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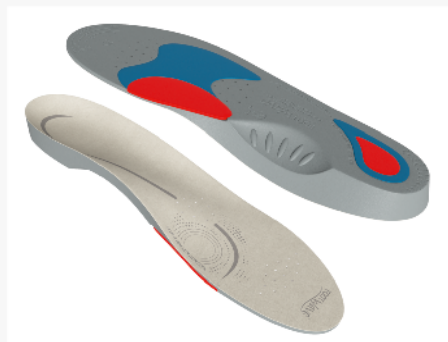
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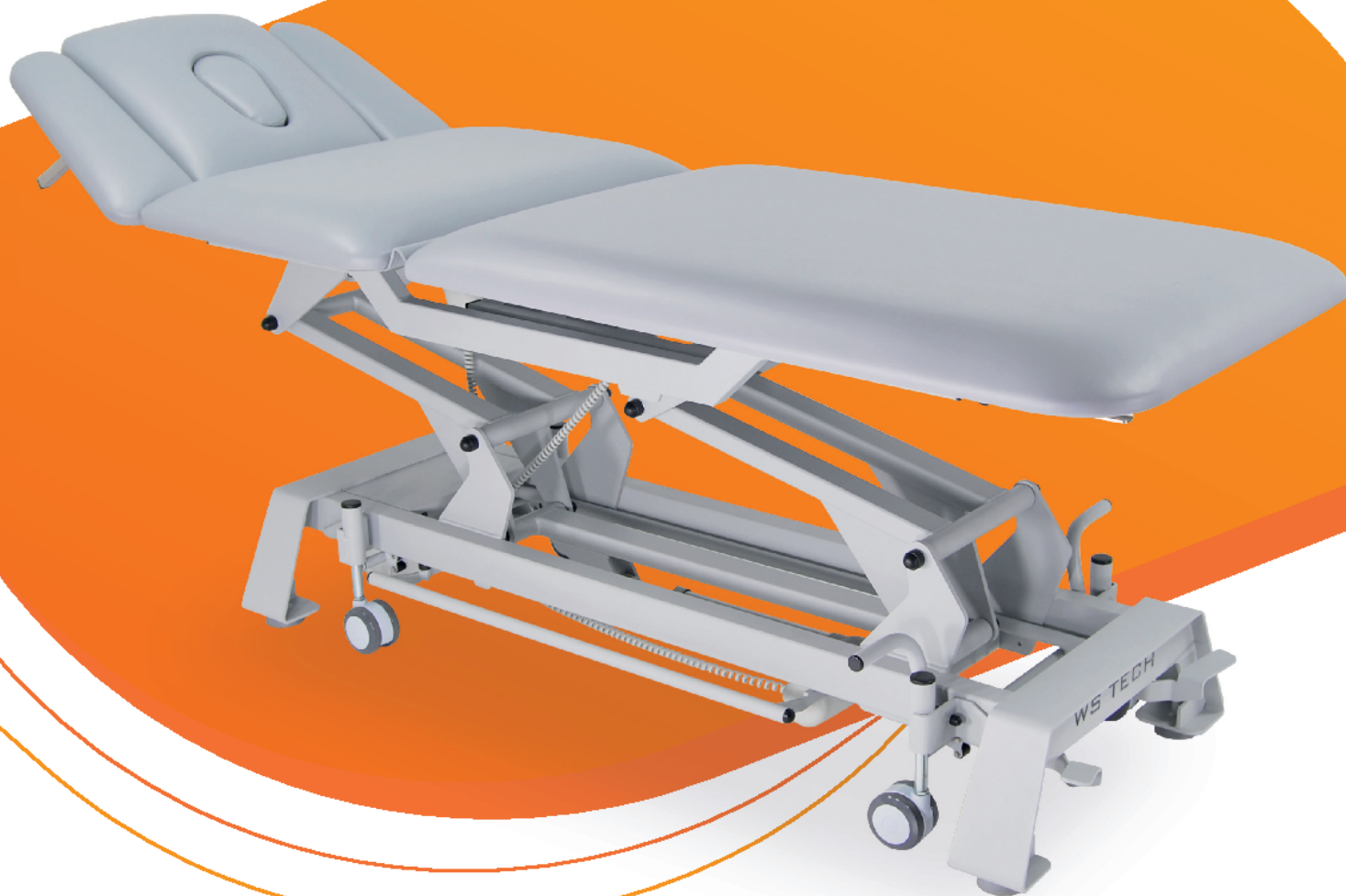


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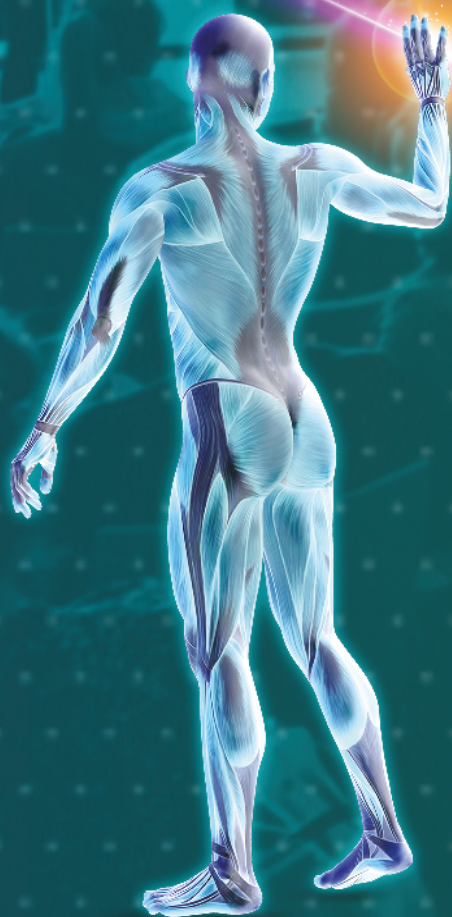
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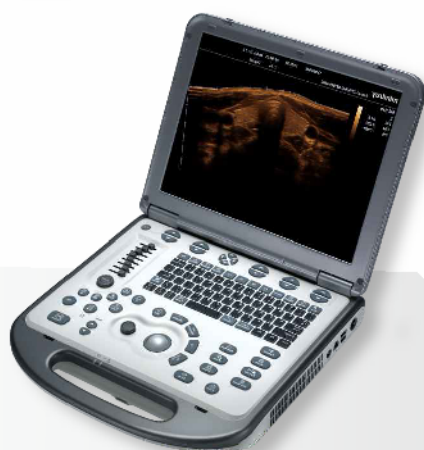
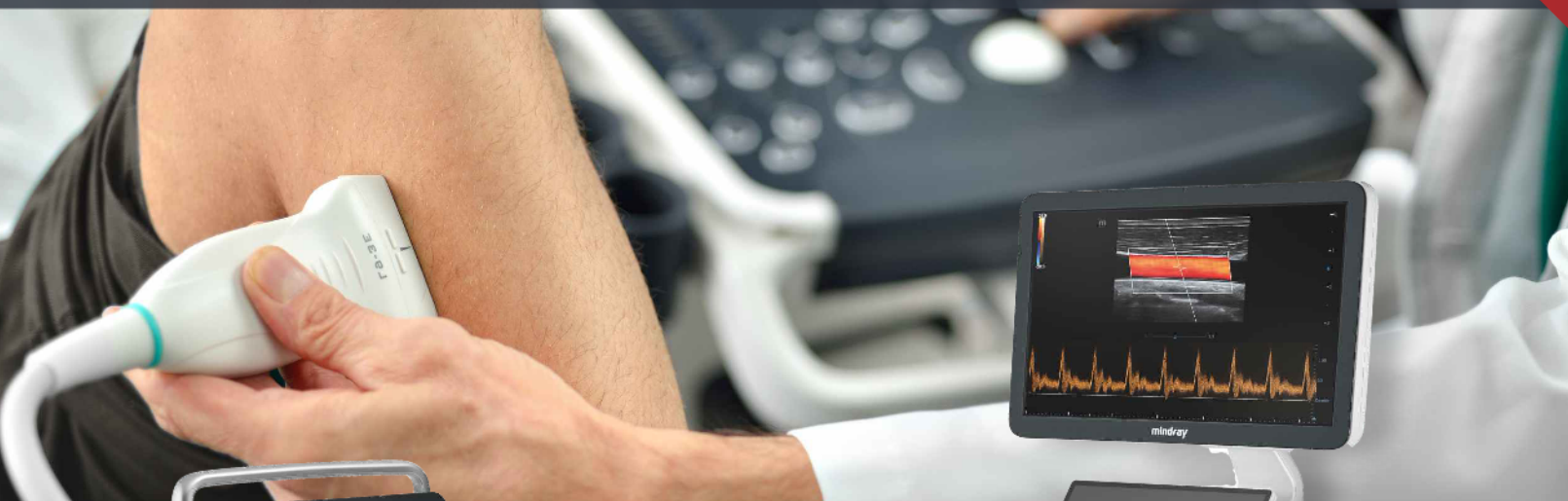
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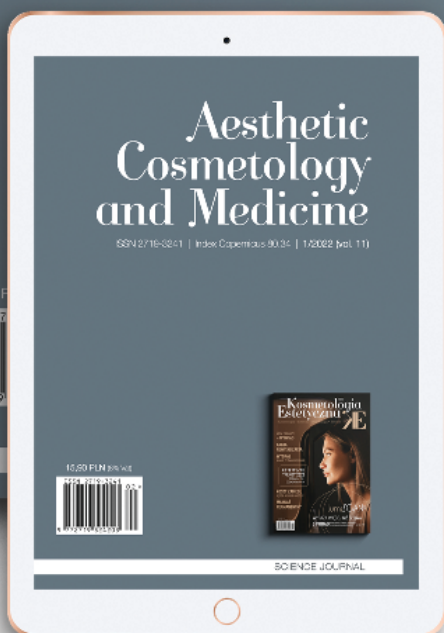


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Use of selected soft tissue therapy techniques in menstrual pain syndromes

Wykorzystanie wybranych technik terapii tkanek miękkich w zespołach bólu menstruacyjnego

Łukasz Skibiński^(A,B,C,D,E,F), Jolanta Rojczyk-Chmarek^(C,D,E,F,G)

Wydział Fizjoterapii, Akademia Wychowania Fizycznego im. Jerzego Kukuczki /
Faculty of Physiotherapy, Jerzy Kukuczka Academy of Physical Education, Katowice, Poland

Abstract

Introduction. One of the more common ailments of young women in the reproductive period is dysmenorrhea (MSM). More than 50% of women complain of menstrual pain, and 10% of them are forced to give up their daily activities for the first 1-3 days of the menstrual cycle.

Objective of the work. The aim of the research was to check to what extent the selected techniques on soft tissues in strictly defined places will reduce the intensity of pain sensations occurring in the painful menstruation syndrome.

Material and methods. 23 women aged 19 to 48 participated in the study. Women with cyclical IBM-related pains that had been repeated for at least a year were invited to the study. Pain complaints were examined according to the VAS scale, which allows the assessment of pain on a scale of 1-10. Each visit began with the completion of a questionnaire. Thanks to it, pain sensations and other ailments or observations related to the menstrual cycle for 3 consecutive menstrual cycles were checked.

Results. The most common complaints were pain in the area of the lower abdomen, lumbar spine or head. There was a positive difference in the assessment of pain scale, pain duration and the assessment of improvement in health during menstruation. There was also a significant decrease in pain medication intake from 86 at the first treatment meeting, where only 21 was indicated at the last meeting.

Conclusions. The results of the presented studies have shown that the therapy of soft tissues at specific points has a positive effect on chronic menstrual pain and the reduction of painkillers. The author, through a detailed analysis of the subject of UBM, hopes that the presented content will increase the prevention and awareness of patients in the subject of UBM.

Key words:

menstruation, menstrual pain, visceral therapy, menstrual cycle, soft tissue therapy

Streszczenie

Cel pracy. Celem badań było sprawdzenie, w jakim stopniu wybrane techniki na tkankach miękkich w ściśle określonych miejscach wpłyną na zmniejszenie intensywności odczuć bólowych występujących w ZBM.

Materiał i metodyka. W badaniach wzięły udział 23 kobiety w przedziale wiekowym od 19 do 48 lat. Do badań zostały zaproszone kobiety, u których obserwowane były cykliczne bóle związane z ZBM, powtarzające się minimum od roku. Dolegliwości bólowe były badane wg skali VAS, która umożliwia ocenę występującego bólu w skali 1–10. Każda z wizyt rozpoczynała się wypełnieniem ankiety. Dzięki niej sprawdzane były odczucia bólowe oraz inne dolegliwości związane z cyklem menstruacyjnym przez 3 kolejne cykle menstruacyjne.

Wyniki. Najczęściej doświadczanymi dolegliwościami był ból w rejonie podbrzusza, odcinka lędźwiowego kręgosłupa czy głowy. Zauważono pozytywną różnicę w ocenie skali bólu, długości trwania bólu oraz ocenie poprawy stanu zdrowia w trakcie menstruacji. Zanotowano znaczący spadek przyjmowanych środków przeciwbólowych z 86 na pierwszym spotkaniu terapeutycznym, a tylko 21 zostało wskazanych na spotkaniu ostatnim.

Wnioski. Wyniki przedstawionych badań wykazały, iż terapia tkanek miękkich w określonych punktach ma pozytywny wpływ na przewlekłe bóle menstruacyjne oraz ograniczenie przyjmowanych środków przeciwbólowych. Autor poprzez analizę tematyki ZBM ma nadzieję, iż przedstawione treści wpłyną na zwiększenie profilaktyki oraz świadomości pacjentek w tematyce ZBM.

Słowa kluczowe:

menstruacja, ból menstruacyjny, terapia wisceralna, cykl menstruacyjny, terapia tkanek miękkich

Introduction

Dysmenorrhea (DM) is a common complaint among young women in their reproductive years as evidenced by questions they ask about coping with menstrual pain and related symptoms [1]. Painful periods result from cyclic uterine contractions and affect the quality of life [2]. Xholli et al. [3] suggested that menstrual pain was a consequence of intense uterine contractions aimed to evacuate menstrual flow through the cervix, and, that it might be related to cervix elasticity [3]. Oladosu et al. [4], in turn, believe that distension of visceral organs, including the uterus, might cause involuntary skeletal muscle activity and referred pain. Menstrual pain may start during puberty. It persists from 8 to 72 hours being the most severe on the first or second menstrual day [5]. Many young women who begin to menstruate might therefore get into the habit of using pain-relief medicines, which can lead to severe and long-lasting complications [6].

Statistical data on the prevalence of dysmenorrhea differ considerably, thus emphasizing a wide variety of factors that may underlie this condition. Contractile function of the uterus, uterine blood flow or abnormalities within the female reproductive tract are just a few among the possible causes of severe menstrual cramps. Clinically, dysmenorrhea has been subcategorized into two types, i.e., primary and secondary.

Mrugacz [7] defines primary dysmenorrhea as "excessive uterine contractility and related menstrual pain without a detectable pathology within the lesser pelvis." Secondary dysmenorrhea is diagnosed when "menstrual pain can be related to an underlying disease, disorder or structural abnormality either within or outside the uterus." Secondary dysmenorrhea is less prevalent and, as already mentioned, may be associated with chronic inflammation within the lesser pelvis, uterine fibroids, endometriosis or congenital / acquired reproductive system pathologies.

Despite the progress in diagnosis, treatment and prevention of dysmenorrhea, the direct cause of this severe monthly discomfort remains unclear. Women begin to suffer a few hours before or at the onset of menstrual bleeding. Pain is the predominant symptom frequently accompanied by digestive problems (e.g. food cravings or a general increase in appetite), irregular heartbeat or neurovegetative symptoms (e.g. abnormal increase in sensitivity to various stimuli). Menstrual pain can be experienced as low abdominal contractions or paresthesias in the lower back, sacral or femoral region.

Concomitant complaints include emotional distress, headaches, nausea, vomiting, breast swelling and tenderness or skin changes. Papers regarding the etiology of dysmenorrhea present a multitude of facts and

hypotheses, which are frequently mutually exclusive. Although numerous authors have offered methods aimed to relieve symptoms associated with this condition, none has proved utterly effective. Hence, it is important to develop a therapy to help women go through this stressful period of severe and debilitating pain. Sapolsky emphasized that short-term stress could have devastating consequences and deleterious chronic effects [8].

Stress can alter the menstrual cycle and affect the severity and quality of menstrual pain as well as duration and amount of menstrual flow [9].

MacRae noted that unyielding thoughts about menstruation-related pain or the cycle itself might lead to embarrassment, decreased mobility and social / religious limitations. Self-confidence, self-efficacy and school/academic performance may also be affected [10, 11]. The word pain has been defined as "unpleasant sensory and emotional experience associated with actual or potential tissue damage" [12].

Numerous researchers attribute the pain of primary dysmenorrhea to changes in blood supply to the uterus. The authors of a paper entitled "*Etiopatogeneza zespołu bolesnego miesiączkowania*" ("Etiopathogenesis of dysmenorrhea") conclude that "...in patients suffering from dysmenorrhea, uterine hyperactivity might cause excessive compression on uterine vessels resulting in ischemia and pain" [7].

However, the reverse cannot be excluded, i.e., a decrease in blood supply to reproductive organs might lead to local ischemia with resultant hypoxia and menstrual pain. Hence, local relaxation of anatomical regions associated with menstrual cycle may have an immediate beneficial effect on blood supply to an organ or related structures (as well as drainage thereof). Unfortunately, in secondary dysmenorrhea, the most efficient intervention is the excision of the underlying anatomical cause, i.e., uterine fibroids, etc.

Naturally, increases in dysmenorrhea severity would, first of all, be related to pathologies within the uterus, ovaries or fallopian tubes. Nevertheless, those in neighbouring structures, including the small and large intestines, urinary bladder or anus, should also be taken into consideration. Not to mention endometriosis, which markedly aggravates the pain [15, 16]. Also nutrition may play a significant role in the prevalence and severity of dysmenorrhea [17].

A study of Hajduk demonstrated that unhealthy diet and poor nutritional status had adverse effects on female fertility and related processes [18].

Therefore, the problem of dysmenorrhea should be analyzed in the context of tensegrity, i.e., a "whole body" approach, which, as Uryzaj writes "means that increases in

tension within one structure lead to occurrence of tension in those structures which are in anatomical or structural contact with tension origin” [19]. Hence, any dysfunction in quite remote structures might cause sacral or pelvic pain or aggravate complaints associated with dysmenorrhea.

Aim

The aim of the study was to determine the efficacy of selected soft tissue therapies applied in specific body areas for the alleviation of dysmenorrhea, without any dietary or lifestyle changes aimed at improvement of health condition. The major efficacy determinant was reduction or elimination of pain medications. The author's intention was also to raise awareness of dysmenorrhea, its prevention and treatment. The following research questions were formed:

- Can the selected soft tissue therapies have beneficial effects on chronic dysmenorrhea complaints?
- To what extent can these therapies reduce or eliminate the use of pain-relief medications?
- Would there be any effect of these therapies on menstrual flow intensity and cycle regularity?
- Can work, environment and poor/unhealthy diet increase dysmenorrhea severity?
- How does age influence dysmenorrhea complaints?

Material and methods

The study was carried out in a physiotherapy office, Fitness Centre Mavi Area, Łaziska Górne and Masaż & Spa Puchalski, Katowice. Twenty-three women aged 19 to 48 years were recruited; the mean age was 29 years. Considering age-related physical changes in the older and reproduction-related hormonal changes in the younger patients, the obtained results were analyzed according to age category.

The first age group comprised women aged 19 to 27 years ($n = 10$), and the other those aged 28 to 48 years ($n = 13$). All participants reported dysmenorrhea of at least one year duration.

The major complaints were cyclic pain in the lower abdomen and/or lumbar area; headaches were also reported. Fewer patients experienced sacral pain. Other ailments included nausea, increased appetite, breast swelling and tenderness, paresthesia in the thigh area or skin changes. Each patients was informed about the aim of the appointments and gave consent to participate in the therapy sessions.

Pain intensity was measured using the visual analog scale (VAS) of 1 to 10, where 1 is no pain and 10 is the worst possible pain. At the beginning though, the majority of women insisted that natural numbers were insufficient; therefore half-values were added (e.g., 1.5). Each appointment started with completing a questionnaire on pain intensity, other complaints and observations regarding the three preceding menstrual cycles.

When the observations did not fall within the below specified standards, the patients were asked to add own assessments. These were mostly given in the areas of VAS score 0 and the number of pain relievers used. Several menstruation-related symptoms were beyond those typically mentioned. A sample pre-therapy questionnaire is given below.

Tab. 1. Sample pre-therapy questionnaire

Spotkanie przed terapią / Pre-therapy appointment questionnaire					
Menstruation symptoms	Sacral pain	Lumbar pain	Lower abdominal pain	Headaches, migraine	Others
Pain severity scale (1-10)	1–2	3–4	5–6	7–8	9–10
Pain duration	1 day	2 days	3 days	4 days	longer
Menstrual cycle length	Shorter than 26 days	26 days	27 days	28 days	Longer than 28 days
Bleeding severity	Extremely light	Mild	Moderate	Severe	Very severe
Number of pain relievers	1	2	3	4	More

Soft tissue physiotherapy interventions for menstrual pain syndromes

Questionnaire completion was followed by therapy interventions aimed to relieve dysmenorrhea-related complaints. The below interventions were applied successively – one after another.

a) Suboccipital

- Patient and therapist's starting positions

The patient is supine on the coach. The therapist sits on a chair at the side of the patient's head, forearms resting on the coach.

- Hand placement

Index and ring fingers in the region of suboccipital muscles C0-C1-C2.

- Intervention performance

The therapist aims at relaxation of the suboccipital region applying continuous and gentle pressure in a ventral direction for 3 minutes.

b) Lower abdominal

- Patient and therapist's starting positions

The patient lies supine with her knees bent. The therapist stands at the patient's right side.

- Hand placement

Small finger and the ulnar side of both hands resting below the patient's umbilicus.

- Intervention performance

The therapist applies gentle pressure in a dorsal direction then moving the structures below their hands upwards. The intervention is continued for 3 minutes with an aim to relax lower abdominal structures.

c) Obturator foramen area

- Patient and therapist's starting positions

The patient is supine, her right leg bent and resting on the physiotherapist's abdomen. The therapist stands at the patient's right side.

- Hand placement

Right thumb of the physiotherapist rests on the anterior border of the adductor longus close to its proximal attachment.

- Intervention performance

The therapist applies gentle dorsocranial pressure. Despite marked muscle tension and pain reported by the patient, the pressure is maintained for about 3 minutes. The intervention is then repeated on the other side. The aim is to relax the obturator foramen area.

d) Sacral bone

- Patient and therapist's starting positions

The patient is supine. The therapist sits on the patient's right side.

- Hand placement

The therapist's right hand is placed under the patient's sacral bone.

- Intervention performance

The therapist applied gentle pressure in a ventral direction. Despite marked muscle tension and pain reported by the patient, the pressure is maintained for about 3 minutes. The aim is to relax local ligaments and muscle origin and insertion.

e) HVT - superior thoracic aperture

- Patient and therapist's starting positions

The patient is in supine position. The therapist stands behind the patient's head.

- Hand placement

The bases of therapist's hands are palced on upper sternocostal joints – symetrically on both sides.

- Intervention performance

The therapists and patient cooperate. The patient is requested to take a deep breath. When she breathes out, the therapist applies pressure in a dorsal direction and then quickly takes hands off the chest so that the patient can breathe in again.

f) HVT – lower ribs

- Patient and therapist's starting positions

The patient is supine. The therapist stands on the patient's right side.

- Hand placement

The therapist places their hands on the lower ribs and possibly extends the touch to upper ribs.

- Intervention performance

The therapists and patient cooperate. The patient is requested to take a deep breath. When she breathes out, the therapist applies pressure in a dorsal direction and then quickly takes hands off the chest so that the patient can breathe in again.

g) HVT – pubic symphysis

- Patient and therapist's starting positions

The patient is supine with her legs bent. The therapist stands on the patient's right side.

- Hand placement

The therapist's forearm rests between the patient's knees.

- Intervention performance

The therapists and patient cooperate. The patient is requested to push against the therapist's forearm. At maximal push the therapist quickly withdraws the forearm.

Results

Following the investigations, the observations regarding dysmenorrhea were subject of analysis. The most common pre- and intraobservational complaints are presented in Figures 1a and 1b.

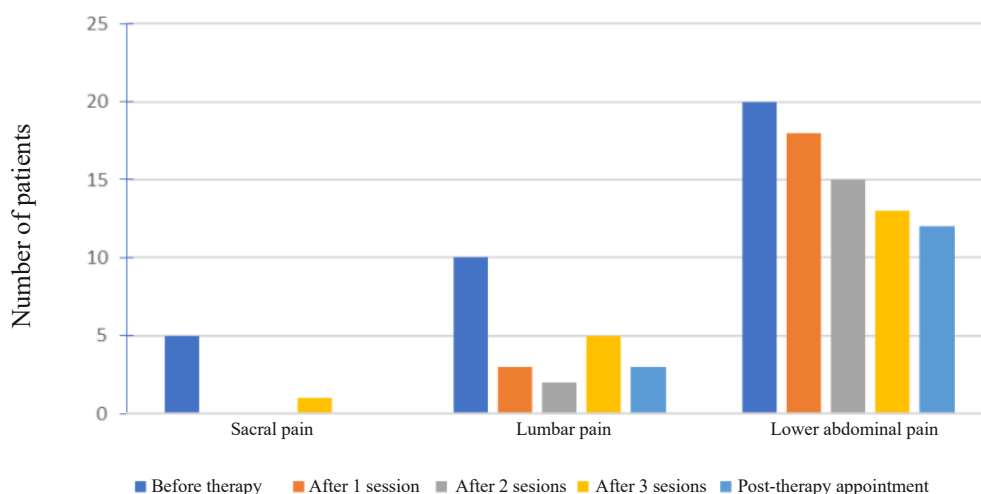


Fig. 1a. Pain complaints

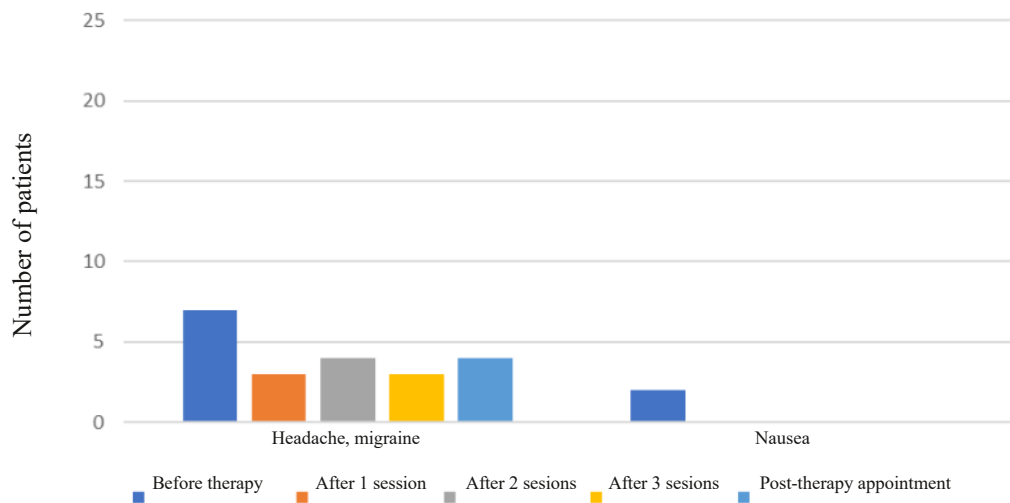


Fig. 1b. Pain complaints

The charts show that, at the first appointment, the majority of patients ($n = 20$) reported lower abdominal pain. Another 10 patients mentioned lumbar pain, 7 suffered from headaches and 5 from sacral pain. These four symptoms can thus be classified as the most common complaints that disrupt normal functioning. After intervention sessions 12 patients still suffered from lower abdominal pain, 4 from headaches and 3 from lumbar pain while none reported sacral pain.

Another parameter was pain intensity assessed using the VAS score. Figure 2 shows the sum of arithmetic means of the patients' VAS scores.

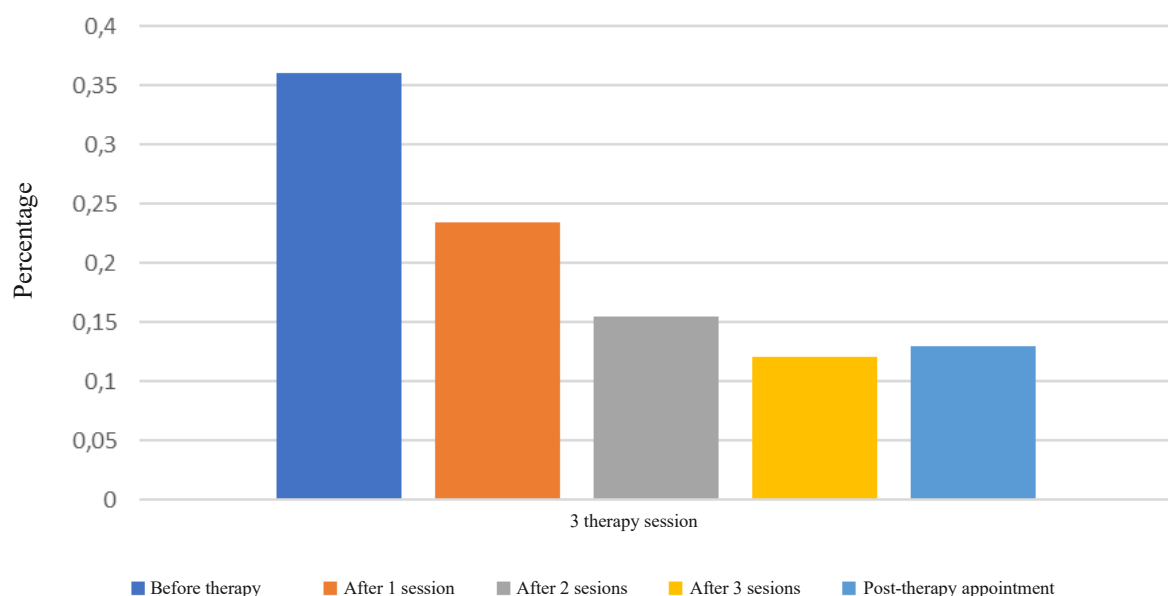


Fig. 2. Pain scale

It should be noted that the analysis also included the post-therapy menstrual cycle (in Figures referred to as post-therapy appointment). Symptom improvement was noted during therapy and sustained after therapy completion. Średnia ocena bólu przed i po terapii wynosiła 36% i 13% of the maximum VAS score, respectively. At the first appointment, pain intensity of 9-10 and 7-8 was reported by 16 women while only 2 participants had these scores at the post-therapy meeting. Since pain complaints proved different in the two age groups, Fig. 3 presents pain complaint severity by age groups.

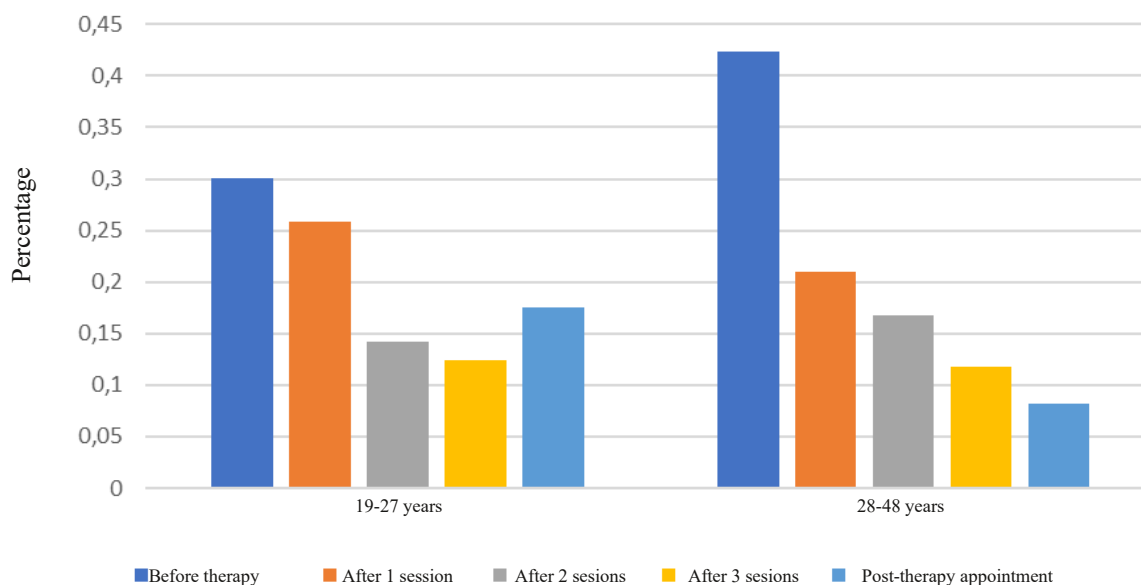


Fig. 3. Pain score by age groups

More noticeable pain improvement was seen in the age group of 28-48 years, where the proportion of patients with pain complaints was 42% and 8% at the initial and final appointment, respectively. Considerably fewer patients aged 19-27 years reported improvement, i.e., the proportion of patients with pain complaints was 30% and 18% at the initial and final appointment, respectively.

Figure 4 demonstrates a marked decrease in the number of pain relievers. The total number of pain-relief medications taken by all patients during the investigation period was 213; the numbers reported at the first and final appointments were 86 and 21, respectively.

The patients aged 28-48 years used 134 medications which equals 63% of the total. The younger group reported 79 pain relievers, i.e., 37% of the total. It should be noted though that the younger group was smaller in number, which obviously affected the above statistics. Another issue

is that the participants used different types of pain relievers including intravenous drugs. This, however, was not included in the analysis. Reduction in the number of pain-relief medications continued in the month following the completion of the study. Results by age group also proved interesting (Fig. 5).

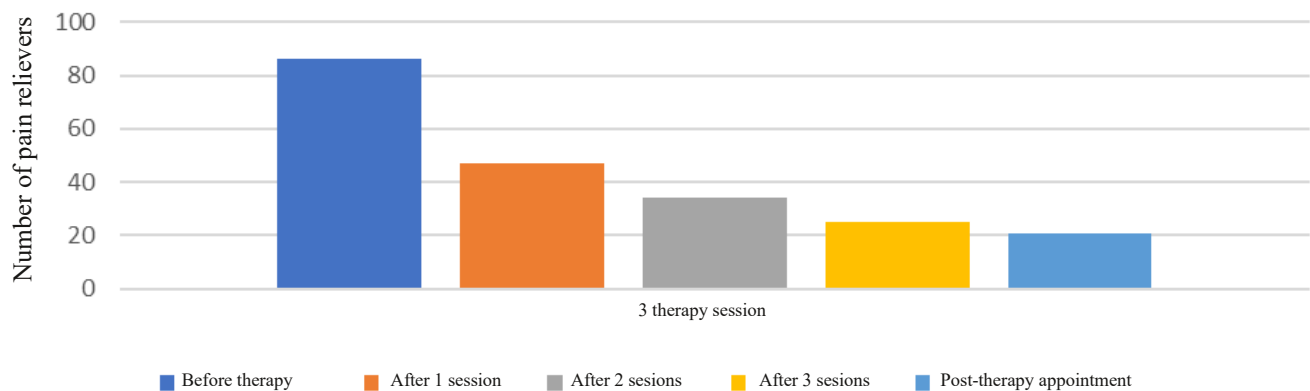


Fig. 4. Number of pain relievers

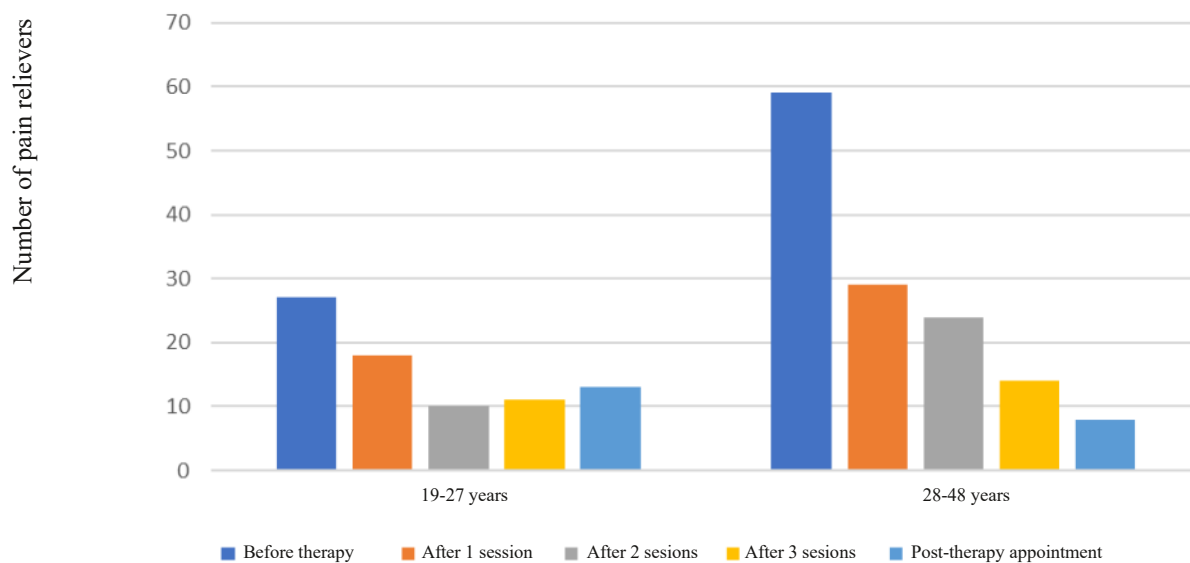


Fig. 5. Number of pain relievers by age groups

The majority of pain relievers were taken by patients aged 28-48 years (the numbers reported at first appointment were 59 and 27 in the older and younger groups, respectively). More frequent use of pain-relief medications by older participants might indicate lower pain threshold or aging-related bodily changes.

Another analysis parameter was the number of days with pain experience, also by age and patient-related improvement (Figs. 6 and 7).

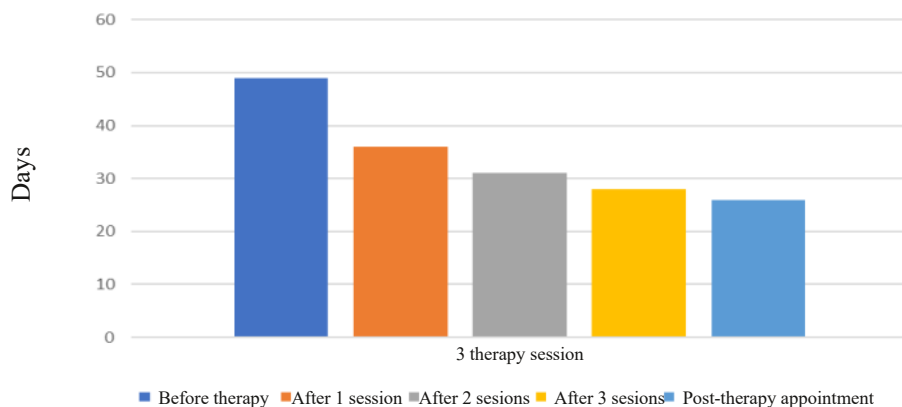
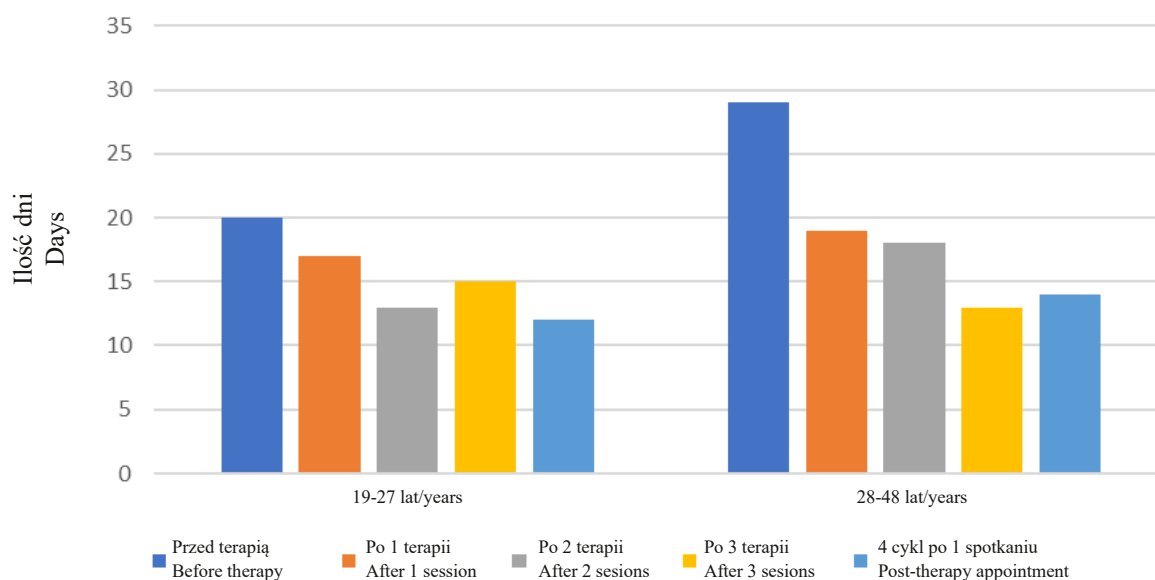


Fig. 6. Pain duration



Ryc. 7. Długość trwania bólu wg. kryterium wieku

Fig. 7. Pain duration by age groups

The total number of days with dysmenorrhea-related pain was 170 in both age groups, of which 54 days (32%) corresponded to the first menstruation day only while 37 (22%) to menstruation days one and two. The beneficial effects of the therapy are also evidenced by a decrease in "painful" days, i.e., from 49 (29%) at the first to 26 (15%) at the final appointment.

Pain intensity score, number of pain relievers and pain duration analyses were performed for the younger group (19-27 years). Pain scores were higher at the final appointment compared to appointments 2 and 3. However,

the number of pain relievers decreased. The results are presented in Fig. 8.

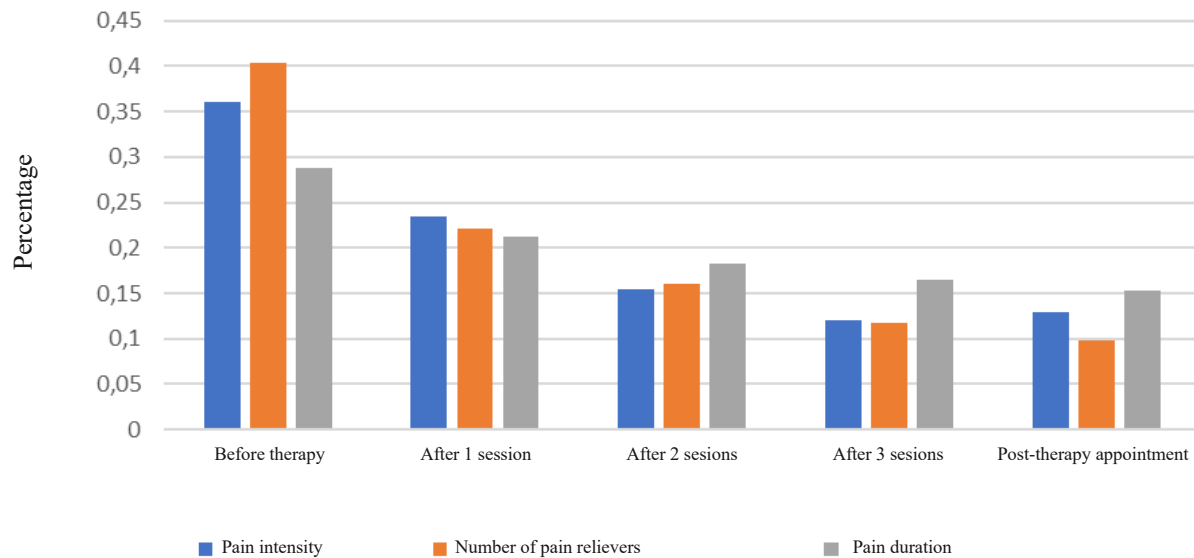


Fig. 8. Pain intensity, number of pain relievers and pain duration in women aged 19 to 27 years

Figure 9 shows improvement indicated during consecutive appointments.

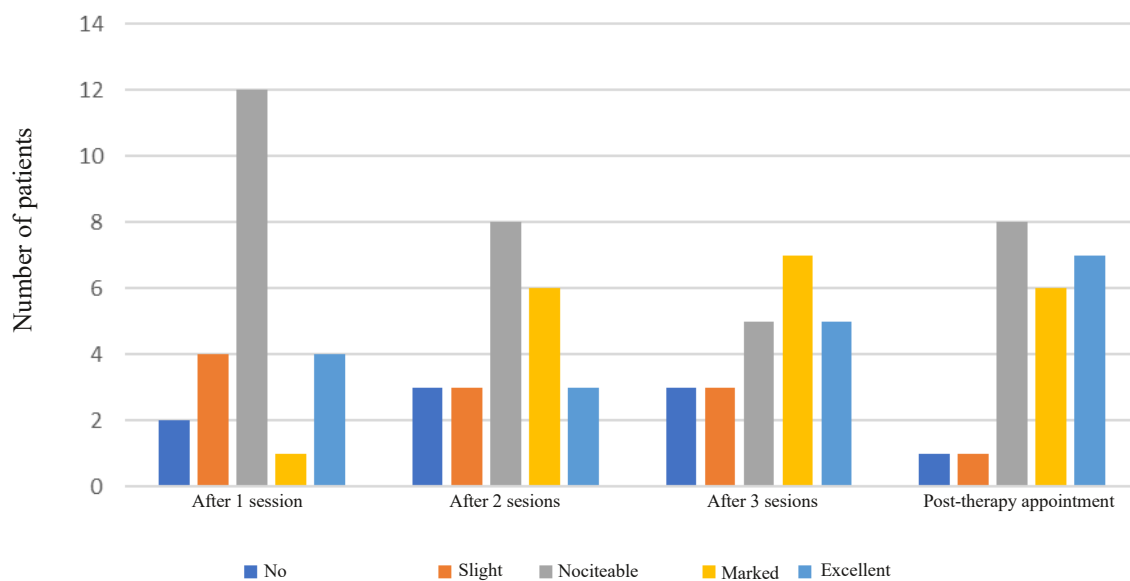


Fig. 9. Improvement – consecutive appointments

The number of days with period pain decreased. The majority of patients positively assessed their post-therapy health status rating the improvement as slight, 21%, noticeable (36%), marked (22%) or excellent (21%). Slight or no improvement were mostly reported at the start of the

study; more rarely at final appointments. The therapy also seems to have had a regulatory effect on bleeding severity and the menstruation length. The results (also by age groups) are presented in Figs. 10, 11 and 12.

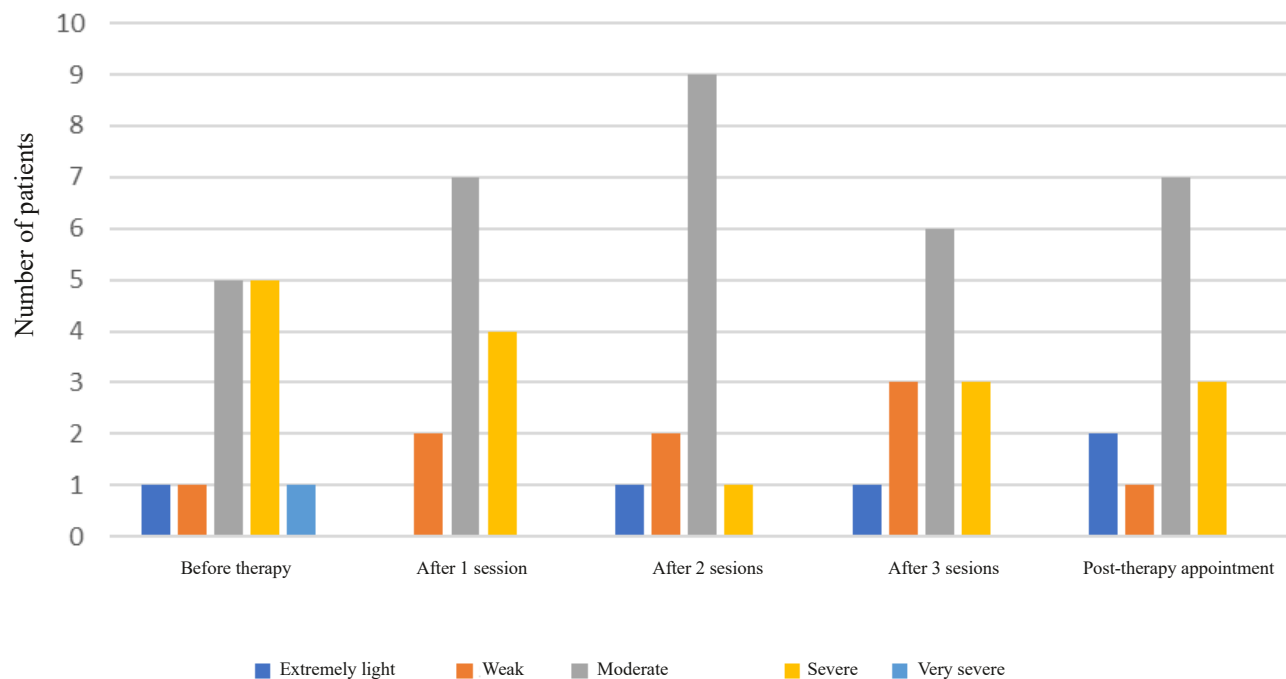


Fig. 10. Bleeding severity

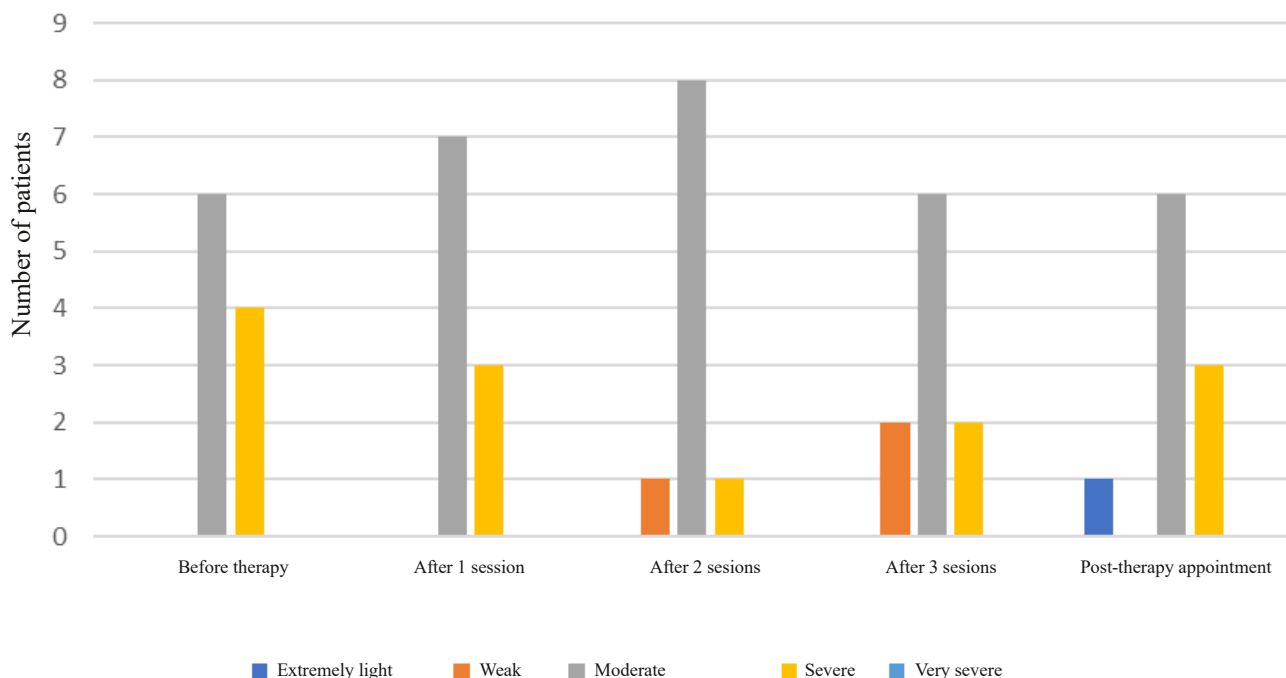


Fig. 11. Bleeding severity in women aged 19 to 27 years

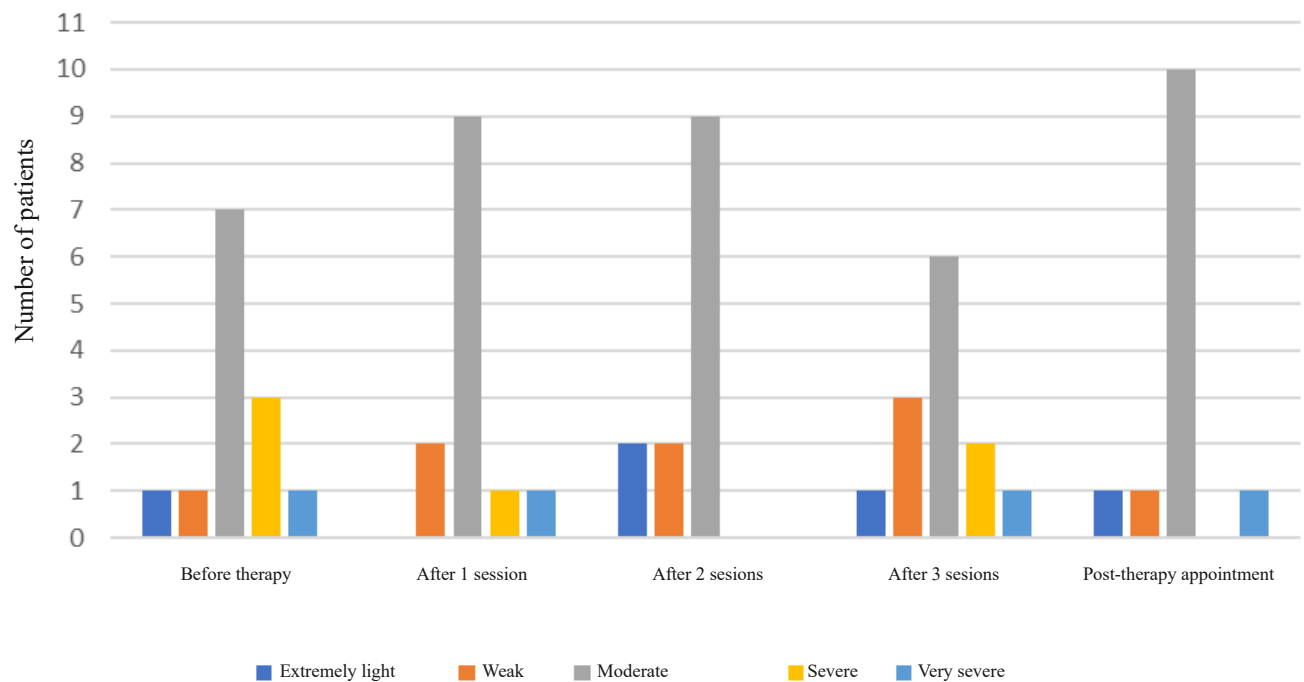


Fig. 12. Bleeding severity in women aged 28 to 48 years

The figures indicate that, during therapy meetings, the participants started using the term moderate to refer to bleeding severity. This might evidence improvement of health condition and resultant reduction in endometrium breakdown and shedding.

Discussion

Dysmenorrhea is a broad topic that, additionally, remains enigmatic. Mrugacz et al. conclude that "despite high prevalence, etiopathogenesis of dysmenorrhea is still unclear and controversial" [7].

Furthermore, muscle tension of dysmenorrhea builds up before menstrual bleeding actually begins. Krawczyk noted that premenstrual syndrome (PMS) comprises approximately 300 symptoms [20]. One of the first questions of our study questionnaire was about the location of dysmenorrhea related symptoms. Eleven symptoms were commonly mentioned by the study participants including sacral, lumbar and/or lower abdominal pain, headaches, nausea, increase in appetite, edema, skin changes, breast swelling, lower extremity paresthesia or discomfort in the ovarian area. The majority suffered from pain in the lower abdomen ($n = 20$), lumbar ($n = 10$) or sacral ($n = 5$) areas. Premenstrual syndrome manifests itself with a whole range of somatic and emotional symptoms.

All respondents in a study of Kozłowski et al. reported irritability, depression, fatigue, mood swings, low self-esteem, breast sensitivity, sensation of fluid retention, diarrhoea, constipation or headaches; 26.2% experienced regular or frequent discomfort [21].

A number of factors could contribute to menstrual pain severity including "...uterine hyperactivity that might excessive compression on uterine vessels resulting in ischemia and pain" [7]. Or, it might be that impaired blood supply causes uterine hypercontractility; hence, increased muscle tension in the lower abdomen. Increased muscular activity might, in turn, affect osteoblast-osteoclast communications or, more directly, restrict joint mobility thus limiting motion within the hip or lumbar spine.

Our study participants with dysmenorrhea reported unusual tightness in the lower abdominal area (20 out of 23 women). As already mentioned, lumbar and sacral pain were noted by 10 and 5 participants, respectively. This brings us back to the problem of pain relievers. Nonsteroidal anti-inflammatory drugs as well as oral contraceptives are effective but the failure rate is around 20% to 25% [23].

As many as 71.3% of Kozłowski et al.'s respondents used pain relievers in the perimenstrual time period [21]. This is consistent with our observations as each of the study participants initially marked taking at least one pain reliever during menstruation. The maximum number of pain medications used was 11 and 10 by one and two patients, respectively. Over-the-counter analgesics including naproxen sodium, ibuprofen, diclofenac, aspirin and ketoprofen were most frequently taken to ease menstrual cramps. Wenbo et al. concluded that considering the efficacy and safety, ibuprofen should be recommended as the optimal OTC analgesic for primary dysmenorrhea [24].

The total number of pain-relief medications taken by our study participants during the investigation period was 213, of which 86 were used prior to the initial appointment. From pharmacological perspective, selective serotonin reuptake inhibitors should be considered first line treatment for severe dysmenorrhea with ovulation inhibitors as second line therapy [7].

Popiel concluded that nonsteroidal anti-inflammatory drugs and antispasmodics were the most efficient. It should be noted that analgesics do not alleviate menstrual cramps completely. Also, NSAIDs show antiprostaglandin synthetase activity and, as such, may cause gastrointestinal, nervous system or cardiovascular complications [26, 27].

Apart from the potential of developing dependence on pain relievers, dysmenorrhea interferes with daily life and is associated with absence from work or school. As many as 16 of our 23 participants marked 7-8 or 9-10 on the VAS meaning they experienced pain severely limiting daily functioning including working life. Hence the empathetic and socioeconomic importance of further investigations on dysmenorrhea. It should be emphasized that, in the course of the study, our younger group was exposed to several participant-independent stress factors including end-of-term

exams, father's death, COVID-19 pandemic; they were able to associate these stressful events with changes in menstrual cycle. Although not included in the analysis, stress-related response might obviously affect the severity of dysmenorrhea symptoms. However, physical therapy interventions, e.g., lumbar, lower abdomen or buttocks massage, have a potential to reduce these complaints [28].

Each and every organ may become dysfunctional; according to Liem and Dobler, changes in female reproductive organs may manifest themselves very differently [29].

Soft tissue therapy used in this study alleviated dysmenorrhea complaints. The number of pre-appointment pain relievers was reduced from 86 to 21, and VAS pain score decreased 3-fold. It can be speculated that if the complaints were only tension-related, the efficacy of these manual interventions would be around 100% skuteczności. It should be noted though that several patients experienced slight relief only. A whole range of factors and relationships might play a role here and further studies are therefore warranted.

Conclusions

The results of this study showed that soft tissue therapy applied at specific body areas alleviated chronic menstrual pain and helped reduce the number of pain-relief medications. The author hopes that a detailed analysis of dysmenorrhea-related ailments might improve prevention thereof and expand knowledge in this area. The following conclusions have been drawn:

- soft tissue therapy at specific body areas alleviated the symptoms of chronic dysmenorrhea;
- the therapy also helped reduce or eliminate the use of pain relievers;
- study participants noted regulatory effects of soft tissue interventions on menstrual bleeding and the duration of their menstrual cycle;
- patient's age had an impact on therapy outcomes.

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