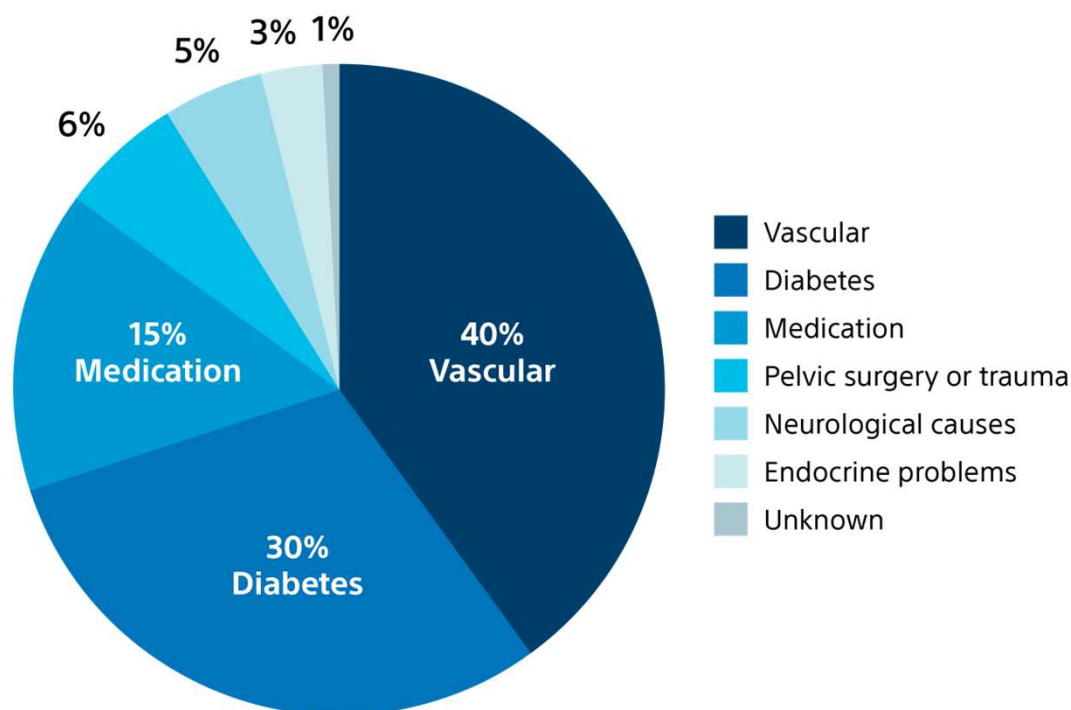
- Vascular
- Diabetes
- Medication

ED can be a result of:

- Prostate cancer treatment

Or precursor to:

- Diabetes
- Heart disease
- Vascular disease



ED can have a broad negative impact on the health-related quality of life.<sup>7-9</sup>



# Erectile dysfunction and heart disease



# The link between ED and heart disease

Symptoms of heart disease may develop within 2–3 years of ED<sup>17</sup>

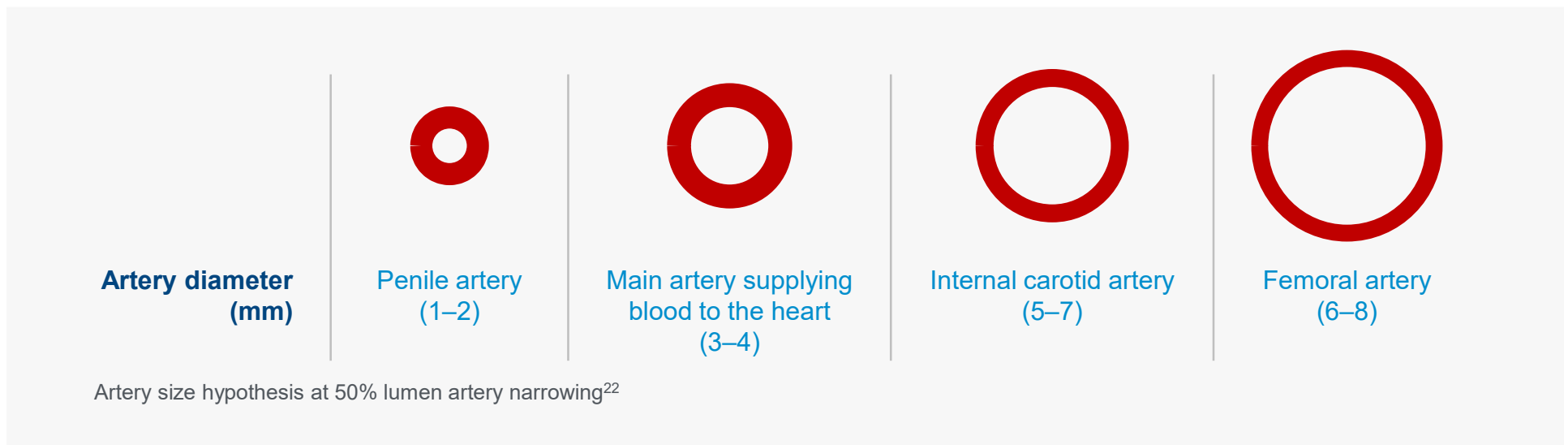
- ED is an **independent risk factor** for future heart-related events.<sup>18</sup> The severity of ED is correlated with the extent of coronary artery disease (CAD)<sup>19</sup>
- ED precedes CAD symptoms in almost 70% of cases<sup>20</sup>



## ED before heart disease symptoms

Arteries supplying the penis are smaller than those to the heart. Blockage creates reduced blood flow. Smaller arteries may be affected **before** heart disease symptoms.<sup>17,18</sup>

At 50% obstruction, the penile artery may cause symptoms of erectile dysfunction.<sup>21</sup>





# Erectile dysfunction and diabetes

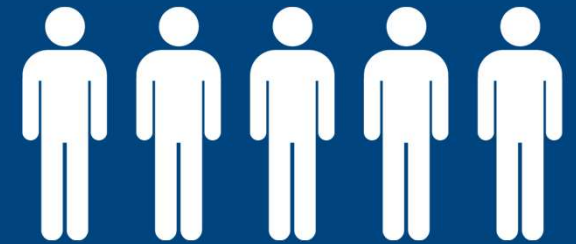


## ED and diabetes connection

According to the  
2015 Census data,

**15.3 MILLION**

men in the US have diabetes<sup>10</sup>



Patients with  
diabetes and  
ED are *less  
responsive to  
oral treatments*  
for their ED<sup>11</sup>



In men with  
diabetes, ED is  
*more severe*  
and associated  
with a decreased  
quality of life<sup>11</sup>

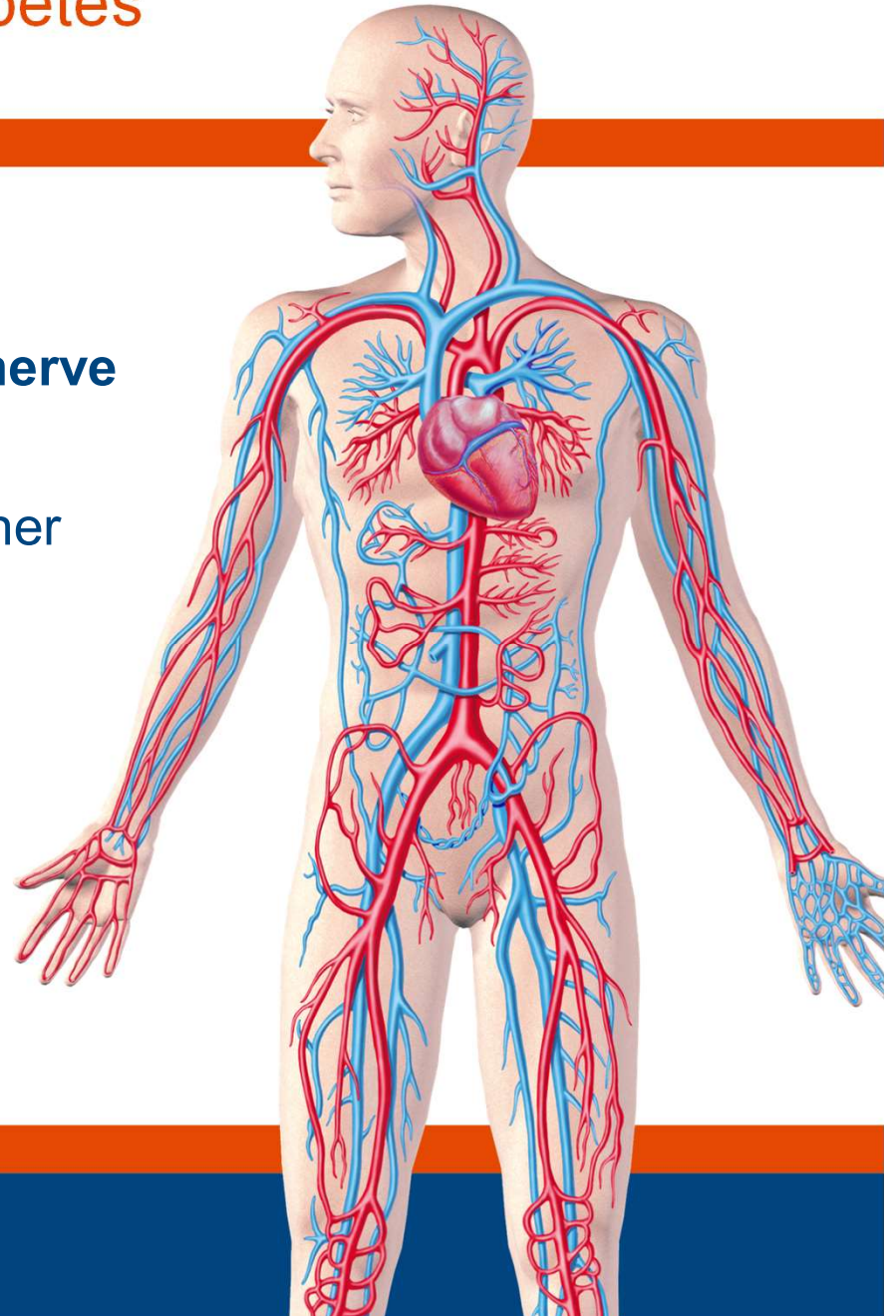


In some patients,  
ED can be the  
presenting  
symptom of  
diabetes<sup>11</sup>

## ED can be a result of having diabetes

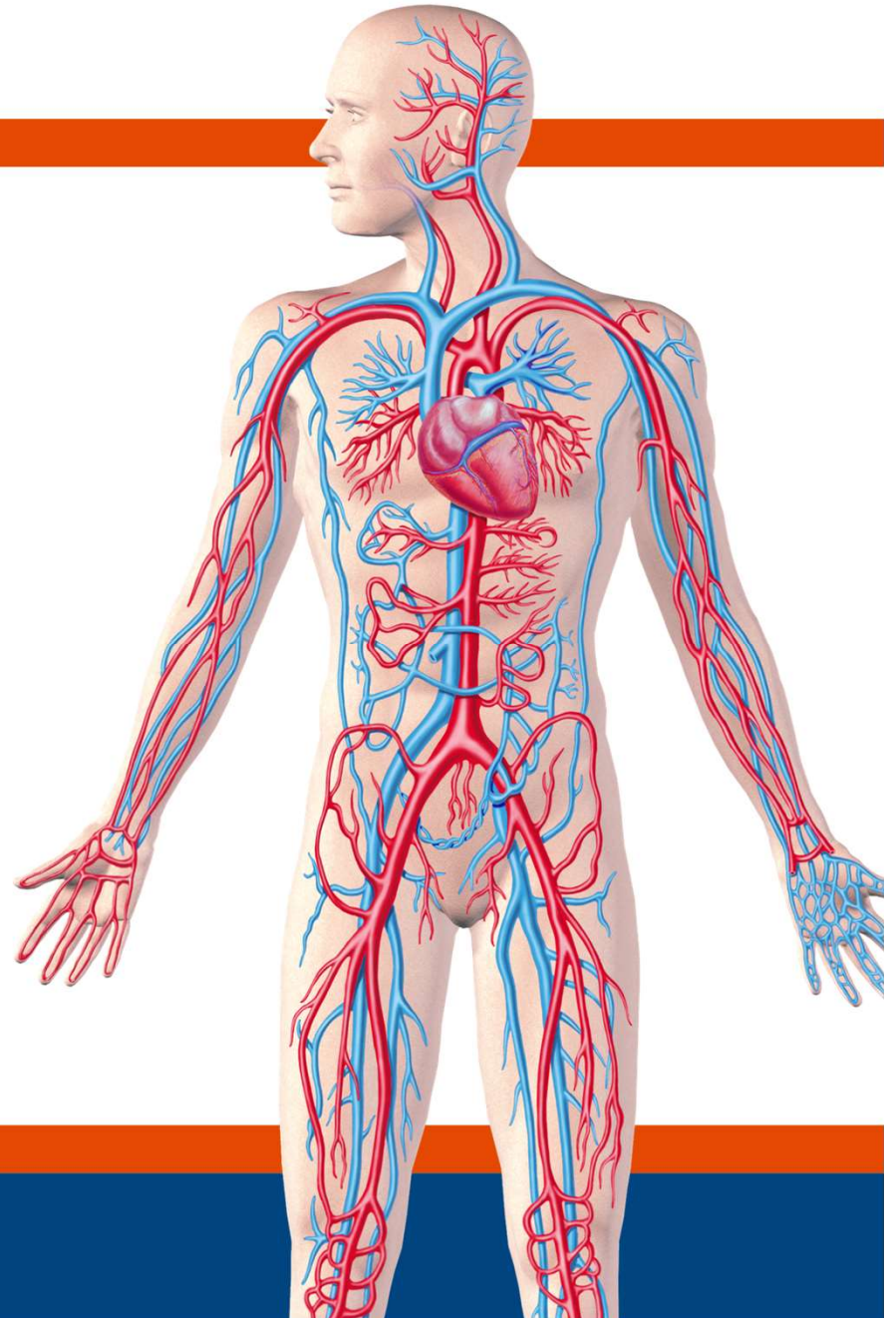
### The reasons why ED can emerge:

- 60–70% of people with diabetes have **nerve damage** or neuropathy<sup>12</sup>
- Diabetes accelerates damage to the inner lining of small arteries.<sup>13</sup>
- ED pills require stimulation (nerves) and healthy blood vessels. If these are damaged due to diabetes, pills may not be as effective.<sup>14,15</sup>



# Evaluation of ED

- Fasting Lipids
- Testosterone
- Fasting Glucose
- Blood Pressure
- Stress Test
- Calcium score / Ct angiography?



## Risk reduction



You may reduce your risk of erectile dysfunction by improving your heart health.

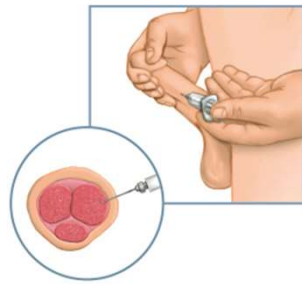
Healthy lifestyle choices:

- Diet
- Exercise/Physical activity<sup>16</sup>
- Weight loss<sup>16</sup>
- Quit smoking<sup>23</sup>
- Reduce stress<sup>23</sup>

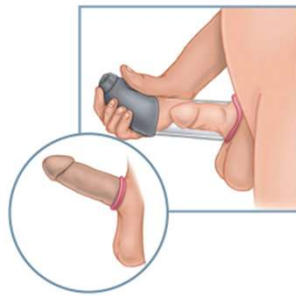
## Treatment options you may be familiar with



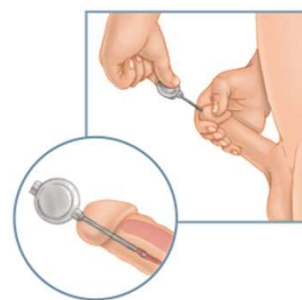
Oral  
Medications



Injectons



Vacuum  
Erection  
Devices



Urethral  
Suppositories



Penile  
Implants

# Oral medications (PDE-5 inhibitors)

## How do they work?<sup>33-35</sup>

- Increases blood flow to the penis

## How effective are they?

- Effective in approximately 60–80% of cases<sup>33-35</sup>
- Efficacy can be affected by food<sup>35</sup>

## Most common side effects:<sup>33-35</sup>

- Headache, facial flushing, upset stomach

## Some cautions:<sup>33-35</sup>

- Consult doctor if on alpha-blocker therapy or taking nitrates



- Almost half of some men with ED who try oral medications give up on the pills or they stop working.<sup>29</sup>
- Men with diabetes are up to 2 times more likely to move on to other treatments.<sup>15</sup>

# Intracavernous injection therapy

## How does it work?<sup>36</sup>

- Self-inject medication directly into penis, erection may develop within 5 to 20 minutes

## How effective is it?

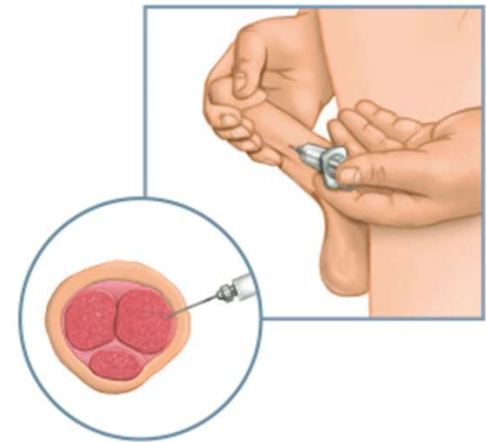
- Despite success rates, approximately 40% of men discontinue the therapy, typically within 6 months<sup>37</sup>

## Most common side effects:<sup>36,38</sup>

- Penile pain, prolonged erection, scar tissue, blood collection under the skin at injection site

## Most common reasons for discontinuation:<sup>38,39</sup>

- Failed erections
- Pain
- Dislike of injections



- A large number of studies have demonstrated that withdrawal rates are relatively high among injection therapy patients.<sup>38</sup>

# Vacuum erection device (VED)

## How does it work?

- A pump creates a vacuum that pulls blood into the penis and an elastic tension ring is placed at the penis base to maintain an erection<sup>40</sup>

## How effective is it?

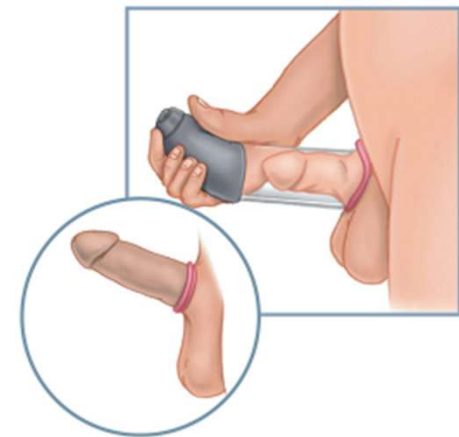
- Patient satisfaction rates range from 68–80%<sup>41</sup>

## Most common side effects:<sup>40,42</sup>

- Blocked ejaculation, bruising, discomfort, pain, penile numbness or coldness

## Most common reason for discontinuation:<sup>19,43</sup>

- Inability to achieve and maintain a full erection
- Pain or discomfort



- In one study, 86% of radical prostatectomy patients decided to move on to other sexual aids.<sup>44</sup>

# Urethral suppository

## How does it work?<sup>45</sup>

- After urination, insert the applicator stem into the urethra to deliver pellet; erection develops within 5 to 10 minutes

## How effective is it?

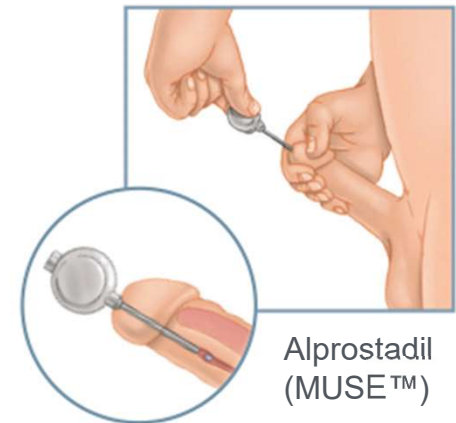
- Success rates are reported at 40–66%<sup>46,47</sup>

## Most common side effects:<sup>45,48</sup>

- Genital pain; minor urethral bleeding/spotting; low blood pressure; dizziness

## Most common reasons for discontinuation:<sup>49</sup>

- Insufficient erections
- Urethral pain and burning
- Switch to other ED therapy
- Natural return of erections



- **Unopened suppositories must be refrigerated.**<sup>45</sup>
- **75% drop-out rate of post-prostatectomy patients after 15 months.**<sup>50</sup>

# Penile implant

## How does it work?<sup>51</sup>

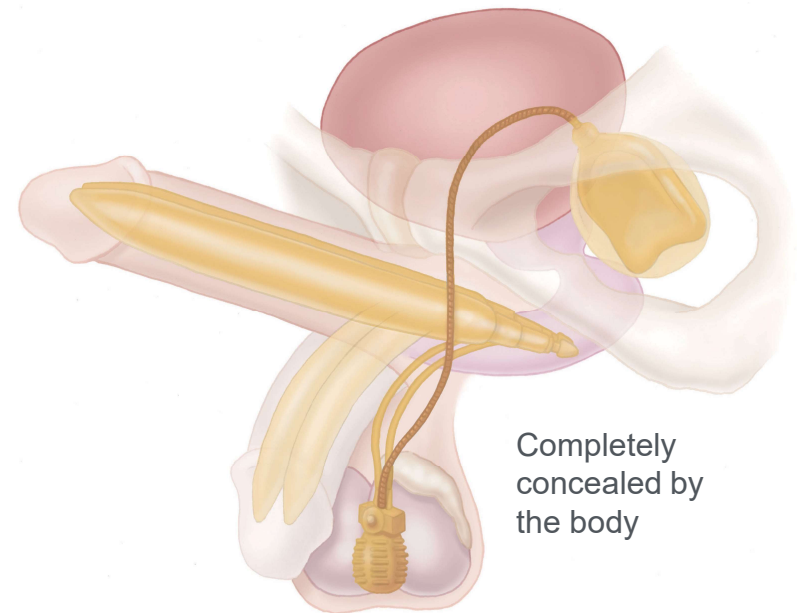
- Squeezing the pump moves fluid to create an erection; the penis returns to a flaccid state by pressing the deflate button

## How effective is it?

- 98% of patients reported erections to be “excellent” or “satisfactory”<sup>52</sup>

## Most common side effects/complications<sup>51</sup>

- Post-operative genital pain or infection
- Mechanical malfunction

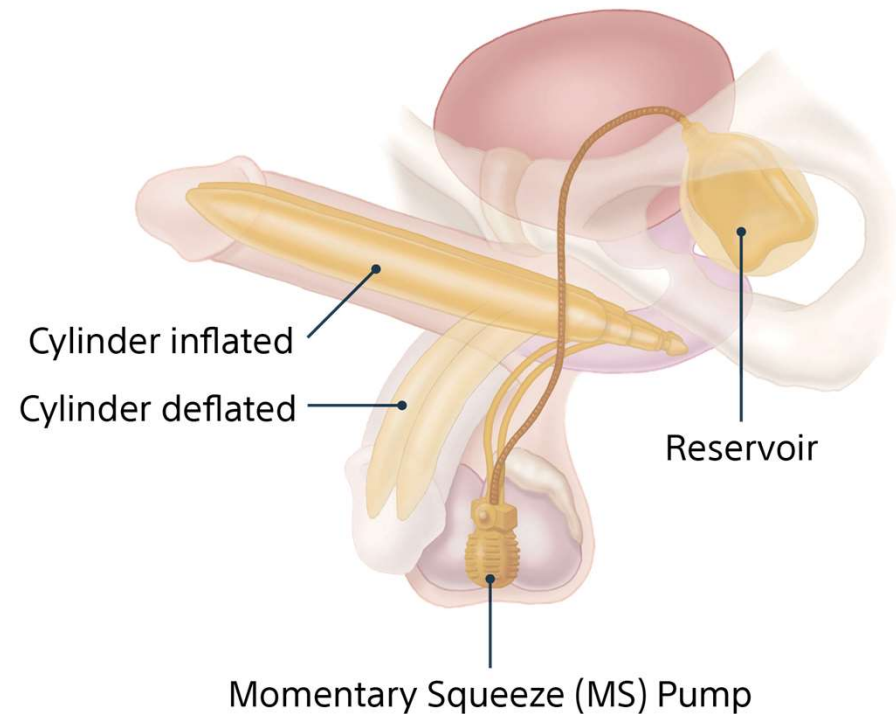


- At 7 years, 94% are still fully working.<sup>53</sup>

# Three-piece Penile Implant

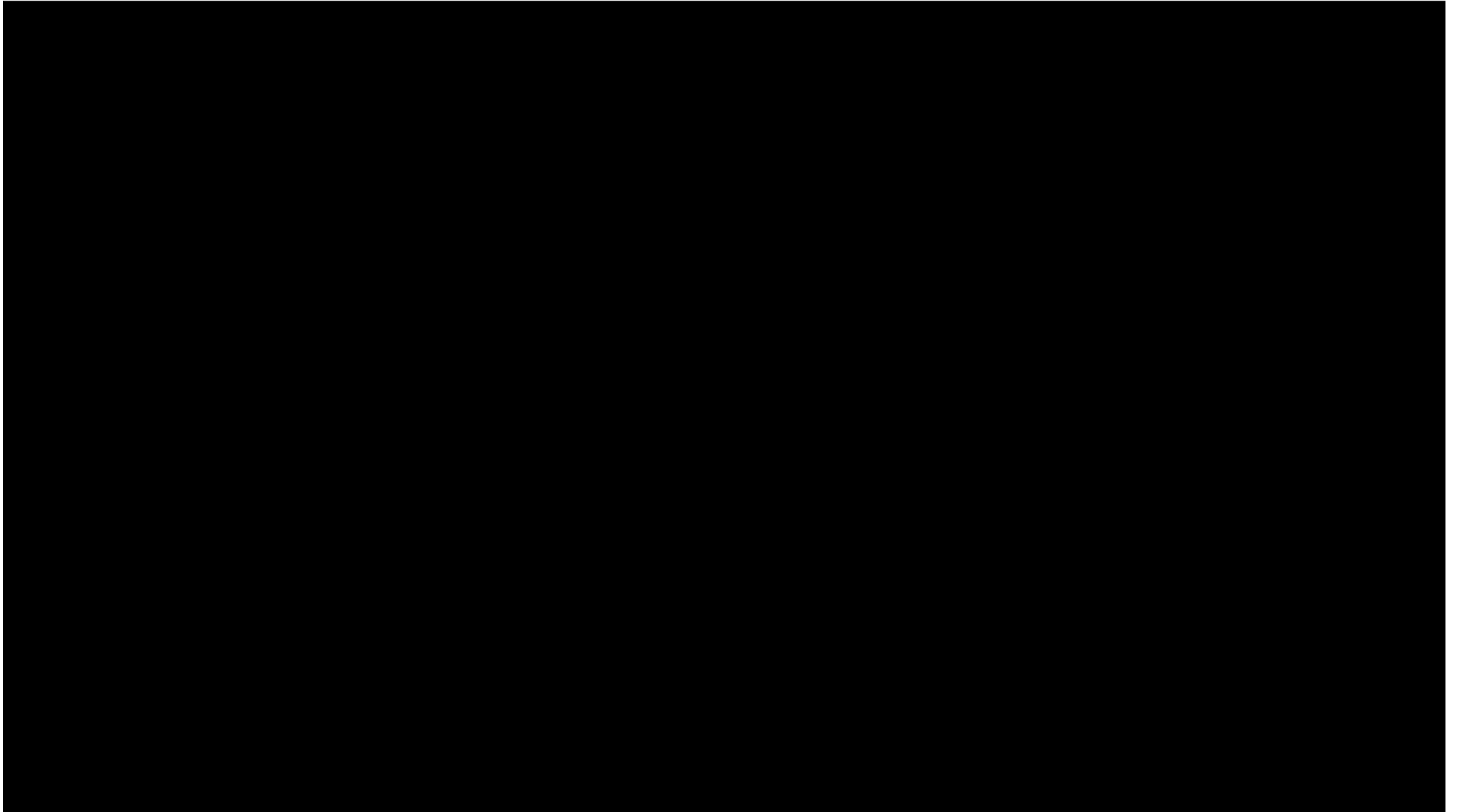
Most implanted and only with built-in antibiotic treatment<sup>4,54</sup>

- Clinically proven to reduce the risk of infection<sup>54</sup>
- Designed to most closely mimic a natural erection<sup>4</sup>
- Provides rigidity when inflated<sup>4</sup>
- Natural flaccid appearance when deflated<sup>4,55</sup>



- Penile implants have been in clinical use for over **45 years**<sup>56</sup> and more than **500,000 men** have received a penile implant.<sup>4</sup>

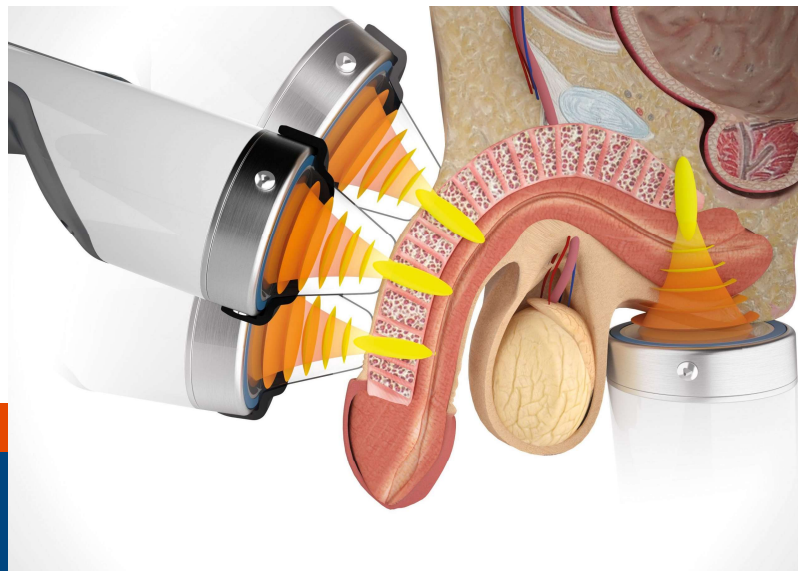
## How it works



# Li – SWT

## Low-intensity ShockWave Therapy

- Stimulation of penile tissue with Li-SWT can increase blood flow by 'recruiting' stem cells to form new blood vessels
- Shown to be safe with no known AEs
- Efficacy studied in hundreds of trials world-wide



# Li-SWT

## Low-intensity ShockWave Therapy

- Mixed results across hundreds of studies
- Modest increase in IIEF score
  - ?? Enough to make meaningful clinical difference
- Keep in mind – average “placebo effect” in ED studies 35-40% !!

Author/year	Device	N	Patients	EHS 3-4	IIEF-EF	Time
Vardi 2010	Medispec	20	vasc		+ 7.1	1-6 mo
Gruenwald 2012	Medispec	29	PDE5i-nonresp.	72.4%	+3.5	1 mo
Reisman 2014	Renova	58	vasc	/	+ 7.48	6 mo
Pelayo-Nieto 2015	Renova	15	vasc	80%	+ 5.46	6 mo
Ruffo 2015	Renova	31	PDE5i- nonresp.	/	+ 4.5	3 mo
Chung 2015	Storz	30	PDE5i-nonresp.	50%	± 3 (N/S)	4 mo
Frey 2016	Storz	18	RP		+0.5 (N/S)	1 yr
Pelayo-Nieto 2015	Storz	15	vasc	80%	+ 5.46	6 mo
Ruffo 2015	Storz	31	PDE5i- nonresp.	/	+ 4.5	3 mo
Bechara 2016	Storz	40	PDE5i non-resp.	60%	+ 9.1	12 mo



Questions?

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