12. Pregnancy

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Summary

In the majority of cases, physical activity during pregnancy is safe for mother and foetus and entails no elevated risk of abnormal pregnancy or delivery outcomes. All pregnant women should therefore be recommended to participate in condition-enhancing exercise as a part of a healthy lifestyle. Regular exercise also improves and maintains good general fitness during pregnancy and can be a good way of preparing the body for the actual delivery. Physical activity should take place at a moderate level of exertion during a total of approximately 30 minutes per day. Activities should be chosen such that they entail a minimal risk of falling and damage to the foetus. From a public health perspective, one of the advantages of women exercising regularly during pregnancy is that they are most often more inclined to continue with some form of physical activity after they have given birth as well.

Physiological changes during pregnancy

During pregnancy, the need for oxygen increases, which entails increased respiratory depth and an increased respiratory rate. The blood volume increases by approximately two litres, which leads to a higher heart rate and greater stroke volume. The resting heart rate increases by approximately 10–15 beats per minute, although with large individual differences. The heart's capacity is affected by the pregnant woman's position. From around the fourth month of pregnancy, the venous reflux is obstructed by the growing uterus in the supine position, called vena cava compression. This leads to an elevated risk of a reduced stroke volume and a drop in blood pressure, which is why physical exercise lying on the back should be avoided after the 16th week of pregnancy. The same is true of exercises while standing still for prolonged periods, which can create the same effect (1).

Hormonal changes caused by pregnancy entail increased flexibility in the joints. The pregnancy-related weight gain leads to the skeleton, muscles, joints and ligaments being placed under greater strain. At the same time, there is a forward shift in the body's centre of balance, the back muscles are strained more, which creates a higher compression on the rear segments of the lumbar region. The curve of the back increases and, consequently, it becomes more difficult to maintain one's balance.

In pace with the growth of the belly, the distance between the rectus abdominis muscles may also increase, called diastasis recti. It is assumed that diastasis recti combined with the altered centre of balance forward can lead to reduced torso stability.

Both the pregnancy in itself and physical activity increase the metabolism and raise the body temperature. A body temperature of more than 39.2 degrees Celsius is believed to be teratogenic (in other words, can cause foetal damage) during the first three months. However, a higher respiratory rate and higher skin perfusion help to reduce the risk of an abnormally high body temperature (hyperthermia). However, a good fluid supply and avoiding physical exercise in a hot and humid climate are important. The risk of low blood sugar (hypoglycaemia) can be avoided with an adequate caloric intake and by limiting the exercise session's length to a maximum of 45 minutes.

Back and pelvic pain

The altered posture during pregnancy, with a greater lumbar lordosis (back curvature) and thoracic kyphosis (backwards arching of the upper spine), is considered to be one of the reasons that back problems can arise. The prevalence of back and pelvic related pain during pregnancy is approximately 45 per cent (2).

Urinary incontinence

Pregnancy and, above all, delivery are risk factors for the development of urinary incontinence with potential damage to the muscles, connective tissues and peripheral nerves (3). More frequent emptying of the bladder and pressure urges are common during pregnancy due to the pressure of the foetus. The incidence of incontinence during pregnancy varies between 32 and 64 per cent (3).

Obesity

Throughout the Western World, there is a rapidly increasing proportion of pregnant women with excess weight and obesity. Today, nearly 40 per cent of pregnant women are overweight (BMI > 25) and approximately 10–12 per cent are obese (BMI > 30) upon registration with maternity care in Sweden. Excess weight and mainly obesity in the mother are associated with elevated risks of serious complications during both pregnancy and birth, which is why this is a problem that must be take very seriously.

Effects of physical activity

Besides a retained or increased physical well-being, the benefits of physical activity for pregnant women include less fatigue and a reduced risk of swelling in the extremities and varicose veins. In addition, physically active pregnant women often experience less stress, anxiety, depression and sleeping disorders. It has been shown that adverse pregnancy and neonatal outcomes are not increased in women who have exercised during pregnancy (4–5). Some data indicates that regular physical exercise during pregnancy decreases the total time the birth takes and reduces the risk of obstetric complications.

Preeclampsia/pregnancy toxaemia

Regular physical activity among those not pregnant has been shown to be able to reduce the risk of hypertension. Consequently, in two randomised studies, the effect of regular exercise of moderate intensity was studied in relation to the risk of developing preeclampsia. The results indicate that a reduction of risk can be achieved, although further studies are needed for clear evidence (6).

Gestational diabetes

In a Cochrane overview comprising four randomised studies involving 114 pregnant women with gestational diabetes, the effect of physical activity was studied during months 6–9 of pregnancy with regard to blood sugar levels, decreased insulin requirements and a potential decrease in perinatal and maternal morbidity. No differences were found between the groups and the authors are of the opinion that larger studies are needed to be able to answer the question of whether physical activity leads to an improvement in terms of diabetes (7).

Obesity

The effect of regular physical activity among obese pregnant women is sparsely studied. In one Swedish case-control study, it was found that obese pregnant women who participated in a programme with motivational talks and aquarobics 1–2 times a week had a smaller weight gain during pregnancy than obese pregnant women who received customary maternal healthcare (8).

Back and/or pelvic pain

In a randomised study by Kihlstrand et al (9), it was found that women with back pain during months 3–6 of the pregnancy who were offered aquarobics achieved a significant reduction in both pain and sick listing during the remainder of the pregnancy. In another randomised study, pregnant women were offered aerobic exercise for 60 minutes three times a week during 12 weeks from month 3–6 of the pregnancy. It was found that the

exercise group had significantly less back pain and restricted mobility compared with the control group (10).

Elden et al (11) showed that a reduction of pelvic pain could be achieved both in a group of pregnant women who received acupuncture and in a group that received stabilising exercise compared with pregnant control subjects. In a primary prevention study among first-time pregnant women, Mørkved et al (12) found significantly fewer pregnant women with pelvic related pain among the women who were randomised to a group training programme consisting of abdominal, back and pelvic floor training and relaxation compared with the controls. In summary, in a Cochrane overview it has been concluded that pregnancy-specific exercise programmes, stabilising exercises, acupuncture and aquarobics appear to reduce back and pelvic pain during pregnancy compared with customary maternity healthcare and obstetric monitoring (13), but that more and more well designed studies are needed. Studies that aim to clarify whether or not physical activity begun early in pregnancy can prevent back and/or pelvic pain during pregnancy would be particularly valuable.

Urinary incontinence

Four randomised controlled studies have investigated the effect of pelvic floor exercise during pregnancy as a method to prevent/reduce incontinence. Three of these show a significant effect from exercise, while one study could not prove any such effect (the latter study is published as a summary and consisted only of a consultation with a physiotherapist, however). The three studies that showed a positive correlation included first-time pregnant women. Sampselle et al (14) found that those who did pelvic floor exercises had significantly fewer symptoms than those who had not exercised in week 35, 6 weeks and 6 months after the birth, but that there were no differences between the groups after 12 months. However, the study had a high dropout rate. Reilly et al (15) found that women who exercised during pregnancy reduced the prevalence of incontinence three months after birth compared with control groups (19 or 33% with urinary incontinence). Mørkved et al (16) found significantly fewer women with urinary incontinence in the exercise group both at week 36 and three months after the birth. The muscle strength in the pelvic floor muscles was significantly higher at both measurement occasions in the exercise group. Several randomised controlled studies have shown an effect from pelvic floor exercises after the birth (17). The effect appears to be better with more frequent follow-up and more intense exercise.

Counselling on physical activity during pregnancy

Every woman is unique and an individual assessment is needed based on the current condition status and the type of physical activity, intensity, duration and frequency. A reasonable objective should be to strive for retained fitness during pregnancy, but not to strive for peak performance. Every exercise session should include a warm-up and a wind-down

phase (1, 18). Pregnant women who were not previously physically active should gradually begin with a short exercise session three times a week. Then, a gradual increase can be made to 30–45 minutes, three times a week, supplemented with virtually daily physical activity for 30 minutes in total.

Aerobic exercise

With regard to aerobic exercise, normal recommendations can be followed as long as one avoids excessively high body temperature (see above) in the first three months. Pregnant women should exercise in light clothing and remember to drink fluids during and after exercising. Activities of a high intensity in a warm and humid climate should be avoided (18). All activities that include rhythmic and dynamic exertion with major muscle groups are recommended, such as brisk walks, Nordic walking, jogging, cycling, aerobics, step-up training, callisthenics and dance. Swimming is also an excellent activity. Aquarobics is suitable for women with pelvic and back problems.

Since the heart rate is elevated during pregnancy, the pulse level is not always a good way of measuring the intensity of an exercise session. Instead, the recommendation is to assess the physical strain with either a so-called talk test or with Borg's Rating of Perceived Exertion (RPE) scale. A talk test is based on the exercise session's intensity not being greater than what permits normal conversation. Borg's scale measures subjective exertion between 6 and 20. The recommended level during pregnancy is 12–14, in other words somewhat hard (19).

Strength training

Strength training during pregnancy should focus on the pelvic floor muscles and the back and abdominal muscles, but training of the lower and upper extremities can advantageously be included. Since there is a risk of vena cava compression, in other words that the venous reflux to the heart is obstructed by the growing uterus, which can lead to an elevated risk of a reduced stroke volume and a drop in blood pressure, it is recommended that strength exercises for the abdomen be done sitting, lying on one's side or standing after the 16th week of pregnancy (20). In general, 7–8 exercises are recommended for the body's most important muscle groups, with 8–12 repetitions in three sets (19). Pregnant women should avoid such high loads that the strain reflex arises. Many have problems to "find" the pelvic floor muscles when exercising and in such a case it may be appropriate to contact a physiotherapist to check that the exercises are done correctly before the birth. After the birth, it may be even more difficult depending on what damage has been done to the muscles, supportive tissues and potential nerve damage. Consequently, it is always an advantage to have learned the technique ahead of time. For beginners, it is also important to learn the right technique for the general strength exercises. The physiotherapist can provide advice on both technique and the scope of the exercises.

Flexibility training

Due to generally increased flexibility during pregnancy, it is important to ensure that stretching and extension exercises are done with a certain degree of caution, so that imbalances do not arise. The muscle groups that have been used in the aerobic and strength training should be extended/stretched, but specific flexibility exercises are not necessary. In general, stretching and flexibility training aims to retain normal joint flexibility. The exercises should be done at a relaxed pace and the extended position should be maintained for 10–30 seconds. The training should be done at least 2–3 times a week (19, 20). Flexibility training for the untrained can advantageously be done under the guidance of an instructor.

Functional tests/need for health check-ups

The following conditions require a professional medical assessment and consultation regarding whether or not physical exercise is appropriate during pregnancy, the type of exercise, the load and the extent of the training (4):

- Heart disease
- Undiagnosed cardiac arrhythmia in the mother
- Restrictive lung disease
- Chronic bronchitis
- Poorly controlled hypertension, thyroid disease, diabetes mellitus or epilepsy
- Anaemia
- Bleeding in month 4–9
- Preeclampsia or pregnancy-induced hypertension
- Preterm labour
- Intrauterine growth retardation
- Cervical weakness/cerlage
- Preterm prelabour rupture of membranes
- Twin pregnancy
- Smoking > 20 cigarettes/day
- Orthopaedic disease that limits motor capacity
- Morbid obesity (BMI > 40)
- Malnutrition or eating disorders.

Warning signals when physical activity should be stopped and the pregnant woman should contact women's healthcare for a medical consultation (4):

- Pronounced breathlessness
- Breathlessness before exercising
- Pronounced fatigue
- Headaches

- Chest pains/pressure on the chest
- Dizziness
- Pronounced abdominal or pelvic pain
- Painful contractions or preterm labour
- Leakage of amniotic fluid
- Vaginal bleeding
- Reduced foetal movement
- Muscle weakness
- Swelling or pain in the calves.

Contraindications

Pregnant women should not go diving since the foetus is not protected from decompression sickness and gas embolism. Contact sports should be avoided from month 4–6.

Risks

Pregnant women who pursue sports with a risk of falling, such as downhill skiing, skating, ice hockey, apparatus gymnastics or riding, should be made aware of degraded balance and the risk of foetal injury in a potential fall.

Physical exercise at a high altitude (> 2,500 metres) may not be common among pregnant women, but has been shown to entail a redirection of blood from the placenta to the muscles. Theoretically, this can entail a risk that the foetus will receive too little oxygen. Therefore, at least 4–5 days of acclimation is needed to reset the metabolism.

Competition sports during pregnancy require careful joint assessment by the obstetrician in charge and the sports physician in charge. Regular check-ups during pregnancy are recommended as well as possible ultrasound check-ups concerning the foetus' growth. It is particularly important to ensure that there is an adequate fluid and nutritional intake and the risk of an elevated body temperature be avoided. Competitive athletes should also be informed that the pregnancy will entail diminished physical performance capacity.

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