



## The principle of system Corefit in rehabilitation of pelvic floor disorders for women in menopause period

**Received:** 5-10-2015

**Accepted:** 8-11-2015

**Published:** 30-11-2015

Żak I<sup>1</sup>, Saulicz E<sup>2</sup>, Linek P<sup>2</sup>, Saulicz M<sup>3</sup>

<sup>1</sup>Corefit, Urogynecology and Pelvic Floor Physiotherapy, Poland

<sup>2</sup>Department of Kinesitherapy and Special Methods in Physiotherapy, The Jerzy Kukuczka Academy of Physical Education, Katowice, Poland

<sup>3</sup>Department of Physiotherapy in Diseases of Internal organs, The Jerzy Kukuczka Academy of Physical Education, Katowice, Poland

### Abstract

**Background:**

Pelvic floor dysfunctions, among which urinary incontinence is the most onerous symptom, pose a serious social problem whose significance is probable to grow together with the process of an ageing society and more frequent incontinence episodes in menopausal women. The growing absence of professionally active people suffering from incontinence is prone to result both from plans to raise the retirement age and the process of an ageing society. The concept of Corefit system has been created to meet the incontinent women's expectations. The above mentioned system is based on an individualized sensomotoric training programme as well as the re-education of incorrect motor patterns resulting in pelvic floor muscle overload. What is also essential for Corefit system effectiveness is monitoring the process of facilitation, which enables constant training plan correction.

**Keywords:**

menopause; pelvic floor; incontinence; sensomotoric training; physiotherapy

**Word count:** 2428

**Tables:** 0

**Figures:** 0

**References:** 24

### Corresponding author

**LinekPawel**

Department of Kinesitherapy and Special Methods in Physiotherapy,  
The Jerzy Kukuczka Academy of Physical Education,

40-065, Mikołowska 72B, Katowice, Poland.

linek.fizjoterapia@vp.pl

## INTRODUCTION

In the perimenopausal period, in women the levels of ovarian hormones, progesterone, and subsequently estrogens, decline. These changes, combined with atrophy of the epithelium of the vagina and uterine cervix, have a significant impact on the function of the organs of the lesser pelvis. Dysfunction of the pelvic floor leads to dropping down of the reproductive organs, functional intestinal disorder, chronic pain of the lesser pelvis, sexual disorders (Petros et al., 2008, Petros et al., 1990) and, the most common – urinary incontinence (Ankee et al., 2004, Lienemann et al., 2003).

Urinary incontinence (UI) is a problem in many women during the menopause and during the preceding years. According to statistical data, 60% of Polish women over 45 years old suffer from UI (Starczewski et al., 2008), however, it can be assumed that, because of the nature of the problem (feeling ashamed, no access to prophylactic and therapeutic programs), this number may be significantly higher. There are also measurable economic effects of this problem because, according to the Uroconti Society report of 2010, the costs of the loss of productivity of women due to UI (annually) were over PLN 1.3 billion (Studio PR 2012).

According to the current ICS definition (International Continence Society) of 2002 – UI is a subjective symptom of uncontrolled urine leakage (Abrams et al., 2002). There are 4 types of UI:

1. *Stress incontinence* – (SUI) – occurs during an increase in the pressure in the abdomen (coughing, strenuous physical exertion, lifting heavy items). It is involuntary and unconscious leakage of a slight amount of urine, without the sensation of pressure. It is characterized by reduced symptoms during the night (Rechberger et al., 2005).
2. *Urge incontinence* – incontinence following urgent pressure. Primary symptoms include urgent pressure, increased number of mictions, nycturia, unstable detrusor.
3. *Overflow incontinence*, accumulation of the urine in the bladder – these symptoms include involuntary loss of urine caused by a diminished contractility of the detrusor or an obstacle in the urine flow (Marks, 2001).
4. *Mixed urinary incontinence* – it is most frequently a combination of stress urinary incontinence and instability of the detrusor (Marks, 2001).

Urinary incontinence frequently is accompanied by dropping of the reproductive organs (Swift et al., 2003). Although the disorders above are not life threatening, they significantly diminish daily

performance of women, cause social and professional withdrawal, discontinuation of sex life which often leads to a relationship breakdown and greater problems between the partners (Skrzypulec et al., 2006, Vereecken et al., 1989). One of the significant risk factors for urinary incontinence symptoms and dropping of the reproductive organs during menopause is obstetrics history. The research shows significant dependence of urinary incontinence in women with a history of delivery (Handa et al., 2011). There are four basic mechanisms of damage to the floor of the pelvis during the passage of the foetus through the birth canal:

1. Damage to the ligament apparatus responsible for the normal statics of the floor of the pelvis, in particular in surgical deliveries. The research of V.L. Handa et al., conducted 5 and 10 years following the first delivery, demonstrated a statistically significant increase in dysfunction in the floor of the pelvis and urinary incontinence after surgical delivery (Handa et al., 2011).
2. Damage to the vessels caused by pressure exerted by the anterior part of the foetus during the passage of the foetus through the birth canal (Ankee et al., 2004, Lienemann et al., 2003).
3. Damage to the nerves and muscles of the floor of the pelvis (primary factors that cause damage to the pudendal nerves include: surgical deliveries, multiple deliveries, extended 2<sup>nd</sup> phase of delivery, large foetal mass at birth).
4. Damage to the urinary tract during delivery .

A trauma during the peri-delivery period which interferes with the function of the structures of the pelvic floor, after many years becomes the primary cause of:

1. *urinary bladder dysfunction* – urinary incontinence, frequent urination, nycturia (the need for urination during the night), impaired bladder emptying, urgent pressure (excessive limpness of the vagina and lack of support for the bladder cause premature activation of the receptors sensitive to stretching, interpreted by the cerebral core as urge pressure) (Petros et al., 2008, Petros et al., 1990).
2. *dropping of the reproductive organs* – dropping and prolapse of the vagina, prolapse of the uterus
3. *intestinal functional disorder* – constipation, stool incontinence
4. *chronic pain in lesser pelvis* (Petros et al., 2008, Petros et al., 1990)

## ROLE OF PHYSICAL THERAPY IN TREATMENT OF URINARY INCONTINENCE

### 1. Training the floor of the pelvis

In the recent years, the role of training the muscles of the pelvic role in effective prevention or non-invasive therapy for urinary incontinence has been more frequently emphasised. As a result of training the muscles of the pelvic floor, a number of beneficial changes are observed. As a result, striated para-urethral muscles are activated because of an increased muscle tone of the levator ani at rest. An increase in the pressure in the urethra at rest and an extension of the functional length of the urethra is observed. During an increase in the abdominal pressure, negative pressure is converted into positive. The patients reported improved sensations during sexual intercourse. Moreover, an improvement in support for the organs of the lesser pelvis was recorded and this optimizes their statics (Bo et al., 1999).

The studies by Kari Bo performed in persons who exercised the muscles of the pelvic floor showed that the UI symptoms resolved in 60% of them. The conversion of intraurethral pressure during coughing from negative to positive constituted the measure of improvement of clinical condition (Bo et al., 1999). Moreover, these studies demonstrated that training the pelvic floor is effective in all types of urinary incontinence, including pressure urge (Bo et al., 1999, Hay-Smith et al., 2007). In other studies, J. Miller et al. showed that women who learned to properly contract pelvic floor muscles during coughing were able to reduce urinary incontinence by 98% after one week of exercises (Miller et al., 1998). Arnold Kegel in his studies demonstrated that urinary incontinence was cured in 84% of the patients (Kegel, 1948).

The Polish Gynaecological Association emphasises the importance of training pelvic floor muscles in their recommendations for diagnostics and treatment of urinary incontinence. It recommends training pelvic floor muscles as a preliminary treatment for urinary incontinence (Ginekologia po Dyplomii, 2005).

### 2. Physical therapy

Biofeedback with electromyographic monitoring of the muscle tone is a method of learning how to properly contract pelvic floor muscles. For measurement, an intravaginal EMG electrode is used. The electrode placed in the vagina records muscle contractions. During the measurement, the relaxation of abdominal and buttock muscles is monitored. The patient watches changes in the electric activity of the pelvic floor muscles on a computer monitor during contracting and relaxing (Dutkiewicz, 2002, Paczkowska, 2002). More recent techniques combine exercises involving contracting pelvic floor muscles monitored by EMG-biofeedback with

electrostimulation. The patient watches the activity of the muscles on the monitor and tries to achieve the task threshold set for contractions of the muscles undergoing therapy (Terlikowski et al., 2013).

### 3. Corefit system concept

The Corefit concept was inspired by many years of experience in the practical use of exercises designed by Benita Cantieni for stress incontinence and functional disorders in the pelvis. Critical analysis concerning

- indeterminate duration of the muscle tightening and intensity of the contraction at various stages of training depending on the severity of problems
- use of only one type of pelvic floor activation – by bringing the tuberosities of the ischium closer together
- recommended activation of the muscles of the pelvic floor while breathing in
- lack of an objective method of progress monitoring

led to a gradual modification of the current approach to women with stress urinary incontinence. The final shape of the Corefit system was influenced by the author's own experience and observation associated with the effectiveness of the process of training which is dependent on such factors as:

- ability to locate and tighten the pelvic floor muscles (sensorimotor training)
- contraction duration and strength, number of repetitions (endurance and strength training)
- ability to activate pelvic floor and supporting muscles
- ability to use active pelvic floor muscles in kinematic chains

The distinguishing feature of the Corefit System is the use during training:

- of sensorimotor exercises, body mindfulness techniques, the goal of which is to be both aware of and to activate the pelvic area;
- teaching to properly locate and consciously tighten pelvic floor muscles with a simultaneous exclusion of large, external muscle groups (partly based on the techniques developed by Norwegian, Australian, Swiss and German scientists, and partly making use of the techniques developed by the Corefit system concept authors);
- voluntary activation of the specific layers of the pelvic floor muscles;
- respiratory exercises,
- individual approach to training – selecting appropriate training plan (approach types: obstetrical, urogynaecological, urological);

- correcting improper motor patterns leading to excessive overloading of the structures of the pelvic floor muscles associated with an increase in the abdominal pressure (primary during coughing, sneezing, lifting);
- monitoring the individual process of training during the training plan with corrections.

Training program includes 48 training units carried out during an 8-week cycle. Sessions with therapist take place twice a week. One session lasts 45–60 minutes. During a 15-minute preliminary part, sensorimotor exercises which lead to the awareness and activity of the pelvic area – the pelvic and sacral bones, tuberosities of the ischium, the lumbar spine, sacroiliac joints; training to properly locate and activate pelvic floor muscles using bone points of the pelvis as reference points, a voluntary activation of which causes tightening of the muscles of the pelvic floor. The main part (20-35) constitutes the training proper of the pelvic floor by activating pelvic floor muscles and maintaining their contraction at the indicated period of time, with the indicated strength and number of repetitions in various starting positions and combining the activities into kinematic chains. The last 10 minutes of the training session include breathing exercises and are devoted to the body mindfulness techniques.

Individual exercises associated with the training proper of the muscles of the pelvic floor are carried out in the initial phase with a lower number of repetitions (not more than 8 per series, with a duration time of 1-2 seconds) and lower intensity of the contractions (40% of strength maximum), extending the contraction time (up to 10 seconds) in each week and increasing its strength (up to 80%) with a simultaneous differentiation – contractions lasting over 5 minutes do not exceed a strength of 40–50%, and contractions lasting 2 seconds – 80%. The number of repetitions and the strength of the contractions depend on the selected approach – *gynaecological* (the program concentrates on the restoration of the functions of the muscles which were overloaded by pregnancy and delivery, and is based on a lower strength contractions, greater number of repetitions during the day), *urogynaecological* (the program is based on sensorimotor exercises which improve muscular strength and endurance, correct improper activities associated with increased pressure in the abdomen), *urological* (the program concentrates on the exercises which improve strength of the pelvic floor muscles and their response to an increased pressure within the abdomen. There is a base of exercises, common to all approaches, which improve the function of the deep muscle cylinder, ensuring the stabilisation of the femoro-lumbar complex. After 8 weeks, each participant receives a customized exercise program recorded on a CD. The program is carried out daily during the training cycle, and after the completion of the cycle it is recommended to repeat it several times

per year for 2 weeks and each time discomfort is experienced or the problems recur.

The objectives for the first and second week of training are as follows:

- obtaining normal, isolated tone of the pelvic floor muscles with a simultaneous exclusion of large groups of trunk and lower limb muscles
- learning how to maintain proper position of the pelvis and spine during exercises
- relearning or learning other proper motor behaviour when the pressure in the abdomen is increased – coughing, sneezing, lifting – “closing pelvic floor”.

The objectives of training in weeks 3–5 are:

- improvement in strength and endurance of pelvic floor muscles by perfecting techniques learned in the initial weeks
- achieving the ability to differentiate the strength of the pelvic floor muscle contractions
- activation and maintaining proper tightening of the “deep cylinder” – cocontraction of the transverse abdominal muscle, multifidus muscle and pelvic floor muscles

The objectives of the last 2 weeks of exercises include:

- improvement in strength and endurance of the muscles trained
- further training to differentiate various strengths of the pelvic floor muscle contractions
- including active muscles of the deep cylinder in kinematic chains.

Customization of the training program is based on a cyclical monitoring and self-monitoring. The following assessments are carried out prior to the training, after its completion and 3 (obstetrical urogynaecological and urological approaches), 6 and 12 months later (urogynaecological and urological approaches):

A. subjective condition of the lower urinary tract using:

1. CLSS questionnaire (Core Lower Urinary Tract Symptom Score questionnaire) containing 10 questions, assessing 10 basic symptoms of the lower urinary tract (frequency of urinating during the day, night, pressure urge, urge urinary incontinence, stress urinary incontinence, slow urine flow, sensation of incomplete emptying, straining, bladder and urethral pain). The person examined evaluates lower urinary tract symptoms on a four-point scale (Homma et al., 2008).

2. Urinary Incontinence Questionnaire composed of 19 questions based on which urinary incontinence symptoms and comfort are assessed on a five-point scale (Blaivas et al., 2008).

B. monitoring deep abdominal muscles using a pneumatic pillow Stabiliser Pressure Biofeedback Unit (PBU) (Richardson et al., 1999). This device allows to evaluate in a non-invasive manner, without the need of exposing private parts and in a simple way, the strength and control of the deep abdominal muscles (transverse abdominal muscle and oblique internal muscle) which function in synergy, synchrony and syntony with the pelvic floor muscles (according to Panjabi's model,

pelvic floor muscles with the transverse abdominal muscle, diaphragm and multifidus muscle are part of the active stabilisation subsystem of the lumbar/pelvic complex) (Panjabi, 1992a). This examination allows determination of the quality of motor control of the entire complex, along with the floor of the pelvis. The proposed Corefit System program, that includes specific recommendations and strategic plans of treatment of specific disorders will hopefully play an important role in the prophylaxis and therapy of disorders of pelvic statics and urinary incontinence in significant part of women over 45 years old, improve comfort of life of the patients, allow longer work and normal functioning in the society and minimize absenteeism due to urinary incontinence.

## REFERENCES

1. Abrams P, Cordozo L, Fall M, et al. Standardisation and Terminology Reports. *Neurourol. Urodyn*, 2002; 21:167-178
2. Anke P, Usenius JP, Kirkinen P. An evaluation of pelvic floor anatomy and function by MRI. *Eur J Obstet Gynecol Reprod Biol*, 2004; 112:84-88
3. Blaivas J, Chancellor M, Weiss J et al. Atlas Urodynamiki. *Medipage*, Warszawa, 2008:1
4. Petros PEP, Woodman PJ. The Integral Theory of continence. *Int Urogynecol J*, 2008; 19:35-40
5. Bo K, Hagen RH, Kwarstein B et al. Pelvic floor muscle exercise for the treatment of female stress urinary incontinence: III Effects of two different degrees of pelvic floor exercise. *Neurourol. Urodyn*, 1999; 9:489-502
6. Bo K, Talseth T, Holme I. Single blind, randomized controlled trial of pelvic floor exercises, electrical stimulation vaginal cones and treatment in management of genuine stress incontinence in women. *BMJ*, 1999; 318:487-93
7. Dutkiewicz S. Leczenie wysiłkowego nietrzymania moczu u kobiet. *Nowa Medycyna* 2002; 117:27-28
8. Handa VL, Blomquist JL, Knoepp LR et al. Pelvic Floor Disorders 5–10 Years After Vaginal or Cesarean Childbirth. *Obst&Gynecol*, 2011; 118(4):777-783
9. Hay-Smith E, Bo K, Beghmans L, et al. Pelvic floor muscle training for urinary incontinence in women. *Cochrane Database Syst Rev*, 2007; 18:CD001407
10. Homma Y, Yoshida M, Yamanishi T, et al. Core Lower Urinary Tract Symptom Score (CLSS) questionnaire: A reliable tool in the overall assessment of lower urinary tract symptoms. *Int J Urol*, 2008; 15 (9):816-820
11. Kegel AH. Progressive resistance exercise in the functional restoration of the perineal muscles. *Am J. Obstet Gynecol*. 1948; 56:238-249
12. Lienemann A, Fisher T. Functional imaging of the pelvic floor. *Eur J Radiol*, 2003; 47:117-122
13. Paczkowska A, Friebe Z, Koszła M. Skojarzone leczenie mieszanych postaci nietrzymania moczu elektrostymulacją i biofeedback. *Przeg Urol*, 2002; 6:57-59
14. Panjabi MM. 1992a The stabilizing system of the spine. Part I. Function, dysfunction, adaption, and enhancement. *J Spinal Disord*, 1992; 5:383-389
15. Petros PEP, Ulmsten UI. An Integral Theory of Female Urinary Incontinence. Experimental and clinical considerations. *Acta Obstet Gynecol Scand*, 1990; 69 (suppl) 153:7-31
16. Petros PE, Ulmsten UI. An Integral Theory of Female Urinary Incontinence. Experimental and clinical considerations. *Acta Obstet Gynecol Scand*, 1990; 69 (suppl) 153:7-31
17. Rechberger T, Skorupski P, Postawski K. Nietrzymanie moczu. Przegląd metod leczenia. W: Nietrzymanie moczu u kobiet. Rechberger T, Jakowiecki JA (red.). *Bifolium*, Lublin 2005; 18:179-94
18. Rekomendacje Polskiego Towarzystwa Ginekologicznego w sprawie diagnostyki i leczenia nietrzymania moczu u kobiet. *Ginekologia po Dyplomie*, 2005; wydanie specjalne: 59-67
19. Richardson C. A et al. Therapeutics exercise for spinal segmental stabilization in low back pain: Scientific basics and clinical approach. *Churchill Livingstone*, Edinburgh 1999.
20. Skrzypulec V, Piela B, Droszdzol A. Życie seksualne kobiet po operacjach uroginekologicznych. *Seksuologia Polska*, 2006; 4:16-20
21. Starczewski A, Brodowska A, Brodowski J. Epidemiologia i leczenie NTM oraz obniżenia narządów miednicy u kobiet. *Polski Merkuriusz Lekarski*, 2008; 25:145-74
22. „Wpływ nietrzymania moczu na koszty społeczno-ekonomiczne w Polsce” Opracowanie: STUDIO PR na zlecenie WFIP, czerwiec 2012: 58

23. Swift SE, Tate SB, Nicholas J. Correlation of symptoms with degree of pelvic organ support in a general population of women: what is pelvic organ prolapse? *Am. J. Obstet. Gynecol*, 2003; 189:372-377
24. Terlikowski R, Dobrzycka B, Kinalski M, et al. Transvaginal electrical stimulation with surface-EMG biofeedback in managing stress urinary incontinence in women of premenopausal age: a double-blind, placebo-controlled, randomized clinical trial. *Int Urogynecol, J* 2013; 24:1631–1638
25. Vereecken R. Psychological and sexual aspects in different types of bladder dysfunction. *Psychother. Psychosom*, 1989; 51(3):128-134