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Management of stress incontinence in older women

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Introduction: Stress incontinence is a problem increasingly affecting older people. This discomfort has an impact on women as a greater extent. Stress urinary incontinence is described as involuntary leakage of urine during even minor efforts: sneezing, coughing, rapid gait. At the beginning inconspicuous loss of a few drops of urine is often not alarming for women. The problem is significant because women often go to a specialist very late and the reason for this is shame. Many people think that this is an accident of old age and it can't be stopped. Nothing could be more wrong, it can be dealt with.

Material and methods: Articles in the EBSCO database have been analysed using keywords: stress incontinence, problems of old age, physiotherapy in urology, older women.

Results: The incidence of stress incontinence in women increases with age. The main reason is muscular weakness, which is caused, among other things by pregnancies and labours. Another reason may be hormonal disorders and genetic predisposition. Statistics show that obese women are more likely to suffer from SUI. The progress of medicine and pharmacology is also increasingly effective in the treatment of stress urinary incontinence. First, after finding the problem, conservative treatment is introduced. Treatment is adapted to each patient individually. Age, existing diseases, weight are important factors in the process of treatment. In pharmacology Duloxetine is used. The use of this drug does not completely eliminate the symptoms of stress urinary incontinence. Due to the possibility of side effects i.e. nausea, the drug is used very carefully. In recent years, physiotherapy has been highly

valued in the treatment of stress urinary incontinence. The most important is kinesitherapy here. Strengthening the pelvic floor muscles brings the most beneficial effects. Active exercises are supported by: electrostimulation, magnetotherapy and vibro-therapy. The final form of SUI treatment is surgical treatment. However, this do not always bring the expected results. In order to increase the effectiveness of therapy for patients with SUI, the interdisciplinary cooperation of the medical team should be used. Treatment of stress urinary incontinence primarily leads to improved quality of life for patients.

Conclusions: Urinary incontinence is a social disease. Women struggle with this problem twice as often than men. Stress incontinence accounts for 63% of all forms of urinary incontinence in women in Poland. The incidence of incontinence increases with age. Problems with stress urinary incontinence become a reason for isolation from society. The patients are not aware of the treatment possibilities, which often results in late inclusion of treatment and rehabilitation. There is a wide range of SUI treatment options. Therefore it is necessary to personalise rehabilitation process to best fit to each patient.

Keywords: stress incontinence, problems of old age, physiotherapy in urology, older women.

Introduction

Urinary incontinence is defined as a disorder that affects urine bladder storage. According to ICS - International Continence Society - incontinence is any leakage of urine that is not controlled by a person. Among all the types of urinary incontinence, the most common type is stress urinary incontinence (SUI) [1, 2]. One of the reasons for this phenomenon is the frequent occurrence of this disease in older people. The direct cause of stress urinary incontinence is the weakening of the pelvic floor muscles because of the age. This results in urine leakage during various daily activities and physical activity, e.g. climbing stairs, as well as during a cough, a sudden change in body position or lifting heavy objects.

It is worth remembering that there are many factors that predispose to SUI. Among them, three main groups are mentioned. The first of these are predisposing factors, which include, among others, genetic conditions and gender. Besides, the inciting factors are distinguished, which are related to the damage to the urinary incontinence mechanism. These contain a large number of births and previous abdominal operations. The last group are promotional factors, which feature overweight, obesity, menopause, medications and previous infections [1, 3].

Stress urinary incontinence is not a condition that is talked about quite openly and publicly. Often, women suffering from SUI do not admit to the problems, because they feel or believe that at a certain age urinary leakage is "normal". Nevertheless, stress urinary incontinence symptoms can impose a significant burden on the women who have them, that’s why there is a real need for healthcare professionals to be proactive in questioning and educating patients about lower urinary tract symptom [4, 5]. In the era of contemporary medicine, there are many ways to treat and prevent SUI, so it is worth using them. The purpose of this article is to discuss the latest reports on SUI.

Causes of stress incontinence in older women

Age is an important factor affecting the occurrence of stress urinary incontinence (SUI). The frequency of this phenomenon increases with age. The main reason for the occurrence of SUI in older women are changes in the myofascial system. These changes occur with age and are caused by the pregnancies and labours. As a result, the pelvic organs are lowering down, as well as the ligamentous apparatus is being damaged, which disturbs the organ system's statics. High birth weight of a child, delivery over 24 hours and abnormal maternity practices, including pushing without getting full dilatation, pushing with full bladder may cause pelvic muscle damage. Damage to the nerves supplying the pelvic floor muscles may ultimately lead to urinary incontinence in old age. Appropriate support for the bladder neck through the pelvic floor is the correct micturition process. Disorders of this structure very often leads to stress urinary incontinence. Injuries and operations in the crotch area are the risk factors for this disease. Direct injuries of the urethra leads to scarring of the coil, resulting in disruption of its function [6,8,10].

Hormonal disorders that occur during menopause are also predisposing factors for the occurrence of SUI in the elderly. Decrease in estrogen levels lead to adverse changes in the genito-urinary system. After the period of menopause, there is a change in the connective tissue, precisely a change in the structure of collagen – generation of the V and VII type fibers. As a result of the body ageing, the bladder detrusor is being encircled with collagen, which makes it weaker and consequently less susceptible to spasms. Genetic predisposition also affects the occurrence of this disease. It is noted that the frequency increases even three times in first-line relatives [5,6,8,9].

Interestingly, the occurrence of SUI depending on the origin and race of the woman. It is caused by cultural differences as well as social and environmental factors. The occurrence of the disease is supported by obesity, it is estimated that WNTM is four times more common in obese women than in people with normal body mass. As a result of obesity, intra-abdominal pressure and intra-bladder pressure increases. Those higher pressures have a negative effect on the urethra, and as a result it may increase its mobility. The disturbance of the micturition process also occurs as a result of many diseases, including diseases of the central nervous system, e.g. Parkinson's disease or a multiple sclerosis. Among the risk factors of stress urinary incontinence specialists also mentions: smoking, chronic cough, hard physical work, chronic constipation [6,7,8,9].

Pathomechanism of urinary incontinence

Urinary incontinence is not a name that uniquely describes a disease entity, but a symptom that arises from complex functional, structural and hormonal changes in the female body. Currently, the popular statement is that due to the close anatomical-functional relationship of the nervous and genitourinary systems, any episode of disturbance of urination control may have a neurogenic basis. There is a division into three groups of factors predisposing to the occurrence of the disease, which combine with each other and at the same time increase the existing risk. These are genetic, environmental and lifestyle factors. The next division distinguishes predisposing, triggering, decomposing and promoting factors. Predisposing factors include genetic, racial, neurological, anatomical and cultural factors. Urinary incontinence has been divided into several types by ICS [11, 12, 13].

Stress urinary incontinence occurs when involuntary loss of urine occurs during an increase in intra-abdominal pressure. Physiological pressure increases in the abdominal cavity occur, for example, during coughing, sneezing or physical work. Stress urinary incontinence is characterized by uncontrolled outflow of small amounts of urine without feeling pressured [11, 12, 13].

Urgent incontinence (abbreviated as NNM) is involuntary urination under the influence of forced urge. Urgency is the sensation of a sudden and difficult urge to urinate. Patients repeatedly describe urgency as a continuous and troublesome need to use the toilet. NNM can be caused by two main causes: instability of the bladder or its excessive excitability [11, 12, 13].

Another type of incontinence is urinary incontinence. It is also called chronic urine retention in the bladder and is due to impaired detrusor contractility. Disturbed contractility leads to excessive bladder filling. This type of urinary incontinence is very often caused by drug-induced impairment of central nervous system function or diseases [11, 12, 13].

Urinary incontinence caused by extrasphincteric causes is a type of disorder distinguished by ICS, which consists in unconscious urination through the fistula. This fistula bypasses the urethral mechanism, which is partially functional [11, 12, 13].

The last group included: mixed and reflex urinary incontinence, bedwetting and continuous incontinence [11, 12, 13].

Epidemiology of urinary incontinence in women

According to the epidemiological data, a problem of urinary incontinence (NTM) affects about 10% of the human population. Due to the progressive aging of the population, the rate of NTM incidence increases constantly. The disease is considered to be a social disease (it is about more than 5% of the human population). It has a big influence at the quality of people's life and their functioning during everyday activities [14,12].

The incidence of NTM is two times higher in women than in men. In Poland, this problem affects approximately 4-6 million women, where 63% of cases is a form of stress incontinence, approx. 19-25% is an urgent NTM and 12-19% is a mixed form. On the other hand, among the population around the world, the data show about 20% of women over 40 years old suffer from this disease [14].

The problem of the stress urinary incontinence affects particularly women after childbirth, woman in perimenopausal and women in old age. The research shows that among women over 30 years old, about 10-25% have problems because of this disease. In the fifth decade of people's life the number of cases increases significantly. After 60 years of age it is about almost half of women. The urinary incontinence incidents happen in follow situations: sneezing or coughing, laughing, taking standing positions and going up the stairs [15,16].

The involuntary urination during sexual intercourses happens to about 25% of women. Because of that they fear about lack of acceptance from the partner and they have a high psychological discomfort. Due to hygiene problems, it is necessary to use sanitary napkins or even diapers, to go to the toilet frequently and to fight with unpleasant smell. Therefore, this condition leads to a huge change in a previous people's lifestyle [15].

Because of an embarrassing nature of the disease and an ignorance about treatment, about 2/3 of the sick people hide their problem. They don't even try to consult a doctor and it causes a delaying of introducing specialized treatment. All of that leads to a people's social isolation, troubles in a social and professional life [16].

Pharmacological treatment of stress urinary incontinence

Treatment of the stress urinary incontinence should focus on improving the quality of life of the patient. Before the implementation of pharmacotherapy, the co-occurrences of other diseases, use of other medicines by the patient and the risk of side effects should be considered [11, 17, 18, 19].

Estrogens and tricyclic antidepressants, applied previously in the pharmacotherapy of stress urinary incontinence, did not have a proven clinical effect and were associated with the frequent occurrence of significant side effects [20]. Currently, the only licensed drug used in

the treatment of SUI of which efficiency has been confirmed in randomized controlled clinical trials (RCTs) is Duloxetine - a serotonin-noradrenaline reuptake inhibitor (SNRI). Initially, this drug was only used in the treatment of depressive disorders and chronic pain [16, 20].

Duloxetine leads to an increase in serotonin and noradrenaline levels in the presynaptic neuron in Onuf's nucleus in the sacral spinal cord by inhibiting their re-uptake. Stimulation of neurons located in the Onuf's nucleus by serotonin and noradrenaline leads to an increase in the closure pressure of the urethral sphincter muscle and strengthens its tension, which reduces the symptoms of stress urinary incontinence [19, 20].

Duloxetine affects the patient as long as it is administered. It does not completely cure stress urinary incontinence, but only alleviates its symptoms. The treatment with Duloxetine may be associated with side effects, most often nausea, to which elderly people are particularly vulnerable. Other adverse effects of the drug include dizziness, tiredness, dry mouth, constipation and excessive sweating, which are a frequent reason for ceasing pharmacotherapy [17, 18, 20]. For this reason, treatment should be started with a low dose and be increased gradually, with regular control every 2-4 weeks to assess the tolerability of the drug. According to the recommendation of the International Urogynecological Association, treatment should begin with a dose of 20 mg twice a day for 2 weeks, with a target dose increase to 40 mg twice daily [12, 17].

Duloxetine is approved for use in the European Union, but due to the possibility of side effects such as toxic impact on the liver and suicidal ideations, it was withdrawn from use in the US [16, 19, 20].

According to the The National Institute for Health and Care Excellence (NICE) guidelines, Duloxetine is therefore not recommended as first-line treatment, but only as second-line therapy for women who are not classified or do not want to undergo surgery [17, 20].

Physiotherapy in stress urinary incontinence

Physical therapy as well as kinesiotherapy, also known as motion treatment are the pillars of physiotherapy in treating stress urinary incontinence. In recent years, there has been an increase in the level of knowledge of women about SUI and the possibilities of its treatment. Due this reason urogynecological physiotherapy has undergone an intensive development. Physical therapy treatments used in SUI includes electrostimulation, magnetotherapy and magnetostimulation as well as vibro-therapy, which in recent years has become an increasingly popular method of supporting SUI treatment [5].

The electric current in the treatment of urinary incontinence was first used in 1965. For over 50 years, many studies have been carried out to explain the mechanism of impact of electrical stimulation on the pelvic structures. It was found that in addition to the direct effect of stimulating the muscles to contraction, electrostimulation also restores the proper positioning of the bladder neck. Electrostimulation also affects the remodeling of muscles, affecting their resistance to fatigue, or the possibility of having a longer contraction. However, the effectiveness of the therapy depends on at least partial innervation of the pelvic floor. Muscle spasm determines correctly preserved micturition arch. One of the possibilities of SUI treatment with the use of electric current is intra-vaginal electrostimulation requiring placement of the probe – an electrode, in the vagina. It is recommended when the patient's response to the stimulation is delayed and the spasm is poorly felt. The treatment improves blood circulation and strengthens the muscles, thus allowing better urinary retention. External stimulation uses medium-frequency current, and it requires placing one electrode directly above the pubic symphysis and the other on the back around the anus. Correia et al. conducted a clinical trial in which they compared the effectiveness of external and internal

electrostimulation in the treatment of SUI. All patients showed a significant reduction in uncontrolled micturition episodes and a significant improvement in the quality of life [21, 22].

In physiotherapy, the magnetic field is widely used in many disease entities. Its biological activity is very complex. The magnetic wave permeates all the body's structures, and the changes take place at the cellular and tissue level. It affects the process of cellular respiration, increases activity of some enzymes and protein synthesis. It also affects the structure of collagen, which plays an important role in the correct mechanism of micturition in older women. The procedure is fully comfortable for patients. They are sitting fully dressed in a chair, which has a built-in magnetic field generator. Unsal et al. Evaluated the effectiveness of magnetic field stimulation in patients with SUI. They performed the procedure for 8 weeks twice a week, for 20 minutes, with a frequency of 5Hz in the first 10 minutes, and in the second half 50 Hz. A year after the end of the therapy, 38% of patients had been completely cured and 41% had a significant improvement. In addition to PFM stimulation, there is a possibility of using nerve root stimulation S2-S4 in treating urinary incontinence. Both Fujishiro et al. And Manganotti et al. used this method in their clinical tests, and had very good effects of therapy. In both experiments, the parameters were similar, a frequency of 15 Hz was used, the treatment was repeated 2 or 3 times a week for a minimum duration of time of 2 weeks. These studies showed a significant improvement in the quality of life of patients after the first week of therapy [23,24,25].

Vibrotherapy is a non-invasive and well-tolerated method supporting SUI treatment. In 2007 Sønksen together with colleagues conducted a clinical trial using vibrations in which participated 29 women with SUI. Stimulation of perineal nerves was applied once a week for 6 weeks. After completion of the study, 24 women were cured and 5 improved their condition [26,27].

Currently, the most common treatment for both conservative and symptomatic SUI are the so-called Kegel exercises, consisting of the voluntary contraction of the levator ani muscle and the pubal muscles. According to different authors of the research, 12% to 60% of women undergo a cure or an improvement after Kegel therapy. Pelvic Floor Muscle Training (PFMT) is based on conscious tightening and loosening of selected muscle groups, aimed at functional elongation of the urethra, activation of periarticular muscles, creating a better support of the urinary bladder. It is recommended to do exercises at least twice a day for 10 minutes, which should give at least 200 contractions at one day. Patients should also contract their muscles at the load, i.e. when coughing, going up the stairs. However, the healing success depends in a large extent on the regularity, discipline and perseverance in performing the exercises daily in a proper way [5,28].

In addition to physical methods and kinesitherapy in the treatment of SUI, a physiotherapist can also apply a healing massage. The aim of the massage is normalization of the tension of the ligament apparatus, located in the bladder area and improvement of the sphincter function. But not only that, massage can also restore the proper distribution of the lymph and venous blood of the bladder region. Local bladder development widens the blood vessels of the massaged body area, thereby oxygenating, nourishing and regenerating the cells. As a result of elasticity, it improves the firmness and ability of muscles to contract and relax, including the bladder sphincter muscles [29].

Surgical treatment of stress urinary incontinence

When the behavioral and pharmacological treatment does not bring the desired effects, surgical treatment should be instituted [30]. Despite many operational possibilities (types of treatments) up to 20% of them may fail [31]. As we know, stress urinary incontinence is caused by two reasons. The first is the increased mobility of the urethra, most

often resulting from the defect of the pubic-urethral ligament which stabilizes the urethra and the other is the internal dysfunction of the sphincter. By generalizing all invasive procedures, they try to eliminate these disorders.

Operative methods can be roughly divided into Colposuspension, mainly using the Burch method, which can be carried out in an open or laparoscopic way, whereas the experience of the operator in the case of a laparoscopic solution is crucial for the results of treatment, and MUS methods (retropubic sling, single incision sling and transobturator sling), it is also possible to use artificial sphincter. The review of methods shows a high variation in the availability of treatment methods, whereas there is no coherence in the indication of the best surgical method in stress urinary incontinence in women.

Consideration of the methods of surgical treatment in stress urinary incontinence should be started with the least invasive method, which is the injection of bulking agents. This method involves injecting the substance into the peri-ligation area, as a result of which the volume of the coil sphincter increases. The substances can be injected via the abdominal wall, through the urethral path, or introduced laterally from the urethra. We obtain an expanding effect that supports the work of an inefficient urethral sphincter. An undoubted advantage of this low-invasive method is the operation under local anesthesia, it can be performed in outpatient settings, and the patient goes home shortly after this procedure [32]. The effectiveness of this method and the undesirable effects of this method vary depending on the materials used for injection. In the case of collagen (glutaraldehyde cross-linked collagen), 10-23% of respondents were cured, the condition improved in 52-57.9%, where the results are 2-year results. Side effects were mainly urinary retention, obstruction of urination in 15% of respondents [33, 34]. In the case of carbon-coated zirconium beads (carbon coated zirconium beads), two-year effects gave a cure of 19-33% [35]. There are also other substances such as calcium hydroxyapatites or cross-linked polydimethylsiloxane that give similar results to the above-mentioned substances. It should also be remembered that the therapeutic effect decreases over the years, and most of these substances require re-injection of the urethra [32].

The surgical method of first-line stress urinary incontinence is MUS (midurethral sling), but it is also suitable for women whose first operation was unsuccessful. It involves placing the tape behind the urethra, at the moment of increased pressure inside the abdominal cavity (cough, laughter) the tape provides support for the coil so that urine can not get out of it. We distinguish two main types of this operation: RPMUS-retropubic and TMUS-transobturator. Many studies have proved similar effectiveness of both methods in long-term and short-term effects, while one of the arguments for the TMUS method is a smaller number of complications and pain sensations, and also shorter stay in the hospital after running the TMUS method. The percentage of cure for TMUS ranged from 62% to 98% and in the RPMUS group from 71% to 97% at the end of 1 year. In the long-term, subjective healing ranged from 43% to 92% in the TMUS group and from 51% to 88% in the RPMUS group. There are also modifications of major MUS subtypes such as mini-sling, while numerous studies show that mini-sling in which self-adjusting ends were used to minimize the risk of damage to vessels and nerves gives worse results compared to the traditional method [36, 37, 38, 39].

Another method of SUI treatment is a colposuspension which can be carried out in an open or laparoscopic manner. The use of a laparoscope leads to a shortening of the patient's stay in the hospital and its recovery. the mechanism of the operation consists in affixing the pubis-coil fascia and the adjacent urethral fascia to the Cooper's ligament using a prolene mesh. The effectiveness of the burch's method is 81% on a scale of 1 year [40]. One clinical trial compared the effectiveness of this method compared to MUS. The results showed 47% of the overall MUS contention compared to 38% of the burcha method. However, a smaller

number of complications, urinary stasis and urinary tract infections speak in favor of colposuspension [41, 42]. However, if we compare the open method of burcha to laparoscopic results after 1, 2 and 3-5 years are similar, in favor of the open surgery speaks the mean shorter time of the procedure (47 minutes compared to 87 minutes laparoscopically). The laparoscopic method was associated with less blood loss, less pain and faster recovery after surgery [43, 44].

Another interesting method of SUI treatment in particularly advanced cases is the use of an artificial urethral sphincter (AUS). It is not a popular method and it is only developing in many centers in the world. The difficult development of this case results in the fact of a short urethra which could lead to an increased amount of infections about the insertion of an artificial sphincter [45]. this is the final method in SUI when other surgical interventions have failed [46]. Currently, the first long-term 10-20-year results appear in which the effectiveness of AUS is 84% [47].

Discussion

Modern data on stress urinary incontinence have repeatedly underlined the difficulty in performing daily activities by persons suffering from the mentioned disease. There are more and more recent studies to better understand the extent to which stress urinary incontinence affects individual elements of everyday life, as well as to develop newer methods of functioning despite the presence of the ailment. An example of this was a questionnaire distributed via e-mail about the impact of urinary incontinence on quality of life. 605 women who are US citizens who suffer from incontinence responded to the questions. According to the results of the study mentioned, the presence of stress urinary incontinence is felt as embarrassing, which was confirmed by over three-quarters of the respondents. However, 29% of the surveyed women considered the disorder to be highly troublesome or embarrassing to an extreme extent. At the same time, a correlation was demonstrated, according to which inconveniences related to incontinence increase with the age of the respondents [4], which confirms the assumption of our work, emphasizing the great importance of the problem of urinary incontinence in older women.

The topic of urinary problems in older women was taken in a 3-year prospective cohort study at the University of Leicester (UK), examining the issue together with people suffering from an overactive bladder. A total of 2,052 women aged over 40 participated in the project. Performing appropriate urological diagnostics, it has been shown that the presence of an overactive bladder definitely increases the risk of stress urinary incontinence. The assumptions formulated in our work were also confirmed that the incidence of incontinence increases with age. At the same time, two periods have been noted where the risk is particularly high: one at the age of about 60 years and the other at the age of about 80 [48]. A similar study, however, including a group of women at a more advanced age (70-79 years) was conducted at the University of California (USA). A cross-sectional analysis of 1,584 white and black women was conducted there, leading a long-term cohort study. According to him, 21% of women in the study observed urinary incontinence over the last week. Among them, stress urinary incontinence occurred as often as sporadic. Among many factors increasing the risk of urinary incontinence, which were observed during the analysis, attention was paid to: belonging to the Caucasian race, diabetes, occurrence of depression or estrogen intake [49]. These factors should therefore be taken into account when planning further research into the disease under consideration, as well as defining the rules of conduct in clinical practice.

As mentioned in our review, physiotherapy and physical exercise is an important part of the treatment of stress urinary incontinence. However it often turns out that carrying out physical activity while incontinence may be difficult. Realizing this fact, older women

commonly avoid any physical effort over the fear of the urinating against their will. To confirm whether women really avoid physical activity, an email survey of 5,130 women aged 18-60 was sent, in which questions about the discomfort associated with urinary incontinence during the physical exercise were formulated. 3364 women (68% of respondents) answered questions, of which 1 in 7 subjects experience urinary incontinence caused by physical exertion. Also, disturbances in urination in women exercising more often and more intensively were also more frequently observed. For 9.8% of the respondents, the mere presence of the disorder in question was a barrier to practicing physical activity [50], which means a considerable difficulty in introducing treatment with methods of physical exercise, limited by human consciousness. Therefore, actions should be taken to promote specific physical exercises, the effectiveness of which to reduce the discomfort associated with stress urinary incontinence has already been confirmed. Pelvic muscle exercises, which can reduce the symptoms of the disease by up to 90%, seem to be ideal here. The effectiveness of such exercises has also been confirmed for older women [51].

Conclusions

Stress urinary incontinence (SUI) is more and more common in the population, mainly in women. SUI refers to more than 5% of society and affects the quality of life of people affected by it, which according to the definition of WHO allows SUI to be granted the status of a social disease.

There are many risk factors such as weight, age, hormonal dysfunctions, and also many pathomechanisms of this disease. In pharmacological treatment the only licensed drug used in the treatment of SUI of which efficiency has been confirmed in randomized controlled clinical trials is Duloxetine - a serotonin-noradrenaline reuptake inhibitor (SNRI). Which leads to an increase in the closure pressure of the urethral sphincter muscle and strengthens its tension, which reduces the symptoms of stress urinary incontinence Available scientific and medical reports indicate the therapeutic effect of physiotherapeutic treatments in the disorder in question. Currently, the most common treatment for both conservative and symptomatic SUI are the so-called Kegel exercises, consisting of the voluntary contraction of the levator ani muscle and the pubal muscles. Physical therapy concludes electrotherapy, magnetic field therapy. In addition to physical methods and kinesitherapy in the treatment of SUI, a physiotherapist can also apply a healing massage.

Physiotherapeutic activities and pharmacological treatment should be an integral parts of a holistic approach to the patient and his treatment plan.

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