Research Article

Integrating the Effect of Franklin Method along with Pelvic Floor Muscle Training in Pelvic Organ Prolapse

Keerthana Ravi[1*], Senthilkumar selvakumar[1], Mohammed Munvar Rizwan Basha[2]

1-Department of Obstetrics and Urology, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical sciences, Chennai, Tamil Nadu, India.
2-Clinical Physiotherapist, Chennai, Tamil Nadu, India.

***Corresponding author:** *Keerthana Ravi, Msc*
Department of Obstetrics and Urology, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical sciences, Chennai, Tamil Nadu, India
Emails: keerthanaravi307@gmail.com

ORCID ID:
Keerthana Ravi: 0009-0005-4347-7225
Senthilkumar Selvakumar: 0000-0002-9260-7656
Mohammed Munvar Rizwan Basha: 0009-0008-1551-1707

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Running title: Effect of Franklin method and PFMT in POP

Abstract:
Background: Pelvic organ prolapse (POP) is the descent of pelvic organ from its anatomical position which affects the quality of life in women. Traditional pelvic floor muscle training (PFMT) has shown benefits, but adherence and technique execution can be challenging. The Franklin method allows individuals to recognise the body image and enhance neuromuscular control. This study aims to determine the effects of Franklin method with Pelvic Floor Muscle Training for women with POP.
Methods: This study includes a group of women with pelvic organ prolapse stage 1 and 2, age 45-55, no associated neurological defects and no present history of the uro-gynecological disorder. Participants were excluded from the study if they had any of the following: uncontrolled systemic illness, history of malignancy, active infection such as pelvic inflammatory disease, ongoing hormonal therapy, inability to understand or respond accurately to the questionnaire, or if they had undergone pelvic surgery within the past 4 weeks. All the participants (120) underwent Franklin method and PFMT for 6 weeks, the outcome measures included Prolapse Quality of Life questionnaire (P-QoL) and ICIQ-FLUTS tamil measured before and after intervention.

Result: The mean values of P-QoL before and after intervention were 56.74 and 47.06. In ICIQ-FLUTS tamil, the overall mean value was pre-test:36.09 and post-test:20.22. Quality of life and incontinence symptoms showed a significant improvement (p value ≤0.001) after the 6 weeks of intervention
Conclusion: Franklin method along with PFMT showed significant improvement in symptoms of POP.
Keywords: Pelvic organ prolapse, Franklin method, Pelvic Floor Muscle Training, Prolapse Quality of Life, International Consultation on Incontinence Questionnaire- Female Lower Urinary Tract Syndrome,

Introduction:
Pelvic organ prolapse (POP) refers to the sinking of the pelvic organ from its anatomical position, this can occur due to the weakness of the muscles and/or connective tissue (1). Worldwide prevalence of POP is 28.8% (2). In India, 1.5-2% of nulliparous women suffer from POP, as aging and with parity the incidence level increases to 5-8% (3). Women who had their first childbirth at the age of 30-34 had reported POP 3.77 times more than women aged 20-29 with first childbirth (4). 45 to 65 years old females are more prone to POP (5). In mild to moderate symptomatic POP about 9.7% of women are affected (6). There are 5 stages of pelvic organ prolapse and those are, Stage 0- presence of no prolapse, Stage 1- the prolapse part is present 1cm above the hymen, Stage 2- the prolapse part is 1cm or less from the hymenal plane, Stage 3- here the part of prolapse organ is present below the hymen more than 1 cm but no more than 2cm shorter than the vagina's length, Stage-4 the prolapsed organ is present completely outside (7). Types of pelvic organ prolapse are cystocele, enterocele, rectocele, uterine prolapse, and vaginal vault prolapse (8). In the United States, the major indication for hysterectomy is POP, symptoms include urinating difficulty or leakage of urine, pressure in pelvic region, protrusion of organ in vagina, sexual dysfunction, low back pain, irritation, ulceration and difficulties in emptying the bowel (9). The levator ani (LA) muscle consists of pubococcygeus, iliococcygeus, and puborectalis, these are the muscles that provide support to the pelvic organs. The weakness of LA after childbirth is due to the uterosacral and cardinal ligament collagen level decreases, vaginal wall tone decreases and due to insufficient blood supply, these are some of the pathomechanisms of POP (10).
POP can be conservatively managed by following the proper lifestyle guidance includes proper posture while lifting weights or avoid lifting heavy things, avoid straining during defecation, avoid foods that cause problems to the bladder and the bowel, quit smoking and avoid excessive weight gain, pelvic floor muscle training allows the muscles to gain strength, coordination and allows to relax, cognitive behavioral therapy, bladder and bowel training, and using vaginal pessaries are two types: one is support and other on space filling pessaries (11,12).
Pelvic floor muscle training (PFMT) provides strength to PFM, the normal mechanism of PFM contraction involves levator hiatus constriction, elevates the neck of the bladder and stabilizes the pelvic organs. In women with pelvic floor dysfunction PFMT helps the muscles get hypertrophied which results in reversing of the dysfunction to normal mechanism (13). PFMT effect can be seen using electromyography (EMG), with many studies as reference the maximum voluntary contraction increases along with improvement in strength and endurance (14). However, PFMT on its own can encounter difficulties related to maintaining consistency, body awareness, and executing the correct technique—elements that might reduce its effectiveness, particularly in community or unsupervised environments.

Franklin method otherwise known as Dynamic Neuro-Cognitive Imagery (DNI)™ allows the person to understand the physical and cognitive exercise through embodiment. This helps the individual to feel what they are doing and allows them to perform in a safe way to avoid getting injured. As they can feel and imagine what is going on inside, they can perform better movement outside. There are four steps to follow during exercises,

- Step one: Assessment - the examination of the posture, movement, and alignment of one's body, by the help of the therapist or self-assessment can be done. Self-assessment is done by gathering information from the sensory inputs from exteroceptors (eye and ear) and proprioceptors (muscles, ligaments, tendons, inner ear and joint capsule), but the difficulties faced in self-assessment is the habitual alignment it can be felt as new normal. This leads to overuse injuries.
- Step two: Plan - after assessing plan for the improvement to be made in body anatomical and physiological functions in an efficient way
- Step three: Act - the implementation of the plan according to individual alignment, movement and mental status.
- Step four: Compare - note the progression made and positive changes from the practice.

By enhancing one's beliefs, worries, motor control, and potential, imagery techniques aid pain treatment, rehabilitation, injury reduction, relaxation, and movement instruction. They also improve alignment, help in learning movement, and activate the parasympathetic nervous system. Biological imagery is subdivided into anatomical (anatomical representation of the body), biomechanical (movement and forces used by the body), and physiological imagery (hormonal, chemical, and fluid functions) (15). Enhanced somatic awareness may improve the execution and neuromuscular efficacy of pelvic floor exercises.

The Prolapse Quality of Life Questionnaire (P-QoL) is a clear, credible, and understandable tool for the evaluation of POP symptom severity and how they affect women's quality of life (16). It includes 20 basic questions that address all of the primary aspects of quality-of-life domains for one understands of urogenital prolapse. Each domain is associated with a specific component of quality of life, such as general health, the impact of prolapse, role, physical and social limitations, personal relationships, emotional issues, sleep/energy disturbance, and the measurement of the severity of symptoms. The score ranges from 0 to 100, higher score indicate the severity of the POP symptoms, and lower score indicate the satisfaction in quality of life. The P-QoL is a reliable and valid tool to assess the quality of life in women with prolapse (17).

International Consultation on Incontinence Questionnaire- Female Lower Urinary Tract Syndrome (ICIQ-FLUTS) Tamil is a self-administered questionnaire made for the South Asian population, as this questionnaire involves lower urinary tract symptoms most of the women feel embarrassed to address this problem to the therapist as this is considered as intimate subject. This consist of 12 items which involves question on the symptoms of urine filling (F- 4 questions), voiding (V-3 questions) and incontinence (I-5 questions), each symptom is divided into 3 subscale and the corresponding scoring ranges from (F)0-16, (V)0-12 and (I)0-20 (18). The ICIQ-FLUTS Tamil has good internal consistency and high test-retest reliability. The ICIQ-FLUTS Tamil has content and construct validity [19,20]. The combination of physical training and cognitive strategies presents a holistic approach to managing POP. This multifaceted strategy may address not only the physical symptoms but also the psychological and social aspects of living with POP. As there is a paucity of the evidence of Franklin method in pelvic health. This study was proposed to address the quality of life and symptoms that individuals face due to POP.

Materials and Methodology:

The study involves the effect of Franklin method along with Pelvic floor muscle training for women with pelvic organ prolapse. This study utilized a convenience sampling method at Saveetha Medical College and Hospital. Participants who expressed interest in the study were asked to complete an informed consent form, which outlined the study's purpose, procedures, and their rights as participants. To determine eligibility, participants provided demographic information along with their past and present medical and surgical histories. This thorough screening process ensured that only those who met the inclusion criteria were enrolled in the study. All participants received a comprehensive explanation of the study, including the intervention procedures and the questionnaires they would be required to complete. This approach aimed to ensure that participants were fully informed and comfortable with their involvement in the research.
A power analysis was conducted using G*Power 3.1 software to determine the minimum required sample size for this paired-sample study. Assuming a medium effect size (Cohen's $d = 0.5$), a significance level (α) of 0.05, and a power ($1 - \beta$) of 0.80, the analysis indicated that a minimum of 95 participants was necessary to detect a statistically significant change in outcome measures. To account for a potential 30% dropout rate, the target sample size was increased to 120 participants.

Inclusion Criteria:

- Women aged 45 to 55 years.
- Clinically diagnosed with pelvic organ prolapse stage 1 or 2.
- No neurological defects.
- No current history of urological or gynecological disorders.
- No history of abdominal or pelvic surgery.

Exclusion Criteria:

- Presence of any uncontrolled systemic illness.
- History of malignancy.
- Active infection such as pelvic inflammatory disease.
- Hormonal therapy currently ongoing.
- Inability to understand or respond accurately to the questionnaire.

A group of 243 participants were examined for eligibility criteria, in that some of the participants (11) were not meeting the inclusion criteria, 5 of them were not interested to participate in the study, and 7 participants dropped out without any reason and had no response from them. Among them 120 participants were included in this study and were willing to participate. The participants were explained about the study, and asked to read and sign the informed consent form before the procedure. Each participant was assessed individually before intervention.
All the participants were explained about the questionnaire and asked to fill P-Qol and ICIQ FLUTS Tamil before the intervention and after 6 weeks of intervention. All the participants were explained how to perform the Franklin method with Pelvic floor muscle training.

Intervention Procedure:
Franklin method (Dynamic Neuro-cognitive Imagery) [15]
Here, selection of exercises employs imagery-based movements grounded in the Franklin Method, which enhances body awareness and neuromuscular control. These unconventional exercises engage participants in multisensory experiences of the pelvic region, promoting internalized pelvic

energy flow and activation. By improving the mind-body connection, these techniques complement traditional pelvic floor strengthening. Currently, there are no standardized protocols applying Franklin Method imagery to POP populations, as the method emphasizes personalized sensory experiences. Exercises were adapted from Franklin Method teachings to meet the unique needs of women with POP.

All the participants were explained about the anatomy of the bony landmarks and how hammock-like muscles are suspended in the pelvic bone. The participant is asked to start the exercise by tapping the upper limb, thorax, abdomen, pelvic bone, gluteal region with knee flexed position, this allows the participants to recognize and create awareness for their body.

- Internal and external rotation:

By placing the hand on their iliac crest, think of how the transverse abdominis and oblique abdominal muscles inflaring and pelvis internal rotation while sliding the hand towards the body's midline. During external rotation, imagine the pelvic bone rotating outward and transverse abdominis & oblique abdominals goes for lengthening while the hands are sliding back to the iliac crest.

- Nutation and counternutation:

Rotate the pelvis anteriorly and posteriorly, during this movement the focus should be on the muscles which moves the sacrum. When performing pelvic posterior rotation, imagine the coccygeus and levator ani engaging at pelvic floor and during anterior rotation, imagine how the lumbar erector spinae drag the sacrum.

- Rotation of innominate:

In standing, flex the legs while allowing the sacrum goes for a nutate position, allowing hip extension. When coming back to standing, the sacrum moves into the counternutation position.

- Pelvic geyser (sitting, standing):

Imagine the pelvic girdle as a main intense energy, like a geyser. The energy present there starts to bubble and shoots throughout the body.

- Biceps femoris:

Imagine the biceps femoris muscle pulls the sit bones towards the outside while flexing the leg and during the extension of leg the biceps femoris muscle releases the sit bone. Imagine using the hands to slide down from the sacrum to the fibular head when doing this procedure.

- Adductor and pelvic floor:

Flex the lower limb in an upright position, imagine the adductor and pelvic floor as a continuous layer and feel the harmonious movement of the adductor and pelvic floor.

- Pelvic Floor Muscle Training:

Participants were taught about how to perform PFMT in crook lying position. They were asked to perform:

Slow contraction- contraction of PFM to individual maximum strength for 10 times

Fast contraction- quick contraction for 1 sec and relaxation for 1 sec of PFM, 10 repetitions

Isometric contractions - hold the contraction for 6 sec, relax and hold again, repeat this for 10 times. During the initial phase (weeks 1–2), participants performed the exercises in a lying position to ensure proper technique and enhance muscle awareness, focusing on identifying and isolating the pelvic floor muscles. From week 3 onward, participants transitioned to sitting and standing positions, mimicking functional postures encountered in daily life to improve real-life muscle integration. Repetitions and hold times were adjusted based on individual improvement, with some participants increasing contraction durations up to 10 seconds as tolerated by weeks

5–6.Duration of the intervention was 45 minutes. Intially, the intensity was two sets of each exercise which was adjusted according to the participant PFMT strength at the end of every week using perioneometer. All participants adhered to the protocol and were monitored regularly over a six-week period, during which results were systematically recorded.

Statistics analysis:

The collected data was analyzed by using IBM SPSS statistics 30.0.0 for their mean, standard deviation (SD) and paired t test. The outcome measures used are P- Qol and ICIQ-FLUTS Tamil. The paired t test was used to identify the difference between the pre and post intervention. To account for multiple comparisons across the five outcome domains, which include P-QoL and the four ICIQ-FLUTS sub-domain (Filling, Voiding, Incontinence, and Overall), the Bonferroni correction was utilized. This adjustment set the significance threshold at $\alpha = 0.025$. All estimates were accompanied by a 95% confidence interval (CI).

Results:

A total of 243 participants entered into this study, among those participants eleven were not eligible, five of them were not interested to participate and seven subjects unexpectedly withdrew from the study. Data analysis was done by using paired t test for 120 participants. The mean age was 50.46 with SD of 3.33. Paired t-tests revealed a significant reduction as shown in table 1, P-QoL scores from a mean (SD) of 56.74 (7.14) pre-intervention to 47.06 (8.21) post-intervention ($p \leq 0.001$), with a 95% confidence interval (CI) for the mean difference of [9.08, 10.28].

For ICIQ-FLUTS Tamil, respresented in table 2 shows the mean (SD) scores significantly improved across all domains: Filling decreased from 12.35 (2.41) to 6.48 (2.82), Voiding from 8.83 (2.00) to 3.70 (2.44), Incontinence from 15.58 (3.04) to 10.04 (3.40), and the overall score from 36.09 (6.91) to 20.22 (4.95) (all $p \leq 0.001$). The 95% CI for the mean difference in overall ICIQ-FLUTS was [14.28, 17.47].

Effect sizes calculated by using Cohen's d were calculated by dividing the mean difference by the standard deviation of the differences in each outcome. The resulting effect sizes were large, with 95% CIs of [2.50, 3.32] for P-QoL and [1.50, 2.08] for overall ICIQ-FLUTS Tamil, indicating clinically meaningful improvements. To address the risk of Type I error associated with testing multiple primary outcomes (P-QOL and ICIQ-FLUTS), Bonferroni and Holm-Bonferroni corrections were implemented for the two primary scales. The adjusted p-values for both scales remained below the corrected significance thresholds (adjusted $p \leq 0.025$), indicating that the observed improvements were statistically significant even after accounting for multiple comparisons. The three ICIQ-FLUTS sub-domains (Filling, Voiding, Incontinence) improvements remained statistically significant (adjusted $p \leq 0.003$), supporting the findings.

Table: 1. P-QOL Mean and SD of Pre and post intervention

P-Qol	**MEAN**	**SD**
Pre test	56.74	7.14

Post test	47.06	8.21

Table: 2. ICIQ-FLUTS Mean and SD of Pre and post intervention

ICIQ – FLUTS	**Pre test**		**Post test**	
	Mean	**SD**	**Mean**	**SD**
Filling	12.35	2.41	6.48	2.82
Voiding	8.83	2	3.7	2.44
Incontinence	15.58	3.04	10.04	3.401
Overall	36.09	6.91	20.22	4.95

Discussion:

POP has many down-sides in women's lives by affecting psycho-social, occupational, physical and sexual components which is commonly seen in multiparous, obese, elderly women, and women with chronic constipation and cough (21). This study shows the importance of understanding one's own body which allows the individual to perform the exercise in proper manner by allowing the participant to use cognitive imagery to visualise how the pelvis is and works during exercise. The Franklin method encourages the neuro-cognitive pathways to reinforce the muscle activation through imagery techniques and also provides a supportive environment for psychological aspects, by reducing anxiety and embarrassment, this is achieved through self-assessment which in turn allows muscle activation effectively. PFMT allows improving the strength of PFM strength. Here, the major question was whether the Franklin method with PFMT has any impact on POP symptoms and in subjective well-being. The Franklin method motivates the participants to do PFMT consistently, as the neuro-cognitive pathway help in understanding the mechanism occurs during the exercise. With this combined therapy, there was a significant improvement in every domain of ICIQ-FLUTS Tamil and in the quality of life of women with POP there was a moderate improvement.

Lina Ryhta et al., (2023) concluded that as for preventive care and treatment of POP and PFM dysfunction, PFMT helps in reduction of symptoms by strengthening PFM. This can also be used in POP stage 2 or greater and showed improvement within 12 months [22]. Linda Fenocchi et al., (2022) demonstrated that PFMT allows the individuals to delay the surgical treatment and in post-surgical period PFMT helps in reduction of hospital stay highlighting its role in both conservative

and adjunct post-operative care [23]. Sabine Schütze et al., (2022) randomized 300 individuals underwent exercise with Franklin method (intervention group) and the control group received postpartum exercise for 12 months. Both showed significant improvement however, those receiving combined therapy experienced significantly greater gains in pelvic floor muscle strength. This suggests that beyond physical exercise, cognitive engagement and mental imagery influence neuromuscular coordination, potentially enhancing motor unit recruitment and muscle activation patterns [24]. CMCR Panman et al., (2016) demonstrated that benefits of PFMT in women with mild symptomatic prolapse over two years, including reduced dependence on absorbent pads, which indicates the functional impact of strengthening exercises on prolapse symptoms [25]. Amit Abraham et al., (2019) suggested that DNI ™ in improving movement efficiency and mental imagery capacity among dancers, supporting the notion that mental visualization techniques can optimize physical performance and neuromuscular function [26].

Currently, there is a scarcity of published research specifically examining the effectiveness of the Franklin method for pelvic organ prolapse (POP). However, initial studies in related disciplines indicate that imagery-based interventions can improve motor control and body awareness, potentially serving as a complement to traditional pelvic floor muscle training (PFMT). To further establish the Franklin method's role and its long-term benefits in POP rehabilitation, high-quality randomized controlled trials are essential.

We recognize that adherence rates, initial physical activity levels, and participant comorbidities are essential factors that affect the outcomes of the Franklin Method and pelvic floor muscle training (PFMT) for pelvic organ prolapse (POP). Unfortunately, these variables were not systematically documented in this study. In future research, we intend to track adherence through exercise logs, evaluate baseline activity using standardized questionnaires, and record pertinent comorbidities. This strategy will enable a more thorough analysis of how these factors influence treatment effectiveness and enhance personalized care for women with POP.

Conclusion:

This study aimed to evaluate the combined effect of the Franklin method and Pelvic Floor Muscle Training (PFMT) on symptom improvement and quality of life in women with pelvic organ prolapse. The results demonstrated significant improvements in both pelvic floor function and associated symptoms after six weeks of intervention, supporting the effectiveness of this integrated approach. These findings highlight the potential benefits of combining cognitive imagery techniques with physical training to enhance rehabilitation outcomes. Future research with larger, controlled trials and longer follow-up periods is recommended to further validate these results and optimize treatment protocols for pelvic organ prolapse.

Limitation:

- Follow- up for long term is not done here
- Age group of 45–55-year women were only included
- Self reported assessment were only used
- Absence of monitoring baseline physical activity
- Varied adherence to the exercise regimen may have impacted the reported findings
- Absence of control group limits the ability to assess treatment effectiveness

Recommendation:

- Should recruit a larger sample size

- Objective measurement should be included
- Incorporate adherence monitoring methods
- Long term follow up is necessary to analyze the effect of the intervention
- Should recruit a control group receiving only PFMT.
- Use of Randomized controlled trials for reliable effects to isolate treatments

Ethics approval of research

This study obtained approval from the Institutional scientific review board. The ISRB number is 02/032/2024/ISRB/PGSR/SCPT.

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Conflict of interest:

Authors declare that we have no conflict of interest.

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