

# The Effect of a Pelvic Floor Muscle Training Program Using Active and Resisted Exercises on Male Sexual Function: A Randomised Controlled Trial

Dorey G<sup>a</sup>, Siegel A<sup>b</sup>, Nelson P<sup>c</sup>

<sup>a</sup> Emeritus Professor of Physiotherapy (Urology), Faculty of Health and Social Science, University of the West of England, Glenside Campus, Blackberry Hill, Stapleton, Bristol BS16 1DD, UK

<sup>b</sup> Assistant Clinical Professor of Surgery, Division of Urology, Rutgers-New Jersey Medical School, Newark New Jersey

<sup>c</sup> Clinical Sexologist, MAZE Men's Sexual & Reproductive Health, 2975 Westchester Ave, Purchase, New York, 10577 USA

## Disclaimer

All authors are members of the medical advisory board of the *Private Gym* male pelvic floor training system.

## Abstract

A small RCT showed improved erectile function in men with mild erectile dysfunction (ED) and enhanced erections and ejaculation in men without ED, with the resistance programme expediting the results beyond the capacity of the non-resistance programme. Pelvic floor muscle strength, erectile rigidity and durability, ejaculation control and force as well as confidence and sexual pleasure were improved. Those in the control group failed to show improvement.

## Introduction

The pelvic floor/perineal muscles are vital with respect to penile rigidity and durability of erections, which demand penile blood pressures that far exceed systemic systolic blood pressures. The contractions of the ischiocavernosus and bulbocavernosus muscles compress the penile crura and are responsible for the hypertensive blood pressure in the penile corpora.

Despite the importance of the pelvic floor muscles to the erectile process, there has been limited research on the use of pelvic floor training in men with sexual dysfunction and an absence of research on its use in healthy men without sexual dysfunction. There have been a few previous studies that have documented the benefits of pelvic muscle training in the management of ED (Dorey et al, 2004; Claes & Baert, 2003; Van Kampen et al, 2003; Prota et al, 2012) and premature ejaculation (La Pera & Nicastro, 1996, Piediferro et al, 2004; Pastore et al, 2012).

A trial in the UK showed that pelvic floor exercises cured or improved erectile function in 75% of men with ED (Dorey et al, 2004). This was the basis for hypothesising that sexual performance in healthy men might be similarly enhanced using pelvic floor muscle training consisting of active and resisted exercises with similar regimens to the intensive training used to strengthen other voluntary skeletal muscles. The principle of exercise physiology that muscle hypertrophy and strength increase occur in direct proportion to the demands and resistances placed upon the muscle provided the rationale for using a resistance mechanism to challenge the pelvic floor muscles beyond what could be achieved with active exercises alone.

The pelvic floor muscles can be trained without resistance by contracting and relaxing them for a number of sets of repetitions for variable periods of contraction time and intensity. The *Private Gym* is a comprehensive, interactive, FDA registered, follow-along exercise pelvic floor muscle training programme designed to adhere to the principles established by Dr. Arnold Kegel, including muscle education, feedback, progressive intensity and resistance. It starts with *Basic Training*, a 4-week programme of progressive non-resisted exercise that strengthens the pelvic floor muscles with a series of progressive “Kegel” exercises. After completion of *Basic Training*, The *Complete Training* programme is pursued, which provides the maximum opportunity for gains via resistance equipment.

When the penis is erect, the ischiocavernosus and bulbocavernosus muscles are responsible for the ability to voluntarily lift the penis up and down as the pelvic floor muscles are contracted and relaxed. The *Private Gym* resistance device is a weighted ring that is placed around the erect penis. Additional resistance may be added via a small magnetic weight that is attached to the weighted ring. When the erect penis with the resistance device is in place it is lifted up by contracting the pelvic floor muscles; the pelvic muscles get a workout that is not achievable by simply contracting the muscles in the absence of such resistance, paralleling Kegel’s use of the perineometer resistance device in the female population (Kegel, 1948).

### **Aim of study**

The aim of this study was to obtain subjective and objective metrics on the effect of active and resisted pelvic floor muscle training on sexual function in a population of men with either mild or no ED.

### **Methodology**

The study participants were accrued by online invitation to community dwelling healthy men. Volunteers were all paid a small stipend for their participation.

Study metrics were obtained at Maze Men’s Sexual & Reproductive Health, 110 E. 40<sup>th</sup> St. New York, NY. Participants were randomised into two groups; one group received intervention of active and resisted training using the *Private Gym Pelvic Floor Muscle Training Program* instructional video and resistance device, while the other group received no active treatment.

Participants in the intervention group had either no or minimal erectile dysfunction and were put through the *Private Gym* programme to strengthen the pelvic muscles. *Basic Training* (non-resisted exercises) consists of a 4-week programme that becomes progressively challenging each week, using a combination of rapid pulsations, 1-2 second, 3-5 second, and up to 20-second pelvic floor muscle contractions. Three sets of exercises are done 3-4 times per week. After completion of the non-resisted exercises, the *Complete Training* is started, which consists of a 4-week programme that also becomes progressively challenging each week, using penile resistance with a combination of rapid pulsations, 1-2 second lifts, 3-5 second lifts, and up to 20-second pelvic muscle contractions. In the final 4-weeks the men repeat the week 8 workout for the next month.

Subjective data were obtained from both groups at baseline. This included personal questions to monitor subjects’ ethnicity, age, weight, sexual inclination, sexual experience and penile length. Metrics were obtained before starting the programme

and after completion of each module. Subjective measures included a multiple-choice questionnaire derived from the Erectile Domain of the International Index of Erectile Function (IIEF-6) (Rosen et al 2002) and written commentary. Objective metrics included assessment of the strength of the pelvic muscles via anal manometry and the use of goniometry to measure penile-pubic angles at full erectile rigidity both with and without a maximum pelvic muscle contraction. A control group underwent the same metrics every four weeks but did not utilise the PFMT programme.

The study sexologist<sup>c</sup> obtained and recorded all objective data in both groups at baseline and at 1 month, 2 months and 3 months from baseline. Anal manometry readings were measured using an anal Peritron™ perineometer (Laborie Medical Technologies, Ontario, CAN). Measurements were obtained in centimetres of water using the average of 10 maximum intensity pelvic floor muscle contractions lasting 1 second, 5 lasting 3 seconds and 5 lasting 10 seconds. In addition to obtaining anal manometry, erectile angulation measurements were also obtained at the same intervals. Participants were requested to obtain an erection and the erectile angle was measured with a goniometer against the vertical with the pelvic floor muscles relaxed and with the pelvic floor muscles contracted. Additionally, the length of time that the maximal angle could be maintained was measured and recorded.

## Results

In total, 26 participants were randomised into the intervention group and 4 men into the control group. Subjects' particulars are shown below in Table 1.

There were six dropouts, all from the intervention group. The reasons for men dropping out were the following: a change in employment resulting in moving out of the area (two actors, one itinerant worker), two subjects withdrew due to the longevity of the study, while one subject withdrew because he did not pursue the programme.

The groups were fairly similar in age, ethnicity, occupation, sexual status, frequency of sexual activity, morning erections, penis size and sexual problems.

All men in the intervention group showed improved muscle strength when determining the average anal manometry results of 10 one-second squeezes, 5 three-second squeezes and 5 ten-second squeezes. At 3 months, these men showed manometry improvement of 65.4%, 69%, and 71%, respectively compared to baseline (See Table 2). The control group failed to improve.

At the end of the trial, the erect penile angle when the pelvic muscles were contracted improved by 14 degrees in the experimental group and 19 degrees in the control group. The time the maximal angle was maintained improved by 23.9 seconds in the intervention group and by 7.5 seconds in the control group. See Table 3.

The IIEF-6 at trial end documented the percentage of men in the intervention group who had increases in erectile strength (68%), intensity of orgasm (68%), ejaculatory control (32%), force of ejaculation (48%), sexual confidence (80%) and sexual pleasure (72%). The corresponding control group results were 33%, 33%, 0%, 0%, 0% and 25% respectively (Table 4).

The average scores in the erectile function domain of the IIEF improved in the intervention group at 1, 2 and 3 months from baseline while the average scores of the control group for the same time points remained the same. See Table 5.

At the end of the trial, the intervention group commented on the Basic and Complete training, strength, size and staying power of their erections, ejaculation, confidence and pleasure as shown in Table 6.

#### *Strength of erection*

From the IIEF-6, 68% of healthy men reported improved erectile strength after pelvic floor training. Only one subject in the control group reported some improvement. Many men in the intervention group commented on a larger, more rigid and durable erection with a greater ejaculate volume. The 3 men who reported premature ejaculation and the 6 men reporting mild erectile dysfunction benefitted as well.

#### *Intensity of orgasm*

From the IIEF-6, at trial end 68% of men in the intervention group reported increased orgasm intensity.

#### *Ejaculatory control and force*

At trial end the IIEF-6 showed that 32% men in the intervention group had improved ejaculatory control and 48% had increased ejaculatory force. No men in the control group improved.

#### *Sexual confidence*

At 3 months, data from the IIEF-6 showed that 80% of men in the intervention group reported improved their sexual confidence compared to none in the control group. This was corroborated judging by their comments--these men felt more in control, masturbated more frequently and desired sex more often. Three men felt that their improved performance had contributed in a meaningful way to salvaging their relationship.

#### *Sexual pleasure*

The IIEF-6 at trial end showed that 72% of men in the intervention group noted improved sexual pleasure.

### **Discussion**

Erectile rigidity and durability is contingent upon a series of events that can be classified into pre-penile, penile and post-penile events. First, mediated by neurochemical-induced arterial smooth muscle relaxation, the arterial blood flow to the penis needs to increase substantially (pre-penile event). Second, smooth muscle within the arteries and the spongy sinuses of the corpora cavernosa and spongiosum of the penis must relax to permit vascular engorgement and tumescence (penile event). Third, the superficial pelvic floor muscles, the ischiocavernosus and bulbocavernosus, must engage and compress the penile crura and bulb, respectively, to transform the tumescent penis into a rigid penis and stabilise the erect penis so that it stays rigid and skyward-angling (post-penile event).

ED is most often multifactorial and the pelvic floor muscles contribute in a meaningful way to the erectile process. The bulbocavernosus and ischiocavernosus

muscles are of particular importance during the process of obtaining and maintaining a rigid erection. When these muscles engage, their contractions help prevent the exit of blood from the penis, enhancing penile rigidity and allowing for intra-corporeal pressure to far exceed systemic systolic pressure. The bulbocavernosus supports and maintains pressure within the turgid corpus spongiosum and glans and at the time of climax it is responsible for ejaculation by virtue of its strong rhythmic contractions. The ischiocavernosus supports, stabilizes, and compresses the corpora cavernosa, impeding the return of blood to maintain pressure and rigidity within the corpora cavernosa. Additionally, the ischiocavernosus supports the penile crura, the foundational support that permits a more “skyward” angling erection and at the time of climax it contracts rhythmically, responsible for maximal erectile rigidity at the time of ejaculation. The 1909 Gray’s Anatomy aptly labeled the ischiocavernosus the “erector penis.” When teaching PFMT, some find it useful advising men to “imagine moving the penis up and down without moving any other part of the body” (Newman, 2013).

Pelvic floor muscle contractility has been studied in men with and without ED using electromyography, demonstrating that pelvic muscle voluntary activity is more efficient in men with normal erectile function as compared with a matched group of men with ED, supporting the concept that pelvic muscle efficiency is related to erectile capability (Colpi et al, 1999). There are statistically significant differences in ischiocavernosus function between patients with intact erectile function and those with ED with respect to stroke length, duration of contraction, and maximal contractile force (Kawanishi et al, 2001).

70% of pelvic floor muscle fibres are slow-twitch type 1 (fatigue resistant that maintain static tone) and 30% are fast-twitch type 2 (fatigue-prone fibres that are capable of active contraction). The fast-twitch fibres that are capable of explosive contraction are particularly susceptible to decline based upon aging, inactivity and other factors (Newman, 2013). However, the pelvic floor muscles, as with all skeletal muscles, are subject to adaptation and are capable of hypertrophy when subjected to exercise.

One participant reported sore muscles when beginning the regimen. Another reported difficulty lifting the resistance device at first. Four men felt that the resistance made the biggest difference and one man wished for more resistance weights than were provided.

This study corroborates the results of a previous randomised controlled trial on the salutary effects of pelvic training on ED (Dorey et al, 2004). The pelvic floor muscle training using the *Private Gym* programme not only improved erectile function, but also ejaculatory dysfunction in men with mild dysfunction.

This is the first study of the effect of pelvic floor muscle training on sexual function in men with normal sexual function. On the basis of objective and subjective measures—anal manometry, erectile goniometry, IIEF survey results and participant commentaries—pelvic floor training does indeed enhance men’s sexual performance, whether they have mild ED or if they have normal sexual function. Participants without ED were noted to have improved PFM contractility and improved erectile function over baseline, including all parameters under study. The resistance programme accelerated the results beyond the non-resistance programme.

Additionally, this is the first time that ejaculatory function has been studied in healthy men subject to pelvic floor muscle training with the finding of improvement in ejaculation/orgasms in these men. **Shortcomings of Study**

The trial took place in the USA and included men of different ethnicity and sexual orientation drawn from a metro area via an online invitation. Due to the geographical location in a metropolitan area, the participants may not be representative of a broader population. Additionally, the nature of the study may have drawn a set of participants with a particular sexual focus that could potentially affect the study outcome.

The study had a relatively small number of participants, limiting conclusions. Additionally, in most randomised controlled trials, subjects are randomised into groups of similar numbers. However, in this small trial the number of controls was limited in order to have as large an intervention group as possible.

Objective data regarding pelvic floor muscle contractility was obtained by anal manometry, which although measuring overall pelvic muscle contractility, may not accurately reflect the muscles of most concern with respect to erectile and ejaculatory function, namely the ischiocavernosus and bulbocavernosus muscles.

## **Conclusion**

This small, preliminary RCT of active and resisted pelvic floor muscle training in men without ED and those experiencing mild ED and/or premature ejaculation has demonstrated increased pelvic floor muscle strength, erectile rigidity and durability, ejaculation control and force. Additionally, sexual confidence and sexual pleasure were improved. The study not only demonstrated improved erectile function in men with mild ED, but it also showed enhanced erections and ejaculation in men without ED, with the resistance programme expediting the results beyond the non-resistance programme. The research team recommends consideration for a larger multicentre randomised controlled trial to confirm these findings.

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	<b>Intervention n=26 Average (Range)</b>	<b>Control n=4 Average (Range)</b>
Age	41 years (21-64)	41 years (27-65)
Ethnicity	11 Caucasian 11 African American 3 Hispanic 1 Philipino	3 Caucasian 1 West Indian
Occupation	10 professional 11 non- professional 2 retired 3 unemployed	3 professional 1 retired
Sexual status	20 heterosexual 5 gay 1 bisexual	2 heterosexual 2 gay
Sex frequency	(0-15 times a week)	(0-5 times a week)
Adventurous sexually (0-10)	7 (3-10)	5 (1-10)
Masturbation frequency	(0-21 times a week)	(0-7 times a week)
Morning erections	10 yes 13 sometimes 3 no	2 yes 2 sometimes
Spontaneous diurnal erections	18 yes 5 sometimes 3 no	1 yes 3 no
Penis size	7" (4.5"-10")	6.5" (6"-7.5")
Sexual problems	4 mild erectile dysfunction 3 premature ejaculation 1 delayed ejaculation	1 mild erectile dysfunction

**Table 1 Subject demographics**



<b>Manometry in cmH<sub>2</sub>O</b>	<b>Intervention n=26 average</b>	<b>Control n=4 average</b>	<b>Between group Difference in H<sub>2</sub>O % Difference</b>
10 x 1 second squeezes			
Baseline	120.2	75.6	
1 month	138.3	62.8	
2 months	156.9	68.9	
3 months	198.8	81.5	
Improvement (3 months – Baseline)	<b>78.6</b>	<b>5.9</b>	<b>72.7</b>
% Improvement	<b>65.4%</b>	<b>7.8%</b>	<b>57.6%</b>
5 x 3 second squeezes			
Baseline	77.8	72.9	
1 month	82.1	54.2	
2 months	91.6	53.7	
3 months	124.5	60.9	
Improvement (3 months - Baseline)	<b>46.7</b>	<b>-12</b>	<b>58.7</b>
% Improvement	<b>69%</b>	<b>-16.5%</b>	<b>85%</b>
5 x 10 second squeezes			
Baseline	71.1	45.7	
1 month	80.5	36.7	
2 months	98.3	53.35	
3 months	122.2	42.7	
Improvement (3 months – Baseline)	<b>51.1</b>	<b>-3</b>	<b>54.1</b>
% Improvement	<b>71.9%</b>	<b>-6.5%</b>	<b>78.4%</b>

**Table 2      Anal Manometry**

<b>Erect penile angle in degrees°</b>	<b>Intervention group n=26 average</b>	<b>Control group n=4 average</b>
Baseline		
With PF muscles relaxed	77°	69°
With PF muscles tense	83°	81°
Time max. angle maintained	2.8 seconds	1.8 seconds
1 Month		
With PF muscles relaxed	58°	73°
With PF muscles tense	88°	85°
Time max. angle maintained	8.4 seconds	2.8 seconds
2 Months		
With PF muscles relaxed	60°	77°
With PF muscles tense	92°	97°
Time max. angle maintained	13.8 seconds	9.3 seconds
3 Months		
With PF muscles relaxed	66°	84°
With PF muscles tense	97°	100°
Time max. angle maintained	26.7 seconds	9.3 seconds
Improvement (3 Months minus Baseline)		
With PF muscles relaxed	-11°	15°
With PF muscles tense	14°	19°
<b>Time angle maintained</b>	<b>23.9 seconds</b>	<b>7.5 seconds</b>

**Table 3      Erect penile angles and time maintained**

<b>IIEF-6</b>	<b>Intervention</b>	<b>group</b>	<b>n=25</b>	
	Men scoring 3 points at 3 months	Men scoring 4 points at 3 months	Men scoring 5 points at 3 months	<b>% men scoring 4 &amp; 5 points</b>
Erectile strength	8	11	6	<b>68%</b>
Intensity of orgasm	8	15	2	<b>68%</b>
Ejaculatory control	17	5	3	<b>32%</b>
Force of ejaculation	13	9	3	<b>48%</b>
Sexual confidence	5	10	10	<b>80%</b>
Sexual pleasure	7	9	9	<b>72%</b>
<b>IIEF-6</b>	<b>Control</b>	<b>group</b>	<b>n=3</b>	
Erectile strength	2	1	0	<b>33%</b>
Intensity of orgasm	2	1	0	<b>33%</b>
Ejaculatory control	3	0	0	<b>0%</b>
Force of ejaculation	3	0	0	<b>0%</b>
<b>IIEF-6</b>	<b>Control</b>	<b>group</b>	<b>n=4</b>	
Sexual confidence	4	0	0	<b>0%</b>
Sexual pleasure	2 (1 scored 2 points)	1	0	<b>25%</b>

**Key**

- Greatly reduced 1
- Somewhat reduced 2
- About the same 3
- Somewhat improved 4
- Greatly improved 5

**Table 4 IIEF-6 % of those with improved scores**

<b>IIEF-6</b>	<b>Intervention group n=26 average</b>	<b>Control group n=4 average</b>
How has strength of erection changed?		
Month 1	4	3
Month 2	4	3
Month 3	4	3
How has intensity of orgasm changed?		
Month 1	4	3
Month 2	4	3
Month 3	4	3
How has ejaculatory control changed?		
Month 1	3.5	3
Month 2	4	3
Month 3	3.5	3
Has force of ejaculation changed?		
Month 1	3.5	3
Month 2	4	3
Month 3	3.5	3
How has your confidence changed?		
Month 1	4	3
Month 2	4	3
Month 3	4	3
How has sexual pleasure changed?		
Month 1	4	3
Month 2	4	3
Month 3	4	3

**Key**

Greatly reduced 1

Somewhat reduced	2
About the same	3
Somewhat improved	4
Greatly improved	5

**Table 5**      **IIEF-6 average scores**

## Comments from men at the end of the study

### Intervention group n=26

#### **Private Gym Basic training**

Surprised. Had no idea muscles affected sex.

The workout was fine.

Muscles were sore for first week – gradually went away.

I did exercises inside my girlfriend. (2 comments)

She orgasms from my doing them inside her.

Biggest improvement was basic training.

#### **Private Gym Complete training**

When I first used the weight I could not move it at all. Now I can.

The weights made the biggest difference. (4 comments)

I want a second weight; I have reached the max. of one weight.

#### **Strength of erection**

Nothing much changed. (2 comments)

It actually helped – did not expect that. (2 comments)

Easier to get erection.

Morning erections more often.

Since I've started I have no ED issues. (2 comments)

Hold farts better.

Penis feels bigger. (4 comments)

Girlfriend/wife noticed my penis was bigger. (3 comments)

Purple head was bigger.

Penis was harder. (3 comments)

Erections last longer. (3 comments)

#### **Ejaculation**

Precum for the first time ever.

More cum. (3 comments)

Premature ejaculation much better.

#### **Confidence**

Feel more in control.

I masturbated more. (3 comments)

It made a huge difference in confidence. (5 comments)

Made me want more sex.

I never had any problems but this only made me better.

It saved my relationship. (2 comments)

It saved my marriage.

**Pleasure**

Improved the sex experience. (3 comments)

**Control group n=4**

What was this supposed to do?

Why did you want to stick something into my ass?

Sex is not fun if I thought about my ass.

I figured out what it was about, but did not know what was going on.

Made me aware of my pelvis and penis.

It was hot to imagine what the other guys were doing.

**Table 6      Comments at study end**