



Setting standards to improve women's health

EXERCISE IN PREGNANCY

This is the first edition of the statement.

1. Introduction and background

Following a review of the available evidence, this statement has been designed to aid women and their care providers as they discuss the relative merits of aerobic and strength-conditioning exercise in pregnancy and the postpartum period.

The effect of exercise in pregnant women has been the subject of comprehensive research. Studies show that, in most cases, exercise is safe for both mother and fetus during pregnancy and they support recommendations to initiate or continue exercise in most pregnancies to derive the health benefits associated with such activities.¹

Many women of childbearing age, 42% by one estimate,² report exercising during pregnancy and many strongly desire to continue to do so.

2. Identification and assessment of evidence

- Medline search 1980–2004: MeSH terms: pregnancy, exercise, training, postpartum, postnatal.
- Embase database search 1980–2004: MeSH terms: pregnancy, exercise, training, postpartum, postnatal.
- Cochrane Database of Systematic Reviews.
- Internet databases.
- National Electronic Library for Health.

3. Key points

In support of guidelines from the American College of Obstetricians and Gynecologists,³ the Royal College of Obstetricians and Gynaecologists (RCOG) suggests that:

- all women should be encouraged to participate in aerobic and strength-conditioning exercise as part of a healthy lifestyle during their pregnancy
- reasonable goals of aerobic conditioning in pregnancy should be to maintain a good fitness level throughout pregnancy without trying to reach peak fitness level or train for athletic competition
- women should choose activities that will minimise the risk of loss of balance and fetal trauma
- women should be advised that adverse pregnancy or neonatal outcomes are not increased for exercising women
- initiation of pelvic floor exercises in the immediate postpartum period may reduce the risk of future urinary incontinence

- women should be advised that moderate exercise during lactation does not affect the quantity or composition of breast milk or impact on fetal growth.

4. Physiological adaptive changes in pregnant women affecting physical activity

Physiological adaptations of pregnancy related to exercise have been well described. Healthcare professionals advising exercise in pregnancy should be aware of these changes.

Marked musculoskeletal alterations in the pregnant woman's body could potentially raise the risk of injury during exercise. Hormonal changes lead to raised joint laxity and hypermobility.⁴ Prudence dictates that activities such as contact sports be avoided and that weight-bearing exercise in women affected by joint laxity changes are overseen by a healthcare professional.^{3,5} Pelvic support belts and core stability work can be used to encourage these women to remain active.

Hyperthermia is a concern, given that both exercise and pregnancy raise the metabolic rate and that maternal core temperatures in excess of 39.2 degrees Celsius are potentially teratogenic in the first trimester.^{6,7} Raised minute ventilation and skin blood flow augment heat dissipation and offset somewhat the potential hyperthermic effects of exercise.⁸ Sensible precautions are suggested such as maintaining adequate hydration and avoiding exercising in very hot, humid environments when not acclimatised to such conditions.⁹ The risk of hypoglycaemia can be reduced by consuming adequate calories and limiting exercise sessions to less than 45 minutes.¹⁰

Exercise in the supine position should be avoided, as this position is associated with lower maternal cardiac output and symptomatic hypotension after 16 weeks of gestation due to vena cava compression.¹¹

Women should avoid overexertion in altitudes over 2500 metres at least until after 4–5 days of exposure to such high altitudes, as this has been shown to lower uterine blood flow.^{12,13} The demands of exercising muscles diverts blood flow from the uteroplacental unit, raising the theoretical risk of fetal hypoxia. In actuality, compensatory changes with exercise, such as raised maternal haematocrit and oxygen extraction, appear to prevent impairment of fetal oxygenation.¹⁴

Regarding the fetal response to exercise, evidence to date has suggested fetuses of exercising women may tolerate labour better than those of non-exercisers.¹

Clinical evidence of stress, as exhibited by meconium, fetal heart rate pattern and Apgar scores is less frequent in women who exercise at 50% of preconception level throughout pregnancy, compared with well-conditioned athletes who discontinued exercise before the end of their first trimester.¹⁵ Women should be advised that adverse pregnancy or neonatal outcomes are not increased for exercising women.¹⁶ Studies have yielded inconsistent findings regarding the effect of exercise on birth weight and length of gestation.^{11,17}

5. Benefits of exercise in pregnancy

As with exercise recommendations for women who have any medical condition, those for pregnant women must balance the benefits and risks to both mother and fetus.

Maternal benefits appear to be both physical and psychological in nature. Many common complaints of pregnancy, including fatigue, varicosities and swelling of extremities, are reduced in women who exercise.¹⁸ Additionally, active women experience less insomnia, stress, anxiety and depression.¹⁹ There is some evidence that weight-bearing exercise throughout pregnancy can reduce the length of labour and decrease delivery complications.^{1,14,20} An argument for public health is that women who incorporate exercise into their routine during pregnancy are more likely to continue exercising postpartum.¹⁵

Women and care providers should consider the effects of a sedentary lifestyle during pregnancy as it may contribute to loss of muscular and cardiovascular fitness, excessive maternal weight gain, raised risk of gestational diabetes mellitus²¹ or pre-eclampsia,²² development of varicose veins and increased incidence of physical complaints such as dyspnoea or lower back pain and poor psychological adjustment to the physical changes of pregnancy.²³

Exercise is helpful in improving glycaemic control in women with gestational diabetes mellitus and may play a role for primary prevention of developing gestational diabetes mellitus.^{21,24}

Evidence also suggests a protective effect of exercise on coronary heart disease, osteoporosis and hypertension, as well as a reduced risk of colon cancer, and perhaps breast cancer, and reduced body fat.¹

6. Conditions requiring medical supervision while undertaking exercise in pregnancy

- Cardiac disease
- Restrictive lung disease
- Persistent bleeding in the second and third trimesters
- Pre-eclampsia or pregnancy-induced hypertension
- Preterm labour (previous/present)
- Intrauterine growth restriction
- cervical weakness/cerclage
- Placenta praevia after 26 weeks
- Preterm prelabour rupture of membranes
- Heavy smoker (more than 20 cigarettes a day)
- Orthopaedic limitations
- Poorly controlled hypertension
- Extremely sedentary lifestyle
- Unevaluated maternal cardiac arrhythmia
- Chronic bronchitis
- Multiple gestation (individualised and medically supervised)
- Poorly controlled thyroid disease
- Morbid obesity (body mass index greater than 40)
- Malnutrition or eating disorder
- Poorly controlled diabetes mellitus
- Poorly controlled seizures
- Anaemia (haemoglobin less than 100 g/l).

Healthcare professionals should use their professional judgement as to what extent and duration exercise should be undertaken in the above circumstances.

7. Warning signs to terminate exercise

- Excessive shortness of breath
- Chest pain or palpitations
- Presyncope or dizziness
- Painful uterine contractions or preterm labour
- Leakage of amniotic fluid
- Vaginal bleeding
- Excessive fatigue
- Abdominal pain, particularly in back or pubic area
- Pelvic girdle pain
- Reduced fetal movement

- Dyspnoea before exertion
- Headache
- Muscle weakness
- Calf pain or swelling.

Women should be advised to seek medical advice should any of the above symptoms occur.

8. Advising exercise in pregnancy

The development of an exercise programme requires individual adaptation. Prior to advising exercise, assessment of fitness status, current athletic or exercise activities and individual goals of exercise should be considered. The classification into the sedentary, recreational and competitive athlete will help guide the intensity of activity. Careful consideration should be given to the type and intensity of exercise, as well as to the duration and frequency of exercise sessions, to carefully balance between potential benefits and harmful effects. Most guidelines advocate a maximal heart rate of 60–70% for women who were sedentary prior to pregnancy and the upper range of 60–90% of maximal heart rate for women wishing to maintain fitness during pregnancy (Table 1).³

Table 1. Modified heart rate target zones for aerobic exercise in pregnancy	
Maternal age (years)	Heart rate target zone (beats/minute)
< 20	140–155
20–29	135–150
30–39	130–145
> 40	125–140

Other measures of exercise intensity include the ‘talk test’ and a visual rating of perceived exertion. When using the ‘talk test’, exercise takes place at a comfortable intensity, allowing the woman to maintain a conversation during exercise. A method of measuring perceived exertion is the Borg scale of perceived exertion (Table 2). This approach seems to be effective as, when exercise is self-paced, most pregnant women will voluntarily reduce their exercise intensity as pregnancy progresses.²⁵ For moderate exercise during pregnancy, ratings of perceived exertion should be 12–14 (somewhat hard) on the 6–20 scale.

Table 2. Borg’s rating of perceived exertion ²⁶	
6	14
7 Very, very light	15 Hard
8	16
9 Somewhat light	17 Very hard
10	18
11 Fairly light	19 Very, very hard
12	20
13 Somewhat hard	

Although there is no established upper level of safe exercise intensity, regular exercisers before pregnancy should be able to engage in high intensity exercise programmes, such as jogging and aerobics, with no adverse effect to mother or fetus. Women who have attained a high level of fitness through exercise prior to pregnancy should exercise caution in engaging in higher levels of fitness activities

during pregnancy. They should also expect a decline in overall activity and fitness levels as pregnancy progresses.²⁵

When starting an aerobic exercise programme, previously sedentary women should begin with 15 minutes continuous exercise three times a week, increasing gradually to 30-minute sessions four times a week to daily. Reasonable goals of aerobic conditioning in pregnancy would be to maintain a good fitness level throughout pregnancy without trying to reach peak fitness or train for athletic competition. It is suggested that a warm up and cool down period be included in any exercise regimen. There is less evidence on strength conditioning, weight training and stretching exercises such as yoga and pilates in pregnancy. Considering complementary and alternative therapies in pregnancy, limited evidence currently exists and attention needs to be given to undertaking high-quality randomised controlled trials in these areas.²⁷

Women should not scuba dive in pregnancy, as the fetus is not protected for decompression sickness and gas embolism.²⁸ Women are cautioned about the potential for loss of balance and fetal trauma if they participate in horseback riding, downhill skiing, ice hockey, gymnastics and cycling during pregnancy.¹¹

Women who have gestational diabetes mellitus must take particular precautions with exercise including monitoring blood glucose, regulating meal times, scheduling rest periods and carefully tracking fetal activity and uterine contractions.¹¹

No adverse effects on the fetus have been reported to occur during water exercise in pregnancy.²⁹ The physiology of water exercise offers some compensation for the physiological changes of exercise on land that may beneficially affect pregnancy.³⁰ If a woman is exercising in water (as in aquanatal classes) the water temperature should not exceed 32 degrees Celsius. Thirty-five degrees Celsius is the recommended maximum while using a hydrotherapy pool.³¹

9. Competitive athletes and pregnancy

Elite athletes who continue to train during pregnancy require supervision by an obstetric care provider with the knowledge of the impact of strenuous exercise on maternal and fetal outcomes. All pregnant athletes must be made aware of proper hydration, the additional nutritional requirements of pregnancy and exercise and the dangers of heat stress. Routine obstetric evaluation must be strongly recommended. Additional evaluation to assess fetal growth and wellbeing may be appropriate if clinically indicated. The care provider should liaise with the medical officer of the athlete's governing body throughout pregnancy and postpartum. Competing athletes should be advised to abide by the rules of the governing body overseeing the event. Although risks are minimal with moderation, even healthy active women should be examined periodically to assess the effect of their exercise programmes on the developing fetus and their regimen should be adjusted and discontinued if necessary. Competitive athletes can expect to experience a reduction in their performance during pregnancy.³²

10. Postpartum exercise

Benefits of postpartum exercise include improved cardiovascular fitness, facilitated weight loss, raised positive mood, reduced anxiety and depression and more energy.³³ Postpartum women are able to participate in moderate physical activity without compromise to infant breast milk acceptance or infant growth.³⁴ By strengthening the pelvic floor muscles, the risk of urinary stress incontinence may be reduced.³⁵

Current recommendations suggest that, if pregnancy and delivery are uncomplicated, a mild exercise programme consisting of walking, pelvic floor exercises and stretching may begin immediately.³⁶ However, if delivery was complicated or was by lower segment caesarean section, a medical caregiver

should be consulted before resuming prepregnancy levels of physical activity, usually after the first postpartum check-up at 6–8 weeks.³⁶ Women need to return to prepregnancy exercise levels gradually, not resuming high impact activity too soon.

11. Conclusion

A review of the evidence suggests that, in most cases, exercise is safe for both mother and fetus during pregnancy and women should therefore be encouraged to initiate or continue exercise to derive the health benefits associated with such activities.

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