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Low Intensity Shock Wave Therapy Should be Offered as a Treatment for Mild ED

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Case #1 Mild ED

- Would you consider ESWT as PRIMARY therapy prior to a trial of PDE5i's? Ans: Yes
- Do you feel this patient should have a duplex doppler ultrasound to document some evidence of vascular disease PRIOR to consideration of ESWT? Ans: No
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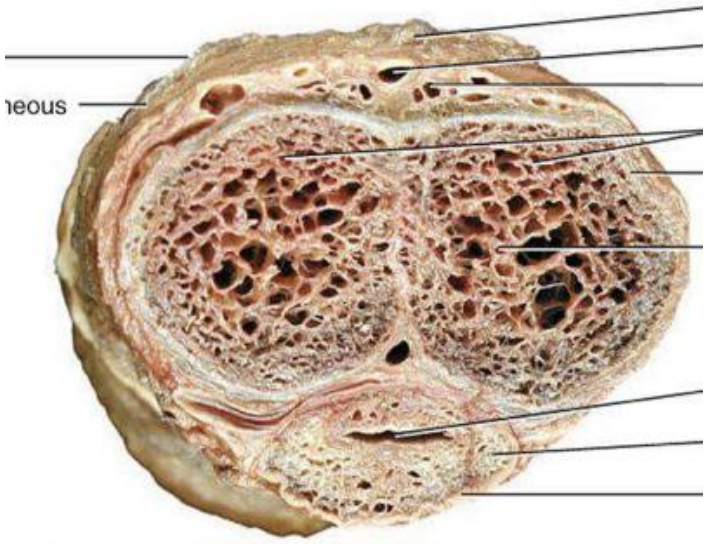
Erectile Dysfunction (ED) is a symptom of endothelial dysfunction (ED)

Endothelial dysfunction (ED) includes (1) reduced NO availability, (2) increased oxidative stress, and (3) inflammation—leads to impaired vasodilation and cavernosal distensibility. **Mild ED** starts with endothelial dysfunction.

PDE5i, ICI and MUSE provide short term symptom relief of ED

Li-ESWT treats the underlying causes leading to long term resolution of ED

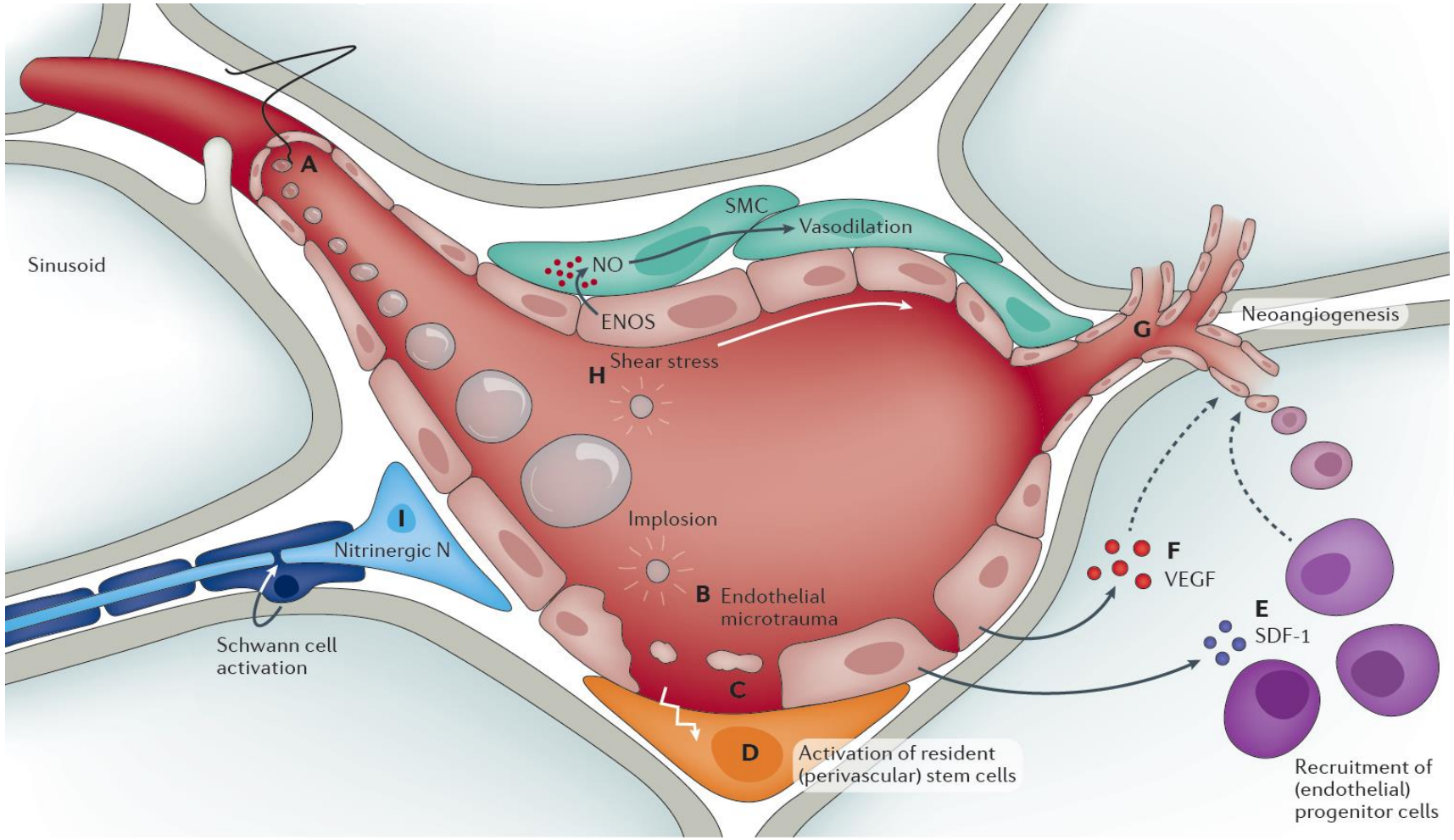
If a patient comes with fever and obstructing kidney stone, do you treat the fever (symptom) or the underlying cause (obstructing stone)?



Dissection Shawn Miller, Photograph Mark Nielsen

Mechanism of Low Intensity Shockwave Therapy for ED

Mechanisms



{Mikkel Fode, 2017}

Activation of endothelial cells → Improvement of endothelial function

Recruitment of endothelial progenitor cells → Angiogenesis

Anti-inflammatory effects

Neural regeneration

Activation of local stem cells

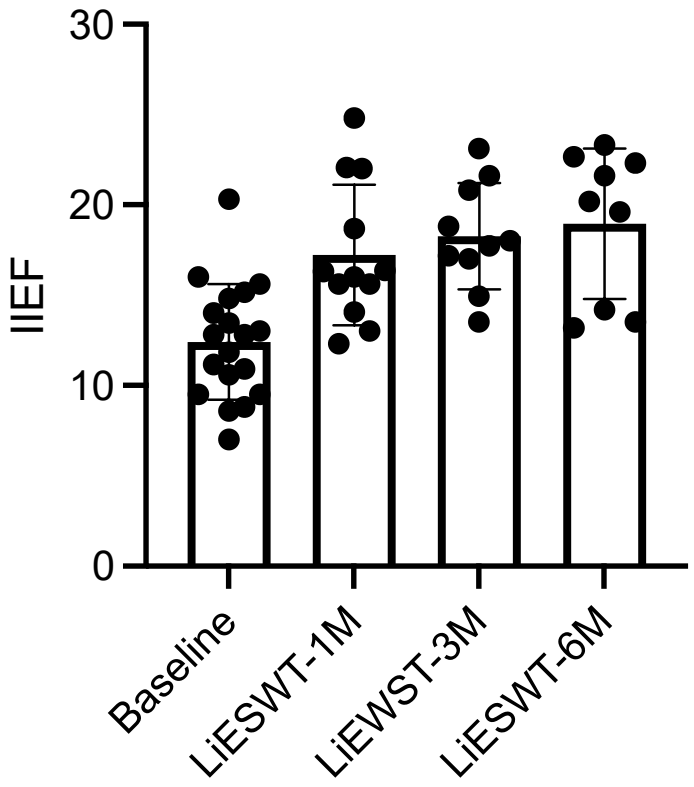
ED Severity	IIEF-EF Score (significant change)
Severe ED	1-10 (≥7)
Moderate ED	11-16 (≥5)
Mild ED	17 – 21 (≥2-4)
No ED (Normal)	22 – 25

A comprehensive, in-depth analysis

Of mild and moderate ED cases supported by AI

Study	Year	IIEF				EHS			
		Baseline	1M	3M	6M	Baseline	1M	3M	6M
Luigi	2021	16	24.8		23.3	2.07	3.39		3.17
Natlie	2021	13		17	13.5	1		2	2
Willam	2022	11.85	14.07	14.93	14.19	2.1	2.4	2.7	2.7
Emmett	2023					2	2.6	2.8	2.9
serdar	2021	15.17			21.6				
Muhammad	2023	9.5		13.5	13.2	1.9		2.6	2.6
Alessandro	2020	13.47	22.07			2.19	3.4		
Dong	2023	8.6	16.3						
scramkova	2019	12.8				2.1	3.1	3.6	
Y reisam	2014	14.8			22.3				
Sudhanshu	2010	15.6			19.6				
lian	2012	8.8	12.3	18.8					
Vasan	2014	9.5	22	21.6	20.2				
Yan-ping	2020	10.6	15.6			3	3		
Pedro	2018	14	16	18					
Kleiton	2018	10.9	15.6	17.2		2	3.1	3.2	
Noam	2015	7	13						
Frouad	2022	11.16	16.36	17.74		1.64	3.1	3.2	
Tatjana	2019	12.8	18.7	20.8		2.1	3.2	3.6	
Nazhar	2021	20.32		23.1	22.67				

Li-ESWT significantly improved IIEF scores at 1, 3, and 6 months following treatment

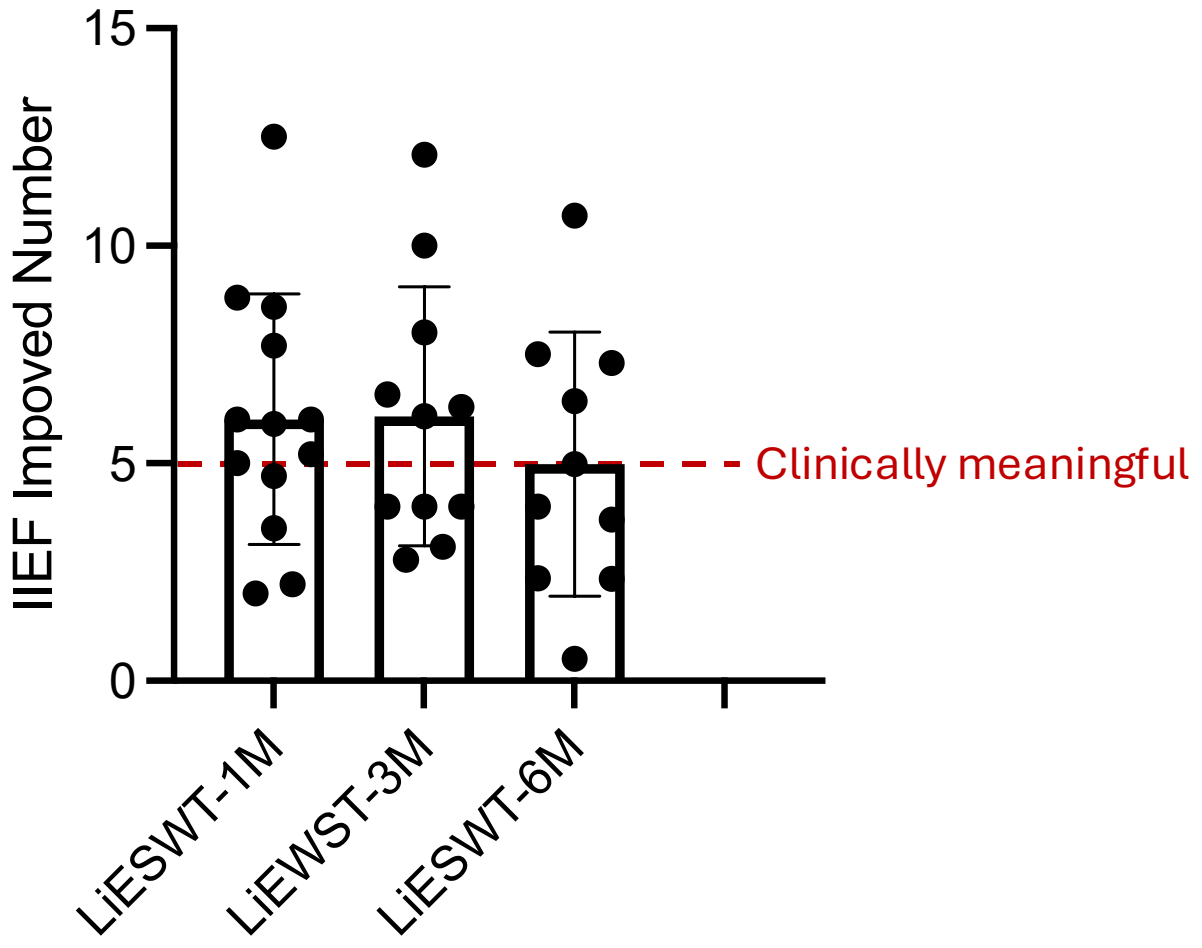


ANOVA summary	
F	10.60
P value	<0.0001
P value summary	****
Significant diff. among means (P < 0.05)?	Yes
R squared	0.4086
Brown-Forsythe test	
F (DFn, DFd)	0.3948 (3, 46)
P value	0.7573
P value summary	ns
Are SDs significantly different (P < 0.05)?	No
Bartlett's test	
Bartlett's statistic (corrected)	1.485
P value	0.6856
P value summary	ns
Are SDs significantly different (P < 0.05)?	No
ANOVA table	SS
Treatment (between columns)	392.0
Residual (within columns)	567.3
Total	959.3

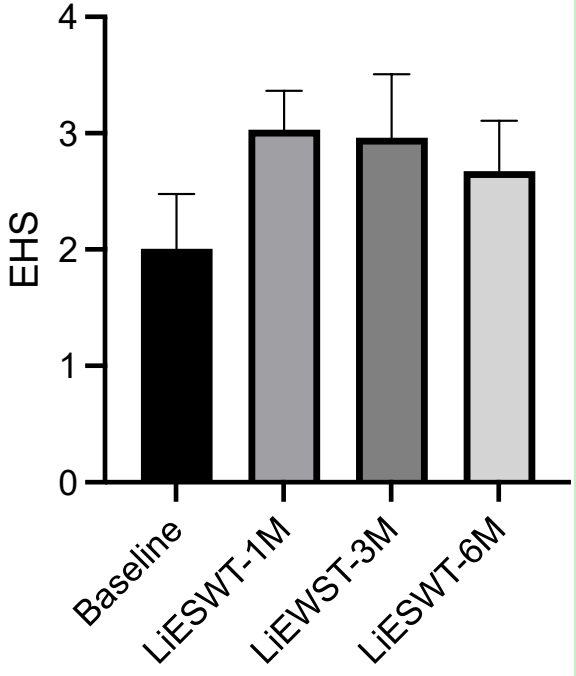
Column B	LiESWT-1M	LiEWST-3M	LiESWT-6M
vs.	vs.	vs.	vs.
Column A	Baseline	Baseline	Baseline
Unpaired t test			
P value	0.0008	<0.0001	0.0001
P value summary	***	****	***
Significantly different (P < 0.05)?	Yes	Yes	Yes
One- or two-tailed P value?	Two-tailed	Two-tailed	Two-tailed
t, df	t=3.758, df=29	t=4.804, df=27	t=4.584, df=26
How big is the difference?			
Mean of column A	12.41	12.41	12.41
Mean of column B	17.23	18.27	18.95
Difference between means (B - A) ± SEM	4.819 ± 1.282	5.853 ± 1.218	6.537 ± 1.426
95% confidence interval	2.196 to 7.442	3.353 to 8.353	3.606 to 9.468
R squared (eta squared)	0.3275	0.4608	0.4470
F test to compare variances			
F, DFn, Dfd	1.475, 11, 18	1.181, 18, 9	1.688, 8, 18
P value	0.4481	0.8302	0.3388
P value summary	ns	ns	ns
Significantly different (P < 0.05)?	No	No	No

Li-ESWT significantly improved IIEF scores, with clinically meaningful improvements observed at 1 and 3 months

Li-ESWT led to significant improvements in IIEF scores at multiple follow-up points. At 1 month and 3 months post-treatment, the mean IIEF improvement exceeded the clinical effectiveness threshold of **5 points**, with notable individual variability. Clinically meaningful improvements were consistently observed at 6 months, where the mean IIEF score changes remained near the effectiveness threshold.



Li-ESWT significantly improved Erectile Hardness Score (EHS) at 1, 3, and 6 months post-treatment

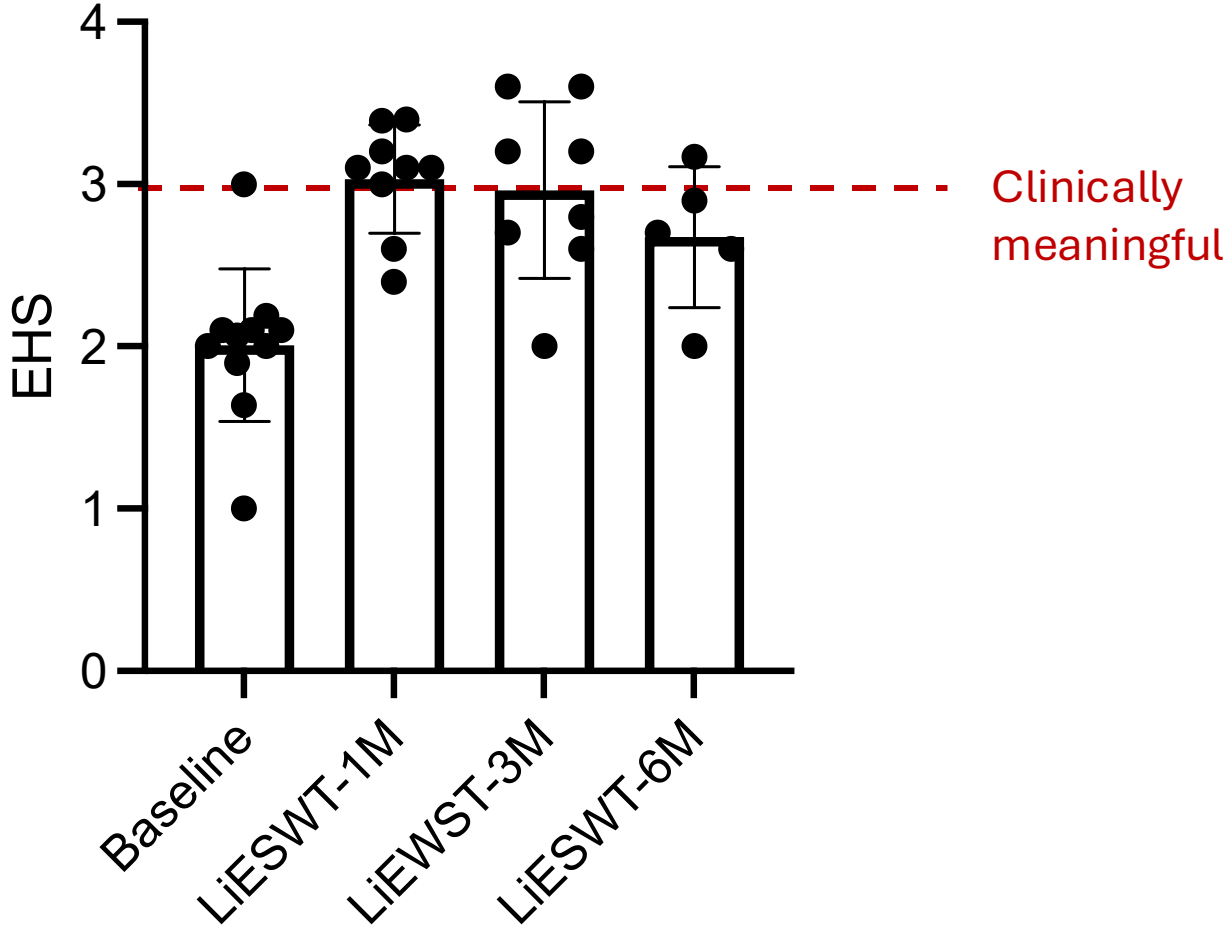


ANOVA summary	
F	10.72
P value	<0.0001
P value summary	****
Significant diff. among means (P < 0.05)?	Yes
R squared	0.5259
Brown-Forsythe test	
F (DFn, DFd)	0.7437 (3, 29)
P value	0.5347
P value summary	ns
Are SDs significantly different (P < 0.05)?	No
Bartlett's test	
Bartlett's statistic (corrected)	1.697
P value	0.6376
P value summary	ns
Are SDs significantly different (P < 0.05)?	No
ANOVA table	SS
Treatment (between columns)	6.588
Residual (within columns)	5.939
Total	12.53

Column B	LiESWT-1M	LiEWST-3M	LiESWT-6M
vs.	vs.	vs.	vs.
Column A	Baseline	Baseline	Baseline
Unpaired t test			
P value	<0.0001	0.0008	0.0180
P value summary	****	***	*
Significantly different (P < 0.05)?	Yes	Yes	Yes
One- or two-tailed P value?	Two-tailed	Two-tailed	Two-tailed
t, df	t=5.483, df=18	t=4.085, df=17	t=2.678, df=14
How big is the difference?			
Mean of column A	2.009	2.009	2.009
Mean of column B	3.032	2.963	2.674
		0.9534 ±	0.6649 ±
Difference between means (B - A) ± SEM	1.023 ± 0.1866	0.2334	0.2483
	0.6311 to	0.4610 to	0.1323 to
95% confidence interval	1.415	1.446	1.197
R squared (eta squared)	0.6255	0.4954	0.3387
F test to compare variances			
F, DFn, Dfd	1.980, 10, 8	1.344, 7, 10	1.167, 10, 4
P value	0.3450	0.6483	0.9572
P value summary	ns	ns	ns
Significantly different (P < 0.05)?	No	No	No

Li-ESWT significantly improved EHS, with clinically meaningful improvements observed at 1 month

Li-ESWT resulted in significant improvements in Erectile Hardness Score (EHS) compared to baseline. At 1 month post-treatment, the mean EHS surpassed the clinical effectiveness threshold of **3**, indicating a meaningful enhancement in erectile rigidity. Improvements were sustained through 3 and 6 months, though mean values at those points were slightly more variable.



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Non-invasive tests used to assess **endothelial dysfunction**

1. **Flow-Mediated Dilation (FMD)**
    1. Assesses brachial artery dilation via ultrasound.
2. **Peripheral Arterial Tonometry (PAT)**
    1. Measures fingertip arterial tone (e.g., EndoPAT system).
3. **Laser Doppler Flowmetry (with Iontophoresis)**
    1. Evaluates skin microvascular perfusion responses.
4. **Biomarker Testing**
    1. Blood-based markers of endothelial function, such as:
        1. **Asymmetric dimethylarginine (ADMA)**
        2. **High-sensitivity C-reactive protein (hsCRP)**
        3. **Interleukins (e.g., IL-6)**
        4. **Circulating endothelial cells (CECs)**

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What are the likely causes of ED in a 24-year-old man with no risk factors

Psychogenic Causes (Most Common at This Age)

- **Performance anxiety**
- **Depression, stress, or generalized anxiety disorder**
- **Relationship issues or lack of sexual confidence**
- **History of trauma or negative sexual experiences**
- **Excessive pornography consumption** (linked to altered arousal patterns)

Lifestyle Factors

- **Substance use** (e.g., alcohol, marijuana, cocaine, anabolic steroids)
- **Smoking** (vascular effects)
- **Poor sleep hygiene**
- **Sedentary lifestyle or obesity**

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Potential synergetic action of the two therapies

PDE5i : Symptomatic therapy
- fast result
- regains confidence quickly

Li-ESWT : Etiological therapy
- improves slowly
- is curative

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