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CHAPTER 5

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(Chapter updated by Mohita Pengoria)

Maternal Exercises, Yoga and Dance Therapy

INTRODUCTION

We have progressed from an era of bed rest prescription to finally into the 21st century when we are talking about prescription of exercise and even dance therapy in pregnancy.

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

The traditional medical advice has been for exercising women to reduce their habitual levels of exertion in pregnancy and for nonexercising women to refrain from initiating strenuous exercise programs. This advice was based on concerns that exercise could affect early and late pregnancy outcomes by increasing core body temperature during embryogenesis, increasing the risk of congenital anomalies, and shifting oxygenated blood and energy substrates to maternal skeletal muscle away from the developing fetus, leading to disturbances in growth.

Early studies focusing on hard physical work combined with undernutrition and on forced exercise in laboratory animals tend to support these concerns. Other concerns included:

- The risk of maternal musculoskeletal injury due to changes in posture and center of gravity
- Fetoplacental injury due to blunt trauma
- Stress effects from sudden motions

But recent investigations, focusing on both aerobic and strength-conditioning exercise regimens in pregnancy have shown:

- No increase in early pregnancy loss

- Late pregnancy complications
- Abnormal fetal growth
- Adverse neonatal outcomes

So, the new evidence suggests that previous recommendations have been overly conservative.

COCHRANE REVIEW

Aerobic exercise is physical activity that stimulates a person's breathing and blood circulation. The review of 11 trials, involving 472 pregnant women, found that pregnant women, who engage in vigorous exercise at least two to three times per week, improve (or maintain) their physical fitness, and there is some evidence that these women have pregnancies of the same length as those who maintain their usual activities. There is too little evidence from trials to show whether there are other effects on the woman and her baby. The trials reviewed included noncontact exercises such as swimming, static cycling and general floor exercise programs. Most of the trials were small and of insufficient methodological quality. Therefore, larger, better trials are needed before confident recommendations can be made about the benefits and risk of aerobic exercise in pregnancy (The Cochrane Database of Systematic Reviews, 2007, Issue 1).

Low-impact aerobic dance, compared with walking at similar heart rates, results in a lower maternal metabolic rate and increases the transient stress on the fetus but this is just a small study.

So pregnancy should not be a state of confinement and pregnant women should be encouraged to engage in physical

activity, move about, work and exercise, and eat healthy. Exercise has minimal risks and many confirmed benefits for most women.

So in the light of all these and so many other studies and along with support of guidelines from the American College of Obstetricians and Gynecologists, the Royal College of Obstetricians and Gynaecologists (RCOG), [Society of Obstetricians and Gynaecologists of Canada, Canadian Society for Exercise Physiology (SOGC/CSEP)] the latest suggestions are:

- All women should be encouraged to participate in aerobic and strength-conditioning exercise as part of a healthy lifestyle during their pregnancy (II-1, 2B)
- 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 training for athletic competition (II-1, 2 C)
- Women should choose activities that will minimize the risk of loss of balance and fetal trauma (III-C)
- Women should be advised that adverse pregnancy or neonatal outcomes are not increased for exercising women (II-1, 2B)
- Initiation of pelvic floor exercises in the immediate postpartum period may reduce the risk of future urinary incontinence (II-1C)
- Women should be advised that moderate exercise during lactation does not affect the quantity or composition of breast milk or have an impact on fetal growth (I-A)
- Exertion at altitudes up to 6,000 feet appears to be safe. Engaging in physical activities at higher altitudes carries a risk of hypoxemia.

WHAT ARE THE BENEFITS OF EXERCISE DURING PREGNANCY?

Childbirth is among the most physically stressful challenges a woman ever faces. Regular exercise during pregnancy:

- Strengthens muscles needed for labor and delivery
- Helps reduce backaches, constipation, bloating, and swelling
- Improves posture
- Gives energy and improves mood
- Lessens some of the discomforts of pregnancy
- Helps one feel less tired and sleep better; strength and stamina are increased.

Benefits to the Infants

- Infants have less body fat at birth
- Infants are less cranky, have a reduction in the incidence of infant colic
- Greater neurodevelopmental scores in oral language and motor areas (tested at age 5).

RISKS OF SEDENTARY LIFESTYLE IN PREGNANCY

If women are prescribed bed rest and do not do regular physical activity or exercise, then they are prone to following complications in pregnancy:

- Loss of muscular tone and strength
- Cardiovascular fitness is decreased
- Excessive maternal weight gain
- Higher risk of gestational diabetes
- Higher risk of pregnancy-induced hypertension
- Development of varicose veins
- Development of deep vein thrombosis
- A higher incidence of physical complaints such as dyspnea or low back pain
- Poor psychological adjustment to the physical changes of pregnancy.

WHEN AND HOW TO START AN EXERCISE PROGRAM?

- The best time to initiate an exercise program is in the second trimester, when the nausea, vomiting, and profound fatigue of the first trimester have passed and before the physical limitations of the third trimester begin. Concerns about the teratogenic effect of high core body temperatures in the early first trimester have not been demonstrated in studies of exercising women.
- Women who have been exercising prior to pregnancy may continue their exercise regimens throughout pregnancy using the guidelines outlined below (II-1, 2B).

Conditions Requiring Medical Supervision while Undertaking Exercise in Pregnancy

- Cardiac disease
- Restrictive lung disease
- Persistent bleeding in the second and third trimesters
- Preeclampsia or pregnancy-induced hypertension
- Preterm labor (previous/present)
- Intrauterine growth restriction
- Cervical weakness/cerclage
- Placenta previa after 26 weeks
- Preterm prelabor rupture of membranes
- Heavy smoker (more than 20 cigarettes a day)
- Orthopedic limitations
- Poorly controlled hypertension
- Extremely sedentary lifestyle
- Unevaluated maternal cardiac arrhythmia
- Chronic bronchitis
- Multiple gestation (individualized 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
- Anemia (hemoglobin less than 100 g/L).

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

Warning Signs to Terminate Exercise

If any of the following symptoms appear during exercise then patient should immediately stop exercise and seek medical attention:

- Excessive shortness of breath
- Chest pain or palpitations
- Presyncope or dizziness
- Painful uterine contractions or preterm labor
- Leakage of amniotic fluid
- Vaginal bleeding
- Excessive fatigue
- Abdominal pain, particularly in back or pubic area
- Pelvic girdle pain
- Reduced fetal movement
- Dyspnea before exertion
- Headache
- Muscle weakness
- Calf pain or swelling.

WHICH MUSCLE GROUPS ARE MOST IMPORTANT TO EXERCISE?

In addition to heart, the three muscle groups, one should concentrate on during pregnancy are the muscles of abdomen, back, and pelvis.

- Strengthening abdominal muscles will make it easier to support the increasing weight of baby. One will also be able to push with more strength and more effectively during the second stage of labor.
- Strengthening back muscles and doing exercises to improve posture will reduce the strain of pregnancy on lower back. It will help prevent discomfort caused by poor posture.
- Strengthening pelvic muscles will allow vagina to dilate more easily during delivery. This will help prevent urinary problems later on as stress incontinence.

Exercise should be made a part of daily life. Daily tasks can double the exercise sessions if one does the following:

- Tighten abdominal muscles when standing or sitting
- Squat when lifting anything, whether it is light or heavy
- Rotate feet and ankles anytime your feet are elevated
- Check posture each time you pass a mirror

Woman should continue doing what exercises feel comfortable, but do not strain yourself by attempting new, unfamiliar lifts or by using too much resistance. Exercises that mimic your daily activities, like step-ups, split squats and mini lunges, are best.

Some Practical While Exercising

- Squats are okay, but one should decrease the range of motion—never flex knees more than 90°. One can increase the squat workout by slowing down the tempo. Try lowering slowly to a count of three or four.
- Leg presses are a good exercise in the first trimester, but after that one should not work out in supine position for more than 30 seconds at a time. Leg presses give you a good workout and keep your lower abdominals tight to protect your back.
- Hip abductor machines are great. Building strength in hips will help overcome postural changes during pregnancy. Be sure to keep lower abdominals tight to avoid hyperextending back; one should be cautious if one has sciatic symptoms, such as pain, numbness or tingling in buttocks and down the back of legs.
- For abdominal muscles one should cut out traditional sit-ups and focus on gaining control of your lower abdominals.
- Sitting on a physio ball and doing Kegel's exercises will help strengthen perineal muscles safely. Kegel's exercises should be advised for all patients in antenatal and postnatal period.

Pilates During Pregnancy

The benefits that have been associated with exercise and pregnancy are based on research done on cardiovascular exercise (aerobic). There has been minimal research done on the independent benefits of pilates. Because the base of pilates is “core” training, we believe that pilates can be a beneficial adjunct to any exercise program. The pregnant woman should make sure she is working with a pilate's instructor who is trained in prenatal exercise.

Yoga Exercises in Pregnancy

The benefits that have been associated with exercise and pregnancy are based on research done on cardiovascular exercise (aerobic). There has been minimal research done on the independent benefits of *Yoga*. We believe that *Yoga* can be a beneficial adjunct to any exercise program. For the pregnant woman, she should make sure she is working with a *Yoga* instructor who is trained in prenatal exercise. Pregnant women should avoid exercise in extreme environmental conditions, i.e. hot *Yoga* should be avoided and avoid inverted positions or positions that require spending long periods of

Tae-Bo During Pregnancy

PROTOCOL OF EXERCISE

Each day a pregnant woman should take the time to relax and stretch, controlling breathing (inhaling and exhaling) throughout the entire stretch, while avoiding bouncing. At the beginning or end of each exercise session, one should take the time to stretch all muscles. Pregnant women should especially focus on calves and legs to avoid cramping.



DURATION OF EXERCISE

INTENSITY OF EXERCISE DURING PREGNANCY

- Fitness status
- Current athletic or exercise activities
- Individual goals of exercise

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).

Women who were active prior to gestation can continue their exercise routine as long as there are no contraindications. Women beginning an exercise program during pregnancy should start with short durations, 15 minutes a day, and add 5 minutes every week or 2 weeks they are exercising, until they are achieving 30 minutes of moderate activity a day on most days of the week. Health effects can still be accomplished when exercise is broken up throughout the day. Less is better than nothing at all. Starting to add activity into daily schedule when health of the pregnant woman as well as that of the unborn child is at the forefront of the mind is a perfect style



Fig. 3: Duration of exercise

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

of healthy living and staying “fit for two”, and has a higher chance of becoming a real lifestyle change.

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’s 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. For moderate exercise during pregnancy, ratings of perceived exertion should be 12–14 (somewhat hard) on the 6–20 scale.

Mode of Activity

- Although there is no established upper level of safe exercise intensity, regular exercisers before pregnancy should be able to engage in high intensity exercise programs, 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

Table 2: Borg’s rating of perceived exertion

Rating	Perceived exertion
6	
7	Very, very light
8	
9	Somewhat light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard
20	

overall activity and fitness levels as pregnancy progresses.

- 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 for undertaking high-quality randomized controlled trials in these areas.
- Women should not scuba dive in pregnancy, as the fetus is not protected for decompression sickness and gas embolism.
- 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.
- 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.
- No adverse effects on the fetus have been reported to occur during water exercise in pregnancy. The physiology of water exercise offers some compensation for the physiological changes of exercise on land that may beneficially affect pregnancy. If a woman is exercising in water (as in aquanatal classes) the water temperature should not exceed 32°C. 35°C is the recommended maximum while using a hydrotherapy pool.

Frequency of Exercise

Frequency is a relatively simple factor in exercise prescriptions. When there are no contraindications with exercise for a female during pregnancy they should try to achieve the recommendations stated by the American College of Sports Medicine and the Centers for Disease Control and Prevention—achieving 30 minutes a day of exercise on most if not all days of the week.

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 well-being may be appropriate if clinically indicated. Although risks are minimal with moderation, even healthy active women should be examined periodically to assess the effect of their exercise programs 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.

Dance and Music

Dance is a form of aerobic activity as it involves rhythmic movements of various groups of muscles. So whatever form of dance is performed, if it is not of high impact aerobic type and the performer enjoys the music and motion, then it is relaxing and good fitness and balance exercise.

Benefits of Dancing During Pregnancy

Dancing is a fantastic and fun exercise during pregnancy. Not only one gets the thrill of moving body to music one loves, but it will keep one flexible while toning muscles. One can get an aerobic workout from any fast-paced dance, or stretch and maintain muscle tone when holding positions in ballet. For maximum benefit, dance for at least 20 minutes three times a week, whether it's in living room or in class. In addition to teaching women how to relax better, dance through pregnancy classes teach women to strengthen their core in preparation for the intense work of labor. Students learn to “strengthen against resistance in motions that help prepare for labor and birth, including Kegel's, abdominal hiss/compress exercises and C-curves, as well as the abdominal core strength, upper back strength, and leg strength in dance-related movements”. These are treated as an integrated and flowing choreography.

Tips for the First Trimester

Dance as you normally would, but keep a few precautions in mind:

- Remember to warm up beforehand to prepare your joints and muscles for exercise, which also builds up your heart rate slowly. Skipping a warm-up could strain ligaments and joints, leading to injury.
- The intensity of dancing should be adjusted according to how one feels. A good rule of thumb—slow down if one cannot comfortably carry on a conversation.
- Keep workout at low-impact by keeping one foot on the floor at all times, substituting marching or stepping side to side for jumps.

Tips for the Second and Third Trimesters

Center of gravity shifts as abdomen enlarges, so pay extra attention to balance.

In Africa, the childbearing woman is said to be the key to the universe. She holds the future generation within her womb, as you do. African dance steals you away from the discomfort you may be feeling and makes you gloriously aware of the miracle happening within you. Simply, naturally, you begin to appreciate the fullness of your body, and the life that you encompass.

Tribal Effect

Finally, beyond the physical benefits of dancing during pregnancy, there is also that great thing called having a good time with other women. And it goes beyond just laughing it up while shaking your belly with other moms-to-be. Tribal effect of dancing together has a positive impact on the mother's experience of pregnancy and helps reduce stress. Cowlin says, “These are psychosocial benefits of group physical activity.” Sounds like another great reason to start dancing.

Belly Dancing Related to Birth Process

The connection between belly dancing and birth is not a new one. Work has been done, noticed and unnoticed to bring the dance to the attention of birth educators. The link was forged as early as 1965 by Carolina Varga-Dinicu known as Morocco. She compared childbirth education taught at Mount Sinai Hospital in New York and major books like *Natural Childbirth* by Dr Frederick W Goodrich to her dance movements as she performed them.

In 1976, Gigi Groth Devitt, a member of Birth Day in Boston, collaborated with the dancer Barbara Brandt and demonstrated among other things, that Lamaze and this dance are based on the same method of muscle isolation. Around that same time, Edith Maxwell stressed the importance of movement during labor and showed how the movements of this dance help in *moving the baby down* the birth canal.

In 1983, Wendy Buonaventura published a book, *Belly Dancing*, where she outlined the role of the dance throughout history in many cultures. She showed that the dance has always been a part of the birth process. The most exact comparative work was done by Morgana, in 1981. She compared specific movements of the dance to the phases of birth and the motion of the emergence of the baby. She has shown that the dance movements exercise all the birth muscles, and the rhythms, in fact, match the birth process. Her work leaves the impression that the dance could be none other than a birth dance.

Belly dance helps in strengthening muscles in the following motions:

- The circle is a sacred shape and is the very foundation of the dance. Moving the heart in a circle *strengthens and flexes the upper abdominals*.
- Moving the hips in a circle massages the internal organs, including the pelvic floor, and also *conditions the lower abdominals*.
- *Tension* is released by moving the wrists, shoulders and ankles in circles, and by rotating the spine in small circles.
- *Accents* introduce a faster rhythm and they are the power of the dance because they provide an outlet for inner impulses. Hip thrusting teaches control and builds concentration for focusing on one body part while the rest relaxes.
- *Shimmies*, all the different varieties, are the endurance of the dance. They require intense concentration and control of deep inner muscles. They loosen the back and hips and allow the focus to shift from pain to movement.
- *Body undulations are the flexibility of the dance*. The movements mirror how a woman's body stretches to allow a baby to grow, and at the same time prepares the birth muscles for the task. Undulations also require concentration and focus, mainly because the muscles that need to be activated are unfamiliar to most people.

All of these qualities—relaxation, focus, endurance, and flexibility are needed in the birth process. Belly dance can be done standing, kneeling, lying down or walking. Lastly, belly dancing while giving birth means movement in general is encouraged while trying to give birth. It gives the power back to the process and allows women to find their way through the pain and fear of giving birth.

Music Therapy During Pregnancy

Although music therapy in healthcare settings is not new, bringing live music to the bedside is a new way of extending the caring tradition of nursing practice. Bedside musical care is consistent with a philosophy of holistic nursing practice and can be used during pregnancy, childbirth, and in neonatal care. It is defined as live music at the bedside, which is part of a treatment plan to foster integrity, well-being, and health for varied populations across the lifespan.

THE ACTUAL PLAN

First Trimester

Warm-Up

Walking 8 minutes at a slow to moderate pace is enough to allow your heart rate to begin to rise.

Aerobic Activity

This can be 20–40 minutes of walking at a brisk pace, biking on a stationary bicycle, swimming, aerobics, etc. Remember if exercise is new, start with a shorter duration and slowly add to the amount of time one is exercising until one is able to achieve at least 30 minutes a day. Make sure one is comfortable with the intensity, one should still be able to carry on a conversation, and not use heart rate as an indication of intensity; Borg's rating of perceived exertion can be used.

Cool-Down

Walking, biking, etc. for 5 minutes at a slower pace or lower resistance. This should be followed by 5–10 minutes of stretching. This can include all the stretches. Each stretch should be held for 10–30 seconds at a point of mild discomfort (in the muscle being stretched, if there is pain in the abdomen choose another stretch), one can repeat each stretch 2–3 times, with proper breathing.

Sample Lifting Workout (Fig. 4)

Remember days before lifting weights one should still start with a warm-up, enough to get the blood flowing to muscles. It is recommended to perform a total body workout 2–3 days a week.

Workout 1

Upper Body

- Dumb-bell row 2 sets × 12 repetitions
- Incline dumb-bell bench press 2 sets × 12 repetitions
- Side raise 2 × 12
- Bicep curl 1 × 12
- Tricep extension 1 × 12.

Lower Body

- Ball squat 3 × 15
- Leg extension 3 × 15 each leg (hold each for a count of three)
- Back Bridge: 30.

Workout 2

Upper Body

- Pulldown 2 × 12