ADVICE FOR PHYSIOTHERAPISTS AND OTHER HEALTH PROFESSIONALS

FIT and Safe
to exercise in the childbearing year
This booklet was compiled by members of the Association of Chartered Physiotherapists in Women’s Health.

For the purposes of this booklet the childbearing year is defined as the 12 month period between conception and 12 weeks postpartum.

Contents

Introduction ........................................................................................................... 3
Normal physiological changes in pregnancy ....................................................... 4
Maternal and foetal physiological changes in response to exercise .................... 7
Potential benefits of exercise .......................................................... 9
Contraindications, precautions and warnings .................................................. 10
Professional issues ......................................................................................... 12
Categories of exerciser ................................................................................... 12
Women with disabilities ................................................................................ 15
Pelvic floor muscle exercises ....................................................................... 15
Antenatal exercise ......................................................................................... 16
Postnatal exercise .......................................................................................... 19
Screening .......................................................................................................... 19
General advice ................................................................................................ 20
References and bibliography ......................................................................... 21
Further information ......................................................................................... 23
Studies have shown that exercising during the childbearing year is not harmful to either mother or baby if the pregnancy is normal and the mother healthy (Arena and Maffulli 2002). In the absence of certain contraindicated conditions (see page 10), there are well-documented benefits to exercise.

This booklet is aimed towards the physiotherapist, working in any speciality, or other health professionals, who may come into contact with a woman in her childbearing year. The woman may be a patient of the physiotherapist or may seek her advice incidentally, while in the community or hospital setting. Records of questions asked and advice given should be documented and retained.

The booklet attempts to offer advice as a framework for safe exercise in the childbearing year. Exercise may be performed in a variety of settings, which could include a hospital gym, an exercise class in hospital or community, a health club, sports or leisure centre or at home. The booklet is not intended to be comprehensive.

Every pregnant woman is an individual with differing levels of pre-pregnancy fitness and varying degrees of fitness requirements both during the pregnancy and after. She may be a complete non-exerciser or an elite athlete. In order to offer the most appropriate advice, the physiotherapist, health professional or instructor needs to be aware of the physiological and physical changes which the pregnant body undergoes.
Aims of exercise

In pregnancy the aim should be to maintain or moderately improve the level of fitness. In the postnatal stage it is to regain the former level of fitness, or improve on this if previously sedentary.

If there are no specific obstetric or medical contraindications, fit women can safely maintain the same level of fitness during pregnancy, although exercise schedules may be modified/scaled down. In most cases, exercise is safe for both mother and baby during pregnancy: research supports starting or continuing with exercise to gain the health benefits associated with physical activity. (RCOG 2006).

It is suggested that pregnant women should not undertake new, vigorous exercise which would make them too warm, tired or breathless. Instead, they should aim to exercise at a moderate level. **Moderate exercise is that intensity which can be maintained whilst able to carry on a conversation.** The Borg Scale of Perceived Exertion (Borg et al 1983) or the Talk Test can be used, preferably at level 3-5 (see table on page 6).

Normal physiological changes in pregnancy

Cardiovascular changes

Pregnancy induces alterations in maternal haemodynamics (Artal et al 2003). Blood volume can increase by up to 50% in the first and second trimester. There is a corresponding physiological response
resulting in an increased heart rate, stroke volume and cardiac output. A decrease in vascular resistance causes a fall in arterial blood pressure. This is compounded by the decrease in vascular resistance of mainly the skin and kidney, and also the increase in the uterine vasculature and utero-placental circulation (Artal et al 2003).

These changes need to be considered in terms of body posture both at rest and during exercise. From around 16 weeks gestation, lying flat in the supine position can result in obstruction of venous return resulting in decreased cardiac output. This position should be avoided for any prolonged activity during exercise or resting/sleeping. Side lying may be more comfortable and safer. (RCOG 2006, Artal R 1999). For the same reason long periods of standing still should be limited as far as possible. Lowered blood pressure in early pregnancy can lead to feelings of dizziness and even fainting.

The heightened heart rate in pregnancy means that monitoring heart rate is an inaccurate measure of exercise intensity. Instead, the Borg Scale or Talk Test should be used at level 3 - 5.

Respiratory changes

The increased blood volume causes a rise in both tidal volume and respiratory rate. The pregnant woman may feel as though she is short of breath at relatively low exertion (see table on page 6).
<table>
<thead>
<tr>
<th>Borg Scale of Perceived Exertion</th>
<th>Talk Test Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Nothing at all</td>
</tr>
<tr>
<td>1</td>
<td>Very easy</td>
</tr>
<tr>
<td>2</td>
<td>Easy</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Somewhat hard</td>
</tr>
<tr>
<td>5</td>
<td>Hard</td>
</tr>
<tr>
<td>6</td>
<td>Can’t talk</td>
</tr>
<tr>
<td>7</td>
<td>Very Hard</td>
</tr>
<tr>
<td>8</td>
<td>Can’t talk at all</td>
</tr>
<tr>
<td>9</td>
<td>Can’t talk at all</td>
</tr>
<tr>
<td>10</td>
<td>Maximal</td>
</tr>
<tr>
<td></td>
<td>Can’t talk at all</td>
</tr>
</tbody>
</table>

Physiological changes during exercise include:

1. a decreased ability to provide oxygen in response to the demand due to the rise in plasma volume before a corresponding rise in red cell volume during pregnancy.
2. a rise in respiratory rate.
3. a greater rise in cardiac output in the pregnant woman compared to the non-pregnant woman doing the same activity. There is a resultant loss of cardiac reserve.

Vigorous or strenuous activity may compromise the mother’s health and raise the risk to the foetus.

Pregnancy causes an increase in insulin resistance. Mild to moderate exercise decreases blood glucose levels, thus reducing the risk of developing gestational diabetes (Hartmann et al 1999; Marquez-
Sterling et al 2000; ACOG 2002). An increased calorific intake compensates for the calories, which are diverted in the form of glucose via the placenta.

Basal Metabolic Rate is also raised and the normal foetal core temperature is 0.6°C higher than the mother’s. Heat is transferred to the mother. This, together with the vasodilatation normal in pregnancy, tends to make the mother feel warm.

**Musculoskeletal changes**

Pregnancy results in a natural but gradual weight gain, which causes changes to the centre of gravity (COG) and balance, lumbar lordosis, and altered spinal curves. The effect of hormonal influences from 6 weeks gestation can result in joint laxity that is normal in most pregnant women but sometimes may lead to joint dysfunction and pain. The pelvic girdle and lower lumbar spine are particularly at risk during pregnancy and may predispose about 50% of pregnant women to report low back pain. One hormone, relaxin, is believed to cause an increased extensibility of all ligaments, noted especially in the pelvic girdle (Artal et al 2003). It is important to bear in mind that although pregnancy-related osteoporosis is not common, it may be present in some women who report persistent pain, which often affects the spine.

**Maternal and foetal physiological changes in response to exercise**

Under normal conditions the foetus is protected and therefore unaffected by changes in maternal metabolism during exercise. During maternal exercise the foetus
responds by increasing its heart rate and BP to facilitate the transfer of oxygen and to decrease the carbon dioxide tension across the placenta, thus protecting itself from potential harm (Brown 2002; Artal et al 2003).

Most women will instinctively limit their exercise intensity and duration to a level which is safe for the foetus. Research studies have concluded that submaximal (moderate) exercise does not induce hyperthermia and therefore does not compromise the foetus (Avery 1999; Hefferman 2000; Riemann et al 2000).

Uterine blood flow is inversely related to exercise but no adverse effects to the foetus have been identified.

Musculoskeletal considerations

All joints are more vulnerable to potential injury during pregnancy due to the decreased protection by ligaments.

All pregnant women should be aware that this increased joint laxity plus the alteration in COG and body weight will alter body biomechanics. These factors may result in low back (LBP) and/or pelvic girdle pain (PGP) or other joint pain. Additionally pre-existing low back pain and/or movement dysfunction of the lumbar spine and pelvis can also contribute to LBP or PGP (Mens et al 2012; To and Wong 2003). Incorrect technique when lifting, poor or non-adaptive posture, incorrect positioning or poor technique when performing exercises will all tend to exacerbate the discomfort.
**Psychological benefits**

Documented benefits from moderate exercise may include an increase in psychological well being and a reduction in the frequency of some somatic symptoms such as anxiety and insomnia (Goodwin 2000).

**Potential benefits of exercise**

Research suggests that mild to moderate exercise is considered to be beneficial to the healthy pregnant woman and is not harmful to the foetus (Horns et al 1996; Avery 1999; Goodwin 2000; Hefferman 2000; Riemann et al 2000). Moderate intensity can be defined as being able to talk easily whilst increasing the mother’s heart rate to a maximum 140bpm. However, further research on the benefits of exercise in pregnancy is needed and the physiotherapist should remain up to date with current literature.

**Potential benefits of exercise include:**

- maintenance of cardiovascular fitness, respiratory and musculo-skeletal status (Kramer 2000)
- maintenance of healthy weight range for mother
- improvement of body awareness, balance, co-ordination and posture
- improvement in circulation and lowered diastolic pressure
- an increase in both endurance and stamina
- increased feelings of social and emotional well being, particularly when exercise is combined with social interaction
• a possible reduction in problems during labour and delivery. Labour may also be shorter and there may be fewer interventions such as an instrumental delivery or caesarean section. (Bungum 2000)

• evidence of neurological benefits to the baby and developing child (Friedman 1999)

• a reduction in minor ailments of pregnancy

• suggestion of a more rapid post-natal recovery as the woman is likely to be fitter

• better glucose utilization by increasing insulin sensitivity

• suggested improved placental growth

• increased foetal growth

**Contraindications, precautions and warnings**

**Absolute contraindications to exercise in pregnancy (Artal and O’Toole 2003, RCOG 2006)**

• serious cardiovascular, respiratory, renal or thyroid disease

• poorly controlled type 1 diabetes

• a known risk of premature labour with or without a history or risk of IUGR - seek specific medical guidance

• cervical incompetence

• hypertension/hypotension - should be discussed with the woman’s doctor

• placenta praevia after 26 weeks gestation - should be discussed with the woman’s doctor
• sudden swelling of ankles, hands or face
• acute infectious disease
• severe rhesus isoimmunisation

Precautions to exercise in pregnancy

The following conditions may require some caution and it is advisable to seek medical advice before commencing any exercise.

• asthma
• diabetes type 1. But moderate exercise may be appropriate if the diabetes is well controlled. (Arena and Maffulli 2002). Discuss with diabetic consultant, GP or nurse
• history of miscarriage
• pre-pregnancy hypertension
• placenta praevia
• vaginal bleeding
• reduced foetal movement
• anaemia
• breech presentation
• extreme obesity
• extreme underweight / very low BMI
• heavy smoking
• thyroid disease
• pelvic girdle pain - seek an assessment from a specialist Women’s Health physiotherapist
• twins

Warnings

All women should stop exercising immediately and seek advice from a midwife or doctor if they experience:

• abdominal pain
• leakage of amniotic fluid
• pelvic girdle pain and resultant difficulty in walking (which could indicate symphysis pubis dysfunction)
• vaginal bleeding
• shortness of breath, dizziness, faintness, palpitations or tachycardia
• persistent severe headache
• calf pain
• absence of or reduced foetal movements

**Professional issues**

Physiotherapists should refer to documents published by the CSP for guidance; Quality Assurance Standards (2012) and Duty of Care (2013). They should recognise that each woman is individual and that she should be provided with enough information to make an informed decision concerning exercise in pregnancy. Some onus is on the woman herself to assess her own physical and emotional response to exercise and to report accurately any problems perceived. Monitoring the emerging research studies and accompanying data is the responsibility of the physiotherapist.

**Categories of exerciser**

Broadly speaking, the pregnant woman will fall into one of the following four categories.

**The complete non-exerciser**

This group tends to be averse to exercise at any time and would probably not react favourably to coercion. However, gentle encouragement may result in participation in basic exercise, which is preferable to none at all.
The non-regular exerciser

This group may wish to take up additional and more regular exercise during pregnancy. Advise as follows:

• avoid starting a new exercise programme until after 13 weeks gestation
• do consider beginning with low impact and reduced weight bearing exercises such as aquanatal, static cycling or Gym ball
• begin with 15 minutes continuous exercise 3 times a week and increasing gradually to 30-minute sessions 4 times a week (RCOG 2006)
• do start with simple and basic levels of exercise. Gradually increase exercise tolerance and progress exercise under the supervision of a suitably qualified professional

The regular exerciser

Guidelines for exercise in pregnancy (ACOG 2002)

Regular exercisers should:

• discuss with consultant, GP, physiotherapist or midwife before continuing their exercise regime
• exercise at least three times per week for 30 minutes or more, to improve aerobic capacity but discontinue contact sports
• self-regulate both the level of intensity and duration of exercise as the pregnancy progresses. This will help to keep core temperature below 38°C
• always aim for low impact activity
• reduce musculo-skeletal stresses by wearing supportive footwear
- prevent dehydration by maintaining an adequate fluid intake and avoid exercising during particularly hot and humid weather
- ensure that they warm up and cool down for at least 5 minutes
- not overstretch because of the hormonal effects on the ligaments
- consult the relevant professional for advice on specific exercises, for example, for the pelvic floor and abdominal muscles
- avoid certain movements like low squats, cross-over steps, rapid changes of direction and ballistic exercise
- avoid aortocaval compression by not exercising in the supine position (supine hypotension syndrome)
- not restrict their calorific intake but aim to eat to appetite
- aim to include variety in their exercise such as swimming, walking, low impact aerobics - and avoid overtraining
- not exercise to the point of fatigue or when they are not feeling well

**The elite athlete**

This group should follow the advice given to regular exercisers and remember that the safe levels of aerobic exercise depend largely on previous exercise habits and ability (Warren and Shantha 2000). The physiotherapist should be aware that, being used to training regimes, the athlete is likely to be able to tolerate more concentrated bouts of exercise, but the same warnings and contraindications apply.

Research into strenuous activity during pregnancy is scarce. The serious athlete is
sometimes difficult to monitor and advise. RCOG (2006) guidelines recommend active women should be reassessed periodically and their regime adjusted and discontinued if necessary.

**Women with disabilities**

The needs of the disabled woman should be assessed individually and advice and information offered regarding appropriate exercise.

**Pelvic floor muscle exercises**

**Pelvic floor muscle training should be offered to women in their first pregnancy as a preventive strategy for UI. (NICE CG40 2006).**

Urinary leakage is common in pregnancy especially if exercising. Pelvic floor muscle exercises should be taught to the woman in the antenatal period to help prevent or lessen leakage. These exercises should be continued into the post natal period to reduce the incidence of stress urinary incontinence. It is important that women know how to contract their pelvic floor muscles correctly - and they should see a specialist physiotherapist if they are having any pelvic floor problems particularly leakage with exercise.

Pelvic floor muscles should be drawn in and there should be a feeling of lifting upwards and forwards closing the vaginal and anal passages. Pelvic floor muscle exercises should include slow, held contractions and shorter faster contractions. Tightening the pelvic floor muscles prior to increases of abdominal pressure - sneeze/cough - can
be preventative of leakage. (See Fit for Birth and Fit for Pregnancy booklets for more information - details p23).

**Antenatal exercise**

If the woman is familiar with the sport and has noted the contraindications and precautions, it is safe to continue many activities such as walking briskly, running, tennis, low impact aerobics, hiking, rowing, swimming (including aquanatal), cycling, dancing, skating and cross country skiing (ACOG 2002; SMA 2002).

Gym-based activities using equipment and weights, therabands or Swiss ball may be continued.

Contact sports pose a potential threat to the safety of the mother and foetus and should be avoided - such as hockey, football, basketball.

Those pursuits with a high risk of falling should also be discontinued - horse riding, downhill skiing, and some racquet sports such as squash.

Special sports such as scuba diving and exertion at altitudes over 6000’ (1850m) are dangerous.

Pilates and Yoga, both of which may have been modified for pregnancy, are popular forms of exercise but should only be undertaken with an instructor who holds a recognised and appropriate qualification - a good teacher will be happy to tell you what their training has been. Teachers on the Register for Exercise Professionals http://www.exerciseregister.org - an independent body - will follow a code of practice and undergo ongoing training.
Common types of exercise

The pregnant woman should listen to her body when exercising and stop if she feels uncomfortable, fatigued or is unwell.

Swimming - an excellent type of exercise if the pace is sufficient to cause aerobic changes. If pelvic girdle pain is a problem, avoid the kicking action of the legs during breast stroke and ensure that there is no increased lordosis when swimming.

Specialist aquanatal or aquaerobic classes may be available in hospitals or leisure centres. Water activities are joint-protective and aid general circulation and so have diuretic and oedema relieving effects.

Brisk walking - during which the Borg Scale/Talk Test is correctly observed is an easy method of exercising when pregnant.

Low impact aerobics - where the emphasis is on maintaining fitness levels.

Pilates or Yoga - these cater for the non-aerobic elements of fitness:

- flexibility
- control of breath
- relaxation
- core stability exercises including pelvic floor muscles
- posture and body awareness

(Stanko 2002).

‘Modified Pilates’ exercises are known to provide a number of positive benefits and are commonly used in women’s health physiotherapy.

Backcare classes - where good back care techniques may be taught. This could include core stability exercises, perhaps
using the Swiss ball, and can be adapted successfully for the pregnant woman.

**Gym-based exercise** - the pregnant woman may use a static bicycle, treadmill, rowing machine or cross-trainer to maintain aerobic activity. Technique is especially important when strength training. Women should use light weights with sub-maximal lifts, aiming to use both upper and lower body muscle groups and vary the exercises. Weights, sets and repetitions should be decreased further as pregnancy progresses (Avery 1999). Resistance should be varied according to ability.

**Circuit training** - may be included as part of the training regime as long as the basic advice is adhered to. Rest periods between activities may need to be longer and intensity closely monitored.

New classes, which periodically become popular, should be observed and evaluated by the physiotherapist before recommendation.

Advise the pregnant woman to:

- Eat for energy, although not immediately before exercising
- Use a chair, wall or support pole to help balance
- Avoid overheating
- Drink plenty of water to avoid dehydrating
- Breathe out with effort
- Keep movement slow and controlled
- Avoid overstretching
Postnatal exercise

There are many valid reasons for exercising postnatally (Tanji 2000; Petridou et al 2001). Becoming active again as soon as possible after delivery is associated with less likelihood of developing postnatal depression provided the exercise is stress-relieving rather than stress-provoking (Koltyn and Schultes 1997).

The return to exercise should be gradual. Ligaments still exhibit laxity for up to 5 months after the birth so care should be taken not to resume high impact activity too soon. Athletes often return to increasingly intensive activity more rapidly and may well discover that the break in maximal training due to pregnancy will not have a significant adverse impact on their postnatal training regime (Lock et al 2001).

Physiotherapists are well placed to encourage all women, together with their new babies, to continue exercising for life

Screening

If there are no contraindications the pregnant woman should be encouraged to engage in regular, moderate exercise for 30 minutes or
more per day on most, if not all, days of the week (ACOG 2002).

If this is in a formal setting, such as a gym or in a class, the usual details should be taken and records kept. In addition to the usual screening questions, enquiries should be made into her obstetric history, with particular emphasis on previous and current problems. The woman should be asked whether she has seen her GP and if her BP is stable. The woman should report all changes in her physical condition at each meeting.

**General advice**

1. wear a well-supporting sports/maternity bra
2. wear loose, light, cool clothing
3. wear supportive training shoes
4. do not exercise when feeling unwell or run down
5. do not exercise when in pain and show caution if experiencing discomfort
6. try to ‘listen to your body’ and act on what it indicates
7. avoid overheating
8. stay well hydrated
9. eat to appetite but not directly before exercise
10. exercise within the limits of the Borg scale / Talk Test
11. warm up before the aerobic content of a workout
12. stretching out after the aerobic content of a workout may be advisable
13. have fun and enjoy exercising
References and bibliography


Lock et al (2001)


Fit to Deliver Pre Natal Fitness Program 2000 Printed in Canada ISBN 0-9687305-0-7

ACPWH Aquanatal Guidelines (Available from Book and Booklet Secretary; see ACPWH Journal)
Further information

The Chartered Society of Physiotherapy (CSP) Rules of Professional Conduct and Core Standards - available from CSP.

14 Bedford Row, London WC1R 4ED.

Telephone: 0207 306 6666

Contact information

ACPWH administration
c/o Fitwise Management Ltd,
Blackburn House,
Redhouse Road,
Bathgate,
EH47 7AQ

T:+ 44 (0) 1506 811077
E: info@fitwise.co.uk

Booklets

Useful ACPWH booklets

• Pregnancy-related Pelvic Girdle Pain (for mothers-to-be and new mothers)
• The Mitchell Method of Simple Relaxation
• Fit for Birth
• Fit for Pregnancy
• Aquanatal Guidelines
• Pilates

For details of these and other reading, see website
www.acpwh.csp.org.uk