

Understanding **Back Pain**

Professor Malcolm I.V. Jayson

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IMPORTANT

This book is intended not as a substitute for personal medical advice but as a supplement to that advice for the patient who wishes to understand more about his or her condition.

Before taking any form of treatment
YOU SHOULD ALWAYS CONSULT YOUR MEDICAL PRACTITIONER.

In particular (without limit) you should note that advances in medical science occur rapidly and some information about drugs and treatment contained in this booklet may very soon be out of date.

Contents

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| | |
|---|-----|
| Introduction | 1 |
| How the spine works | 7 |
| What is pain and what can we do about it? | 16 |
| Some common back problems | 20 |
| Treating back pain – the first steps..... | 33 |
| Protecting your back | 43 |
| What causes persistent back pain?..... | 57 |
| Treating persistent back pain..... | 67 |
| Back pain in young people..... | 93 |
| Useful addresses | 98 |
| Index..... | 107 |
| Your pages..... | 115 |

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About the author



Malcolm I.V. Jayson MD, FRCP is Professor of Rheumatology and was Director at the Manchester and Salford Back Pain Centre. He has conducted extensive studies of the structure and function of the human spine, methods of measurement and trials of treatment, plus basic research on the mechanisms by which back pain develops.

Introduction

Back pain is a symptom

Backache is not an illness in itself, but a symptom. Its development means that something has gone wrong somewhere, although it may not always be clear exactly what.



Most of us suffer from backache at some time or other. Usually it is an unpleasant, awkward but not desperately serious problem caused by some kind of mechanical stress or damage within the back which gets better fairly quickly. Poor posture, excessive stresses, and wear and tear problems may be at least partly responsible.

You should not be surprised that backache is so common when you realise that your spine is composed of many different structures, including bones, discs, ligaments, tendons, nerves, blood vessels and other tissues, all of which can be affected by mechanical damage resulting in backache.

In most cases the precise cause of the problem is not important. Backache is a symptom that will clear up; the purpose of treatment is to relieve pain and to make sure that you recover as soon as possible. Occasionally there may be a more severe underlying cause and detailed investigations are required to decide the right approach to treatment. Understanding how the back works will help us to protect our spines and recover more rapidly from attacks of backache.

This booklet aims to show you how the back works, what goes wrong, why back problems arise and how they are treated, and to give some indication of when further investigations and specialised help are necessary.

A growing problem

Backache is remarkably common. At any one time some 30 to 40 per cent of the population have backache and between 80 and 90 per cent experience it at some time in their lives. It affects both sexes and all ages from children to elderly people, but is most prevalent in the middle years.

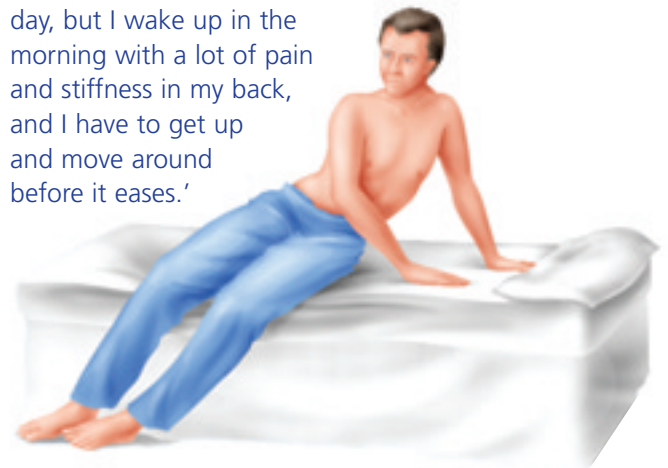
What patients say

Back pain can take many forms, but the following complaints are typical:



'I work in a factory assembling components. By the end of the day I have a terrible aching pain low down in my back and I really don't know how much longer I can stand it.'

'I am not too bad during the day, but I wake up in the morning with a lot of pain and stiffness in my back, and I have to get up and move around before it eases.'



'I bent over to pick up a book from the floor and felt a sudden severe pain in the bottom of my back, and I couldn't straighten up.'



'While I was working in the garden, I got a twinge of pain in my lower back. Over the next few hours the pain spread into my bottom and down the back of my leg. It has really hurt and I have had to go to bed.'

Time off work

Backache is one of the most common reasons why people have to take time off work, especially in heavy manual industries. At particular risk are workers in the building industry and nurses who often have to undertake heavy lifts in awkward postures.

It's often hard to separate cause and effect: in other words, do the stresses in the job cause the backache, or is the person unable to do heavy work because he or she already has a bad back? In many cases, back pain follows some injury or a sudden twist. Much time is now spent training workers to avoid subjecting their backs to excessive stresses.

The scale of the problem

The amount of working time lost as a result of back problems has increased enormously in recent years. It is now running at some 100 million working days per year in England and Wales, two or three times more than 20 years ago. In fact, this dramatic rise does not mean that more people are being injured at work. Rather, it reflects the more concerned approach taken by both workers and employers to the effects of back pain. The result is a dramatic escalation in the costs of back pain to our society. This is now calculated as nearly £6,000,000,000 (six billion pounds) per year for the medical treatment provided, the benefits received and loss of production – a phenomenal sum.

The increase in the numbers of people disabled by back problems has led to a complete rethink of our approach to back pain and how it is treated. In this booklet I provide the most up-to-date views based on the latest research on the treatment of back pain, and

explain how we are attempting to reduce the frequency and severity of this problem.

KEY POINTS

- Backache is a symptom not a disease
- Acute episodes of back pain, although unpleasant, usually get better quickly
- Backache affects 80–90 per cent of the population at some time in their lives

How the spine works

The vertebral column

The spine or backbone is known medically as the vertebral column. Its role is to support the whole body, be capable of bending and twisting in all directions, and at the same time protect the vital structures such as nerves that run through it. What's more, it has to last a lifetime. No engineering structure comes anywhere near meeting such specifications, so it is hardly surprising that problems can arise from time to time.

Vertebrae

The human spine consists of a column of bony blocks known as vertebrae, which sit one on top of another, joined together by tough ligaments to form the vertebral column.

There are seven cervical vertebrae in the neck, twelve dorsal or thoracic vertebrae in the upper and middle back, and five lumbar vertebrae in the lower part of the spine. The fifth lumbar vertebra is known

The versatility of the spine

The spine or backbone is a truly amazing engineering structure, allowing a huge range of movement while supporting the body and the vital structures, such as nerves, that run within it.



The spine can bend sideways



The spine can bend forwards



The spine can twist



The spine can bend and twist at the same time

as L5 and sits on the sacrum, which in turn is connected to the coccyx – the tail bone. The sacrum consists of several vertebrae that have joined together. The sacrum is joined at its edges to the pelvis – the ring of bone that carries the trunk and which in turn is supported by the hips.

Discs

The spine is not a rigid structure. It is able to bend and twist because there are flexible cushions or discs between each of the vertebrae. Each disc is a flat, biscuit-shaped structure with a jelly-like centre called the nucleus and an extremely strong outer skin called the annulus.

Facet joints

The vertebrae are also joined to each other by pairs of small joints which lie at the back of the spine, one on either side. They can be affected by strain or by wear and tear and may develop bony swellings, causing pressure on nerves.

Nerve network

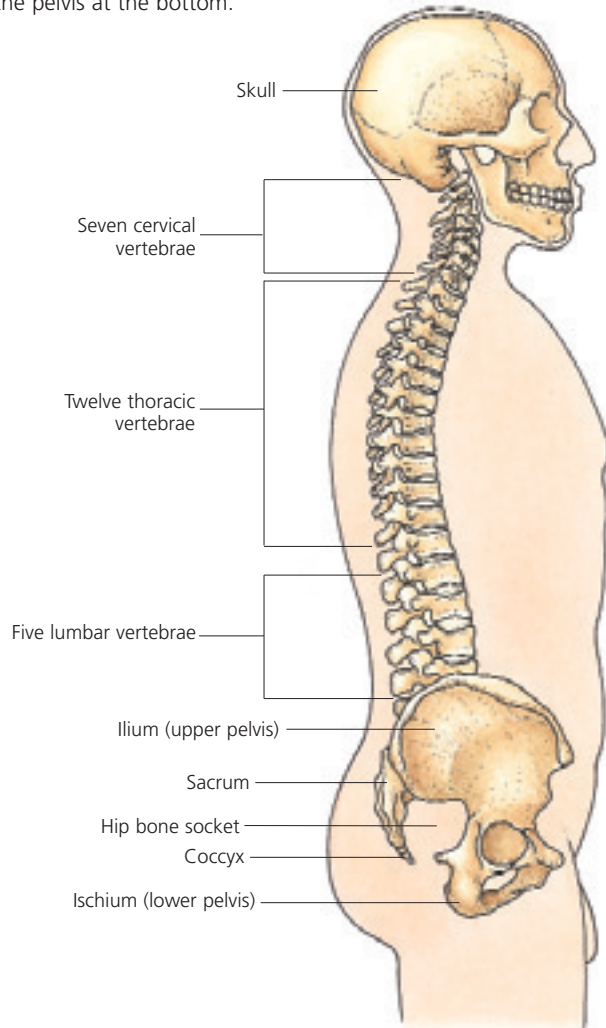
The nervous system resembles a telephone network carrying messages from your brain to various parts of your body and back again. Messages that pass down the nerves make muscles contract and so control movements such as walking. Those travelling up the nerves carry sensations which eventually reach your brain so that you experience sensations such as touch and pain.

The spinal cord and nerves

A 'cable' of nervous tissue, known as the spinal cord, extends from the brain down the spine inside the canal

The spine – side view

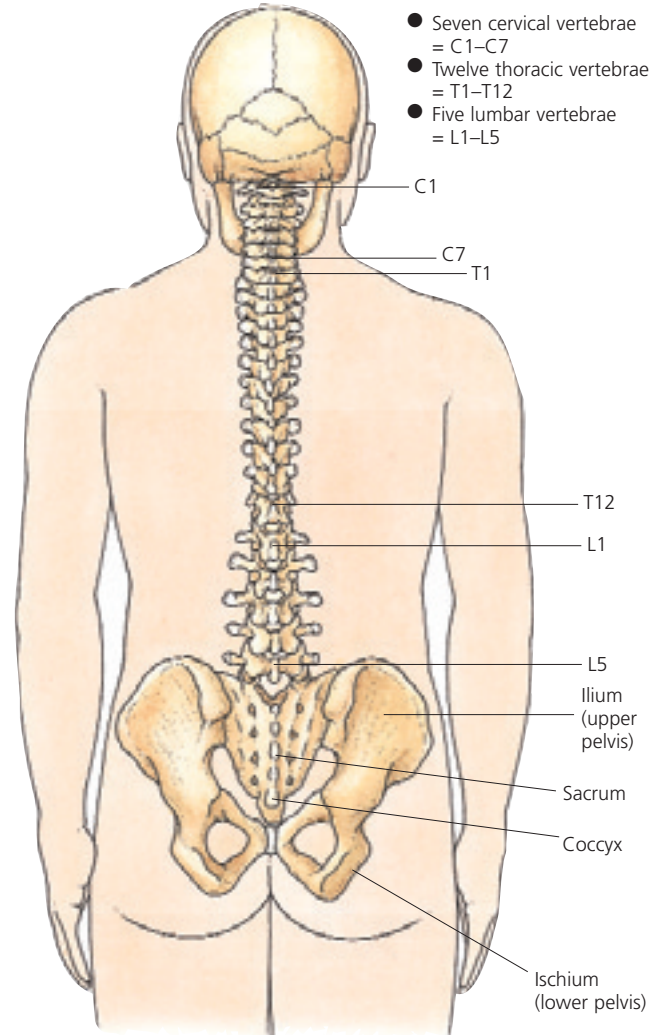
Viewed from the side the human spine has a definite curve. The spine is not a rigid structure; it is able to bend and flex because there are cushions or discs between each of the vertebrae. The vertebrae attach to the skull at the top and the pelvis at the bottom.



The spine – back view

Viewed from the rear the human spine consists of a vertical column of bony blocks called vertebrae, which sit one on top of another. The vertebrae are numbered in descending order according to their location:

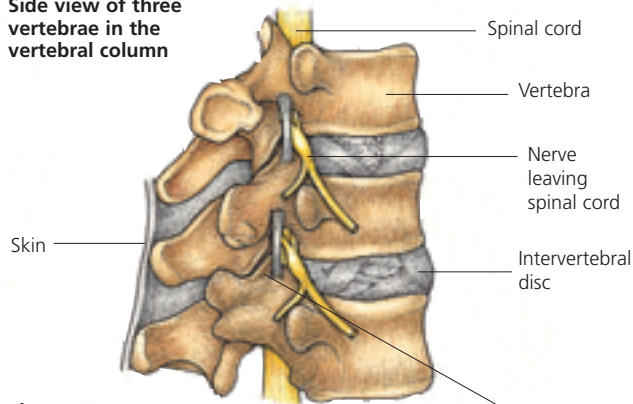
- Seven cervical vertebrae = C1–C7
- Twelve thoracic vertebrae = T1–T12
- Five lumbar vertebrae = L1–L5



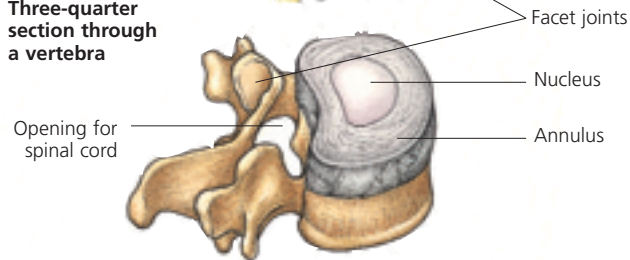
The structure of the spine

The vertebrae are separated from one another by flexible intervertebral discs. Each disc is a flat, biscuit-shaped structure with a jelly-like centre (nucleus) and an extremely strong outer skin (annulus).

Side view of three vertebrae in the vertebral column



Three-quarter section through a vertebra



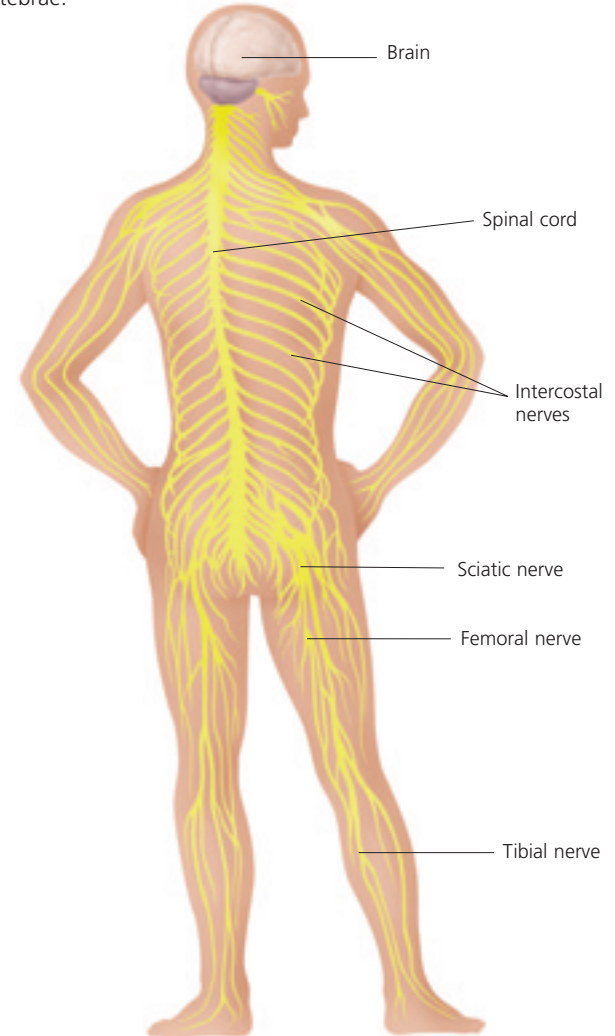
formed by the vertebrae. The nerve roots separate from the spinal cord, run for short distances within the canal itself and emerge in pairs, one on each side, from the sides of the vertebral column to supply the body, the arms and the legs.

What happens in back injuries

The fact that the spinal cord carries messages to and from the body means that, if it is damaged, the 'connection' may be affected, which can lead to the

The nerve network

A cable of nervous tissue, known as the spinal cord, connects the nerves of the limbs and torso to the brain. The spinal cord runs through a protective canal within the bony vertebral column. Nerve roots emerge in pairs from the sides of the vertebrae.



loss or alteration of sensation, development of pain and weakness of movements. This is what happens when people become paralysed after a serious accident.

The number of limbs paralysed, that is whether the affected person can move the arms and not the legs, or whether all four limbs are paralysed, depends on where the spinal cord has been damaged.

If the injury is in the neck, paralysis and loss of sensation can affect both the arms and the legs. However, if the injury is in the thoracic or lumbar segments – below arm level – then only the leg muscles are affected. Fortunately most back problems damage only the nerves and not usually the spinal cord.

Pain can develop in the back itself, resulting from direct injuries to ligaments, tendons, joints and other structures. As the same nerves that supply these tissues in the back also supply the legs, patients may feel the pain as though it were arising from the legs.

In addition, there may be pressure directly on the nerves, producing pain, alteration in the sense of feeling and weakness in the legs.

Investigating back pain

It is clear that the back is a very complicated structure. When there has been some injury, back pain can arise for several different reasons. Very careful analysis would be necessary to determine what has happened in any individual. Fortunately, most acute episodes of back pain get better without the need for specific forms of intervention.

As a result very detailed tests to determine the particular injuries causing problems are generally not

required. However, when symptoms are more serious and prolonged, it becomes important to determine exactly what is going wrong. Very careful examination and diagnostic tests, including some of the newer forms of computer imaging, may then become necessary.

KEY POINTS

- The vertebral column consists of vertebrae joined by discs and facet joints. The disc has a jelly-like central nucleus and an extremely strong outer skin, the annulus
- Pain may arise from damage to a wide variety of structures
- The pain is transmitted by the nerves. The ways that these are stimulated are complex and depend upon the particular tissue or type of nerve that has been affected
- As most acute episodes of back pain get better quickly, usually there is no need for very detailed tests to determine the precise cause