

Effect of Intravaginal Electric Stimulation and Kegel's Exercise on Pelvic Floor Muscle Strength and Endurance in Postpartum Females Having Urinary Incontinence: A Case Series

Dr. Hiral Ayalani¹, Dr. Saumya Dave²

¹MPT Student, ²Assistant Professor, CU Shah Physiotherapy College, Surendranagar, Gujarat.

Corresponding Author: Dr. Hiral Ayalani

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ABSTRACT

INTRODUCTION: Urinary incontinence can be of three types stress, urge and mixed. Almost two-thirds of women experience UI postpartum. Prevalence rates of up to 42.8% are reported for women aged 30 to 45 years living in India. Urinary incontinence is socially embarrassing condition with a profound effect on Quality of life. Physical therapy has become preferred treatment for many patients with urinary incontinence because of its relatively simple treatment, low medical cost, and no side effects and adverse reactions which mainly includes pelvic floor muscle training, bladder training, and nerve regulation.

AIM OF THE STUDY: To check the effect of IVES along with Kegel's exercise on pelvic floor muscle strength and endurance in postpartum females having UI.

METHOD: Three cases of below 40 years female were taken having urinary incontinence. Pre examination of Pelvic floor muscle strength and endurance in all three cases was done. Four weeks of intervention including Intravaginal electric stimulation (IVES) along with Kegel's exercise was given. Post analysis was done after four weeks.

RESULTS: Results were calculated on the basis of Mean±SD values of all three cases. There was improvement found in muscle strength and endurance after four weeks of IVES along with Kegel's exercise.

CONCLUSION: This present study concludes that Combined intervention of IVES+ Kegel's exercise is safe and effective in females with urinary incontinence. IVES is safe to use in females with urinary incontinence.

Keywords: Urinary incontinence, Intravaginal electric stimulation, Postpartum females, Pelvic floor dysfunctions, Quality of life.

INTRODUCTION

Urinary incontinence is defined by international continence society as complaint about involuntary leakage of any amount of urine.¹ It can be Stress incontinence, urge incontinence and Mixed incontinence caused by coughing, sneezing, laughing, or lifting heavy items or sudden and strong urge to

void.² Weight Gain during pregnancy and injuries to pelvic floor tissues caused by birth are often associated with reduction in Pelvic floor muscle strength and results in Pelvic floor dysfunctions such as Urinary incontinence.² Almost two-thirds of women experience UI postpartum. Prevalence rates of up to 42.8% are reported for women aged

30 to 45 years living in India. Urinary incontinence is socially embarrassing condition with a profound effect on Quality of life.³ The most common etiology for UI includes increasing age, increasing parity, vaginal deliveries, obesity, pelvic surgery, diabetes mellitus, depression, constipation, chronic respiratory problems as well as caffeine and alcohol intake. The prevalence of UI and treatment- seeking behavior is comparatively a very less explored field of research in India. With numerous confounding factors such as shyness, fear of surgery, lack of money, dependency on husbands and belief that it is a natural consequence after delivery or aging⁵, women tend to avoid reporting this problem. Urinary Incontinence is also known as 'Social cancer'.⁶ Kegel's exercise is prescribed in UI cases. The outcomes which can improve with physiotherapy includes subjective such as QOL questionnaire, King's Health questionnaire, MMT grade, muscle endurance with Laycock pelvic floor assessment and objective such as perineometer, pad test, urodynamic study. Physical therapy has become preferred treatment for many patients with urinary incontinence because of its relatively simple treatment, low medical cost, and no side effects and adverse reactions which mainly includes pelvic floor muscle training, bladder training, and nerve regulation.⁴ Electric stimulation is a way of nerve regulation and it is used to stimulate the afferent, efferent nerve or effector innervating bladder by outputting appropriate current through the device so as to reduce sensitivity of bladder. Such females feel shy on sharing these problems and so they suffer silently. Kegel's exercise is effective in urinary incontinence but the improvements in strength and endurance takes time. Proper contraction of pelvic floor muscles in Kegel's exercise is important, where few females are not able to initiate or understand. Intravaginal electric stimulation (IVES) with instruction to attempt simultaneous voluntary pelvic floor muscle contractions improves the ability to contract the Pelvic floor muscles in those

women who are unable to perform PFM contraction properly in their acute stage of incontinence⁸, so it does works as Biofeedback and provides precursor to improvement in pelvic floor muscle strength and endurance. There are very few reported cases of UI for physiotherapy treatment, so the need for doing case series is minimal cases referred. Therefore, need of this study is to check the effect of IVES along with Kegel's exercise on pelvic floor muscle strength and endurance in postpartum females having UI.

MATERIALS & METHODS

The study included three female participants with Urinary incontinence who were below 50 years of age with no history of Pelvic organ prolapse, Hysterectomy, Intrauterine devices and urinary tract infection. The consent of all three participants were taken and they were explained about treatment.

After taking written informed consent, and detailed history, physical examination was done. The details of each participant are summarized below:

- Case1 Participant: - A 48-year-old female had weight 57kgs and height 160cm with BMI 22.2kg/m². She had history of 2 vaginal deliveries with episiotomy 11 years ago. She complained of leakage of urine with bending activities and not able to hold urine for few hours while travelling. She felt pelvic pain while urinating. She had her USG reports done which suggested normal urinary bladder and uterus alignment. On examination she had Laxity in pelvic floor muscles, with grade 1 of MMT scale and muscle endurance of 3 seconds hold with grade 1.
- Case2 Participant: - A 30-year-old female had weight 62kgs and height 163cm with BMI 23.39kg/m². She had history of 2 lower segment Caesarean section delivery 6months ago. She had history of miscarriage of her first child, 2.5months gestational age 4years ago. She complained of leakage of urine with coughing, bending and during night. She

also complained of feeling of heaviness around her pelvic region. On consulting gynaecologist she was diagnosed with grade 1 cystocele, laxity in her pelvic floor muscles. On examination, she had Grade 1 pelvic floor muscle strength and endurance of 2 seconds hold with grade 1. She had severe weakness of levator ani muscles.

- Case3 Participant: - A 36-year-old female had weight 51kgs and height 162cm with BMI 19.46kg/m². She had history of 1 lower segment Caesarean section delivery 4.5 years ago. She complained of leakage of urine with coughing, bending, carrying child and during night. She also complained of pelvic pain while urinating. Her USG reports were normal. On examining, she had Grade 2 pelvic floor muscle strength and endurance of 8 seconds hold with grade 2.

- **Treatment Protocol:**

All three participants were given physiotherapy sessions were for 4 weeks, 5days a week at physiotherapy OPD. Two participants were given IVES and Kegel's exercise, while one participant (case 3) was treated with Kegel's exercise alone.

IVES used in this research is Elise Pelvic floor exerciser, Tens care brand with ASIN number B007RXMZRO. IVES has 4 programs which are preset with data which includes Stress, urge, mixed and tone programs. Intensity of machine will vary from individual to individual. IVES machine, electrical stimulation was delivered using asymmetric biphasic current with fixed parameters: frequency 50Hz, Pulse width 300ms, and on-and-off time as 8s on/16s off.¹³ It was given for 10 minutes to each participant at an intensity as tolerable. Participants were positioned in supine lying with hip and knee flexed. Placement of a probe was done intravaginally with gel applied on the probe. Proper sanitisation of probe was done to avoid cross contamination after each session.

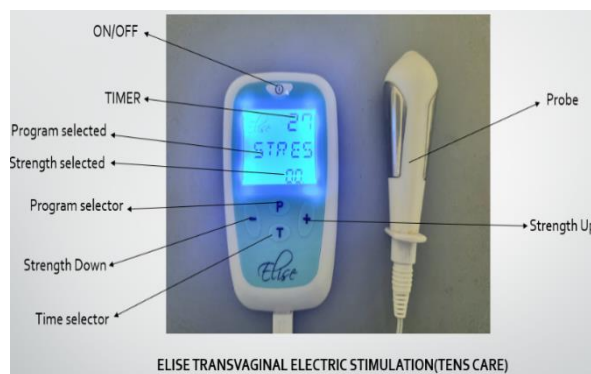


FIGURE 1: shows parts of Elise Transvaginal electric stimulation machine which has on/off switch, vaginal probe, program selector(P) with 4 programs (stress, urge, mixed, tone), time selector(T), intensity plus and minus button.

Kegels exercise was taught and participant were instructed to perform it with 10seconds hold and 10 repetitions.^{15,16} Isometric Abdominal exercise, Isometric Back exercise and Isometric adduction exercise was taught and performed with 10 second hold 10 repetitions.¹⁷

- **Outcome Measures:** Pelvic floor Muscle strength was measured with Modified Oxford MMT scale²⁰, Pelvic floor Muscle endurance was measured with Laycock pelvic floor assessment scale.¹⁹

RESULT

The data of all participants were recorded before commencement of treatment and after 4 weeks of treatment.

Case1 had improvement in her holding of urination and frequency of urination was reduced. On examining her pelvic floor muscle strength, it was found Grade 3 of MMT scale and muscle endurance increased from 3seconds of grade 1 hold to 15seconds of hold with grade 3.

Case2 had improvement in her holding of urination and frequency of urination was reduced. On examining her pelvic floor muscle strength, it was found Grade 2 of MMT scale and muscle endurance increased from 2 seconds of grade 1 hold to 8 seconds of hold with grade 2.

Case3 had improvement in her holding of urination and frequency of urination was

reduced. On examining her pelvic floor muscle strength, it was found Grade 4 of MMT scale and muscle endurance increased from 8 seconds of grade 2 hold to 10 seconds of hold with grade 4.

The data is given below in table 1.1, with pre values of week 1 and post values of week4:

PARTICIPANT	MUSCLE STRENGTH (MMT)		ENDURANCE	
	PRE	POST	PRE	POST
CASE1	1	3	3seconds	15seconds
CASE2	1	2	2seconds	8seconds
CASE3	1	4	8seconds	10seconds

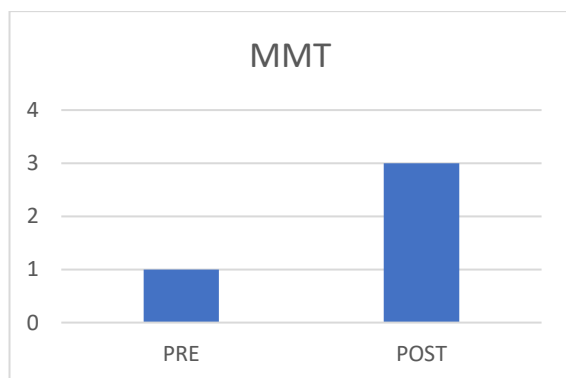
TABLE1.1

The Observed mean value improvements of outcomes in all three cases are given in table 1.2 in Mean±SD

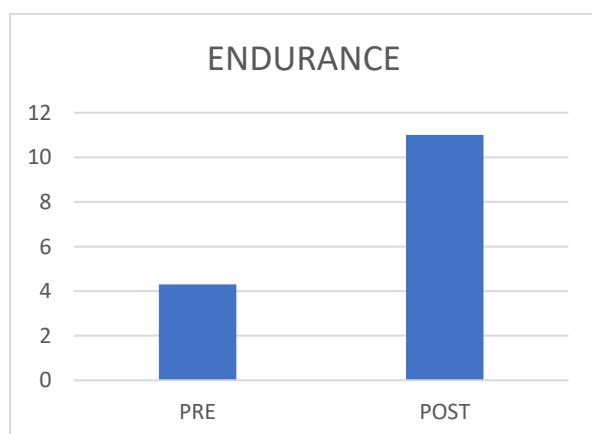
OUTCOME	PRE(Mean±SD)	POST(Mean±SD)
MUSCLE STRENGTH(MMT)	1±0.1	3±1
ENDURANCE	4.3±3.21	11±3.6

TABLE1.2

The graphical presentation of mean improvements in all three cases is shown in graph 1.1,1.2:



GRAPH1.1



GRAPH1.2

DISCUSSION

All the three participants were treated with Intravaginal Electric Stimulation, Kegel's exercise, Isometric Abdominal exercise, Isometric back exercise and Isometric adduction exercise. Cases were examined and Pre MMT, endurance was taken and after exercise and machine Post MMT, endurance was taken.

The treatment was given for 4 weeks. Participants were instructed to squeeze perineum inwards, upwards and stop urine flow to perform Kegel's exercise.⁹ Pelvic floor muscles play main role in pelvic supporting systems, as it became weak or loose; pelvic organs tend to descent which leads to pressure over urinary bladder causing involuntary leakage of urine. Levator ani muscles undergo stretch postpartum because of muscle strain and lose their contractility properties.²¹ This laxity and weakness in pelvic floor muscles leads to increased involuntary loss of urine or frequency of urge to urinate. Kegel's exercise when performed under supervision improves contractility properties of pelvic floor muscles and also improves sensations around pelvic area¹⁰. Kegel's exercise is easy to perform which includes contracting and relaxing pelvic floor muscles leading to increase contractility part of muscle. However, few females find it difficult to do Kegel's exercise, contracting and locating pelvic floor muscles. Few studies have shown along with Kegel's exercise performing IAE, IBE and isometric adduction exercise leads to core muscle activation and activates pelvic floor muscles

also its surrounding muscles.¹¹ There are few researches which shows effectiveness of Therapeutic current in urinary incontinence females, such as Interferential therapy¹², Transcutaneous electric nerve stimulation¹⁴, Transvaginal electrical stimulation¹³, Transvaginal vibratory stimulation¹³.

IVES is used in clinical field but there are no researches done on this device, so this is first research. Intravaginal electrical stimulation (IVES) can inhibit the activity of the reflex parasympathetic nerve and reduce the involuntary contraction of the bladder detrusor. IVES stimulate pelvic floor muscle contraction and relaxation directly through the sensors in the vagina, increasing pelvic floor muscle strength, and effectively improving UI symptoms.^{7,18} IVES with instruction to attempt simultaneous voluntary PFM contractions improved the ability to contract the PFMs in those women who are unable to perform PFM contraction properly, so it does works as Biofeedback which is its addictive effect. There were no adverse effects noted during research using this device. As noted because of its effectiveness and safety, this device can be used in females with urinary incontinence.

CONCLUSION

This present study concludes that Combined intervention of IVES+ Kegel's exercise is safe and effective in females with urinary incontinence. IVES is safe to use in females with urinary incontinence. To find the additive effect of IVES future studies can be done. Furthermore, RCTs can be conducted having larger sample size and using objective outcomes.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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