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Review

The Application of Physiotherapy in Urinary Incontinence

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Abstract

Objective: The problem of urinary incontinence affects half of the adult female population, impacting adversely on their comfort of life and significantly hindering ordinary life activities (laughing, sneezing, coughing, physical activity); it also affects the quality of their sexual life. Physiotherapy is an increasingly common method for the conservative treatment of genital static disorders and stress urinary incontinence. **Mechanism**: In this article, the authors consider the following aspects: the use of various physiotherapy interventions as adjunctive treatment for urinary incontinence. The authors reviewed the literature databases in PubMed, Medline and Embase to identify links between the applied physiotherapeutic treatment and its effectiveness. **Findings in Brief**: The applied physiotherapeutic treatments and their effectiveness in urinary incontinence are presented. **Conclusions**: Physiotherapy treatments are effective and supportive of the treatment process in women of all age ranges with urinary incontinence, thus improving their quality of life.

Keywords: physiotherapy; women; urinary incontinence

1. Introduction

The problem of urinary incontinence affects half of the adult female population, worsening their comfort of life and significantly hindering ordinary life activities (laughing, sneezing, coughing, physical activity); it also affects the quality of their sexual life [1,2]. Urinary incontinence is associated with female genital statics disorders, which increase with age. The period of a woman's life predisposing to genital static disorders is the menopause, especially the senium period, which is associated with hypoestrogenism. The balance of forces acting in the pelvis determines the correct position of the female genital organs. Any weakening of the elements of the apparatus supporting the organs in the correct position, and an increase in the "top down" force lead to genital static disorders.

An analysis of the factors impacting on the risk of developing statist abnormalities of the genital organs indicates that what is important in preventing statist abnormalities of the genital organs is physical activity (pelvic floor exercises) and a proper diet that does not lead to constipation or obesity, but at the same time which takes into account the increased catabolism during the particularly senile period [3–5].

Collapse and prolapse of the uterus and vagina and secondary incontinence might be caused by the following: insufficiency of the pelvic floor, weakness in the suspensory and supporting apparatus, abnormal intra-abdominal pressure with visceral prolapse due to a weak pelvic floor, a drooping, hanging abdomen, distention of the rectus muscles, and possibly, a petite asthenic physique.

It should be emphasised that significant factors for lowering and prolapse of the genital organs are perinatal tissue damage, flaccidity of the ligaments and parametria, and damage to the pelvic floor muscles.

However, illnesses with persistent cough, heavy physical work and stress, overweight, obesity, and chronic constipation have been identified as additional causative factors. It is worth emphasising that obesity, overweight and constipation, especially habitual constipation, which is one of the factors of static disorders, can be prevented by introducing an appropriate lifestyle and nutrition [6–8]. Of particular importance in dietary habits is increasing the amount of dietary fibre in the diet (especially its insoluble form), drinking sufficient fluids, including fermented dairy products in the diet, and limiting the intake of fatty foods and sweets.

The basis for urinary system activity is its innervation. Diseases of the central nervous system: demyelination, synaptic disorders, mediator abnormalities, interruption of stimulus-conducting pathways, or the use of psychoactive agents (drugs, narcotics, alcohol, stimulants) lead to impaired or lack of control of urination. Attention should also be paid to orthopaedic conditions that develop with nervous system dysfunction. These can also cause or exacerbate micturition problems [9].

Physiotherapy in gynaecology, obstetrics and urogynaecology has developed significantly over the last decade. Every year women's awareness of and accessibility to urogynaecological physiotherapy increases [10]. Physiotherapy is becoming an increasingly common method of conservative treatment of genital static disorders and stress urinary incontinence. What is great importance here is the correct qualification of patients for the appropriate physiotherapy technique and the development of a therapy management plan.

Physiotherapy in pelvic floor muscle training involves the use of a wide range of treatments, including behavioural therapy, movement therapy—pelvic floor muscle training, manual visceral therapy, and physical therapy, i.e., treatment with physical stimuli such as electrotherapy, magnetic fields and high-frequency currents. An interdisciplinary approach in treatment is extremely important for improving women's health and lives.

2. Materials and Methods

In this article, the authors consider the following aspect: the use of different physiotherapy treatments as adjunctive treatment for urinary incontinence. The authors reviewed the literature databases in PubMed, Medline and Embase to find an association between the physiotherapeutic treatment applied and its effectiveness. Then, the data obtained from these inquiries were evaluated to remove papers related to other keyword meanings. The following keywords and queries used: physiotherapy, magnetotherapy, electrotherapy, cones, incontinence, physiotherapy in incontinence, physical treatments in incontinence, use of cones in incontinence and pelvic floor muscle exercises in incontinence. These results were assessed for compliance with the inclusion and exclusion criteria based on an analysis of the abstracts (inclusion criterion: research articles describing the use of physiotherapy in urinary incontinence; exclusion criterion: non-research articles and those not within the keywords and queries). Of the 50 articles initially shortlisted for further analysis, 10 were rejected at this stage. The 40 remaining articles were subjected to content analysis and a further eight were rejected on the basis of further analysis. The remaining articles were analysed in depth and are presented in Table 1 (Ref. [11–43]).

3. Results

Behavioural therapy has a special place in comprehensive therapy intervention. It is important to introduce regular and simple changes to the patient's daily life to enhance the effect of physiotherapy. Targeted action involves the patients introducing restrictions and avoiding triggers. It is necessary to develop the correct urinary and faecal behaviour based on physiological reflexes, but with the application of the correct habits. It is particularly important to introduce the correct principles in the treatment of patients with overactive bladder-type disorders and mixed incontinence and constipation [44].

The use of comprehensive therapy is crucial, because women who present with micturition disorders due to troublesome complaints often also have emotional disorders and depression. Many patients significantly limit their personal life, work and activities in various areas of life. Loss of urine is also culturally recognised as an embarrassing, often taboo subject. The main technique used in behavioural therapy as preparation for a proper therapy plan is to keep a micturition diary. The patient is instructed by the therapist on how to keep the diary correctly. Usually, urination is measured independently for about two days under normal everyday conditions. The key to reading the test correctly is conscientious and accurate record-keeping. It is suggested that the micturition diary should be kept on a day off, such as at the weekend [45]. Implementing behavioural therapy, including concomitant physical and pharmacological treatment, leads very quickly to subjective improvements and objective improvements in the long term.

Pelvic floor muscle exercises include preventive and problem-specific measures. The use of kinesitherapy mobilises the circulatory and respiratory systems and improves the metabolism of the whole organism. The efficiency of the pelvic floor muscles depends largely on the condition of our muscular, ligamentous and fascial systems, which keep the organs at the right height. When influenced by exercise, the fibres increase in mass and can change their character from fast-twitch to slow-twitch and vice versa.

The main aim of pelvic floor muscle training is to gain muscle mass and increase resting tension. Increased strength, improved deep sensation and neuromuscular control are all direct effects of training. In addition, regular exercise can help to inhibit the stimulation of receptors that are stretch-sensitive and can also reduce complaints of instability, i.e. urgency and frequent urination. A history and basic physical examination by a physiotherapist is necessary before doing pelvic floor muscle exercises. Three basic exercise techniques are commonly used: active exercises, biofeedback, and cone exercises. All these methods may be used together or separately during therapy. Active exercises using muscle synergies, the most accessible and inexpensive method, require no special equipment. The individual exercises consist of adopting the correct position and activating the relevant muscle groups. This works the

Table 1. Provides an overview of studies dealing with the management of urinary incontinence and the effectiveness of the physical methods used.

Author of publication/year	Study aim	Material and methods	Methods for assessing the effectiveness of treatment	Results/Conclusions
Bo *et al*., 1996 [11]	To evaluate the effectiveness of transvaginal stimulation in the treatment of SUI.	9 patients with SUI underwent TES at 10, 20, 50 Hz.	Observation of contraction, patients' subjective feelings. McGill Pain Questionnaire.	Correct contraction was achieved in only one of the nine patients; any frequency of stimulation caused pain and discomfort in all women.
Siegel *et al*., 1997 [12]	To evaluate the effectiveness of electrostimulation in the treatment of UUI AND MUI.	68 patients were divided into two groups: Group I - ES (50 Hz and 12.5 Hz - MUI, 12.5 Hz - UUI, 20 weeks, daily); Group II - ES (50 Hz and 12.5 Hz - MUI, 12.5 Hz - UUI, 20 weeks, every other day).	Micturition diary, night-time urinary frequency, pad test, Quality of Life questionnaire, subjective assessment of patients.	A statistically significant improvement was identified in all the parameters studied. There was no difference in the results between the groups.
Brubaker *et al*., 1997 [13]	To evaluate the efficacy of transvaginal electrostimulation in the treatment of SUI, MUI, UUI.	121 women were subjected to TES (20 Hz, bipolar pulse, pulse width 0.1 s, treatment duration - 8 weeks).	Urodynamic examination, micturition diary.	Improvements in outcome were achieved in 49% of women with UUI; there was no statistically significant improvement in women with SUI.
Bø *et al*., 1999 [14]	To compare the effectiveness of pelvic floor muscle exercises, transvaginal stimulation and vaginal cones in the treatment of SUI.	107 women with SUI with confirmed urine leakage >4 g in the incontinence test after standard bladder filling (200 mL) were divided into 4 groups: Group I (n = 25) - PFMT performed 3 times a day at home, combined with additional group training once a week for 45 min under the guidance of a physiotherapist; Group II (n = 25) - TES (50 Hz for 30 min daily); Group III (n = 27) - VC insertion for 20 min; Group IV (n = 30) - no treatment.	Pad test, subjective assessment of patients, increase in pelvic floor muscle strength measured with a balloon catheter placed in the vagina.	The greatest improvement in muscle contraction strength after 6 months of treatment was found in women using pelvic floor muscle exercises. Objective recovery (urine leakage on the pad test $\leq$2 g) was achieved in 11 women in the pelvic floor muscle training group, 7 in the electrical stimulation group, 4 from the vaginal cone group and in 2 from the control group. Based on the assessment by the patients themselves, complete resolution of stress urinary incontinence symptoms was found in 14 women performing pelvic floor muscle exercises, three using electrical stimulation, two wearing vaginal cones and only one patient in the untreated group.
Kralj *et al*., 1999 [15]	To evaluate the effectiveness of functional electrostimulation in the treatment of SUI.	111 patients underwent FES: biphasic, rectangular pulse, pulse time 1 ms; frequency 20 Hz; intensity 35 mA; 1.5–2 hours per day; for a period of 3 months.	Urodynamic examination, pad test, urine laboratory tests.	After therapy, complete recovery was observed in 50.5 per cent of the patients, 23.4 per cent showed an improvement and 26.1 per cent were unsuccessful.
Fujishiro *et al*., 2000 [16]	To evaluate the effectiveness of magnetic stimulation in the treatment of SUI.	Group I (n = 75) - FMS (15 Hz, 50% intensity, 30 minutes) Group II (n = 63) - placebo.	Quality of Life questionnaire, perineometry.	Improvements were revealed in all parameters studied in the group subjected to magnetic stimulation.
Sung *et al*., 2000 [17]	To compare the effectiveness of pelvic floor muscle exercises and functional ES combined with biofeedback in the treatment of SUI.	The 60 patients were divided into two groups: Group I - FES - biofeedback (variable frequency 35–50 Hz, 20 minutes, twice a week, for 6 weeks); Group II - PFMT performed at home, daily, for 6 weeks.	Perinometry, urodynamic examination, pad test.	FES biofeedback shown to be more effective.

Table 1. Continued.

Author of publication/year	Study aim	Material and methods	Methods for assessing the effectiveness of treatment	Results/Conclusions
Spruijt *et al*., 2003 [18]	To evaluate the effectiveness of pelvic floor muscle exercises and transvaginal electrostimulation in the treatment of SUI, UUI, MUI.	35 female patients with SUI and 17 female patients with UUI underwent FMS: 20 minutes (10 min - 5 Hz and 10 min - 50 Hz), twice a week, for 8 weeks.	Gynaecological examination, pad test, urodynamic examination, culture, micturition diary.	One year after the end of therapy, complete recovery was observed in 38% of SUI patients and 40% of UUI patients.
Unsal *et al*., 2003 [19]	To evaluate the effectiveness of magnetic stimulation in the treatment of SUI and UUI.	36 patients were divided into two groups: Group I (n = 24) - TES (50 Hz, biphasic pulse, asymmetric, pulse duration 300 μs; 40 hours of stimulation); Group II (n = 12) - placebo.	Bladder capacity, number of incontinence episodes.	At the end of treatment, 88% of the patients showed resolution or a significant reduction in symptoms. After 6 months, one third of patients required therapy again.
Barroso *et al.*, 2004 [20]	To evaluate the efficacy of transvaginal electrostimulation in the treatment of MUI.	Twenty-two women underwent TES (50 Hz, 700 μs pulse duration, 20 minutes, twice a week, for a period of 8 weeks).	Vaginal ultrasound, exercise test, micturition diary.	In 81.7% of patients, urinary frequency decreased significantly, and 63.3% of patients had better Valsalva test results.
Herrmann *et al*., 2004 [21]	To evaluate the efficacy of transvaginal electrostimulation in the treatment of SUI.	33 women with SUI were randomly divided into two groups: Group I (n = 16) - pelvic floor muscle exercises, use of VB during daily activities; Group II (n = 17) - pelvic floor muscle exercises, use of VB during daily activities, 10 - 50 Hz interferential current electrostimulation, biofeedback exercises were recommended on a case-by-case basis (once a week, on average nine times in the first year).	Pad test, subjective impressions of female patients, UISS questionnaire.	The effectiveness of the therapy was assessed after 4 and 12 months and after 5 years. After 12 months, there were no statistically significant differences between the groups in any of the variables tested, but in both groups the results of all tests were significantly better compared to baseline. At 5 years, 21 of 33 women (64%) reported subjective improvement. Urine leakage in the incontinence test decreased from 23.0 to 1.0 g in group I and from 13.0 to 1.0 g in group II.
Parkinen *et al*., 2004 [22]	To compare the effectiveness of electrical stimulation, pelvic floor muscle exercises and vaginal crutches in the treatment of SUI.	120 patients were divided into two groups: Group I - FES - biofeedback (variable frequency 35–50Hz, 20 minutes, twice a week, for 6 weeks) Group II - PFMT using VC (150 g) performed at home, daily, for 6 weeks.	Micturition diary, perinometry.	Improvements were obtained in 88.3% of patients using PFMT and in 91.6% of patients using FES biofeedback, with no statistically significant differences between the groups.
Seo *et al*., 2004 [23]	To compare the effectiveness of pelvic floor muscle exercises using vaginal cones and functional electrostimulation combined with biofeedback in the treatment of SUI.	The 103 women were divided into 3 groups: Group I (n = 34) - PFMT; Group II (n = 34) - biofeedback; Group III (n = 35) - ES (10 Hz, imp.time 400 μs). The therapy lasted 12 weeks.	King's Health Questionnaire	The highest effectiveness was found in the ES group. Biofeedback was more effective than PFMT.
Wang *et al*., 2004 [24]	To compare the effectiveness of pelvic floor muscle exercises, biofeedback and electrostimulation in the treatment of UUI.	Twenty patients with UUI and 17 patients with SUI (24 women and 3 men) were treated. The therapy used the NeoControl system: pulsed magnetic field, (alternating 10 Hz and 50 Hz), 20 minutes, twice a week, for 8 weeks).	Micturition diary, 1h underwire test, urodynamic study, quality of life questionnaire.	In the group of patients with UUI: 5 patients (25.0%) were cured, 12 patients (60.0%) improved, 3 patients (15.0%) were unsuccessful with therapy. In the group of patients with SUI: 9 patients (52.9%), were cured, in 7 patients (41.1%) improvement was obtained, in 1 patient (6.0%) therapy had no effect.

Table 1. Continued.

Author of publication/year	Study aim	Material and methods	Methods for assessing the effectiveness of treatment	Results/Conclusions
Yokoyama *et al*., 2004 [25]	To explore whether this new technology is effective for patients with urge incontinence, as well as those with stress urinary incontinence.	20 patients with urge incontinence and 17 patients with stress urinary incontinence. The Neocontrol system (Neotonus Inc., Marietta, GA) was used. Treatment sessions were for 20 min, twice a week for 8 weeks.	Evaluations were performed by micturition diaries, one-hour pad weight testing, quality of life surveys and urodynamic studies.	Of the urge incontinence cases, five patients were cured (25.0%), 12 patients improved (60.0%) and three patients did not show any improvement (15.0%). Leak episodes per day reduced from 5.6 times to 1.9 times at 8 weeks ($p < 0.05$). Eight patients with urge incontinence recurred within 24 weeks after the last treatment (47.1%). Of the stress incontinence cases, nine patients were cured (52.9%), seven patients improved (41.1%) and one patient did not show any improvement (6%). In the one-hour pad weight test, the mean pad weight reduced from 7.9 g to 1.9 g at 8 weeks ($p < 0.05$). Three patients returned to the baseline values within 24 weeks after the last treatment (17.6%). No side-effects were experienced by any of the patients.
Almeida *et al*., 2004 [26]	To evaluate the efficacy of extracorporeal magnetic stimulation in the treatment of SUI and UUI.	91 women underwent ExMI (16 sessions).	Micturition diary, urodynamic study, quality of life questionnaire.	Patients were assessed after 3, 6 and 12 months. After therapy, 77% of patients were cured, but after 12 months, 94% had had a relapse.
But *et al*., 2005 [27]	To evaluate the effectiveness of functional magnetotherapy in the treatment of MUI.	39 women with MUI were randomly divided into two groups: Group I (n = 23) - FMS (18.5 Hz, continuously (night and day), for a period of 2 months; Group II (n = 16) - placebo.	Frequency of urination (including at night), use of pads, weight of pads, VAS scale, urodynamic examination.	In the FMS-treated group, the following was confirmed: Statistically significant: reduction in urinary frequency, reduction in night-time urinary frequency and number of sanitary pads used, improvement in urodynamic test results.
Bölükbaş *et al*., 2005 [28]	To compare the effect of functional electrostimulation and functional magnetic stimulation in SUI and MUI.	22 women were divided into 2 groups: Group I (n = 14) - FES (10 Hz in patients with MUI and 50 Hz in patients with SUI. The treatment lasted 20 minutes, 3 times a week for 6-8 weeks; Group II (n = 8) - FMS (twice a week for 6 weeks).	Patients' subjective impressions, a micturition diary, a one-hour sublingual test and perinometry.	The results showed the efficacy of both therapies, with better results in patients undergoing FMS therapy.
Dannecker *et al*., 2005 [29]	A 7-year observation of the effectiveness of pelvic floor muscle exercises in the treatment of various forms of urinary incontinence.	390 women with SUI (80%) and UUI (20%) underwent PFMT + biofeedback therapy.	Urodynamic examination, provocation tests (cough), EMG examination.	The study showed very high efficacy of biofeedback therapy and PFMT, both immediately after therapy and an average of 2.8 years after completion. Before therapy, female patients with SUI grade III accounted for 60%, grade II for 21% and grade I for 10%. After therapy, SUI grade III persisted in 5% of the women studied, grade II in 19% and grade I in 26%. Improvements in incontinence symptoms were confirmed in the self-assessment of 95% of the women studied. On average, 2.8 years after therapy, 71% of the women surveyed confirmed the maintenance of the effects.

Table 1. Continued.

Author of publication/year	Study aim	Material and methods	Methods for assessing the effectiveness of treatment	Results/Conclusions
Wang *et al*., 2006 [30]	To compare the efficacy of electrical stimulation, oxybutynin and placebo in the treatment of UUI.	The 68 women were divided into 3 groups: Group I (n = 24) - ES (symmetrical biphasic current, frequency 10 Hz, pulse duration 400 μs, duty cycle 10/5; Group II (n = 23) - received oxybutynin (2.5 mg); Group III (n = 21) - placebo.	Micturition diary and King's Health Questionnaire.	The best results were obtained in the group undergoing electrical stimulation.
Manganotti *et al*., 2007 [31]	To evaluate the effectiveness of magnetic stimulation in the treatment of SUI.	20 women were allocated to two groups: Group I - patients subjected to FMS of the S2-S4 roots at 15 Hz, for 15 minutes, 3 days a week, for 2 weeks; Group 2 - placebo.	King's Health Questionnaire, SEAPI - QMM, a one-hour pad test and an exercise test. Tests were performed before therapy, one week and one month after the end of therapy.	Improvements in quality of life were evident in the magnetic stimulation group after one week, but the effects did not persist one month after treatment. Conclusions: Magnetic stimulation of the sacral roots has a short-term effect on some aspects of patients' quality of life, and efficacy has not been proven using quantitative measurement.
Castro *et al*., 2008 [32]	To compare the efficacy of PFMT, electrostimulation and the use of vaginal cones in the treatment of SUI.	Patients were divided into 3 groups: Group I (n = 31) - performing PFMT; Group II (n = 30) - ES (50 Hz, imp. time 0.5 ms); Group III (n = 27) - using VC; Group IV (n = 30) - placebo	Quality of life questionnaire, urodynamic study, pad test, micturition diary, patients' subjective impressions	Significant improvements were found in all study variables in each study group with no significant differences between the groups
Hoşcan *et al*., 2008 [33]	To evaluate the effectiveness of magnetic stimulation (ExMI) in the treatment of SUI.	30 women with SUI underwent ExMI (20 minutes, twice a week for 6 weeks).	Micturition diary, pad test, urodynamic study, quality of life questionnaire.	The efficacy of the therapy was assessed at 3, 12 and 24 months after completion of therapy. 77.8% were cured. No improvement was observed in six patients. The effects lasted an average of one year after the end of therapy.
Santos *et al*., 2009 [34]	To compare the effects of functional pelvic floor muscle electrostimulation and vaginal cone therapy in the treatment of SUI.	45 women were divided into two groups: Group I - FES (50 Hz, pulse duration 1 ms, intensity up to 100 mA, treatment time 20 minutes, therapy time 4 months; Group II - two 45-minute sessions per week were applied with 20–100 g VC.	Micturition diary, pad test and quality of life questionnaire	Both therapies proved effective and there were no differences in outcomes between the groups.
Gilling *et al*., 2009 [35]	To evaluate the efficacy of extracorporeal magnetic stimulation in the treatment of SUI.	70 women were divided into two groups: Group I (n = 35) - ExMI (3 sessions per week, for 6 weeks); Group II (n = 35) - placebo.	Micturition diary, urodynamic study, pad test, King's Health Questionnaire, perinometry.	There were no statistically significant differences between the treatment group and the placebo group.
Ismail *et al*., 2009 [36]	To evaluate the effectiveness of extracorporeal magnetic stimulation in the treatment of SUI.	48 women underwent ExMI (16 sessions, twice a week).	Micturition diary, 1 h underwire test, urodynamic study, quality of life questionnaire.	52.1% of patients withdrew during therapy and 35.4% developed adverse reactions.

Table 1. Continued.

Author of publication/year	Study aim	Material and methods	Methods for assessing the effectiveness of treatment	Results/Conclusions
Alves *et al*., 2011 [37]	To compare the effectiveness of low- and medium-frequency current in patients with SUI.	20 patients were divided into two groups: Group I - a medium frequency current was applied (carrier frequency - 2000 Hz, modulation frequency 50 Hz); Group II - a 50 Hz frequency current was applied. Stimulation was performed for 6 weeks (twice a week for 20 minutes each).	King's Health Questionnaire, VAS pain scale, pad test, pelvic floor muscle contraction tested using EMG.	In both groups, there was a significant improvement in the results of the subpubic test and an increase in tubal pressure.
Huebner *et al*., 2011 [38]	To compare the effectiveness of pelvic floor muscle exercises, biofeedback and electrostimulation in the treatment of SUI.	108 women were divided into three groups: Group I (n = 33) - EMG + biofeedback + ES (50 Hz, 20–80mA, contraction time 15s, pause time 8s, 15 minutes, 2 times a day); Group II (n = 28) - EMG + biofeedback + T ES (50 Hz, 20–80mA, contraction time 15 s, pause time 8 s, 15 minutes, 2 times a day); Group III (n = 27) - PFMT + EMG Therapy lasted 12 weeks.	24 h underwire test, Bristol questionnaire, VAS scale, micturition diary.	Quality of life improved in the study groups; there was no statistical significance between the study groups.
Wallis *et al*., 2012 [39]	To evaluate the effectiveness of magnetic stimulation in women with urinary incontinence.	101 women were divided into two groups: Group I (n = 50) - subjected to magnetic stimulation (mini stimulators placed in underwear were used, which the patients used for 12 hours a day, over a period of 3 months); Group II - placebo.	King's Health Questionnaire, perinometry, patients' subjective impressions.	There was no statistically significant improvement in the treatment group. The study authors suggest that this method requires further clinical trials.
Pereira *et al*., 2012 [40]	To evaluate the efficacy of surface electrostimulation in the treatment of SUI in older women.	14 women were divided into two groups: Group I - ES (50 Hz, 700 μs pulse width, 4-on/8-off, 20 minutes, for 6 weeks); Group II - control.	Micturition diary, 1-hour pad test, Doppler ultrasound, King's Health Questionnaire, perinometry.	There was a significant improvement in quality of life in the treatment group, with no significant differences between groups in the perinometric examination.
Terlikowski *et al*., 2013 [41]	To evaluate the efficacy of transvaginal electrostimulation with surface EMG-biofeedback (SEMG) in the treatment of SUI.	25 patients were divided into 2 groups: Group I - TES and SEMG (10–40 Hz, pulse width 200–250 μs, 20 min, twice daily, for 8 weeks); Group II - placebo.	24 h pad test, micturition diary, quality of life questionnaire, urodynamic study.	Significantly better results were found in the 24 h pad test and the acuity of life test in Group I, compared to Group II. There were no differences between groups in urodynamic test and PFM strength.
Nygaard *et al*., 2013 [42]	To assess the effectiveness of PFMT before and after using a quality of life questionnaire.	47 premenopausal and 35 menopausal patients individually performed the learned PFMT.	Quality of life assessment questionnaire.	PFMT significantly improved quality of life.
Karaman *et al*., 2020 [43]	To assess the impact of electrostimulation and Kegel muscle exercises.	Group 1 - 20 patients were qualified, they had electrostimulation 2x a week (30 minutes) for 4 weeks plus mm Kegel exercises, Group 2 - 28 patients were qualified, they had underwent electrostimulation.	Wagner scale, micturition diary.	Electrostimulation in the postoperative period has a significant impact on incontinence.

UI, Urinary Incontinence; SUI, Stress Urinary Incontinence; UUI, Urge Urinary Incontinence; MUI, Mixed Urinary Incontinence; OAB, OverActive Bladder; PFMT, Pelvic Floor Muscle Training; ExMI, Extracorporal Magnetic Innervation; FMS, Functional Magnetic Stimulation; ES, Electrostimulation; TES, Transvaginal Electrical Stimulation; FES, Functional Electrical Stimulation; FMS, Functional Magnetic Stimulation; VB, Vaginal Ball; VC, Vaginal Cones; WBV, Whole Body Vibration; EMG, Electromyography; PFM, Pelvic Floor Muscle.

thighs, buttocks, abdomen and torso. These exercises will enable intermediate tension of the pelvic floor muscles [46–48]. Properly selected exercises with appropriate body positioning allow activation of the transverse perineal muscles, the urethral sphincter muscle, and the anal lever muscle. It is important to teach the patient the correct activation of the external muscle groups in order to trigger a contraction of the pelvic floor muscles.

Manual visceral techniques can be used effectively in gynaecology and obstetrics for various dysfunctions in the pelvic area [49,50].

Positive effects in training the pelvic floor muscles are obtained using biofeedback. Many scientific publications prove the effectiveness of this form of therapy [51–53]. Biofeedback therapy controls the activation of the relevant muscle group, as well as the size and duration of contractions and relaxation. Correct reading of the results makes it possible to monitor the progress in the therapy. However, this treatment requires special conditions, such as a separate room and requires special equipment. During the therapy, the woman must remove her underwear, expose her perineal area and consent to an electrode being applied to her vagina or anus.

Biofeedback therapy involves higher financial costs for both the patient and medical staff. However, studies have shown that conducting therapy with biofeedback quickly teaches patients how to properly tone the correct muscle groups and enhances motivation to undertake exercise [54–57]. Biofeedback is used in both women and men for treating urinary incontinence and is considered a modern technique that is an effective complement to traditional pelvic muscle exercise programmes [58,59].

The use of a vaginal cone in the form of a weight that the woman inserts into the vagina is intended to strengthen the anal lever muscle. Gradually increasing the weight of the cones triggers stronger muscle contractions to hold the cone in the vagina. The ability to hold the cone with the correct weight in an upright position while walking is to lead to the correct contractions of the pelvic floor muscles. Cone exercises should be considered as supplementary to training and should only be used when clearly indicated [60,61]. Weights can be an effective training aid for women with mild to moderate stress urinary incontinence, especially in the absence of severe pelvic organ prolapse. However, incorrect application of vaginal weights may lead to the patient developing pathological muscle contraction in the absence of proper relaxation [62].

Physical treatments using low-frequency medium-frequency or high-frequency currents are the most commonly used of the physical treatments available for patients with urinary incontinence. The main task of electrostimulation is to activate the striated muscles in order to support urethral sphincter function. During electrostimulation, the bladder neck is displaced in the sagittal plane and the posterior urethrovesical angle is reconstructed. The stimulation caused by the electrical impulse also runs to the muscles via the vulvar nerve. If there is no damage to the peripheral motor neuron during electrostimulation through the efferent fibres, smooth muscle excitation of the detrusor muscle is inhibited. This is used in physiotherapy in micturition disorders due to neurogenic causes and in urge incontinence, urinary urgency and overactive bladder. Long-term electrostimulation causes increased muscle mass and also increases resting tension and contraction strength. Moreover, electrostimulation influences the remodelling of striated muscles with an increase in the mass of type I slow-contractile fibres, which makes it possible to perform a longer contraction, and boosts resistance to fatigue. Type II fast-twitch fibres make up 30% of the pelvic muscle mass; they are mainly located in the urogenital diaphragm and become active when intra-abdominal pressure increases, for example, as a result of coughing, laughter or sudden jumping. Normal muscle function is mainly activated by slow-contracting fibres, which account for 60% of all motor units. In the conservative treatment of urinary incontinence, the key is to select the appropriate parameters of electrostimulation which stimulate and engage the right number and types of muscle fibres. Determining the type of incontinence is crucial for selecting the appropriate electrostimulation parameters. The intensity used in electrostimulation should not exceed 100 mA [63]; it needs to be individually adjusted to the sensitivity of the patient, and the sensation of the current may be variable in the same patient on each day of therapy. Some studies have shown that a frequency of 50 Hz is optimal for closing the urethra and about 5–12 Hz for relaxing the detrusor muscle; in a mixed form, a frequency of 25 Hz can be used [64,65].

Electrostimulation is performed with vaginal or rectal courts or non-invasively in an external manner with flat electrodes taped to the suprapubic area, sacral area and perineal area [66]. Electrostimulation should be long-term therapy over many months; the best results are obtained after approximately 3–5 months of continuous therapy [67].

Magnetostimulation is the therapeutic application of alternating magnetic fields with very low magnetic induction values, which induce contractions in the pelvic floor muscles. For the purposes of urology, flat applicators of no more than a few centimetres have been developed, which are inserted into the patient's underwear in the perineal area. Stimulation consists in continuously or periodically exposing the organs of the lower pelvis to a magnetic field. This form of stimulation is considered complementary to other forms of conservative measures [68]. Using a pulsating magnetic field makes it possible to select the appropriate strength and frequency for the magnetic field. This field acts directly on the motor fibres of the vulvar and visceral nerves, activating the sodium-potassium pump and regulating the depolarisation of motor neurons, forcing muscle contraction in the innervated area [69,70]. In the treatment of urinary incontinence through physiotherapy, a magnetic

chair in which a field applicator is built into the structure is most commonly used [71]. The S2–S4 sacral nerve roots ensure primary autonomic and somatic innervation of the bladder and urethra, vaginal and rectal walls and pelvic floor muscles. Stimulating these roots is an effective way to modulate the pelvic floor and subsequently to control pelvic organs [72–74]. This method is used to treat all types of urinary incontinence.

The aim of magnetostimulation is to alleviate the habit of frequent urination, delay urination and lengthen the urinary interval, which improves bladder capacity and reduces displacement instability. The procedure is painless and does not require undressing during therapy or the insertion of a probe into the vagina or rectum [75].

Current recommendations from the European Society of Urology advise against treating urinary incontinence or overactive bladder with magnetic stimulation [76–78].

The quality of life of women with Stress Urinary Incontinence can also be affected by the distribution of body fat. A study by Ptak and co-authors found that women with a gynoid body type (Waist to Hip Ratio (WHR) $<$0:8) compared with women with an android body type (WHR $>$0:8) had better quality of life questionnaire (QOL) scores after performing pelvic floor muscle and a transverse abdominal muscle (Pelvic Floor Muscle (PFM) + Transverse abdominal (TrA)) workout [79].

It is important to remember that physical therapy procedures are not used in pregnant women, during menstrual bleeding, or in cases of cancer, active tuberculosis, hyperthyroidism, gastrointestinal bleeding, severe infections of viral, bacterial and fungal origin, or in the presence of electronic implants, e.g., pacemaker. Pelvic procedures should be carefully considered in patients with anal and vaginal varices and endometriosis. In patients undergoing oncological treatment, all electro and magnetotherapy stimulation should be consulted with an oncologist.

4. Conclusions

Physiotherapy treatments are effective and support the treatment process in women of all age ranges who experience urinary incontinence, thus contributing to an improved quality of life for these women. It is important that treatment is selected based on the patient's current clinical picture.

This review points to the need for interdisciplinary preparation of an algorithm for managing urinary incontinence in women and conducting randomised trials to identify the physiotherapy interventions with the greatest effectiveness.

It is important that treatment is selected on the basis of the patient's current clinical picture. A strength of the manuscript is the indication of the use of various physiotherapeutic interventions as adjunctive treatment in urinary incontinence. A weakness of the manuscript is the reference to searching for articles in only three journal databases.

Author Contributions

MW and KP analyzed the data; MW, KP, KP-R, GJ-B performed the review and editing. MW, KP, TG, KP-R, PM, MM, DL, MP-K, WK, GJ-B wrote the paper. All authors read and approved the manuscript.

Ethics Approval and Consent to Participate

Not applicable.

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Conflict of Interest

The authors declare no conflict of interest. Małgorzata Wójcik, Katarzyna Plagens-Rotman, Piotr Merks and Grażyna Jarząbek-Bielecka are serving as Guest editors of this journal. We declare that Małgorzata Wójcik, Katarzyna Plagens-Rotman, Piotr Merks and Grażyna Jarząbek-Bielecka had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to Andrzej Semczuk and Andrea Tinelli.

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