

Group Resistance Training in Pregnancy

Part 1 – Considerations and Benefits

The aim of this article is to present group resistance training as one possible method of exercise in pregnancy for **normal, healthy women with no medical conditions experiencing a normal, health pregnancy with no problems or discomfort.**

Formal, structured exercise is now a common part of many people's lives. Normal, healthy adult women who are already regularly exercising may, naturally, wish to continue their usual activities when they become pregnant. Some women may only think about exercise after becoming pregnant in an effort to control their weight gain, or to "be fit" for labour and birth. Some women stop all forms of activity completely, or at least for the first few months when they may feel nauseous and/or very tired. Myth and anecdote about exercise in pregnancy are very common and up until relatively recently, research has been limited.

General benefits¹ of exercise in pregnancy can include improved postural and body awareness, strengthening of specific muscle groups, reduction of fatigue, fewer discomforts and problems with weight control, enhanced physiological wellbeing, reduction of stress and anxiety, improved confidence and encouragement of social interaction. A study published in 2002² on 98 pregnant women participating in a structured antenatal aerobic type class concluded that "women who participated in regular physical activity tended to have protection against reduction of psychological well-being" as well as "no indication of any risk to the pregnancy or the baby". James F. Clapp³ states that "Regular, sustained, weight bearing exercise is the best type of exercise for pregnant women...however the proper frequency, duration and intensity will vary from woman to woman". The benefits of regular physical activity are many and varied, however exercise prescription in pregnancy is very individual and it is possible that some benefits, especially psychological ones, may come from regular contact with other pregnant women in a properly structured pregnancy exercise class.

It is common to hear the suggestion that women should avoid exercise for the first 12 to 16 weeks of pregnancy as this period is thought to be the most vulnerable. Brayshaw¹ suggests that women should be at least 16 weeks gestation before beginning to exercise. This is also the time when many women feel nauseous and tired, although there is anecdotal evidence that some women find activity helps alleviate this. There is also a general belief that pregnancy is not a time to start a new physical activity. James F. Clapp's research³ has shown that "there is no evidence ...that healthy women need to change their exercise habits...during early pregnancy." "Beginning an exercise programme at this time is unstudied, but it appears that it should be safe as long as the duration of each session is limited to 20 to 30 minutes".

Resistance training classes consist of weight bearing, sustained activity and therefore may offer one type of activity thought to be beneficial in pregnancy. Women who were already participating in and enjoying classes may wish to continue when they become pregnant; others may want to start for the first time. For any resistance training instructor asked to agree that a pregnant woman continue, or start participating in, a class, general considerations should include awareness that:

- The individual concerned may not have been individually screened for general health, medical history and pregnancy in particular. There may be issues or potential problems that are relevant but not disclosed. Even there is disclosure, is the instructor competent, experienced and knowledgeable enough to realize the relevance and potential risk involved and adapt accordingly?

¹ Exercises in Pregnancy and Childbirth, Eileen Brayshaw, 2003/American Council on Exercise – Pre and Postnatal Fitness 2002

² Effects of Antenatal Exercise on Psychological Well-being, Pregnancy and Birth Outcome, Jean Rankin 2002

³ Exercising through your Pregnancy, James F. Clapp, 2002

- It is sometimes suggested that a pregnant woman obtain her doctor's consent before participating in an exercise class. It is as well to be aware that usually a midwife will be the main health care provider in pregnancy and therefore it may be more appropriate to ask for the midwife's written consent. However, midwifery knowledge and experience of exercise in pregnancy may vary considerably and it may be debatable as to how useful this permission is in practical terms.
- Professional instructor liability insurance may not cover instructors to teach special populations for which they have not been specifically trained. Some insurance policies do not cover pregnancy at all.
- Women may need to be asked to consider whether continuing participation during the first 12/16 weeks of pregnancy is right for them, and, for complete beginners, whether resistance training is the best choice of activity in terms of type, intensity and duration for them as an individual.
- The A.C.P.W.H.⁴ have stated that the legal position on advice on exercise in pregnancy may be unclear and that "liability might be based on negligence, where lack of appropriate advice prevented the woman from making an informed decision about exercising"⁵

Research into resistance training in pregnancy is limited. Clapp's research mainly relates to cardiovascular training, so for the purposes of relating to resistance training his conclusions can only be used in general terms.

A.C.O.G. guidelines⁶ for exercise during pregnancy state that "pregnant women are encouraged to engage in 30 minutes or more of moderate exercise on most, if not all days of the week" and that "participation in a wide range of recreational activities appears to be safe".

S.O.G.C.⁷ guidelines detail studies into strength training exercise programmes which have shown no adverse results in terms of pregnancy loss or outcome and recommends that "all women without contra-indication should be encouraged to participate in aerobic and strength conditioning exercises as part of a healthy lifestyle.". However, this is limited by the recommendation that the chosen activity should be in 30 minute sessions up to 4 times per week. The issue of session duration relates to individual capabilities and the possibility of hypoglycaemia. Pregnant women experience a progressive increase in insulin resistance to ensure that maternal blood glucose circulates for longer to ensure adequate glucose absorption by the baby. In pregnancy regular food intake and hydration are vital.

A further S.O.G.C. recommendation is that "women should choose activities that will minimize loss of balance and foetal trauma". As pregnancy progresses the maternal shape changes, weight increases and the centre of gravity shifts forward. The pelvis will commonly tilt anteriorly, increasing lumbar lordosis and the sacrum may tilt forward within the pelvis at the sacroiliac joints. This may place additional load on the lumbar spine. As the uterus grows and rises out of the pelvis there is additional loading on ligaments which are relaxed under the influence of the hormone relaxin. If, in addition the deep trunk stabilizing muscles Transversus Abdominis, Multifidus and the Pelvic Floor are weak they will not be able to cope with the additional demand placed upon them and this may result in pelvic and back instability and pain. Lumbar and/or sacroiliac pain may be felt from early on in pregnancy, possibly due to hormonal changes relaxing ligaments in the pelvis rather than necessarily changes in pelvic alignment. The effects of relaxing hormones (principally relaxin) may not be solely confined to laxity of the pelvis and it is common to also see ankle, knee and shoulder mis-alignment and instability. A wider pelvis may result in an increased Q angle (hip/femur/knee) affecting the knee joint. Heavier breasts and altered posture may result in thoracic kyphosis and shoulder girdle instability, especially if shoulder stabilizing muscles (rotator cuff and possibly lower trapezius) are weak or have poor

⁴ Association of Chartered Physiotherapists in Women's Health

⁵ Association of Chartered Physiotherapists in Women's Health journal no 87 2000

⁶ American College of Obstetricians and Gynaecologists, Obstetrics and Gynecology 2002

⁷ Society of Obstetricians and Gynaecologists of Canada, Clinical Practice Guideline 2003

recruitment. All these changes combined with an inability to see the feet late in pregnancy can result in clumsiness and loss of balance.

Both A.C.O.G. and S.O.G.C. recommend that women should not exercise in the supine position after the first trimester (approx 14 weeks) and 16 weeks respectively. It is thought that the increasing weight of the baby may compress the inferior vena cava, thus impeding blood flow and resulting in loss of blood pressure. This is called supine hypotensive syndrome. There is some debate over this subject and the possible consequences for mother and baby. Hammer, Perkins and Parr⁸ suggest a prudent guideline of 1 minute or less. Clapp suggested that the supine position may be possible if the lower limbs are moving and A.C.E. suggest “short periods of time (60 to 90 seconds) interspersed with exercises performed in a side lying position” However, some midwives advise their clients to avoid the supine position, even when sleeping, and advice from a medically trained professional should not be contradicted. In practice some women find that the supine position is not a problem, whereas some feel uncomfortable or even very unwell. Possible problems from pressure of additional weight on the vulnerable sacroiliac joints should also not be disregarded, nor should the difficulties of transition from the supine position to sitting or standing in a heavily pregnant state.

A.C.O.G. adds that women should avoid standing motionless for too long. The hormone progesterone relaxes the blood vessel walls to accommodate an increased volume of blood. This reduced vascular resistance commonly results in reduced venous return and blood pooling in the lower extremities, and pregnant women can feel dizzy or faint if asked to stand motionless, or rapidly change position from lying or sitting to standing. This is called postural hypotensive syndrome.

Specific benefits Resistance Training in pregnancy may include:

Strength development of muscle groups used in performing functional activities such as lifting, carrying, walking and climbing stairs.

Strength development, or at least prevention of disuse atrophy, of muscle groups used to assist, maintain and improve posture and stability of pelvis, spine, shoulders knees and ankles.

Improved circulation and endurance by using low resistance with higher repetitions (the usual suggestion in pregnancy⁹) adding an element of weight bearing cardiovascular training.

Improved endurance and strength of muscle groups used to adopt active positions during labour and birth.

Improved body awareness and feeling of confidence as strength does not diminish.

In the past there has been a school of thought that resistance training is not suitable in pregnancy for those new to exercise¹⁰, and that for experienced participants it is preferable to train on machines rather than with free weights, and one to one rather than in a group situation¹¹. However it should not be forgotten that pregnancy is, per se, a form of progressive resistance training and that there may be important psychological and motivational benefits to training in a peer group.

• Potential Risks of resistance training in pregnancy:

- Over balancing, falling, trauma to abdomen
- Tripping over obstacles or equipment due to reduced vision by anterior bulk, and altered centre of gravity.
- Injury due to vulnerability of joints and soft tissue.
- Fainting from prolonged standing, inadequate nutrition or hydration, rapid change of position.
- Increasing pelvic instability resulting in low back problems.

⁸ Exercise During the Childbearing Year, Hammer, Perkins and Parr, Journal of Perinatal Education 2000

⁹ YMCA Fitness Industry Training 2000/Hammer, Perkins and Parr – The journal of Perinatal Education Vol 9 2000

¹⁰ Pirie 1987

¹¹ YMCA Fitness Industry training 2000

- Joint misalignment – resulting in problems in back, knees and shoulders
- Inbalance of muscle groups worked, or absence of training for certain muscle groups resulting in later problems or injury.

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Part 2 – Exercise Selection and Class Structure

Although class resistance training formats should contain the necessary “whole body” approach, a “pre set” or pre choreographed format of resistance training may not adequately cover all the elements necessary to benefit the individual pregnant body. Training of large global muscles may be at the expense of local stabilizers and this potentially may cause problems later on. The balance of muscle groups selected may be disproportionate for the specific, individual needs of the pregnant body, eg chest strength disproportionate to back, and excessive hip flexor and hamstring recruitment. Selected stretches may also be disproportionate eg in pregnancy hamstrings, hip flexors and pectorals require extra focus for postural reasons. Pregnancy requires maintenance stretching only as developmental stretching may encourage relaxed ligaments to allow joints to go where they anatomically should not, increasing vulnerability to injury. Pregnant women should be encouraged to complement resistance training work with additional cardio-vascular effort and work on stabilizing and postural muscles and the pelvic floor. Association with other pregnant women is also important for information and social and emotional reasons. **For these reasons it could be argued that pregnant women might gain most benefit from participating in a correctly structured pregnancy class rather than being incorporated into general classes.**

The constraints (limitations) of group resistance training in pregnancy may include:

- The competitive class situation -Pregnant women may feel differently week-by-week as pregnancy progresses. A woman should always feel comfortable with what she is being asked to do and encouraged to listen to her own body and respect how she feels. In the middle of a large class it can be difficult to stop and take a break. Careful monitoring on the part of the instructor is vital, as is the offer of regular permissions to reduce intensity or to rest. Pregnant women have a raised core temperature and heat disipation. They may find that they feel very hot and sweat more. The feet may swell due to overheating, sluggish circulation and retained fluid in the lower limbs. Attention should therefore be paid to footwear, clothing and temperature of the exercise environment. Water should be readily available and frequent drink breaks offered.
- Class size - Careful and continual monitoring of pregnant women is crucial, even more so in a class situation. If the numbers in the class are very large it may be necessary to consider whether adequate monitoring and instruction is possible to maintain safety and effectiveness.
- Equipment - Alternatives may need to be offered, e.g. light dumbbells, resistance bands (avoid wrapping around the hand or fingers) or free plates instead of a bar, which may not always be the best choice for all moves. Often just the weight of a limb or gravity will provide adequate resistance. A bar may limit the range of movement whereas dumbbells may allow a better range, however more stabilizing muscle recruitment and technical expertise will be necessary. If a bar is used as an aid to balance, stability should be carefully monitored for safety reasons. A stability ball is an option to adapt some exercises to seated, however correct ball size, maintenance of neutral spine and good alignment of hips knees and feet are vital. Propping a step on risers for a makeshift inclined bench will be unstable and therefore unsafe. The height of the bench may make change of position awkward.
- Resistance and Intensity - Light weights to optimize endurance training are thought safest in pregnancy to reduce risk of injury, maintain posture and technique¹². Women should be offered frequent permissions to maintain or reduce weights as appropriate rather than to increase resistance. They should also be offered permission to rest and should avoid training to failure

¹² YMCA Fitness Industry training 2000

- **Lifting technique** -Correct lifting technique is vital to avoid injury. The woman concerned must always be in obvious full control with no swaying or rocking. Correct joint alignment especially of the spine (neutral spine), pelvis and knees is crucial. Some moves, such as raising the arms above the head or working with the bar resting on the shoulders may not be the best choice to maintain correct technique and spine alignment. The instructor must be prepared to monitor this carefully and closely by observing from all angles, and offer immediate correction or adaptations/alternatives if necessary. Pregnant women need frequent reminders to keep breathing and avoid breath holding.
- **Pregnant body shape** - Additional anterior bulk may make some moves difficult to execute and maintain correct technique eg when clearing a bar over the abdomen for the deadlift, row, upright row and clean and press, therefore safer alternatives may need to be offered. The maintenance of neutral spine and correct shoulder and knee alignment may also be difficult as shape and posture change. Foot arches may drop and ankle stability compromised because of relaxed ligaments and footwear should afford adequate stability and support. Instructors should be aware that baggy clothing, although helpful to maintain a cool core temperature, can interfere with adequate monitoring of correct spine and shoulder position.
- **Transitions** - Due to altered body shape many pregnant women need more time than usual to change from one position to another using correct technique and body alignment. A too rapid transition can result in dizziness or fainting due to postural hypotensive syndrome (blood pooling). They will need reminding about correct technique e.g. to always roll to the side and on to all fours to return to standing, and maintaining good shoulder/hip alignment to avoid twisting the pelvis.
- **Class duration** -Woman should be encouraged to have eaten about an hour before they come into class and again immediately following to maintain blood sugar levels throughout the class. Adequate hydration must be maintained throughout and frequent water breaks should be offered. Some pregnant women may find a 60 minutes class too long for them as individuals, so perhaps could be offered the option to rest during some tracks or stop early before the rest of the class.
- **Duration of exercise for a specific muscle group** - Consecutive standing exercises may not be a safe choice. Because of the risk of postural hypotensive syndrome and additional weight, many pregnant women find long periods on one spot difficult and tiring. Possible pre-fatigue of muscle groups should also be considered when constructing the sequence of the class, and consecutive exercises for the same muscle groups (consider the role of fixators and synergists) may not be the best choice.

Individual tracks involving prolonged slow moves or endurance holds (see Isometric work) may be very challenging in pregnancy. The instructor should monitor this closely and offer the option to move around in between tracks to maintain circulation, or to rest during some tracks.

- **Prone lying** - This is impossible in later pregnancy. Many women will not find this position comfortable even in early pregnancy because of breast tenderness. An alternative should be offered.
- **Supine lying** - As discussed previously, many women will not find this comfortable. Inclined lying may not be suitable because of difficulty in maintaining correct back alignment (neutral spine). A safe alternative should be offered.
- **Isometric work** - Isometric holds for global muscles in this type of situation are unsuitable for pregnant women due to the risk of breath holding and possible raise in blood pressure. An alternative should be offered.
- **Abdominal training** - In pregnancy Rectus Abdominis stretches and lengthens as anterior bulk increases. Resistance training and endurance activity raise the pressure in the abdominal cavity, which places the abdominal muscles under additional strain. The role of deep “core” stabilizing muscles of Transverses Abdominis, Multifidus and Pelvic Floor is essential in maintaining control, and priority should be given to effective recruitment of these muscle groups. Rectus Abdominis and Obliques training is ineffective and inappropriate at this time. However, because of reduced body awareness and feeling, and altered breathing patterns “core stability” training in pregnancy is a specialist skill to

obtain an effective result. Most general class abdominal training is unsuitable for pregnant women and a better option is to encourage attendance of a dedicated antenatal Pilates class or specialist instruction.