Exercise in pregnancy

Part 2: Recommendations for individuals

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ABSTRACT

OBJECTIVE To provide practical guidelines for family physicians advising exercise in pregnancy.

QUALITY OF EVIDENCE MEDLINE search was limited to the English literature between 1987 and 1995 with the key MeSH words exercise and pregnancy. Other sources included the Sports and Fitness Database between 1991 and 1995 and a manual search for relevant articles.

MAIN FINDINGS After contraindications to exercise in pregnancy are excluded, the exercise prescription depends on the level of maternal fitness; the state of gestation; and the mode, intensity, duration, and frequency of exercise. Pregnant women must be closely monitored, particularly those who want to maintain vigorous exercise programs.

CONCLUSIONS The available data suggest that moderate exercise has minimal risk to a woman and her fetus, if the woman is in good health, the pregnancy is monitored, and the exercise program is modified as necessary.

RÉSUMÉ

OBJECTIF Offrir aux médecins de famille des lignes directrices pratiques pour mieux conseiller leurs patientes sur l'exercice pendant la grossesse.

QUALITÉ DES PREUVES La recherche dans MEDLINE s'est limitée à la documentation de langue anglaise publiée entre 1987 et 1995 en utilisant le langage MESH et les mots clés «exercise» et «pregnancy». Les autres sources consultées furent la base de données «Sports and Fitness» couvrant la période de 1991 à 1995 ainsi qu'une recension manuelle des articles pertinents.

PRINCIPAUX RÉSULTATS Après avoir éliminé les contre-indications de l'exercice pendant la grossesse, la prescription du programme d'exercice est fonction de la condition physique de la mère, de l'état de la grossesse et de l'intensité, de la durée et de la fréquence de l'exercice. Les femmes enceintes doivent faire l'objet d'une surveillance étroite, particulièrement celles qui désirent poursuivre des programmes d'exercices vigoureux.

CONCLUSIONS Les données disponibles indiquent que l'exercice d'intensité modérée comporte un minimum de risques pour la mère et son foetus lorsque la mère est en bonne santé, que la grossesse est bien surveillée et que le programme d'exercice est modifié au besoin.

Can Fam Physician 1997;43:107-111.

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Based on the information presented in the first part of this two-part series, practical recommendations will be outlined for family physicians counseling their patients about the safety of exercise in pregnancy. Information in this article is particularly useful for physicians counseling women who would like to begin or maintain a moderate to high level of physical activity throughout their pregnancies.

Suggested guidelines

Currently available data suggest that healthy pregnant women can begin or maintain moderate exercise programs with minimal adverse effects on their unborn children. However, the upper limit of safe exercise is not established. Exercise guidelines must, therefore, be flexible and individualized and must include regular monitoring of the health of women and their fetuses. Pregnant women must understand the theoretical concerns and how they compare with available data.

Physicians must first identify any absolute contraindications or relative contraindications to exercise in pregnancy for their patients. Any factors that compromise maternal physiologic reserves could put the pregnancy at risk (**Table 1**[1-3]). In these situations the risk to the fetus and to the mother far outweighs any exercise-related benefits identified. A list of relative maternal contraindications to exercise in pregnancy are listed in **Table 2**.[1-3] In these situations the safety of exercise must be assessed on an individual basis with extremely close medical surveillance.

Once any contraindications are eliminated, exercise programs should depend on expectant mothers' current fitness levels and future goals. Active mothers should not expect to maintain the same level of fitness throughout their pregnancies. The exercise program must be modified throughout the pregnancy depending on maternal and fetal response to the exercise.[4,5]

In general, common sense should be stressed. Emphasize the three don'ts: don't get exhausted, don't overheat, and don't dehydrate.[5] First, rest cycles are as important as training and must be incorporated into the exercise schedule.[4] Don't overtrain and get overtired. As there are still large gaps in our knowledge, serious competition should probably be avoided and elite athletes should not expect to maintain the same training programs during their pregnancies. They should shift focus away from performance and toward the health benefits of exercise.[4,5] Second, emphasize safety and the importance of avoiding hot, humid environments and extremes in temperature. Third, it is critical to ensure adequate hydration and nutrition.[4,5]

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Exercise prescription

The optimal exercise prescription is essentially still unknown and depends on several factors: maternal fitness level before pregnancy, state of gestation, type of exercise, intensity of exercise, and environmental conditions. We will look at each of these factors.

Maternal fitness and state of gestation. For women who have been inactive, the best time to start regular exercise is the second trimester (13 to 29 weeks).[1] This will avoid the time of closure of the neural tube and avoid the risk of hyperthermia.[1] For previously fit women, it seems to be safe to continue at a prepregnancy perceived level of exertion throughout the first trimester.[2] In the second trimester women can slowly increase their level of exercise.[1] In the third trimester (29 to 40 weeks), the potential conflict between fetal and maternal glucose is at its greatest, as is the change in body habitus. During this time pregnant women may maintain their exercise intensity, duration, and frequency or perhaps even decrease it, depending on how they feel.[1,6] It is best to exercise after meals to avoid hypoglycemia.[2]

Type of exercise. When pregnant women choose the optimal type of exercise, they must avoid any exposure to hyperbaric, hyperthermic, humid, or hypoxic environmental conditions.[1] Women must avoid scuba diving, hiking at high altitudes, or activities that involve high-risk awkward positions.[6] In general, most people still recommend against activities that involve extreme jerking motions and exercise that could cause even mild abdominal trauma. Situations where the loss of balance would endanger the mother and fetus are also best avoided. Prolonged exercise in a supine position after the fourth month of pregnancy, when the weight of a pregnant uterus could decrease venous return, is unwise. However, currently, very little evidence supports these restrictions.[2]

Conservative approaches still rule, but common sense must prevail.[2] For women who were inactive before pregnancy, non–weight-bearing activities, such as cycling, walking, low-impact aerobics, swimming, and aquafit programs, are ideal. With swimming the added buoyancy of the water increases cushioning and also enhances heat dissipation provided the water is not too warm.[5,6] General muscular conditioning, in the form of weight training, is probably safe if proper breathing techniques (avoiding breath holding) are used.[1,4]

Intensity of exercise. Monitoring the intensity of exercise in pregnancy is more difficult than in the nonpregnant state. Heart rate is increased in normal pregnancy and therefore cannot be used alone as a reliable monitoring tool. A combination of methods is more ideal.[1,5,6] Rate of perceived exertion is probably least affected by gestational adaptations.[1] Borg's rate of perceived exertion is a 15-point scale from 6 to 20. Maintaining a target range of 12 to 14 (moderate to somewhat hard intensity) is recommended throughout pregnancy and not exceeding 17 (very hard).[3,5,6] The talk test can also be a good measure of intensity (where exercising mothers can easily carry on a conversation).

The safe upper limit for an exercising heart rate in pregnancy is controversial and probably not a reliable monitoring tool. Some authorities recommend that young healthy women unaccustomed to physical activity should exercise at an intensity below 140 beats per minute (or 65% to 70% of maximum heart rate).[2] Previously fit young women can likely exercise up to 155 beats per minute (or 80% of maximum heart rate).[2,6-8]

The duration of exercise will depend on previous maternal fitness and stage of pregnancy, exercise modality, and intensity of exercise, as well as on environmental conditions and on the maternal response to exercise.[6] It is probably reasonable to exercise for 20 to 40 minutes but not at an intense level for the entire time. This period should also include good warm-up and adequate cool-down exercises.[2] Most authorities agree that regular exercise is better than sporadic exercise; 3 to 5 times per week is ideal.[2,9]

Table 1. Absolute contraindications to exercise in pregnancy

Clinically significant heart disease (ischemic or valvular)
Type I diabetes mellitus, peripheral vascular disease, thyroid disease, or uncontrolled hypertension, other serious systemic disorders (ie, hepatitis, renal disease)
Incompetent cervix
Two or more spontaneous abortions in previous pregnancies
Placenta previa or bleeding in current pregnancy
Ruptured membranes or premature labour in current pregnancy
Toxemia or preeclampsia in current pregnancy
Very low proportion of body fat, eating disorder (anorexia, bulemia)
Multiple pregnancy
Evidence of fetal growth retardation in current pregnancy

Data from American College of Obstetricians and Gynecologists,[3] Wolfe et al,[1] Paisley and Mellion.[2]

Pregnancy monitoring

Pregnant women. Women who would like to exercise throughout their pregnancies must continually monitor how they are feeling. Any symptoms of excessive fatigue, pain, bleeding, gushing vaginal fluid, dizziness, shortness of breath, palpations, faintness, tachycardia, increasing back pain, pubic pain, difficulty walking, decreased fetal movement, or persistent contractions should indicate immediate cessation of exercise and medical guidance as soon as possible.[1,2,5]

Drinking water before, during, and after exercise will prevent dehydration. Exercising mothers should monitor the colour of their urine and insure that it remains clear, indicating sufficient hydration.[5,6] They can also measure acute weight loss after an exercise session, which should not exceed 1 kg.[4] Most recommend that rectal temperature, particularly in the first trimester, should not exceed 38°C with an upper limit of 38.7°C or an elevation of greater than 1.5°C.[1,4,6,10] However, the most practical advice is to avoid exercising in hot, humid conditions or warm water, at high intensity, and for a long time.[6]

Physicians. Regular medical monitoring is also essential. The effect of exercise on the pregnancy can change throughout gestation, and the exercise program might need to be modified. Monitoring an exercising pregnant woman must include the regular assessments of sufficient weight gain, increasing symphysis fundal heights according to

Table 2. Relative contraindications to exercise in pregnancy

History in previous pregnancies of premature labour, intrauterine growth retardation, preeclampsia, or toxemia
Significant anemia or iron deficiency (hemoglobin < 10 g/dL)
Significant pulmonary disease (eg, chronic obstructive pulmonary disease)
Mild valvular or ischemic heart disease, significant cardiac arrhythmia
Obesity or type II diabetes mellitus before pregnancy
Very low physical fitness level before pregnancy
Presence of twins (after 24 weeks' gestation)
Medications that can alter cardiac output or blood flow distribution
Breech in third trimester

Data from American College of Obstetricians and Gynecologists,[3] Wolfe et al,[1] Paisley and Mellion.[2]

gestation, and ultrasound monitoring to assess fetal well-being.[4]

Experience with highly competitive athletes who want to continue a vigorous training program during pregnancy is very limited; serious competitive training requires a detailed monitoring program, probably by a physician with special expertise in this area and the monitoring equipment to match.[4,11] Clapp's paper[11] outlines a detailed monitoring program.

An excellent tool physicians can use to counsel their patients on the safety of exercise in pregnancy is the PARmed-X for pregnancy. It was developed by Dr L.A. Wolfe and Dr M. Mottola in conjunction with the Canadian Society for Exercise Physiology and Health Canada. It includes a screening questionnaire to identify maternal contraindications to exercise in pregnancy, as well as an outline of the exercise prescription and a list of safety considerations and signals to stop. It can be ordered from the Canadian Society for Exercise Physiology, 185 Somerset St W, Suite 202, Ottawa, ON K2P 0J2; telephone (613) 234-3755, fax (613) 234-3565.

Exercise and lactation

Studies to date suggest that even strenuous exercise has little adverse effect on milk quality or quantity or on infant weight gain.[12] One reason could be that exercise and lactation seem to have an additive effect on appetite. Women who exercise postpartum seem to eat more to compensate for the increase in energy demands.[12] Lactation alone requires an extra 2100 kJ (500 kcal) daily of energy.[13] Exercising mothers must, therefore, ensure that they have increased their caloric intake sufficiently to meet the increased energy needs of both lactation and exercise.

No one really knows the ideal time to begin exercising postpartum. Some suggest as soon as a woman feels her body is ready, and others suggest at least 2 to 6 weeks of recovery. The first 6 weeks postpartum is a time of great change for the female body as well as a time of sleep deprivation, of learning to breastfeed, of stress, and of adjustment. It is not a time to add the stress of feeling that one must exercise. For new mothers who feel comfortable, walking is probably the best form of exercise, but any exercise is permitted as long as mothers avoid excessive fatigue. Note that it may take up to 1 year to regain prior fitness levels.[12]

Adequate breast support is also essential. A proper exercising bra should have ample room but good support and a wide nonelastic strap. An all-cotton fabric will decrease nipple irritation. Avoid an underwire construction, as it could compress the milk ducts and lead to plugging.[13] Some women feel more comfortable exercising after breastfeeding to avoid engorgement.

The benefits of exercise to breastfeeding mothers are a boost in energy levels, a decrease in fatigue, and elimination of stress. Exercise can allow women to feel in control of some part of their lives when everything else seems to be dictated by the baby's needs. It could even have a role in decreasing the incidence of postpartum depression.[13]

Many women want to know whether exercising will increase weight loss and speed up the involutional changes induced by pregnancy. Two studies by Dewey and associates[12] and Lovelady and colleagues[14] looked at this question. They did a randomized, controlled trial of previously sedentary women exclusively breastfeeding their infants at 6 to 8 weeks postpartum. One group of 18 women were randomized to an aerobic exercise program of walking, jogging, or cycling, four to six times weekly for 45 minutes at 60% to 70% of maximum heart rate. The control group of 15 women remained sedentary.

Although the exercising mothers had greater energy expenditures, they also increased energy

intake. There was no difference in the resting metabolic rate, the weight loss, the change in proportion of body fat (which declined steadily), the volume or composition of breast milk, or infant weight gain. There was, however, a significant improvement in the cardiovascular fitness of the exercising mothers.[12,14] The researchers advised mothers that exercise alone would not speed up weight loss unless caloric intake was controlled. However, they also stressed that the postpartum period is not the time for rapid weight loss, dehydration, or restrictive dieting, particularly when exercising and breastfeeding. To maintain lactation, exercising postpartum mothers should not drop more than 0.45 kg weekly.[12]

Conclusion

Important gaps remain in our current knowledge of exercise and pregnancy. Many theoretical risks cause concern for exercising mothers and for their health care providers. This concern led to somewhat conservative guidelines in the past that have been recently modified to encompass a more individual and flexible approach. Available data suggest that moderate exercise on a regular basis during a normal pregnancy has minimal risks for women and their fetuses, provided women are in good health, pregnancies are monitored, and exercise programs are modified as necessary.

There is likely an optimal amount of exercise that will benefit mothers without compromising fetuses. Unfortunately this optimal amount or even an upper limit of safety is still not clearly established. Therefore, an exercise program during pregnancy must be based on common sense, flexibility, individualization, and compromise. These essential elements will lead to a successful pregnancy and to the best ultimate outcome, a normal healthy child.

Acknowledgment

I thank Dr Frankie Fraulin for his tremendous support, patience, and guidance in the preparation of this manuscript.

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