

# Overview of Back and Neck Pain

Dr Fong Shee Yan, MBBS FRCSEd(Orth) MMed(Surg) FAMS(Orth)  
Consultant, Spine Service  
Department of Orthopaedic Surgery  
Tan Tock Seng Hospital  
11 Jalan Tan Tock Seng  
Singapore 308433  
Email shee\_yan\_fong@ttsh.com.sg

The first step in relieving your back and neck pain is to understand the mechanics of your spine (or backbone). If you can determine where the pain is coming from, you are on your way to taking control and finding relief.

Your spine extends from the base of your skull to the top of your sacrum (or tailbone) that connects to the top of your pelvis (to which your hips join). The 44 bones of your spine are called vertebrae (7 in neck or cervical, 12 in chest or thoracic, and 5 in lower back or lumbar). Between each hard vertebra are soft discs which are jelly-filled shock-absorbers that allow the spine to stay flexible and mobile, while also supporting your body weight and the weight of anything you lift. Another important component of your back are the two facet joints behind that link each vertebra to the one above and the one below. Therefore your spine can be imagined as a long stack of bones (vertebrae) joined together at each level by 3 moveable joints (one disc in front and two facets behind) enabling the whole spine to bend forward, backward and side-to-side (see Figure 1). Because of the rigid rib cage, the thoracic spine moves relatively less than the lumbar and cervical spine, and therefore rarely has any mechanical problem compared to the lower back and neck.

Your spinal cord lies within a continuous bony tunnel known as the spinal canal in the centre (between the disc in front and the two facets behind). This canal is made up of stack of rings of bone attached to the back of each vertebra. Branches of nerves from the cord leave the canal (and the spine) between adjacent vertebrae and travel throughout the body into your arms, chest and legs (see Figure 2).

The nerves that allow your spine to feel pain are the same nerves that cause your arms and legs to feel pain too. When signals originating from a disc or facet joint are felt down your arm or leg, we call it referred pain. This effect is common and typical of most sufferers of mechanical back and neck pain. This type of pain is different from that of a pinched nerve, which can also travel into the arms or legs, called radicular pain.

Now that you have a basic understanding of how your spine works, you can move on to identifying the type of pain you may have.

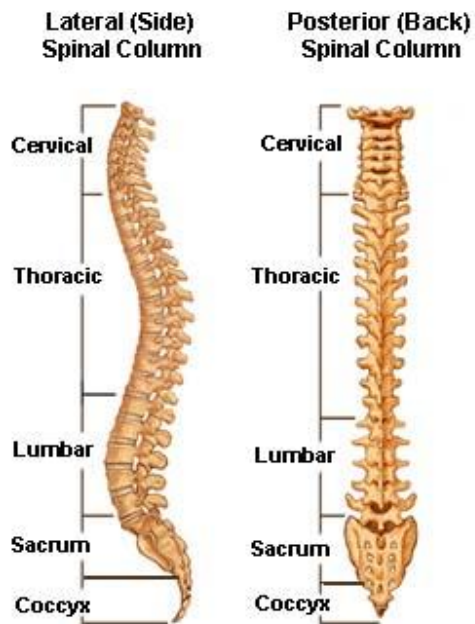


Figure 1

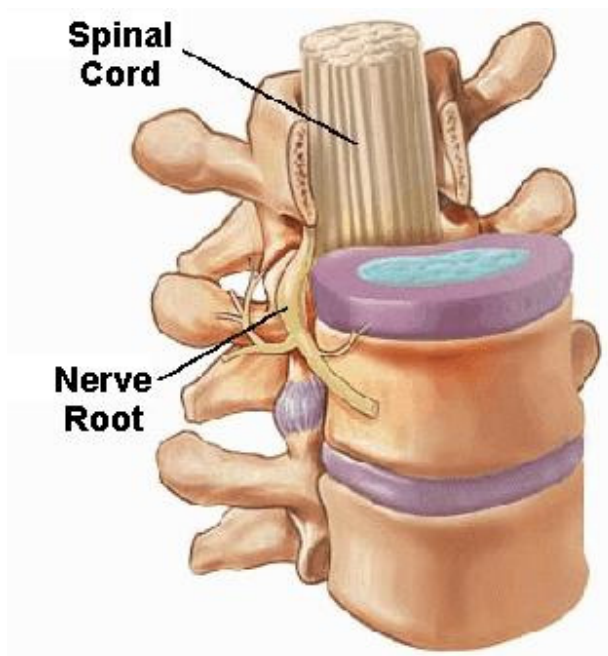


Figure 2

## Symptoms and Diagnosis

Identifying your type of back and neck pain...It's important to know that if you are among the vast majority of back and neck pain sufferers, you are probably experiencing a mechanical problem. This means that the source of your symptoms is likely coming from one of the spine physical components: the bones, the discs or the joints.

The good news is that mechanical back and neck pain almost always falls into one of four common patterns of pain, first described by Dr Hamilton Hall. Once you recognize your typical pattern, you can take steps on your own to quickly reduce the pain. The bad news is that if your pain does not improve after a week, it is still essential that you seek a doctor's opinion...less commonly, back or neck pain can be caused by rare but serious conditions like infection, cancer and fracture (especially after a bad injury). Please note the following discussion only applies to adults (paediatric spine problems deserve a different approach).

### Pattern 1

commonly called Disc Pain (see Figure 3).

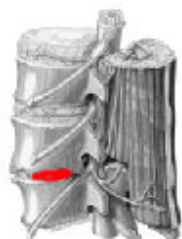


Figure 3

### Pattern 2

commonly called Facet Pain (see Figure 4).



Figure 4

### Pattern 3

commonly called Pinched Nerve (see Figure 5).

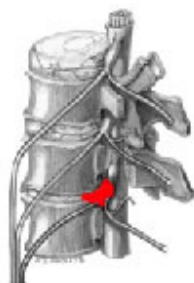


Figure 5

### Pattern 4

commonly called Spinal Stenosis (or narrowing) (see Figure 6).



Figure 6

### For Lumbar Spine (or lower back)

#### 1. Where is your pain located ?

Pattern 1 = Pain is worst in the back. May spread to the buttocks or legs (referred pain).  
Pattern 2 = Pain is worst in the back. May spread to the buttocks or legs (referred pain).  
Pattern 3 = Pain is felt mainly in the leg, although back pain may be present (radicular pain).  
Pattern 4 = Pain is worst in leg(s), described as heaviness or aching.

#### 2. How often are you in pain ?

Pattern 1 = Pain is usually intermittent but may be constant with varying intensity throughout the day. Usually at end of the day after work or trip.  
Pattern 2 = Pain is always intermittent. Usually in the morning.  
Pattern 3 = Pain is usually constant that cannot be completely abolished with any back movement or position.  
Pattern 4 = Pain is intermittent of short duration and occurs with activity, especially walking.

#### 3. What makes your pain worse ?

Pattern 1 = Pain is made worse by sitting and by bending forward.  
Pattern 2 = Pain is made worse by bending backward and standing or walking for long periods of time.  
Pattern 3 = Pain is often made worse by sitting and bending, but can also be made worse by all back movement or position in the acute stage.  
Pattern 4 = Symptoms are made worse by activity. Walking for more than a few minutes makes the legs feel so achy and weak that you have to stop walking and rest before continuing.

#### 4. What makes your pain better ?

Pattern 1 = Pain is eased by bending backward. Better to walk than stand, and stand than sit.  
Pattern 2 = Pain is eased by bending forward or sitting.  
Pattern 3 = Pain is eased by laying face down or on the back with the legs drawn up.  
Pattern 4 = Symptoms are relieved by a change in position, such as bending forward or sitting.

### For Cervical Spine (or neck)

#### 1. Where is your pain located ?

Pattern 1 = Pain is worst in the neck, over the shoulders, or between the shoulder blades and may involve a headache (referred pain).  
Pattern 2 = Pain is worst in the neck, over the shoulders or between the shoulder blades and may involve a headache (referred pain).  
Pattern 3 = Pain is felt mainly in the arm, although neck pain may be present (radicular pain).

#### 2. How often are you in pain ?

Pattern 1 = Pain is usually intermittent but may be constant with varying intensity throughout the day.  
Pattern 2 = Pain is always intermittent.  
Pattern 3 = Pain is usually constant.  
Pattern 4 = Pain is usually intermittent but may be constant with varying intensity throughout the day.

#### 3. What makes your pain worse ?

Pattern 1 = Pain is made worse by sitting and looking down, such as when reading or doing work on the computer.  
Pattern 2 = Pain is made worse by looking upwards and turning the neck.  
Pattern 3 = Pain is often worse when sitting and looking down, but can be made worse by backward and turning movement in the acute stage.  
Pattern 4 = Pain is made worse by either looking up or down, often associated with an "electric shock" sensation going down the spine or arms.

#### 4. What makes your pain better ?

Pattern 1 = Pain is eased by doing a 'chin tuck' and then looking up.  
Pattern 2 = Pain is eased by bending the neck forward and dropping the chin onto the chest.  
Pattern 3 = Arm pain is eased by careful positioning of the neck and lifting the arm to rest on the head.  
Pattern 4 = Pain is less an issue than numbness and clumsiness in the hands and feet.

## Treatments

What a relief! Simple ways to reduce your pain... Now that you've identified your particular type of pain, I'll show you some simple ways you can take control of your symptoms and get back to normal, pain-free living...

### Pattern 1 :

For Fast Relief...

Lay face down on the floor for a few minutes every hour. If necessary, place a pillow(s) under your stomach until the position lessens your back pain or buttock pain. Remove the pillows gradually until laying flat is comfortable.

Improve your neck posture in sitting position. Sit in a straight-backed chair, and use a 5" diameter lumbar roll to support the curve in the lower back.

Daily Tips...

When sitting, use a straight-back chair and a five-inch lumbar roll to support the curve in the lower back. When working stooped over, stand upright, place hands on hips, bend backward several times.

Daily Exercises...

Learn how to do the Sloppy Push-Up and Chin-Tucks.

### Pattern 2 :

For Fast Relief...

When standing, draw back your shoulders, raise your chest, tighten your stomach muscles and tense your buttocks (Standing Pelvic Tilt.) Sit down and bend forward.

Relieving Pattern 2 neck pain is usually quite easy and is achieved by bending the neck forward until your chin touches your chest.

Daily Tips...

When standing, place one foot on a box, step or rail. Alternate feet frequently. Sit down as often as you can.

If you are involved in prolonged work looking overhead, take regular stretch breaks, by touching your chin onto your chest 2 to 3 times each hour.

Daily Exercises...

Learn how to do the Knees-to-Chest and the Chin-to-Chest Stretches.

### Pattern 3 :

For Fast Relief...

In the acute stages, try lying down for two to three days until symptoms are relieved. Long term bed rest is not recommended.

Use pillows and a neck roll, either sitting or lying, to position your neck until the symptoms in your arm are relieved.

Daily Tips...

Lie on your stomach, over a pillow(s) if necessary, and rest on your elbows. Lie on your back with your lower legs on the seat of a chair and your knees drawn up over your stomach.

Maintain proper neck posture at all times including during sleep, with adequate head support with pillow.

Daily Exercises...

Proper positioning to minimize your leg or arm pain during the first few days.

In a fully supported position, try gentle retractions on the neck and sustain the retraction for several seconds. Repeat as long as it does not increase your arm pain.

### Pattern 4 :

For Fast Relief...

When you feel pain in your legs, stop the activity, sit down and lean forward until it subsides.

Daily Tips...

Daily tips for Pattern 2 pain can be helpful to control Pattern 4 pain.

Daily Exercises...

Embark on a long-term strengthening program, focusing on the abdominal muscles.

Important Note...

Pattern 4 disorder oftentimes requires surgery to stop the progressive compression of the spinal cord in the cervical spine and should come to the attention of a doctor the soonest.

## **Prognosis**

I cannot re-emphasize the importance of seeking a medical consultation if your pain does not improve after a week. Your doctor will examine you to look for signs of nerve tension in the back and neck (Pattern 3), as well as signs of spinal cord compression in the neck (also called cervical myelopathy – Pattern 4 in the cervical spine). As these two conditions may require early surgery to decompress the irritated nerve or spinal cord, your doctor may order further imaging studies other than an X-ray, like an MR (magnetic resonance) scan to confirm or exclude the diagnosis. Otherwise, simple back and neck exercises (with or without the help of a physiotherapist) may help in the eventual self-recovery of the other mechanical conditions (besides rest, pain medications, and avoidance of heavy lifting). Pattern 1 sufferers can find relieve by doing extension exercises to strengthen the back muscles and avoid sitting for long duration. Pattern 2 pain can be improved with flexion exercises to strengthen the abdominal muscles (for the back) and the front neck muscles and avoid standing for long duration. Pattern 3 pinched nerves may sometimes need traction therapy, failing which surgery is the last option for relief. Pattern 4 stenosis in the lumbar spine will do well with flexion exercises and avoid walking for long distance without rest or breaks. Rarely, pain from the disc in Pattern 1 (discogenic pain) may not recover even after few months of therapy. Only then will spinal fusion or more recently, disc replacement, be offered by a spine surgeon after further investigations like discogram and/or facet block. Similarly, Pattern 3 and 4 may rarely require decompression surgery after failing more conservative options, including nerve root and epidural steroid injections. Regardless, prognosis remains good for self-recovery for 90% of pain sufferers without the need for surgery. For the remaining 10% not responding to conservative therapy, emerging technology like minimally invasive spine surgery offers faster postoperative recovery with less bleeding, less postoperative pain, shorter hospital stay and subsequently, earlier return to work and play.

## **References**

1. Hall H, Hadler NM. Controversy: Low back school. Education or exercise? Spine 1995; 20: 1097-8.
2. Wilson L, Hall H, McIntosh G, Melles T. Intertester reliability of a low back pain classification system. Spine 1999; 24: 248-54.

### **Minimally invasive surgery is often better for the spine**

Procedures that once required large incisions, hours in the operating room and extensive blood loss, can, in some cases, be done through an incision less than an inch long. The overriding trend in surgery is to complete major procedures through the most minor incision possible. This approach, known as minimally invasive surgery, uses tubes, tiny cameras, microscopes and pinpoint instruments to limit damage to muscle and tissue surrounding the area being surgically repaired. For patients, this results in shorter hospital stays, less recovery time and reduced post-operative pain.

Spine surgery for neck and back disorders has benefited from the move to minimally invasive techniques perhaps as much as any other surgical field. Procedures that once required large incisions, hours in the operating room and extensive blood loss, can, in some cases, be done through an incision less than an inch long. Back and neck pain are the second most frequent reason, behind the common cold, that Americans visit the doctor, according to the North American Spine Society. Treatment of low-back pain alone costs Americans at least \$50 billion each year and is the most common cause of job-related disability and a leading contributor to missed work, the National Institute of Health, United States, says.

The causes of back and neck pain are complex. They range from muscle strains to fractures of one of the 24 bones, or vertebrae, that form the spine, or deterioration of one of the shock-absorbing 24 discs between the vertebrae, with or without spinal cord or nerve root involvement giving rise to arm or leg symptoms. Fortunately, most patients with acute symptoms improve with physical therapy, medication, injection and other non-operative treatments. For others, who have failed non-operative management, surgery may offer the only long-term solution for relieving pain and restoring mobility.

Minimally invasive spine surgery, for the right patient, can make the sometimes-difficult decision of whether to undergo surgery a little easier. In traditional spine surgery, a surgeon has to make a large incision and dissect several layers of muscle to access the area of the spinal column he or she is trying to correct. The injury caused by cutting through this muscle and tissue significantly adds to a patient's recovery time after surgery. In some cases, it can leave long-lasting weakness in the back muscles. Minimally invasive techniques limit injury to surrounding muscle and tissue without compromising results.

A vivid example is a procedure called endoscopic lumbar microdiscectomy, which is used to treat a ruptured or herniated disc in the lower back. The bulging disc compresses nerves in the spine, causing disabling leg pain. Traditional discectomy requires lengthy incisions and the stripping of several levels of muscle to give the surgeon a good view of the area where the disc material compressing the nerve needs to be removed. Now, microdiscectomy can be done through a 2cm incision. A tube is inserted through the incision, creating a tunnel for the surgeon to reach the affected disc with a microscope and surgical instruments with minimal blood loss (Huang 2004, J Orthop Res 23: 406-11). Patients typically can go home the same day or next (23-hour ambulatory surgery in TTSH: overnight stay in day-surgery ward and home the next morning foregoing hospitalisation). This is achieved as post-operative pain is significantly reduced and these often young working adult patients can return to work early. In fact, the average number of disability days was reduced from 49 to 27 days (Hermantin 1999, JBJS 81: 958-65).

Other spine procedures that now may benefit from minimally invasive approaches include: lumbar fusion to correct back and radiating leg pain caused by spondylolysis, a defect or fracture of the wing-shaped parts of a vertebrae in the lumbar region or lower back. The fusion procedure, which traditionally required an incision that exposed the vertebrae, can now be done through incision an inch long. Similarly, the rods and screws that hold the spine in place while the fusion heals can be inserted via multiple small incisions even less than an inch. Thoracoscopic instruments — tools that aid in visualization and operation through portal holes in the chest — allow a surgeon to address part and, in some cases, the whole correction of a patient with scoliosis. During kyphoplasty to treat painful vertebrae fractures caused by osteoporosis, the surgeon makes two small incisions and inserts a tube in the center of the vertebrae. Cement is injected into the weakened vertebrae, creating almost immediate pain relief.



## **AMBULATORY SPINE SURGERY DISCHARGE INSTRUCTIONS**

### **WOUND CARE**

After surgery, there will be a light dressing covering your back wound (please note this may not be waterproof). Do not wet the dressing and back wound for 3 days. You may then take light shower 4 days after surgery and remove the dressing and dry and expose the wound (as the smaller bandages or steri-strips begin to peel off, they can be removed). Do not soak in a bathtub or swim till after 2 weeks following surgery

### **ACTIVITIES**

- do not lift weight greater than a carton of milk for 1 month
- do not drive for 1 week after surgery until comfortable
- do not sit for longer than 15 minutes for 1 month after surgery
- do not engage in rigorous sports or heavy work for 2 months after surgery
- you may resume light work after 1 week if not physically demanding
- gradual resumption of exercise, starting with walking (but not cycling, swimming and jogging - wait after 1 month), is encouraged but if the activity causes pain, then stop (otherwise unlimited walking distance)

### **DIET**

You may resume a regular diet after discharge if there is no more nausea or vomiting from the anaesthesia.

### **PAIN MANAGEMENT**

You only need to take the prescribed pain medications only during times of pain causing discomfort – you don't have to take them everyday if you are comfortable. Please stop the medications if signs of allergic reaction (skin rashes, breathing difficulty, swollen eyes or lips or face)

### **WHEN TO SEEK MEDICAL ATTENTION**

- please call/return if signs of wound infection (wound redness, wound discharge, fever and chills) - a slight amount of wound drainage is normal for up to 2 days following surgery
- please call/return if persistent worsening pain, numbness or weakness or abnormal bladder activity (occasional or intermitent symptom is part of healing process)

### **DISCHARGE CRITERIA ON THE SAME DAY**

- your vital signs are stable,
- your wound is not bleeding,
- you regain the ability to walk on your own,
- you can eat without nausea, and
- your bladder activity is normal.

### **References**

1. Bookwalter JW, Busch MD, Nicely D. Ambulatory surgery is safe and effective in radicular disc disease. Spine 1994; 19: 526-30.
2. Zahrawi F. Microlumbar discectomy. Is it safe as an outpatient procedure ? Spine 1994; 19: 1070-4.
3. Foley KT, Smith MM. Microendoscopic discectomy. Tech Neurosurg 1997; 3: 301-7.
4. An HS, Simpson JM, Stein R. Outpatient laminotomy and discectomy. J Spinal Disord 1999; 12: 192-6.
5. Singhal A, Bernstein M. Outpatient lumbar microdiscectomy: a prospective study in 122 patients. Can J Neurol Sci 2002; 29: 249-52.

### **Useful Websites**

Spine Universe at <http://www.spineuniverse.com>

Spine Health at <http://www.spine-health.com>

Dr Fong Shee Yan, MBBS FRCSEd(Orth) MMed(Surg) FAMS(Orth)  
Consultant, Spine Service  
Department of Orthopaedic Surgery  
Tan Tock Seng Hospital  
11 Jalan Tan Tock Seng  
Singapore 308433  
Email [shhee\\_yan\\_fong@ttsh.com.sg](mailto:shhee_yan_fong@ttsh.com.sg)