THE COMPLETE GUIDE TO

Judy DiFiore

POSTNATAL FITNESS

2nd edition

'An indispensable, authoritative and comprehensive manual'

The Guild of Postnatal Exercise Teachers

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Note

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THE **COMPLETE GUIDE** TO

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INTRODUCTION

Many women are anxious to get themselves back into shape as soon as possible after baby is born. Although her body may not resemble its former shape, a woman will feel relieved that it is her own again and can move freely in a more co-ordinated, unrestricted way. Inspired by a wobbly abdomen and leaky breasts and pelvic floor, she needs sound guidance and understanding to help her along the road to recovery and fitness. It isn't just a matter of starting where she left off and resuming her pre-pregnancy programme; pregnancy and delivery have implications for her exercising body which she should be aware of before she begins. Consider the key postnatal issues of reduced joint stability, stretched and weakened pelvic floor and abdominal muscles, and large, heavy breasts, to understand that the body is really quite vulnerable at this time.

For the purpose of health-related fitness it is recommended that women do not commence formal exercise until completion of a satisfactory postnatal check-up. We hear of elite athletes who return to training within two weeks of delivery because they want to capitalise on physiological changes that have occurred during pregnancy. This is all very well in the pursuit of athletic success, but there are risks involved which are certainly not worth taking if health-related fitness is the goal. Return to fitness and regular weight should be viewed as a long-term goal which cannot be achieved in a short space of time.

About the guide

The Complete Guide to Postnatal Fitness was written in response to the demand for more detailed information on the subject from group fitness instructors and personal trainers. It goes a step further than other postnatal exercise books and looks at specific training methods, their suitability, and considerations during the postnatal period. Research in this field of exercise is continually improving and, where available, resultant information has been cited, but there are some areas which lack any scientific evidence at all. In such cases, I have based my recommendations on sound knowledge of the anatomical and physiological implications of pregnancy and delivery, together with many years experience of teaching postnatal women.

How to use the guide

Whilst it is hoped you will read the guide from cover to cover, it is also intended as an essential resource for you to dip in and out of as required. With this in mind, the chapters are all self-contained and cross-referenced as necessary.

- Part One looks at the implications of pregnancy and delivery in detail, in particular how these will affect the return to exercise in the postnatal period, and how it can help the body to recover more quickly.

- Part Two is all about exercise. It looks at core stability, cardiovascular and resistance training methods, and a range of group exercise sessions, for their suitability during the postnatal period.
- Part Three is concerned with planning and teaching a specific postnatal exercise session and the strategies involved in its success.

For ease of writing, baby is referred to as 'he' in the text; the early postnatal period is defined as birth to six weeks; the extended postnatal period is anything after that time.

Benefits of postnatal exercise

Posture

- Correction of pregnancy stance.
- Improved core strength.
- Strengthened muscles that have lengthened.
- Lengthened muscles that have shortened.
- Redressed muscular balance.
- Awareness of posture whilst feeding/lifting/carrying.
- Awareness of back, abdominal and pelvic care.

Functional capacity

- Targeting muscles required for baby care.
- Increased strength and endurance for lifting, carrying and performing one-handed tasks.
- Improved core strength.
- Improved aerobic fitness.
- Increased ability to deal with the everyday demands of a new baby.
- Reduced fatigue – increased energy.

General health

- Boosted immune system.
- Improved sleep quality.
- Improved circulation and healing.
- Improved digestion.

Body composition

- Increased muscle mass.
- Increased metabolic rate.
- Increased caloric burning.
- Increased fat loss.

Social and emotional well-being

- Increased production of endorphins.
- Enhanced self image and self-confidence.
- Personal satisfaction.
- Personal identification.
- Increased social interaction.

Risks of postnatal exercise

- Fatigue and exhaustion.
- Injury from reduced joint stability.
- Injury from poor core stability.
- Injury from inappropriate exercises or technique.
- Reduction in milk quality and production.

Contra-indications to exercise

- Joint or pelvic pain.
- Inadequate healing, discomfort.
- Excessive fatigue.
- Gross divarication of rectus abdominis.

PART ONE

THE IMPLICATIONS OF PREGNANCY AND DELIVERY FOR EXERCISE

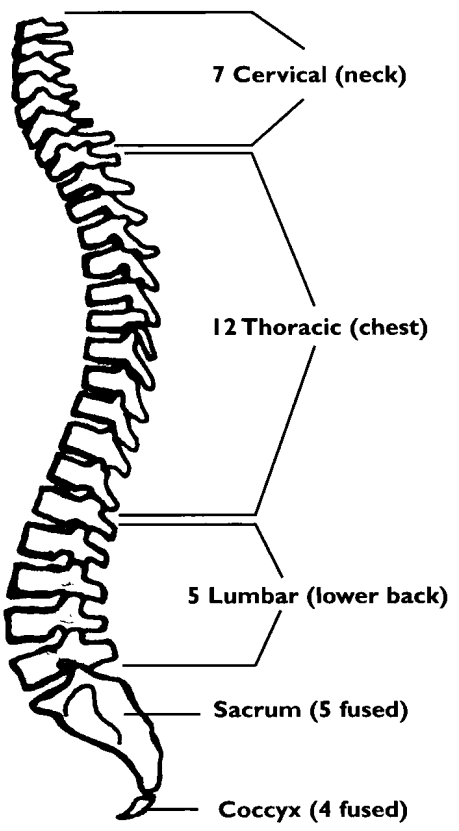
CONTENTS

STRUCTURE AND ALIGNMENT

The Spine

Structure of the spine

Fig. 1.1 Structure of the spine



The vertebral column is made up of 33 bones: 24 separate vertebrae, five vertebrae fused together to form the sacrum, and another four vertebrae fused together to form the coccyx. The spine has enormous strength, but since it is made up of small sections it is also very flexible and this allows a large range of movement. The vertebrae are separated by intervertebral discs of fibrocartilage that cushion the vertebrae against jarring and help to keep the spine upright. The curves of the spine are vital for shock absorption; without them the base of the brain would receive the full impact when jumping. The spine is dependent on ligaments as well as muscles for its stability.

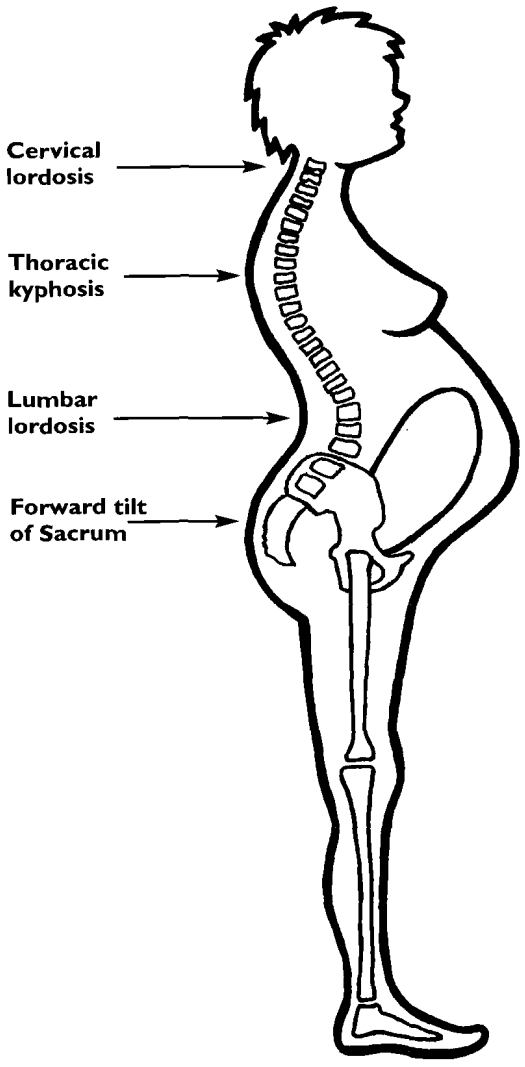
Effects of pregnancy on the spine

The stability of the spine is seriously at risk during pregnancy for the following reasons.

- Increased elasticity of the ligaments.
- Forward pull of the abdomen as the uterus grows out of the pelvis into the abdominal cavity.
- Increased load, causing the sacrum to tilt downwards and forwards.
- Over-stretched abdominal muscles which are no longer able to support the spine.
- Increased size and weight of the breasts.

Common changes in spinal alignment result in increased lumbar lordosis, thoracic kyphosis and cervical lordosis as a consequence of the latter.

Fig. 1.2 Effects of pregnancy on the spine



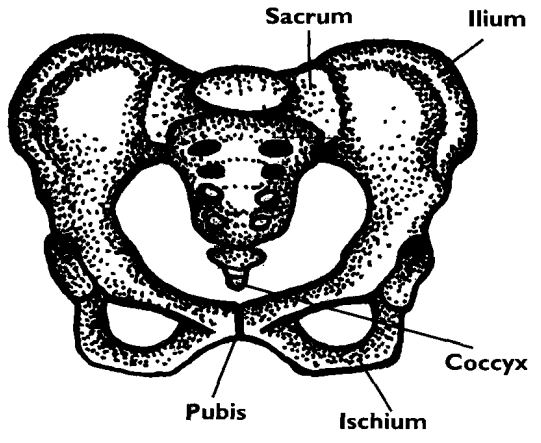
The pelvis

The bones of the pelvis

The pelvis is made up of four bones: two hip bones, the sacrum and the coccyx. Each hip bone is made up of three fused bones, the ilium, ischium and pubis. At the junction of these three bones is the deep socket of the acetabulum.

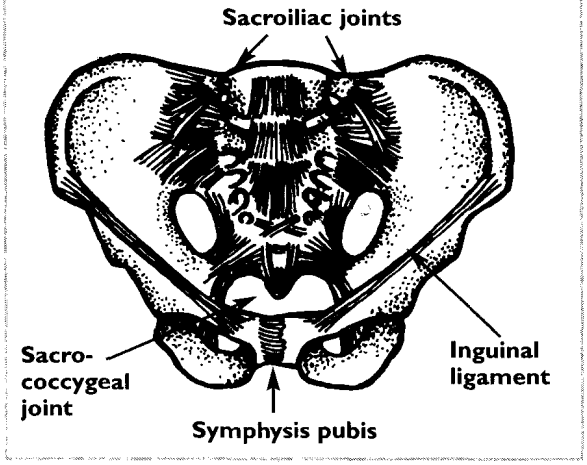
- The **ilium** is the large wing-shaped part of the pelvis providing a broad surface area for muscle attachment. The upper border, the iliac crest, can be felt when the hands are placed on the hips. The bony points at each end of the iliac crest can be felt at the front, as the anterior superior iliac spines (ASIS) and at the back, as the posterior superior iliac spines (PSIS) of the pelvis. These are useful landmarks when checking correct postural alignment.
- The **ischium** is the thick, lower part of the pelvis leading down to the ischial tuberosities.
- The **pubis** is at the front of the pelvis where the two pubic bones join to form the symphysis pubis at the top and the pubic arch underneath.
- The **sacrum** is a triangular-shaped bone made up of five fused vertebrae. It is joined to the ilium by the sacroiliac joints, which are positioned on either side of the sacrum.

Fig. 1.3 Bones of the pelvis



- The **coccyx** consists of four fused vertebrae joined to the sacrum at the sacrococcygeal joint. This joint has a small amount of movement that may allow the coccyx to be pushed backwards during delivery.

Fig. 1.4 Joints of pelvis showing ligaments



The joints of the pelvis

The pelvis is formed by two halves that join at the front at the symphysis pubis and at the back at the sacroiliac joints.

- Symphysis pubis is situated at the front of the pelvis, where the two pubic bones meet. Separated by a pad of cartilage resembling a vertebral disc, the joint is approximately 4mm wide prior to pregnancy and held together by ligaments.
- Sacroiliac joints are two joints formed by the unity of the ilium with the sacrum at each side. The strongest joints in the body, they are held together by ligaments. They allow very limited backwards and forwards movement during flexion and extension of the trunk (sacral nodding) as well as a sideways tilt which occurs when walking.

Effects of pregnancy on the pelvis

The three joints of the pelvis – one symphysis pubis and two sacroiliac – are vulnerable during pregnancy. Hormonal changes allow the ligaments supporting these three joints to become more elastic, increasing their range of movement and consequently reducing joint stability. The width of the symphysis pubis may increase to 9 mm, causing severe discomfort around the pubis and groin, and in severe cases the joint may separate. In some cases however, pain around the pubis may not always be reflective of the degree of movement at the joint. This condition is known as symphysis pubis dysfunction (*see* section on symphysis pubis pain on page 49). Increased laxity in the sacroiliac joints may cause pain in one or both sides of the pelvis. Alternatively, pain could be the result of the two joint surfaces becoming stuck together, causing stiffness and reduced mobility.

The pelvis is dependent upon the correct alignment of the symphysis pubis and sacroiliac joints and pain experienced in one area is generally consistent with misalignment of the whole structure.

Relaxin

What is relaxin?

Research has identified relaxin as a hormone produced in both pregnant and non-pregnant women (Bani 1997). Produced primarily by the corpus luteum, it reaches its highest levels during pregnancy when it is also produced by the placenta and the decidua. Increased levels of relaxin are evident in the body from as early as the second week of pregnancy and continue until delivery. Monthly production resumes with the recommencement of the menstrual cycle. Relaxin levels are higher in second and

subsequent pregnancies and in women carrying more than one baby.

What effects do increased levels of relaxin have on the body during pregnancy?

The most significant change occurs in the collagen fibres of connective tissue, found in cartilage, tendons, ligaments, muscles, skin etc. Increased levels of relaxin appear to affect the remodelling structure of collagen fibres by increasing the water content which in turn increases their size and elasticity. This directly affects joint stability as the ligaments are unable to provide the same degree of support as before.

Increased elasticity of the ligaments allows the pelvic joints a greater range of movement and, together with the forward tilt of the sacrum, increases the size of the pelvic outlet by 28 per cent. This is vital to accommodate the growing baby and allow an easier birth.

Which joints are most at risk?

All joints will be affected to some degree and although there is concern for the ankles, knees and elbows during exercise, it is the pelvic joints that are mostly at risk. The symphysis pubis and sacroiliac joints are cartilaginous, or slightly moveable, joints that rely solely on ligaments for their stability. The resulting increased range of movement created by relaxin, together with the progressive pressure exerted by the growing baby, makes these joints particularly vulnerable.

Are muscles affected by relaxin?

Connective tissue surrounds bundles of muscle fibres that merge together and extend beyond the muscle to form the tough, inelastic tendon. The relaxing effects of the collagenous fibres afford a greater range of movement for the muscle and its attachments. It is essential for the abdominal muscles to stretch to allow the uterus to grow out of the abdomen, and for the pelvic floor muscles to stretch to deliver the baby. However, this adaptation severely reduces the support previously given by these muscles and has major implications on muscle function and support (*see* Chapters 2 and 3).

What happens to relaxin after delivery?

Production of relaxin ceases on delivery of the placenta. However, the changes that have occurred to the collagen fibres will continue until new tissue has been reformed in the absence of relaxin. This may be a period of up to five months postnatally. Reduced joint stability should still be strongly considered when exercising postnatally as the body continues to be vulnerable during this time.

Do the joints regain their stability?

If the joints have been overextended during pregnancy, the ligaments may not provide sufficient stabilisation. However, if appropriate care has been taken the ligaments should return to their pre-pregnancy inelastic state once the lingering effects of relaxin have left the body. The absence of pressure from the baby greatly reduces the risks to the pelvis, but whilst the increased range of movement is still evident the pelvis should be treated with much respect and caution.

Breastfeeding women may find increased joint laxity continues until feeding stops although there is no evidence to support this at present.

Posture

Posture is strongly influenced by habit and controlled by our own kinesthetic awareness, good or bad, of what 'feels right'. Correct postural alignment is governed by the strength and suppleness of specific muscles. Good posture is not a static position; correct alignment is constantly challenged as the body moves.

Why is correct posture so important?

When the body is misaligned it has to work harder to maintain an upright stance. Muscles that are not designed to support the body are recruited to take up the slack and they become too tight. In addition to placing extra strain on the joints and their support structures, tight muscles will decrease range of movement and pull the body out of alignment. If that's not enough, overly lax muscles tire easily in the attempt to counterbalance the forces and the body begins to sag. Such changes in muscular balance increase the degree of compression on the vertebrae and intervertebral discs and decrease blood flow.

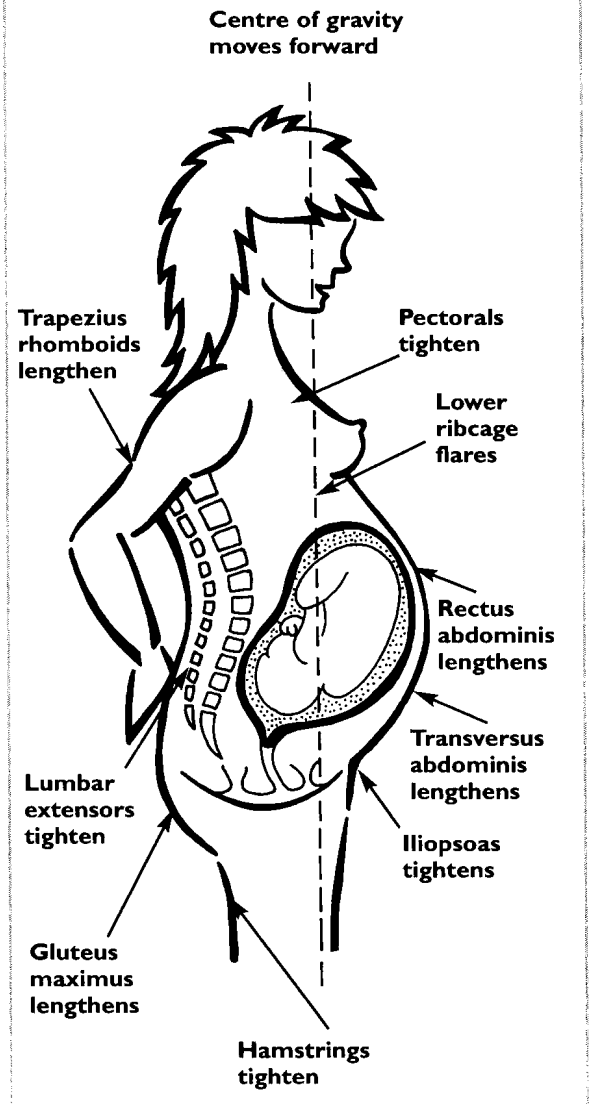
Postnatal posture

The following biomechanical changes are the most commonly observed as a result of pregnancy.

Increased lumbar lordosis:

- Shortening and tightening of iliopsoas and lengthening and weakening of gluteus maximus occur as the sacrum, and sometimes the whole pelvis, tilts anteriorly.
- The facets of lumbar vertebrae become compressed so the hamstrings tighten to draw down the ischial tuberosities in an attempt to protect the spine.
- The hamstrings become overactive and tight as they hang on to the tilting pelvis.

Fig. 1.5 Musculoskeletal and biomechanical changes



- Lumbar extensors shorten and tighten whilst transversus abdominis weakens.
- Rectus abdominis lengthens, weakens and possibly separates.
- Poor functional use of the abdominal wall reduces stability in the pelvis and lower back.

Thoracic kyphosis:

- Shortening and tightening of pectoralis minor occurs with the increased size of the breasts which is further enhanced by poor feeding positions.
- Corresponding lengthening and weakening occurs in trapezius/rhomboids.
- The lower rib cage flares to accommodate the baby.
- Cervical lordosis increases with tilting of head forward.

Postural retraining is crucial to redress the balance of pregnancy-induced changes, and an awareness of correct alignment should be rigorously observed.

Key aims for restoring correct posture

- Re-establish good body alignment.
- Increase core stability.
- Balance opposing muscle groups through strength/stretch.

Correct spinal alignment

Neutral spine is the natural alignment of the spine, i.e. inward curve of the lumbar and cervical vertebrae and outward curve of the thoracic vertebrae. In this position, pressure is equally distributed along the length of the spine, enabling the back to absorb impact whilst minimising stress on bone and soft tissue. When the spine is balanced in neutral, body weight is supported primarily through the bones. Only a very small amount of muscular contraction is needed, from the abdominals and spinal extensors, to maintain equilibrium.

Benefits of neutral spine include:

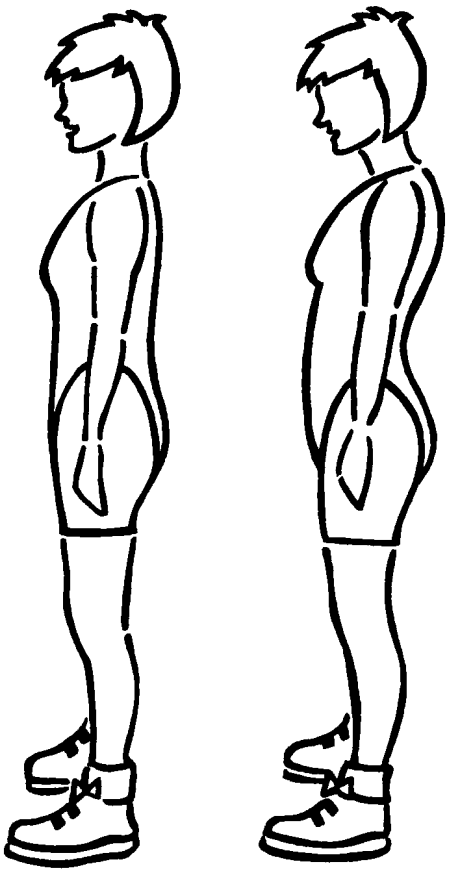
- Improved body mechanics and neuro-muscular efficiency
- Reduction and/or elimination of pain
- Prevention of injury
- Improved circulation
- Improved body shape and a more slender appearance
- Increased flexibility
- Improved co-ordination and sense of balance
- Release of pent-up tensions

Maintaining the spine in a neutral position is extremely difficult for many people. It is often misunderstood and performed incorrectly by over-tilting and eliminating the natural lumbar curve.

Finding neutral spine

Stand with feet hip-width apart and knees soft. Place the heel of your hands on the prominent bones at the front of your pelvis (ASIS) and fingertips on your pubic bone. Tilt the top of the pelvis forward so that your fingertips are lower than the heel of your hand and the natural curvature in your back has increased (anterior pelvic tilt). Now tilt your pelvis the opposite way by lifting your pubic bone upwards so that your fingertips are higher than the heel of your hand (posterior pelvic tilt). Feel your back straightening as the natural curvature disappears. Now find a position midway between these two extremes where your fingertips and heel of hands are on the same vertical plane. Buttocks and front of thighs should be relaxed. This is your correct spinal alignment also known as 'neutral spine'.

Fig. 1.6 Correct (left) and incorrect (right) posture



Standing posture

- Stand with the feet hip-width apart (underneath ASIS).
- Spread weight equally between both feet.
- Distribute weight evenly between big toe, little toe and heel.
- Soften the knees and align them over the ankles.
- Find your neutral spine (see above).
- Draw navel through to spine.
- Slide your shoulders down and open the chest.
- Lengthen your tailbone towards the floor.
- Extend your spine towards the ceiling.
- Lengthen the neck keeping the chin parallel to the floor.
- Look straight ahead.

Back care

A new baby makes many new and repetitive demands on the body. Getting in and out of bed for unsociable feeds, bending over to change nappies, securing car seats, and lifting and carrying baby and his accompanying equipment all require the body to work in a variety of physically demanding ways. The spine and pelvis can all too easily be twisted when lowering the car seat into position and securing the seat belt, and the spine can be badly stressed if the large muscles of the legs are not used for bending and lifting. Guidelines for safe practice can be found in the Appendix.

Relaxin and postnatal exercise

The lingering effects of relaxin on joint stability is one of the main risk factors of postnatal exercise. The following areas should be considered.

Range of movement

Care should be taken to protect the joints against injury by ensuring all movements are performed within the regular range of the joint. Speed becomes very important here as fast, particularly long-levered, movements will increase momentum and could easily result in overextension of the joint. Activities such as