The Back Pain Handbook

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Disclaimer

Francine St George recommends that any person who considers they have a back condition, that is not resolving with the exercise and advice outlined in this book, must consult a medical or health practitioner.

About the author

Francine St George is a Sydney-based physiotherapist who is passionate about sharing the latest research with her patients to help them overcome back pain. Francine has studied anatomy and sports science and has a Master of Science in Medicine. Her thesis topic was the correlation of Magnetic Resonance Imaging with clinical findings about back pain.

In the first phase of her career Francine travelled extensively with elite athletes as a trainer and physiotherapist. She uses this valuable experience in her daily clinical work. Francine has conducted courses for health professionals and others in her Sydney clinic, in various parts of Australia, and abroad.

Over Francine’s 36 years of clinical practice, many of her patients have learned how to overcome back pain with exercise and other strategies that are covered in this book. Now it is your opportunity to learn these.

Francine practises in Sydney at the Physiotherapy Posture and Fitness Clinic. Winter or summer you will find her enjoying a swim and doing her daily exercises at one of Sydney’s great beaches.
Acknowledgements

My greatest thanks go to my patients and radio listeners. They continually request clear and concise explanations about why their pain has not resolved. This continues to inspire me to stay up to date with the latest research and share this with them.

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Other books by Francine St George

The Muscle Fitness Book
Simon & Schuster, Sydney, 1989

The Stretching Handbook

Bodyworks
ABC Publishers, Sydney, 1999

New Bodyworks
Self-published, 2013
Preface

In my physiotherapy practice I treat back pain every day. Fortunately, I can use advanced technology and review the current research on back pain. This knowledge is invaluable in choosing solutions for my patients.

Intriguingly, no matter how much the research has evolved over the years, these simple concepts still help to resolve back pain:

- you need to think a bit differently
- breathe a little more deeply, and
- keep moving.

An episode of back pain can interfere with normal daily functioning. Advances in technology have shown why this is, and also what you need to do to avert recurrent episodes or longstanding back pain.

I have experienced back pain. My original injury happened over 25 years ago. Although I recovered from the injury and superficial bruising, a deep ache and pain lingered in my back, hip and leg for many years. My back often became locked, and seeing myself in the mirror standing crookedly was not pretty.

In recent years, new technologies including Magnetic Resonance Imaging and Real Time Ultrasound imaging have shown why these subsequent episodes of instability and locking occur. This information enabled me to identify the most helpful exercises and strategies for my back. I can now state confidently that you can learn these too, even if you do not have access to this advanced technology.

I have never labelled myself as a “back pain sufferer” nor have I thought of myself as having a “bad back”. Over the years though, the pain or locking of my back has affected me physically and emotionally. Fortunately it has been some years since I have seen a crooked image of myself staring back from the mirror. It has taken diligence, commitment and investment to understand what I needed to do, but it has definitely been worth it.

Sometimes medical or surgical intervention is necessary to overcome back pain. But even if you have had or are going to have surgery, the exercises and information in this book will support the best possible outcome.

Unfortunately there is no single exercise or thought that is likely to “fix your back”. But being informed of the latest research and working through the exercises and strategies in this book will help you to know what works for you and what does not. Although it is important to seek treatment as soon as possible when you are experiencing an acute episode of back pain, it is critical not to become dependent on someone “fixing” you regularly, either weekly, or year after year.

Nevertheless, if you find it challenging to understand how to do some of the exercises in this book, it is important to work with a physiotherapist or other health practitioner. They will help you to clarify which are the most suitable exercises for your back condition.

Over the years, at times, it has been a frustrating journey looking after my back, so if you are reading this book in search of solutions, I do empathise with you. The good news is that you can overcome your back pain and lead a more normal life. From personal and professional experience, I know that it is possible.
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1 The back pain story - breaking the cycle

**Figure 1.** The pain cycle can start after even one episode of back pain
There are three phases to back pain. The first phase is the onset of back pain, which might have occurred without apparent cause or through injury. You tend to ignore the incident until you notice that the pain is becoming more frequent or more intense or is taking longer to resolve.

The second phase involves seeking a cure. The pain might remain, but the process of seeking relief can be time-consuming, expensive and emotionally draining.

The third phase is putting research into action. This involves recovering from an acute episode and using early interventions to prevent the pain from recurring. My goal is to move you as quickly as possible into the third phase.

Phase 1. “The back’s gone out, I don’t feel so good”

When you experience back pain it is easy to think of yourself as a “back pain sufferer”. However, you are not a sufferer, nor is your back “bad”. When you think negatively, you move differently without realising it. You start to avoid everyday physical activities because you associate them with pain. The more you do this, the more other areas in your body start to compensate.

You may notice that when your pain is present you start to feel out of sorts or more emotional. This can make you irritable and alter how you interact with family, colleagues and friends.

These sometimes subconscious and emotional behaviours associated with back pain are now well understood. The challenge is to recognise that these things are happening and to take the correct steps, straight after your first episode of back pain. You will thereby avoid the cycle of regular treatment to overcome pain.

Phase 2. Finding the help you need

Figure 2 demonstrates what most of us do when pain occurs often. Going to a general practitioner for advice on back pain is second only to visiting the doctor when suffering from a flu or cold. During their lives, 80 per cent of people will consult a doctor about back pain.

You might be advised to take pain medication and tests such as X-rays, CT (Computerised Tomography) or MRI (Magnetic Resonance Imaging) scans. The findings might show a disc bulge, disc deterioration or another condition. Once you hear these terms, you could easily think that the findings revealed by the
tests are the source of your pain, but they might not be. Intriguingly, the research shows that you can have a disc with anatomical changes accompanied by a lot of pain, but you can also have these changes and experience no pain.

However, once you see the results of such scans, you could easily start thinking that there is something seriously wrong. Unconsciously, you might start to limit your physical activity. Then the endless search begins as you try various treatments and fads. You might continue to hear many different terms along the way: your back is out; your pelvis is misaligned; even that you have “the worst misalignment I have ever seen,” and so on. It is disillusioning when you try yet another series of treatments and at the completion the pain is still there. Often it seems simpler to just give up and accept the inevitable. You can mistakenly think that you have to live with the pain, whereas you can take steps to help yourself.

**Phase 3. Recovering by putting research into action**

Studies show that from the first episode of back pain, the body responds with a fight-or-flight response. This is to protect you from doing the same action or movement that caused your pain in the first place. As part of this fight-or-flight response, muscles seize up, you breathe a little differently, think a little differently, and change the way you move.

Technology can show how the brain records these physical and emotional effects. However, chronic pain can develop because even though the initial pain in your back has gone, residual muscle weakness, compensatory habits and negative thoughts might remain. The brain is still registering the need to protect you from the perceived danger of hurting yourself again, when this is no longer required. That is why you might inadvertently tighten muscles or feel emotional when you think of making a movement that used to be painful. Research has shown how to deal with the physical, emotional and compensatory habits that remain from an episode of back pain. This is essential to preventing chronic pain from developing.

**Figure 3. Seeking recovery from back pain**

In the following chapters you will learn what to do if you experience an acute episode of back pain. You will be able to identify which muscles have been weakened by the episode and how to strengthen them. You will also learn which muscles compensate and become tight and how to stretch or relax them.

Changing how you react to an episode of back pain can avert the development of a chronic condition. The goal is to move into and through the third phase confidently and competently, and not stay stuck in the first or second phases.

**HOW TO USE THIS BOOK**

Please do not stop at merely reading about what you should be doing. Try the exercises and strategies. This will give you the best chance of having a healthy back again.
My suggestion is that you begin by reading the first few chapters on anatomy and nerves so that you have an overview of the possible causes of your back pain.

If you have longstanding pain you may have heard many diagnostic terms over the years. If so, I recommend that you read Chapter 10 before starting any of the exercises.

There are six chapters of exercises: for your back; for finding your core; and for all areas of your body. Try working through one of these chapters each week and note the exercises that feel most beneficial for you. These will be the ones that help you to move more freely or that ease your pain.

By the time you reach the last chapter, you will be able to choose a daily routine from Appendix 11 or design your own program and refer to it as you exercise.

**Self-assessment**

I strongly recommend that you complete the self-assessment in Appendix 1. This will record where you are now and allow you to put some helpful strategies into action immediately. I have also left spaces for you to make notes at the end of each chapter.

At the end of six weeks you will be ready to complete your follow-up assessment. You will quickly determine how you have progressed and you will be able to identify any aspects that you still need to work on.

Eventually, for future twinges of back pain, you will not need the self-assessment. You will be able to quickly and easily put into action all of the new exercises and strategies you have learned.

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**Is this book suitable for me?**

The book has been written for anybody who is interested in an active, exercise-based approach to resolving their back pain. You can benefit from this approach if:

- your back feels vulnerable when you lift a light weight
- you have ever experienced a locked back
- you wake up feeling stiff in your lower back each morning
- your back aches when you sit or stand for extended periods
- your posture could be better
- you have ever sustained a back injury, or
- you are frustrated by recurrent episodes of back pain, despite trying many approaches.

⚠️ **CAUTION:** Please consult a medical practitioner before trying the solutions offered in this book if you experience any of the following:

- constant night pain in either the lower back, hip or legs
- loss of bowel or bladder function
- constant pins and needles, numbness in your leg or obvious muscle weakness, for example foot drop
- pain that does not resolve with a course of anti-inflammatory pills or pain medication
- recent surgery, or
- rheumatoid arthritis.
Questions to ask

- What terms do you use to describe your pain? How could you change them?
- How could you avoid making decisions based on how your back is feeling?
- When does your back pain happen? Are there some poor postural habits you could change immediately?
- Could you improve your overall fitness?
- Is it time to assess your nutrition and diet? Should you consult a nutritionist or dietician?

Actions to take

- Do not simply read this book; do the exercises. Note which ones feel good and which ones do not.
- If you are not clear on an exercise, postural tip or strategy, consult a physiotherapist or other health professional who treats back pain, to learn how to apply this information to your condition.

"It’s time to change things – I know I can"
Anatomy overview

“Ok kids - story time. We’re going to study just enough anatomy so that we know how pain and all our daily postural habits affect our muscles, tendons and ligaments”
Bones, ligaments and muscles

There are 226 bones in the body. All bones are held together at differently shaped joints by ligaments, which provide stability and flexibility. There are 450 muscles, joined to the bones by tendons. All of these anatomical structures, as well as our nerves and organs, are supported, separated and interconnected by an amazing soft-tissue structure called fascia. These anatomical structures are described in more detail below, outlining how they are affected by daily postural habits and how they might contribute to back pain.

The spine

There are 24 vertebrae that enable movement from the top of the spine down to the sacrum, and lastly to the tailbone or coccyx. The neck vertebrae are called cervical, the mid back thoracic, and the lower back the lumbar region. In between each vertebra is a gelatinous (jelly-like) disc that provides protection for the spinal cord. The discs, and the facet joints that are also between each vertebra, give the spine flexibility and stability. Spinal nerves exit from the spinal cord between each vertebra; as they run into legs and arms they are called peripheral nerves. Overcoming back pain requires attention to all levels of the spine.

Muscles

Some muscles have an important role in supporting posture. Other muscles contribute more to movement.

All throughout the body muscles have slightly different functions. The main role of postural or stability muscles is to reinforce ligaments and stabilise joints. These muscles tend to be deeper and not visible to us. They have a higher content of slow-twitch fibres and are designed for endurance. They are generally working automatically, without conscious direction. For instance, you are not thinking about contracting your neck muscles to hold your head up while you are reading now. This is due in part to your stability muscles being automatically engaged.
When in a sedentary state, for instance sleeping or sitting, many postural muscles are synchronised with breathing. This is important to remember when you start to retrain these muscles, which I explain further in subsequent chapters.

Phasic muscles are those that more actively involved in larger movements. When you anticipate or think about moving, stability muscles engage to stabilise joints before activation of the more superficial phasic muscles occurs. Phasic muscles are larger, longer and have more fast-twitch than slow-twitch fibres. Phasic muscles also have variable fast-twitch fibres in them and this enables them to adapt to the varying paces we move at, including walking, jogging or sprinting.

The muscles that assist poise, balance and posture are called postural or stability muscles. These are usually deeper in the body and not as visible. When these are weak in the back or hips you could tire if you stand or sit for a long time.

The muscles evident on the outside are for faster movements. These are called phasic or power muscles.

When pain occurs anywhere in the body, the deep postural muscles become inhibited. This means that they are somewhat inactive. In the back this compromises the stability of the spine.

The phasic muscles activate too quickly when you are in pain and even think about moving. This can be triggered by the smallest activity, such as bending to put on your shoes or leaning forward to brush your teeth.

The fast triggering of the phasic muscles can cause the back to lock. The deep stability muscles do not automatically activate to support the spine and the phasic muscles go into protective spasm. You will feel this as tight muscles in your back.

A helpful analogy is to compare the different muscles to the gears of a car. When you have pain and even think about moving, the body needs to jump straight from neutral (where everything is relaxed) into second, third or even fourth gear. A specific vertebral level is not able to adjust to your moving quickly, and the back may lock.

Probably one of the most important things that technology has permitted us to confirm is which specific stability muscles have become inhibited by pain and which phasic muscles have compensated. The resulting imbalance of muscles can occur at any joint following an injury. This instability might be experienced as locking but you could also experience unpredictable clicking. This is common in the hip or shoulder as well as in the lower back.

"Ah ha! So this is why my back goes out when I am not even lifting anything heavy"
Muscles of the spine

Underneath the erector spinae is the multifidus. This muscle has segments of various length; some run between each other; others attach to a vertebra a few levels above or below. The multifidus runs all the way from the lower back right through to the neck.

There are many other muscles that arise from the back and go to the arms and legs.

The first step in overcoming back pain is to stretch and relax the outer erector spinae and other phasic muscles that are tight, and then activate and wake up the deeper muscles that have been inhibited by pain.

"I feel like I have two rods in my back when I have back pain"

When you have back pain it can often feel like you have two rods of muscles either side of your spine. The superficial phasic muscle group that feels so tight is called the erector spinae. It runs from the base of the spine and inserts at varying places all the way up and down your spine including your ribs and neck. If there is tightness or muscle spasm of the erector spinae, it usually indicates weakness of the deeper stability muscles.

Figure 5. The erector spinae refers to muscles that are superficial and have a predominantly phasic action

Figure 6. The multifidus is the deepest muscle of the spine. It runs between each vertebra and between a few levels of the spine

The core muscles

Research confirms precisely which muscles are compromised by back pain.

The deep muscles that contribute directly to the stability of the spine are the diaphragm, the pelvic floor muscles and the transverse abdominus. In combination with the multifidus, these muscles are often referred to as our inner core.
Any or all of these muscles can become “sleepy” or inhibited after even one episode of back pain.

**Figure 7:** The muscles that comprise our inner core are affected by back pain.

Because understanding these muscles is one of the most important things you need to know to resolve your back pain, they are covered in detail in subsequent chapters.

**Gluteal and hip muscles**

The muscles of the hips and legs have a direct influence on the back.

There are muscles at the front, side and rear that all influence stability and movement of the hips. At the rear, the superficial muscle is called gluteus maximus. Some of the deep muscles underneath include the piriformis, quadratus femoris, gluteus medius and gluteus minimus.

Daily postural habits can have a marked influence on the strength of our deep hip and gluteal muscles. Weakness of any of these muscles can cause back ache, hip pain or both. A pain deep in the gluteals can also be due to tight hip muscles; usually this tightness is in the piriformis. The good news is that correcting some of our daily postural habits, which we are often unaware of, can quite quickly provide relief from back or hip pain.

**Figure 8.** Important hip muscles that can cause or be affected by back pain.

*“When I stand sideways to a mirror I can see that I have strong glutes on one side of my body but on the other it looks so flat”*

Postural habits could be influencing the strength of your hip muscles.
Having uneven gluteal muscles is often caused by the poor postural habit of standing with all your weight on one leg.

The first step is to try to stand on both legs evenly. The next is to strengthen the deep hip stability muscles and also the superficial gluteals. This can quickly balance gluteal strength and take pressure off the lower back.

Do you have other postural habits that might need attention?

**Hip flexors, hamstrings, adductors and calves**

The other muscles that are important to know and that affect our back directly are: the hip flexors, iliopsoas and rectus femoris, at the front of the thigh; the hamstrings and calves at the back of the leg; and the adductors along the inner thigh. Iliopsoas is a deep hip muscle but, depending on your posture and how you habitually stand, it may be either tight or weak. Posture is covered in more detail in Chapter 9. If you spend many hours sitting, all of these muscles and muscle groups are often tight.

**Figure 9.** The superficial or larger muscle groups that are usually tight when stability muscles of the hip or lower back are weak are the iliopsoas, quadriceps, adductors, hamstrings and calves

**Attention to all parts of the body**

In solving back pain, all areas of the body are important.

**Figure 10.** Some of the more common areas in the upper body that require attention
The following chapters outline exercises for the hip, legs and back as well as those for the neck, mid back and shoulders.

This information will help you determine whether any muscle imbalance in these areas is contributing to your back pain, through poor postural habits or a prior injury.

**The role of tendons**

Tendons attach all of our muscles to bone. However, excessive rotation of a tendon in the legs could cause a local problem such as knee or Achilles pain and also prevent the muscles of the back and hips from working efficiently. This in turn could cause back pain or hip pain.

![Achilles tendon](image)

**Figure 11.** The Achilles tendon needs optimum postural alignment for the muscles in our legs, hip and back to work efficiently

Doing stability and balance exercises could improve your postural alignment, but you might also need to consider using orthotics if you have flat feet.

"I really want to run, but my back aches afterwards when I do. I am so knock-kneed and my feet are so flat - maybe it is time to check this out?"

"I wonder whether I would move any faster if I used orthotics?"

**Postural alignment and stability test**

Try this exercise to test your postural alignment and stability.

- Stand facing a mirror. Now stand on your left leg.
- Observe your left foot – is it wobbling, and are you needing to clench with your toes?
- Can you see the arch of your left foot collapse?
- Were you able to maintain your left knee in alignment over your foot or does it roll inwards? (Checking the direction your kneecap is facing can help you decide this.)
- Repeat on your right leg and notice whether the foot, knee and hip alignment is different on that side.
- Now shift your focus a little higher to your pelvis. Repeat the exercise of standing on each leg but this time observe whether you drop laterally into one hip. It is normal to have a shift to the side, but this should not be excessive and should not cause your foot to wobble or your knee to roll in.
- Next, close your eyes for one to two seconds only. Please be close to a wall if you know that you do not have good balance. How stable do you feel?

**Checking your balance**

Poor balance is often an indicator that you have weak stability muscles.
Ideally you should be able to stand on one leg, maintain a slight arch in the foot, not clench with your toes and not move sideways too much. Your inability to do this could be one of the factors contributing to your poor postural habits and to your back pain.

**How to improve balance and postural stability**

- Become more aware of standing with your weight evenly balanced over each foot; do not stand with all your weight on one leg.

- Keep your arch raised just a little as though there was a small grape under your foot and you do not want to crush it. Be sure not to claw your toes. (If you have a high arch, a less common condition called a supinated foot, lifting the arch would not be suitable for you. You can still benefit from all of the other posture tips, but you will need to relax the arch of your foot as you do each of these; do not lift it.)

- Move as though you were going to turn your feet and thighs slightly outwards, but minimally, so that someone who was next to you would not notice.

- Imagine that you are stacking all the bones in your body in a balanced way on top of each other.

- Once you feel more balanced in your posture, try raising each heel once or twice. Do not tense your neck and shoulders or hold your breath.

- If this feels too easy then tuck one foot around the other ankle and still maintain a tall but relaxed posture. This is great to do if you are at the bus-stop or need to stand in a queue for a long time.

All of these postural awareness movements and exercises will strengthen your stability muscles and improve your balance.

**Ligaments**

Poor postural habits can cause pain.

Ligaments are structures that attach bone to bone, and are similar to a new piece of elastic. They can be strained if you injure yourself or become overstretched and weakened if you stay in one position for too long.

If either a strain or overstretching occurs, the ligament becomes like an old piece of elastic. Examples of overstraining neck or back ligaments are using an electronic device in a sustained forward-flexed position, or sitting slumped in a chair watching TV. This might feel relaxing at the time but the body adapts to the awkward position. The superficial muscles in the mid and lower back and the front of the hips tighten and the deeper muscles weaken, particularly in the abdomen and core.

Can you identify a habit of being in a constantly flexed position? How could you change this right away, while you are reading this book?
Points to remember

- In the spine are vertebrae joined by ligaments and separated and cushioned by discs. Facet joints provide additional stability for the spine.

- Muscles have different functions. Stability muscles, deeper in the body, provide endurance and become “sleepy” or inhibited after an episode of pain.

- Superficial muscles are called phasic and have a fast-twitch function. They tend to tighten with back pain.

- Poor postural habits, such as standing with more weight on one leg, can create an imbalance of the muscles in the hips, which can contribute to back pain.

- All muscles require attention to overcome back pain, but the hamstrings, hip flexors and gluteal muscles are particularly important.

- Tendons join muscles to the bone. They need optimum alignment to permit ideal muscle balance in the knees, hips and lower back.

- Ligaments give joints stability and flexibility. If you have strained a ligament in the past or keep it in a sustained overlengthened position, muscles will adapt badly to this.

Actions to take

Try the postural alignment exercise and look at your feet, knee and hip alignment in the mirror while you do it.

“Crikey – he makes it look so easy!”