

**Why training very fit
moms-to-be is different
from training their
more sedentary
counterparts.**

The Pregnant Athlete

By Lisa Druxman, MA

It wasn't that long ago that pregnant women were deemed frail and weak and advised to avoid all physical activity. In recent years, a growing number of fitness enthusiasts have elected to continue their exercise programs throughout pregnancy. To remain competitive, female athletes are especially and understandably reluctant to stop participating in their chosen activities, which may include contact or collision sports.

Unfortunately, designing exercise programs for pregnant athletes is not a simple task. Adhering to the maxim, "First, do no harm," most physicians—ob-gyns included—operate very conservatively in this area (Anthony 2002). So it can seem scary and even irresponsible to design training regimens for your pregnant athlete clients.

How much is too much exercise for pregnant athletes? What sports should they avoid during pregnancy? What are the benefits and risks to the fetus? This article will examine these issues and present the latest research on training pregnant athletes. ►



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FIRST, A PREGNANT PAUSE

Because of space limitations, it is assumed that readers are already familiar with current pre- and postnatal exercise guidelines (see “A Little Background” below). It cannot be overstated that the information contained in this article applies *only to female athletes who are very fit and participated regularly in sports before becoming pregnant*.

This information does *not* apply to women who are new to exercise or have not participated in high-intensity exercise prior to pregnancy. There is good evidence that starting such activity for the first time while pregnant can be dangerous to both the woman and the fetus.

Finally, no matter how fit a client is, she should not be exercising if she has any of the following contraindications:

- pregnancy-induced hypertension
- preterm rupture of placenta membranes
- preterm labor during the current pregnancy or previous pregnancies
- incompetent cervix
- persistent bleeding during the second or third trimester
- intrauterine growth retardation

A LITTLE BACKGROUND

In 1985, the American College of Obstetricians and Gynecologists (ACOG) published its guidelines for prenatal exercise, cautioning women not to exceed a maximum heart rate of 140 beats per minute (bpm) (ACOG 1985). With these guidelines, pregnant athletes found themselves in a quandary, since 140 bpm hardly qualifies as a workout for most fitness enthusiasts. In 1994, ACOG revised its guidelines, making them less restrictive but still failing to address the upper limits of exercise (ACOG 1994).

Researcher and physician James Clapp, MD, was one of the first medical experts to break rank with these conservative guidelines. He took the position that athletes are more efficient at handling the stresses of exercise during pregnancy and can safely exercise beyond the ACOG guidelines if properly trained and monitored. His book, *Exercising Through Your Pregnancy* (2002), is an excellent resource for the fitness professional with athletic clients and the source for many of the less conservative recommendations that follow in this article.

EFFECTS OF EXERCISE ON THE FETUS

When it comes to the effect of exercise on the fetus, the three areas of concern are hyperthermia, sports injuries and oxygen deficit.

HYPERTHERMIA. The most common concern for the fetus during high-intensity exercise is hyperthermia, a higher-than-normal body temperature. Exercise dramatically increases body temperature, and the fetus can take on the mother’s heat, possibly leading to birth defects. Yet to date, research has not proven any increase in birth defects when women exercise at high intensities (ACOG 1994). In fact, studies indicate that fit clients actually have better ability to dissipate heat (ACOG 1994).

It is during the first trimester that the fetus cannot regulate its own body temperature and is most susceptible to the mother’s. In this period, pregnant athletes should be cautious about exercising in hot conditions and for long durations. They should wear light-colored, breathable fabrics to keep cool and should drink water throughout the day and during exercise bouts; their urine should be diluted to the point that it is virtually clear in color. Some experts recommend that pregnant athletes take their temperature either vaginally or rectally (orally is less accurate) immediately before their longest weekly workout and again immediately after, *before* the body cools down. Clapp recommends a temperature increase of no more than 1.6 degrees Celsius (3 degrees Fahrenheit [F]) and a postexercise temperature no higher than 102 degrees F (Clapp 2002).

SPORTS INJURIES. At any stage during pregnancy, an extreme blow to (or fall onto) the abdomen can damage the placenta. Later in pregnancy, as the fetus moves higher in the womb and is unprotected by the pelvis, there is greater risk of damage to the fetus itself by direct impact during sport (Sports Medicine Australia [SMA] 2001). Most medical experts agree that the kinds of falls and direct contact that typically occur during contact sports are unlikely to damage either the womb or the fetus. However, because there is some potential for injury, it is ultimately up to each client and her physician to decide which sports are safe to play during pregnancy.

Here are some specific sports that I have found can be problematic for pregnant athletes. I usually discourage my own clients from participating in these activities:

- contact sports, such as hockey (field and ice), boxing, wrestling,

football and soccer, all of which increase the risk of abdominal trauma

- high-risk sports, such as gymnastics, horseback riding, skating (ice, roller and inline), skiing (water and snow), hang gliding, racquetball and scuba diving, all of which increase the risk of falls/trauma to the fetus

OXYGEN DEFICIT. The duration, type and intensity of the exercise that pregnant athletes perform can all affect the fetus’s heart rate. However, if a pregnant athlete trains regularly, the fetus will be better conditioned and able to adapt to the stresses of exercise. The concern arises when a woman performs extreme levels of exercise on an inconsistent basis: then, the effect can be detrimental to the fetus. Studies have shown that when unfit women exercise at very high intensity levels, uterine blood flow decreases to the point where the fetus experiences a serious oxygen deficit (Wolfe & Mottola 1994). Fortunately, this rarely occurs when the pregnant mother is fit or an athlete. To prevent oxygen deficit to the fetus, it is essential that any exercise program you design for a pregnant athlete contain a thorough cool-down period comprising gentle exercise. It is also critical that all pregnant clients who exercise at high levels pay special attention to fetal movements in the hours immediately following a workout. Like us, babies stop moving when they are not getting enough oxygen.

EFFECTS OF EXERCISE ON THE MOTHER

The three major concerns for pregnant athletes in training are dehydration, hyperthermia and hypoglycemia.

DEHYDRATION. Clapp recommends that pregnant athletes drink sufficient water throughout the day and especially when training. Because blood volume decreases during the early stages of pregnancy, pregnant athletes should drink 6 to 8 ounces of water for every 15 minutes they exercise (Clapp 2002). They should also not exercise when dehydrated. Clapp says one way to tell if they are sufficiently hydrated is to check the color of their urine, which should be almost clear.

HYPERTHERMIA. As mentioned earlier, pregnant athletes should take their temperature weekly (vaginally or rectally) immediately before and after their longest workout (before they cool down).

HYPOGLYCEMIA. Blood sugar levels can fall rapidly during pre-

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natal training sessions. Clapp recommends that pregnant athletes monitor their blood sugar levels weekly (using one of the over-the-counter devices that diabetics use). The goal is to maintain a level above 55 to 60 milligrams per deciliter (Clapp 2002).

EXERCISE INTENSITY

Whether recreational or competitive, athletes are typically very tuned in to their bodies. Most recognize the signs indicating that exercise intensity levels are too high, and they adjust their workouts accordingly. Pregnant athletes should be encouraged to exercise at a level that feels comfortable, using rating of perceived exertion (RPE) as a guide (Anthony 2002). A general rule of thumb is that if it feels good, it probably is good; if, however, it feels bad, it's probably *not* good.

Kardel and Kase (1998) studied how high- and medium-intensity exercise affected both the fetus and labor/delivery of the baby. The study involved 42 healthy female athletes who followed either a high- or a medium-intensity exercise program throughout pregnancy until 6 weeks after delivery. At the end of the study period, there were no differences between the high- and medium-intensity exercise groups in terms of onset/duration of labor, baby's birth weight or Apgar score, which measures the baby's health. Once again, such results underscore that healthy, well-conditioned women can exercise during pregnancy without compromising fetal growth and development.

Regardless of fitness level, pregnant athletes should *never* exercise to exhaustion. According to Clapp, this is less of a concern with recreational athletes. It is more likely to affect competitive athletes, who sometimes use poor judgment with regard to perceived exertion when competing in an event.

SUPINE POSITION CAUTION

Many medical experts caution pregnant women to avoid lying on their backs after the first trimester. Lying in a supine position after the first trimester can put too much pressure on the inferior vena cava (the vein that returns blood to the heart from the torso and legs), owing to the weight of the enlarged uterus.

This pressure can lead to **supine hypotensive syndrome**, characterized by a decrease in cardiac output, blood pressure and fetal blood supply. Pregnant clients who experience nausea, dizziness or breathing difficulties when supine are most likely victims of this condi-

tion and should immediately discontinue lying in this position.

However, because only 10 percent of pregnant women suffer from supine hypotensive syndrome, some experts feel that the direction to avoid supine exercise entirely after the first trimester is overly cautious. Clapp, for one, feels that if the legs and torso are moving, interference with blood flow back to the heart should not be a problem (Clapp 2000). A more moderate recommendation that I make—only to my *asymptomatic* clients—is to limit the amount of time spent in a supine position to just a few minutes of each workout. Women who continue to do supine abdominal crunches after the first trimester should be aware of the potential for **diastasis**, a condition in which the rectus abdominis muscle separates at the linea alba.

STRENGTH TRAINING

Pregnant athletes should be able to continue their strength training routine throughout pregnancy. They ought to breathe normally during strength training, because any act of breath holding (as during a Valsalva's maneuver) can reduce oxygen delivery to the placenta. To keep the oxygen supply going to the fetus, pregnant clients should avoid maximal lifts and heavy resistances, especially when increasing amounts of the hormone **relaxin** are present (see next section). Although ACOG guidelines recommend a single set consisting of at least 12 to 15 repetitions (without undue fatigue) for each resistance exercise, I have found that pregnant athletes can safely perform up to four sets of eight to 10 reps (again, without undue fatigue).

FLEXIBILITY TRAINING

Experts generally advise that all pregnant exercisers—regardless of fitness level—avoid stretching to maximal tension, because of relaxin's effect on the joints. The purpose of relaxin is to provide increased movement in the pelvis to accommodate the growing baby and allow for an easier birth. It helps the abdominal muscles stretch during pregnancy and the pelvic floor muscles stretch during delivery. Relaxin concentrations are greatest in the first trimester, drop after the fourth month and then reach a second peak prior to labor (Anthony 2002). Although relaxin is no longer manufactured in the postnatal period, its effects on the ligaments and joints linger on until about 5 months after delivery.

Because there is no objective evidence that relaxin production

leads to injuries when stretching, Clapp says there is no reason for pregnant athletes to change their flexibility routines during pregnancy (Clapp 2002). This is another situation in which clients should know their bodies and their limits. However, to be on the safe side, ballistic stretching is definitely *not* recommended during pregnancy, to avoid the potential for muscle tears.

CARDIOVASCULAR EXERCISE

Blood volume increases dramatically during pregnancy; while vasodilation increases to accommodate this blood flow, blood pressure can be inconsistent during the first two trimesters. As a result, heart rate is a poor indicator of exercise intensity during pregnancy. Therefore, pregnant athletes should know how to assess their own intensity using the RPE scale. As mentioned earlier, ACOG advises against exercising to exhaustion, regardless of fitness level. According to the American College of Sports Medicine, pregnant women can continue to exercise at high intensity levels as long as they do not exceed their prepregnancy intensity levels (ACSM 2000).

PREGNANCY & SPORTS PARTICIPATION

Recently, there has been much controversy about the role of pregnant women in sports. Experts in the fields of medicine, law, insurance and ethics presented current research, statistics and information relating to this topic at the National Forum on Pregnancy and Sport conducted in Sydney, Australia, in 2001. The following is a brief summary of the key points made by the medical presenters (SMA 2001):

- Medical evidence suggests that healthy pregnant women (with normal pregnancies) can participate in sports without affecting the course or outcome of the pregnancy. (The panel did make some provisos in terms of type, intensity, duration and frequency of exercise.)
- Pregnant athletes should avoid maximal-intensity exercise, have a thorough cool-down period of gentle exercise, avoid excessive stretching and jerky ballistic movements, ensure adequate fluid intake and pay attention to core body temperature.
- The fetus is extremely well protected from blows to the abdomen during the first trimester (first 3 months) of pregnancy.
- The risk of abdominal injuries during sports (for both men and women) is extremely low. Current research indicates that fewer

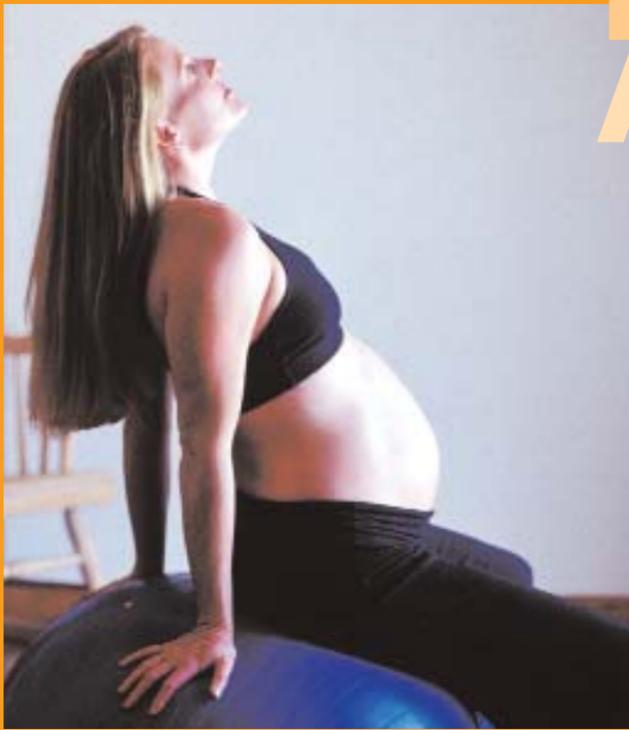


Warning Signs When Exercising During Pregnancy

If a pregnant client exhibits any of the following signs, she should immediately discontinue exercising and receive medical attention.

- pain
- dizziness
- shortness of breath
- faintness
- vaginal bleeding
- difficulty walking
- contractions
- unusual absence of fetal movements (but note that the baby is often most quiet when the mother is exercising)

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Additional Resources

Books

Exercising Through Your Pregnancy by James F. Clapp, Addicus Books 2002

Pre- and Post-Natal Fitness by Lenita Anthony, ACE 2002

Exercise During Pregnancy (IDEA Resource Book), IDEA 2001

Articles

"The Core of Postpartum Training" by Caroline C. Creager, *IDEA Personal Trainer*, November-December 2002

"Breast-Feeding for the Active New Mom" by Janet Weller, *IDEA Health & Fitness Source*, June 2002

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than 2 percent of all injuries, including those that occur during contact sports, involve the abdomen or chest area.

- The pregnant woman, herself, is best placed to know (generally from discomfort and lack of coordination) when to stop participating.
- Pregnant women should seek advice from medical professionals and, if appropriate, seek a second opinion.
- No medical evidence has linked adverse outcomes for the fetus (including miscarriage) to sporting injuries. Statistics and research on adverse outcomes following severe or catastrophic trauma to pregnant women relate almost exclusively to road trauma and domestic violence.

RUNNING. It seems that more is known about running and pregnancy from anecdotal stories than from hard research. Many runners have continued to train safely and successfully throughout their pregnancies. Most pregnant runners report cutting back on their intensity by 30 to 40 percent. If a pregnant client feels pelvic pressure when running, owing to the weight of her belly, she may wish to try a maternity support belt, which has been shown to alleviate some of this discomfort.

CLIMBING. Although little research is available on the effect of indoor or outdoor climbing during pregnancy, some of the concerns are obvious, especially in the less controlled, outdoor environment. First, there is the potential for abdominal trauma from the climbing harness itself or from a fall. Then there is the difficulty of climbing safely when contending with a large abdomen in front of you! Finally, climbing becomes increasingly difficult during the latter stages of pregnancy, when a woman loses her center of gravity. (The latter isn't always a problem, since many athletes have a superior sense of proprioception, enabling them to adapt readily to their changing center of gravity.)

Possible solutions to these problems include wearing a specially designed harness that doesn't cross over the abdomen; climbing familiar, safer routes; and traversing lower to the ground to reduce the impact of a fall. Climbers should also keep to low altitudes to avoid oxygen decreases, as these can result in serious illness.

A SAFE DELIVERY

It's true that pregnancy can detract from an athlete's ability to attain peak performance levels in elite competition. But that doesn't mean your pregnant athlete clients need to lower their

activity to negligible levels. As long as they listen to their bodies, it should be safe for them to exercise at prepregnancy training levels throughout their pregnancies. (As for returning to training after delivery, this is up to each individual and her physician. The conservative approach is to refrain from vigorous exercise for at least 6 weeks [longer for those with special needs], but many athletes start training earlier than that, provided they have medical clearance to do so.)

Although experts have not established an upper level of safe activity for pregnant athletes, the benefits of continuing to be active during pregnancy appear to outweigh any potential risks. Unfortunately, no exact limits for frequency, duration and intensity are available. It is ultimately up to each woman—with the help and advice of her physician and fitness professionals like you—to decide the fitness path to take during pregnancy. ♦

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