

# 13. Menopause

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## Summary

Menopause is the woman's last menstruation and occurs when the production of oestrogen from the ovaries has decreased so much that the mucous membrane (endometrium) of the uterus is no longer stimulated. The transition period is a period that covers approximately 5–10 years before and after menopause and is characterised in many women by certain physical and psychological changes. These are often associated with reduced oestrogen levels in the body. Oestrogen replacement therapy mitigates many, but not all of these changes and works well in most women, but can sometimes result in undesired effects or side-effects. Consequently, not all women can receive oestrogen replacement therapy, such as those with a tendency for blood clots or who have had breast cancer.

Physical activity also mitigates most of the changes that arise in the transition age, sometimes just as distinctly as oestrogen, in some cases more. Problems from fragile vaginal mucosa are not at all affected by physical activity, but can in principle always be easily treated with low dose oestrogen applied locally in the vagina.

Menopausal women can follow general exercise recommendations and exercise principles. Suitable activities include brisk walks, Nordic walking, dance, exercise callisthenics, cycling, jogging, skiing and so on.

## Definition

### *Prevalence/Incidence*

All women experience reduced ovarian hormone production in their 50s, which leads to the cessation of menstruation, but far from all women have difficulties in association with this. Up to 75 per cent of women in the Western World have hot flushes and sweats, and

nearly half of all women have symptoms of fragile vaginal mucosa. As described below, not all of these women, however, need medical help for these symptoms.

### *Causes and symptoms*

*Menopause* is the woman's last spontaneous menstruation and in the Western World occurs on average around the age of 51–52, and a few years earlier in smokers. This is caused by the ovarian oestrogen production decreasing so much that the endometrium of the uterus is no longer stimulated and therefore does not need to be flushed out. Oestrogen is produced in the ovarian follicles, which are already formed in the fetus and do not regenerate after that. Approximately 5–10 years before menopause, the remaining follicles already produce less oestrogen. In this stage, some women already note some symptoms with *irregular menstruation* and, sometimes, early effects on their moods (1).

Some 50–75 per cent of all women report *vegetative symptoms* with hot flushes and sweats around menopause, often with negative effects on night-time sleep and the ability to work (1). The symptoms can already arise in women with irregular menstruation cycles, but are most common right after the last menstruation – menopause (1–3). These symptoms are considered to be due to the body's thermostat (located in the brain) becoming less stable and suddenly changing its setting to a lower level, whereby the body needs to get rid of energy in the form of heat and by sweating. The thermostat's reduced stability is probably due to the oestrogen reduction leading to altered formation of substances in the brain – such as beta-endorphins – which normally stabilise the thermostat (4).

In a German study, 500 men were compared with 153 women. No differences were then found between men and women in their 50s with regard to the frequency of sweating attacks (5). Both genders had more sweating attacks than younger people, which was particularly true of sudden night sweats, but also those occurring in the daytime. The conclusion drawn was that sweating attacks are a phenomenon that arises due to an altered temperature regulation in the age group of 50–55 year-olds, and the study raised the question of oestrogen's significance in the context.

The *mood problems* reported by many women around menopause are considered to mainly be linked to the vegetative symptoms with associated sleep disorders, reduced quality of life and increased psychological vulnerability (6–8). The lower oestrogen levels have been suggested to directly incite mood effects, through altered formation of signal substances in the brain (6).

After menopause, up to half of all women have symptoms of *fragile vaginal mucosa* with soreness during intercourse, burning upon urination and an increased prevalence of urinary tract infections (2, 3). These symptoms usually first arise a few years after menopause once the oestrogen levels have become really low, because the vaginal mucosa is normally also stimulated by low levels of oestrogen. When this stimulation subsides, the mucous membrane becomes thin and fragile and its blood supply is reduced.

Urinary incontinence is more widespread among women than men, and is a symptom that can have many different causes. There are several types of incontinence and the most common are stress and urge incontinence as well as mixed-type incontinence. Stress

incontinence is involuntary leakage upon physical exertion, sneezing or coughing. Urge incontinence is a sudden pressure urge that leads to involuntary leakage. Mixed-type incontinence is a combination of both types (9).

The prevalence statistics for urinary incontinence based on the definition of “occasionally” or “at least once in the past 12 months” varies in most studies between 25 and 45 per cent (10). Stress incontinence is more widespread among young and middle-aged women, while urge incontinence and mixed-type incontinence is dominant in older women. High prevalence figures have also been found in athletically active women who have not given birth (11).

It has long been believed that menopause was an important factor in the development of urinary incontinence, since atrophy changes can result in diminished closure of the urethra and an elevated risk of urinary tract infection. Urinary tract infections can entail problems in holding water (repetitive urination and pressure). The research results concerning a lack of oestrogen as a cause or risk in this context are not unambiguous, however. Some studies have shown a lower prevalence among post-menopausal women than pre-menopausal women, and some studies show that there are more women with urinary incontinence among those who take oestrogen than among those that do not (10). Since urinary incontinence is a problem for women of all ages, a high prevalence has also been found among pre-menopausal and perimenopausal women.

Another widespread dysfunction in the pelvic floor is prolapse, which is defined as a drop in one or more of the following areas: front vaginal wall, rear vaginal wall, vaginal vault, portio or the larger part of the uterus (9). The condition can be clinically rated on a scale from 1–4 where the absence of prolapse is defined as stage 0. Utero-vaginal prolapse is commonly occurring and prevalence statistics vary between 5 and 94 per cent depending on the definition, population and classification system (10). It has been assumed that as many as 50 per cent have one type of prolapse or another after a vaginal birth (12), but the prevalence based on symptoms is lower (7–23%) (10). The symptoms are fatigue, a feeling of weight and discomfort in the genitals, a feeling that something is “falling out” and sometimes difficulties emptying the bladder and urinary incontinence. Prolapse can, like urinary incontinence, lead to discomfort during physical activity and can be an important factor in reduced physical activity among women.

A reduced production of oestrogen involves changes in several systems in the body. These include an acceleration in skeletal bone loss and the risk of *osteoporosis* increases. Bone tissue is produced the entire time, at the same time that it is broken down in other areas. The cells that build up and break down are somewhat in balance, but when the oestrogen levels decrease, the decomposing cells’ activity begins to dominate. Consequently, the woman can be affected by osteoporosis with a risk of fractures, mainly in the wrist, neck of the femur and vertebra.

Furthermore, oestrogen probably has a positive effect on balance. According to this theory, when oestrogen levels drop, balance degrades, the risk of falling increases and thereby also the risk for osteoporotic fractures (13). These effects of oestrogen are probably exerted on substances in the cerebellum where the balance is controlled.

Oestrogen also has positive effects on *lipids* by affecting the liver. Oestrogen has a direct relaxing effect on the walls of the blood vessels, and also has a damping effect on

how some lipids are stored in the vessel wall as a part of the actual arteriosclerosis process. These phenomena have been tied to women having a relatively rapidly increasing risk of cardiac infarction after menopause, when the effect of oestrogen rapidly subsides.

### *Diagnostics of menopausal symptoms*

If in close connection with menstruation becoming irregular or ending, a woman experiences sudden hot flushes or sweats night and day, the diagnosis is usually simple. If the woman had previously had a hysterectomy or uses some type of contraceptive that has ended menstruation (such as a hormone spiral or injection with a contraceptive injection), a blood test (to analyse follicle-stimulating hormone – FSH) is taken to secure the diagnosis of “hormonal” menopause, since altered menstruation does not provide any help in making a diagnosis. In some cases, the typical symptoms of sudden hot flushes and sweats are caused by factors other than reduced oestrogen levels. Then, other functions are studied, such as the functioning of the thyroid.

If the woman does not have distinct hot flushes and sweats, but is rather mostly troubled by dejection and sleeping disorders, other diagnoses, such as depression, must be considered. Sometimes one may choose to try oestrogen replacement therapy for a brief period, even against mild depression, to see how the symptoms are affected, particularly if the woman has hot flushes and sweats with night-time sleep disruptions at the same time.

### *Treatment of menopausal symptoms*

Hot flushes and sweats are the most common cause of women in Sweden seeking medical help around menopause. Most women are helped by oestrogen replacement therapy. Oestrogen alleviates these symptoms very distinctly (approximately a 90% reduction in the number of hot flushes per day) and thereby improves night-time sleep and well-being (14, 15). Since oestrogen also stimulates a number of different target organs and tissues, the treatment will reduce symptoms of fragile mucous membranes in the vagina and bladder, stimulate bone tissue so as to prevent osteoporosis, possibly also affect balance positively and have a good effect on lipid levels. Oestrogen replacement therapy also possibly reduces the risk of colon cancer and the risk of Alzheimer’s disease (16). It has long been believed that oestrogen replacement therapy reduces the risk of arteriosclerosis and heart attack, since women treated with hormones more seldomly have heart attacks than women who do not receive hormone therapy. However, it has been shown that this may partially be due to women who receive hormone therapy being more health aware and healthier from the beginning than those who do not receive hormone therapy and more recent studies have shown that oestrogen-progestagen given to women above age 60–65 may rather increase their risk of myocardial infarctions.

### *Disadvantages of oestrogen replacement therapy*

Because oestrogen also stimulates the mucous membrane of the uterus, it can lead to a risk of increased thickness of the endometrium and also sometimes atypia of the endometrium on the long term. Therefore, treatment is usually always given with a hormone that has the same effect as the body's progesterone, which, if used for about 10–14 days per month, usually leads to the woman having regular menstruation. After a few years of treatment, progesterone can be given in a small daily dose and the woman can thereby avoid menstruation. A disadvantage is that some women have undesirable bleeding similar to menstruation, while others have negative mood effects from progesterone (17, 18). Nausea and breast pain are other, not uncommon, but often rapidly transient symptoms of oestrogen.

The most serious side-effects of oestrogen replacement therapy are blood clots and breast cancer. The risk of blood clots is doubled with the use of oestrogen taken orally, but since the risk is small from the beginning, the absolute risk is still very small during hormone treatment as well. Breast cancer affects nearly one tenth (10 of 100) of Swedish women at sometime in life. If all Swedish women were to use oestrogen against menopausal symptoms for 10 years, approximately another three women out of 100 would be affected.

It was long believed that oestrogen replacement therapy would reduce the risk of arteriosclerosis and heart attack, but research of recent years has not been able to prove this. Rather, the risk of heart attack is somewhat elevated during the first years of treatment, at least if treatment is applied among somewhat older women after the age of 60–65. This is probably due to the oestrogen's effect on the coagulation system with a somewhat elevated propensity for blood clots, which can then affect the heart's coronary artery (19, 20). Today, one speaks of a "window of opportunity", which means that treatment applied soon after the last menstruation probably entails mainly advantages, also with regard to the cardiovascular system.

### *Effects of physical activity*

The effects of physical activity are the same in menopausal women as in people in general, but are more distinct at this age due to certain specific effects.

#### *Effects on various functions affected during menopause*

Vegetative symptoms with hot flushes and sweats have been shown to occur less often in women who exercise regularly than in inactive women. Studies from Linköping, Sweden have shown that women who exercise regularly, report fewer menopausal symptoms than women who do not exercise (21, 22). In a later study, a group of inactive women were randomly assigned to begin exercising regularly and maintain a journal over the number of hot flushes and sweats, complete quality of life forms, etc. (23). It turned out that the number of hot flushes decreased and quality of life improved in the women who exercised three sessions a week. A U.S. longitudinal study was able to confirm these findings in

women with prior depression, but not in women in general (24). This can be explained by physical activity leading to increased production of beta-endorphins in the brain, which are of significance to maintaining the stability of the brain's thermostat. If this is the cause of the effect, the woman should be recommended regular exercise that activates large muscle groups at least 30 minutes at a time, at least three times a week. Examples of such exercise can be Nordic walking, exercise callisthenics or strength training. It should be noted that women who exercise regularly can also have hot flushes and exercise is no guarantee that these symptoms will subside. However, exercise gives several other valuable effects at the same time.

*The mood effect* is often improved when hot flushes and sweats decrease, but exercise has been shown to be valuable by relieving stress and reducing depression. This has been shown in several scientific studies of women (and men) in general (25–29). Women who were randomly assigned physical exercise or yoga for four months experienced improved quality of life, primarily women who had improved fitness at the same time (30). Another randomised study found that as little as six weeks of regular walking on a treadmill improved quality of life, but that the effect only lasted among those who continued for another six weeks and declined in those who stopped exercising (31).

Symptoms of *fragile vaginal mucosa* are not at all affected by physical activity, but can be easily treated locally with low dose oestrogen. Such local low-dose therapy provides no other valuable oestrogen effects or side-effects and can be used by all women who need it without risk.

Oestrogen replacement therapy has little effect on *stress incontinence* (32). Randomised, controlled studies have shown that between 44 and 70 per cent of women with stress incontinence are completely healed after pelvic floor exercises, which is equivalent to < 2 grams of leakage in a pad weighing test after training (33). There have been no specific studies of post-menopausal women, but the majority of studies include women ages 40–50 or older. Pelvic floor exercises are effective and have no side-effects. Internationally, it is recommended that pelvic floor exercises should be the primary choice in terms of treatment alternatives for stress or mixed-type incontinence (34). Several studies also draw the conclusion that more intensive exercise is more effective than training without follow-up. Therefore, it is recommended that women with stress incontinence be given information about exercise methods and frequent follow-up by a physiotherapist. Strength training can advantageously be done in a group where one also focuses on other supplemental physical exercises.

One U.S. study has shown that if one learns to find and activate the pelvic floor muscles before and during coughing it leads to an average of 73 per cent less leakage after a coughing attack (35). Actively tensing the muscles (pinching) to prevent leakage when coughing, sneezing and heavy lifting can therefore entail rapid improvements. To increase muscle volume and improve the nerve-muscle function so that the muscles automatically contract when one runs, jumps or dances, requires regular training for 5–6 months, however (36).

A Norwegian study showed that 70 per cent remained satisfied with their condition and had no leakage when coughing five years after the organised training had been concluded.

In one Belgian study, two thirds of those who were satisfied upon completed training said that they remained satisfied after 10 years (33). How much training is required to retain muscle strength is individual, but 8–12 pinches/contractions of the muscles as hard as possible 1–2 times a week are recommended (37).

That pelvic floor training has an effect on *urge incontinence* has not been shown in randomised, controlled studies.

Treatment of *utero-vaginal* prolapse includes surgery, a prolapse ring and pelvic floor training. Surgery is most often the only alternative when the prolapse has an advanced progression, but has a high frequency of relapse (38). Most women are operated in their 50s, with an average age of 55 at the first operation (38). There are no studies that have compared the use of a prolapse ring with pelvic floor training or no treatment, and little is known of what kind of ring is most effective (39). Today, there are only two randomised controlled studies of pelvic floor training, of which one has a low methodological quality and the other is only reported in summary and is a pilot study (40). However, both studies indicate a positive effect of strength training of the pelvic floor muscles. This is assumed to be an effect of the pelvic floor being lifted, and of a tightening of the connective tissue and muscles, but there are no studies that have investigated this (41). Today, it is not known if pelvic floor training can be primarily preventative or which stage it may potentially be possible to alleviate or slow a prolapse.

*Osteoporosis* is a condition that is affected by hereditary disposition, smoking, physical inactivity, oestrogen deficiency and by some diseases. Regular physical activity decreases the bone loss that usually begins as early as age 30–35 and accelerates after menopause. A number of studies have shown a positive effect of regular exercise, and then primarily of exercise that strains the skeleton, such as apparatus training with resistance, walks, exercise callisthenics, etc. (42–46). However, bone tissue is the tissue that adapts the fastest to activity, and variation and increased loading are therefore important to the effect. The guidelines for better bone health emphasize activity with a high weight load, in other words running and exercises where jumps occur and strength training with heavy weights (47). Various types of ball sports, for example, can be excellent activities to stimulate bone density. However, it should be noted that such exercise can increase the risk of strain injuries and it is therefore important that the training be individually adapted. A Cochrane overview draws the conclusion that aerobics, weight-bearing exercise and strength training are effective for increasing bone density in the backs of post-menopausal women and that walking has an effect on the bone density of the back and hips (48). Some, but not all, studies have shown that the effects of oestrogen and exercise strengthen each other (44, 45, 49). The effect is greater, the longer and the more often one exercises. In addition, it has been observed that regular physical activity improves balance and the risk of falling thereby decreases (46).

The risk of *cardiovascular disease* decreases with regular exercise and the effect is caused by a number of mechanisms, such as a positive impact on lipids, improved insulin effect, weight loss, decreased stiffness of the artery walls, etc. (50–58). This has been shown for both men and women and in various ages, as well as in women around menopause. With the new knowledge that indicates that oestrogen replacement therapy does not

reliably protect against heart attack (19, 20), this knowledge about the effects of exercise becomes even more important. In addition, exercise improves aerobic fitness and endurance, which hormone treatment does not do (59). Thirty minutes of physical activity at a moderate intensity (sweaty or breathless) reduces the risk of premature death in otherwise inactive persons (60). Aerobic exercise at an intensity of 70–80 per cent of maximal heart rate is recommended to improve the maximal oxygen uptake (37). All activities that involve major muscle groups and are dynamic and rhythmic by nature (cycling, brisk walks, aerobics, etc.) are recommended to increase aerobic fitness (37).

Epidemiological data has shown that people who have been and are physically active have a reduced risk of having some *forms of cancer* such as breast and uterine cancer (61–64). The studies claim that this was not only due to the physically active women being generally more aware of health. The cause of these findings can possibly be that more intensive exercise can thin out or completely prevent ovulation, which means that oestrogen production is lower and the risk of breast and uterine cancer thereby decreases. Other proposed causes of a reduced risk of breast cancer in physically active women is that exercise also activates antioxidative systems (65), reduces breast density measured by mammography (66) and decreases oestrogen levels (67). A randomised study was also recently published that found that women who were randomly assigned 45 minutes' exercise five times a week for one year had fewer colds than the control group (68).

*In summary*, regular physical activity entails many advantages for menopausal women. The majority of the effects do not differ from those also observed in people of other ages, but the effects are clear and affect several of the phenomena that otherwise usually become prevalent in menopause in particular. One should choose varied types of exercise to avoid overload problems from excessively one-sided exercise. It is also important that the activities chosen are perceived as pleasant and enjoyable and that one gladly exercises and trains in a group. Group exercises can often involve a certain "social pressure" that means that one continues. It is necessary that these activities continue regularly and are maintained for an extended period of time.

## Indications

Physical activity during menopause can serve as both primary and secondary prevention, in other words can both prevent problems from arising and function as treatment once something has happened (such as an osteoporotic fracture). The treatment is probably nonetheless most effective as primary prevention, since the problem developed can in itself reduce the possibilities of pursuing regular exercise. The effect of physical activity in many cases reinforces the effect of hormone therapy and there is absolutely no obstacle to combining these measures. The need is most clear among women who do not choose hormone therapy (primarily with regard to the effect on bone density) and physical activity can also continue for an unlimited period, which is not true of hormone therapy.

## *Prescription*

Physical activity during menopause should contain both condition and strength elements to prevent osteoporosis, cardiovascular disease and reduce the risk of hot flashes and sweats, urinary incontinence and improve mood.

Menopausal women can follow general exercise principles (also see Chapter 2) for adults that mean that one should do at least 30 minutes of moderate physical activity per day (one will be able to talk but not sing, i.e. breathing and heart rate will be increased) to achieve health benefits. A combination of moderate and intense activity can also be utilised to achieve these effects. To improve or retain aerobic fitness, exercise is recommended with an intensity of up to 70–80 per cent of the maximal heart rate three times a week (37). Moderate activity can also be divided up into multiple sessions per day, such as 3 x 10 minutes (69). To retain or increase muscle strength, strength training of the most important muscle groups (abdomen, back, pelvic floor, gluteal, thigh and arm muscles) should be done 2–3 times a week with one to three series of 8–12 repetitions close to maximum capacity. To retain or increase flexibility, flexibility training is recommended for the body's joints 2–3 times a week, with 2–4 repetitions and with a duration of 15 seconds for each extension (37, 69).

The intensity of the exercise, the number of sessions per week and the time for every session should be gradually increased for a tentative minimum of three months to not lead to overload symptoms. The exercise can gladly be performed as group training and with varying content to increase the chances of the activity becoming permanent.

### *Suggestions of suitable activities*

Brisk walks, Nordic walking, dance, aerobics, step-up training, exercise callisthenics, strength training, cycling, jogging and skiing are excellent activities. Swimming is a good activity that stimulates the muscles and fitness, but does not have any effect on osteoporosis. Varying the activities during the week is stimulating. Strength training can be done at home, under guidance at a training centre or as general group training to music.

### *Functional tests/need for health check-ups*

- The effect of physical activity in menopausal women can be evaluated at the earliest after three months with regard to well-being and the effect on hot flashes/sweats.
- The effect on bone density can hardly be measured until after at least one year or more.
- The effect on weight, lipid levels and aerobic fitness can (if so desired) be measured for the first time after approximately six months.
- The effect on the pelvic floor muscles and incontinence can be seen after 3–4 months' regular training.

## *Interactions with pharmaceutical treatment*

Hormone therapy and physical activity can advantageously be combined without any problem.

## *Contraindications*

There are no contraindications except in acute illness with a diminished general state of health.

## *Risks*

The risk of injury in excessively intense and rapidly increasing training must be observed, which is why intensity, frequency and duration should not be increased too rapidly, but rather gradually and with caution. An excessively rapid increase could cause a risk of overload symptoms, which can take a long time to heal and thereby make exercise difficult for a long period of time and, which is perhaps most important, could mean that the woman would not dare to continue or resume her training.

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