

Orthopedic Diseases

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Low back pain (LBP)

The most common questions that strike us are:

What causes low back pain?

What are the manifestations of low back pain (LBP)?

How is this condition diagnosed?

How this condition is medically managed?

How does yoga treat LBP?

Nine out of ten persons have had at least one episode of low back pain in their lives. The human being is an erect species and this is erroneously thought to be a predisposing factor. It is very possible to live without back pain. One has to know the techniques for this: not the usual guidelines to avoid bending forward, or avoid lifting heavy weights and so on, but a thorough knowledge of exercises that benefit the back and proper performance of the postures. Before embarking on a detailed discussion of low back pain, let us review the causes for this condition. Apart from a protruded disc, there are a number of conditions that cause low back pain. I have listed them below:

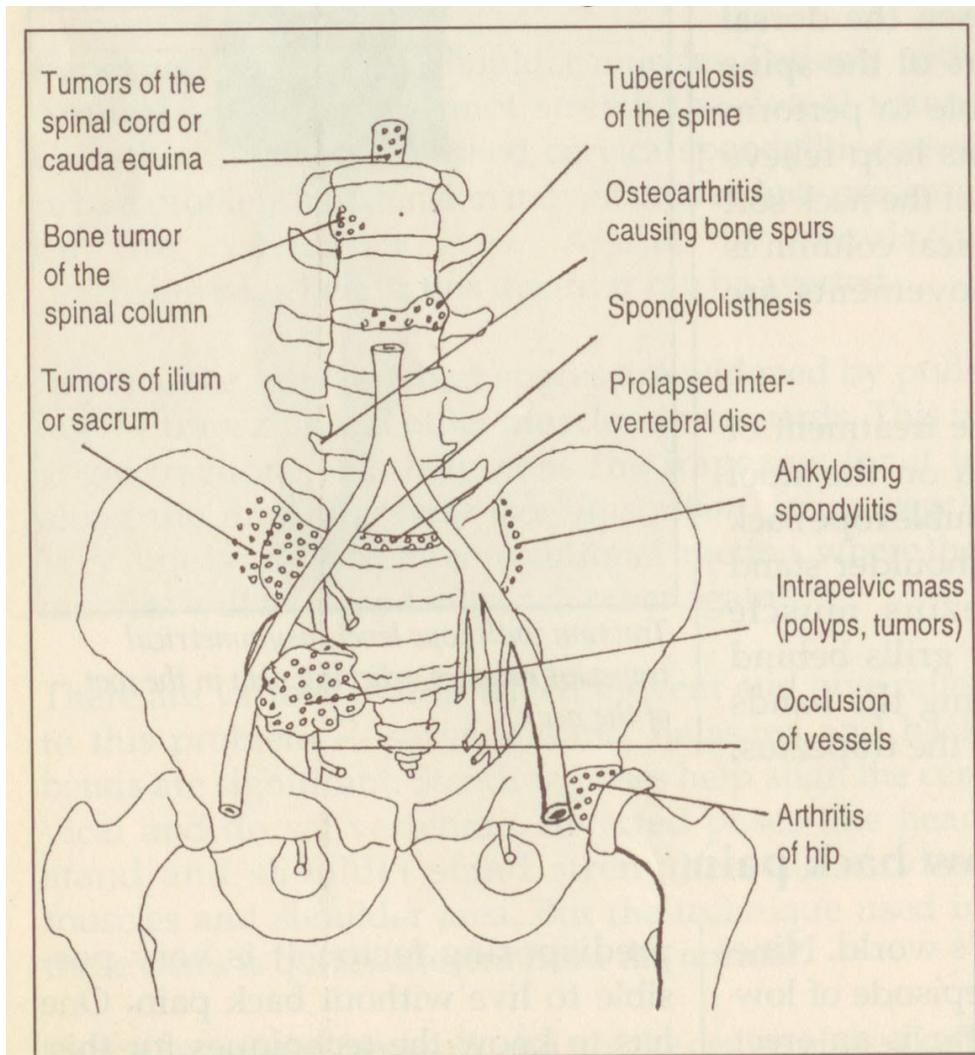


Fig 165 *Conditions, other than protruding discs, that cause pain in the lower back or leg.*

Figure 1-Causes of LBP: (Diagram reproduced with permission from A Matter of Health: Integration of Yoga and Western Medicine for prevention and cure).

Some possible causes of LBP:

Degenerative changes of the spine: arthritis, spondylitis, etc;

Strains, sprains and fractures of the spinal bones;

Tumors of the spinal cord;

Tumors of the spinal and pelvic bones;

Infections of the spine;

Ankylosing Spondylitis, the so-called 'bamboo spine' where the entire column becomes calcified and movement is nil in the late stages;

Any malignancy with spread to the spinal column as in breast cancer, tumors of the abdominal and pelvic viscera, chronic prostatitis in the male;

Blockage of the blood vessels in the pelvis;

Arthritis of the hip;

Gynaecological conditions: pro-lapsed uterus, painful periods, pregnancy;

Menopausal bone disease: osteoporosis, Paget's disease where the condition is one of faulty remodeling of bone which is abnormally fragile.

What are the clinical manifestations of LBP?

Local pain (see fig below) is usually caused by any process that irritates structures that contain nerve endings. The process can be any of the above factors, but in this discussion I am concerned solely with mechanical low back pain due to asymmetric muscles and ligaments as this is by far the most common cause.

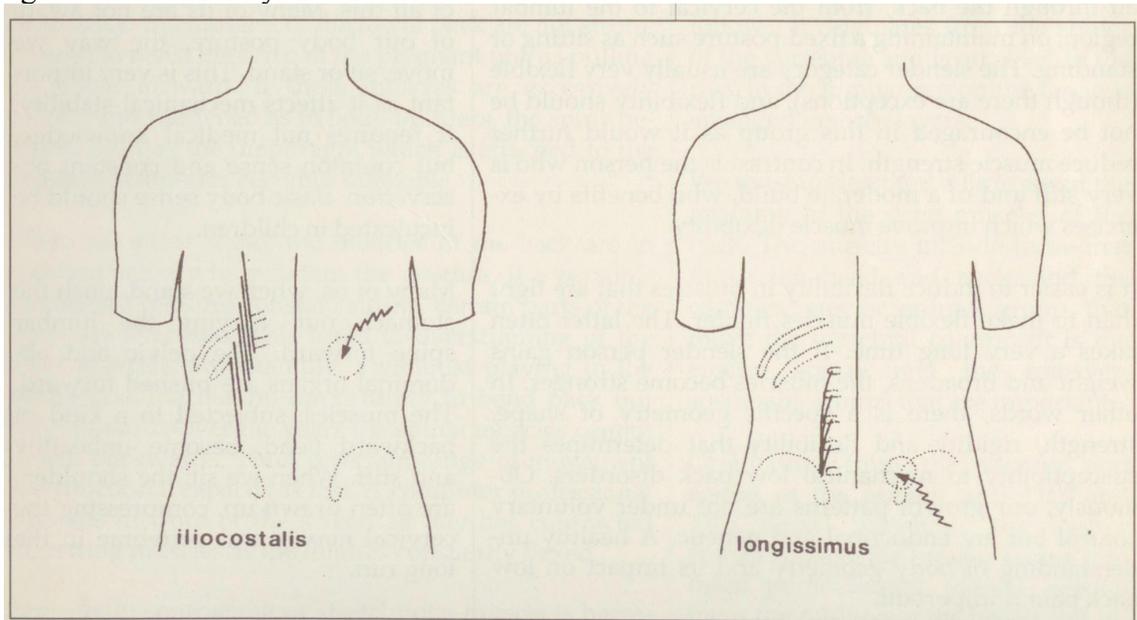


Fig 166 Typical locations of tenderness in relatively superficial back muscles, following sprains of their myotendinous junctions. Left: Tenderness in the iliocostalis lumborum pars thoracis, near the costal attachments of its fascicles. Right: Tenderness in the longissimus thoracis pars lumborum where its fibres form the lumbar intermuscular aponeurosis. [Diagram reproduced from Bogduk/Twomey, *Clinical Anatomy of the Lumbar Spine*; Courtesy: Churchill Livingstone, Publishers]

Figure 2-Common areas of lower back pain manifestation: (Diagram reproduced with permission from A Matter of Health: Integration of Yoga and Western Medicine for prevention and cure).

Referred pain is pain arising in one area manifesting in another area. For example, if the patient suffers from pancreatic disease or ulcerating peptic disease, the pain may be referred to the back of the spine (behind the stomach region). Pain due to lumbar disease is felt in the groin and thigh. This is due to the areas being activated by the same nerves. The logic is similar to the shock felt in one part of the house if there is a short-circuit of electrical wiring at some other point.

Root pain is (see fig below) due to compression of the nerve roots as they emerge from the spinal canal. Characteristically, anything that aggravates intra-spinal pressure, like sneezing, coughing, or straining, aggravates the pain. Other maneuvers like stretching the leg while supine stress the lower back and bring on root pain.

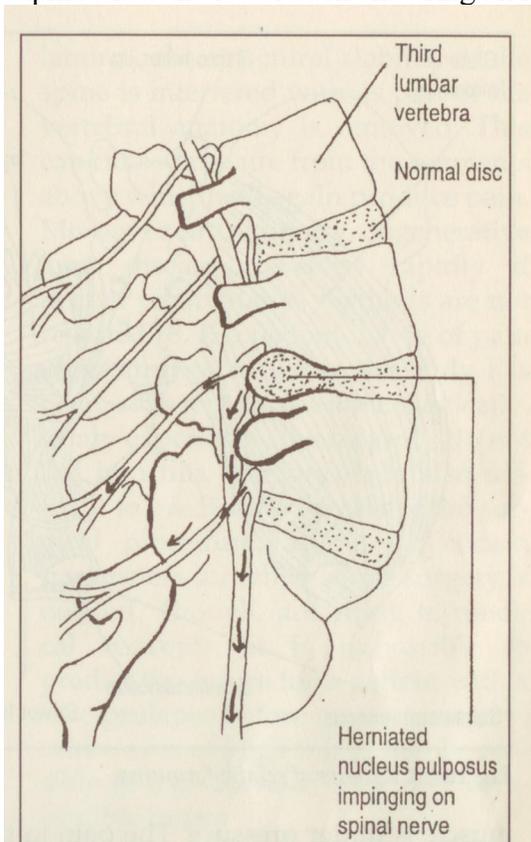


Fig 186 *Herniated disc (arrows indicate perceived pain paths along nerves).*

Figure 3-Nerve root compression: (Diagram reproduced with permission from A Matter of Health: Integration of Yoga and Western Medicine for prevention and cure).

To Summarize:

Local pain

Referred pain

Root pain

What causes the radiating pain in the leg?

If the third and fourth lumbar nerves are involved, the patient may complain of pain in the front of the thigh. If the fifth lumbar and first sacral nerve roots are affected, the patient may not be able to extend the big toe of the concerned foot upwards. This radiating pain in the leg is known as sciatica as it involves the sciatic nerve that courses down the leg on both sides. Incidentally the sciatic nerve is the longest in the body. Muscle spasm causes localized pain.

If the patient is suffering from a chronic low back disorder, the involved muscles may be very tight and inelastic, swollen, nodular and resistant to any attempt at stretching.

Diagnosis of LBP:

On examination of the patient and looking for certain signs, a diagnosis is made. Of importance is limitation of movement in several directions. This depends on the height of the patient, whether he/she is slim or fat, and the relative flexibility of the various spinal and hip joint muscles. Paradoxically the patient may have fairly complete spinal movements and yet suffer from pain.

A preliminary radiograph may reveal some abnormality. A computerized axial tomography (CAT scan) or magnetic resonance imaging (MRI), along with other relevant investigations, may be needed in certain cases to establish the diagnosis. If no pathology can be identified, the cause is of a mechanical nature. If a cause is found, the remedy is to treat the cause. For example, if a tumor is pressing on the spinal cord, it is to be removed. If there is an infection of the spine like tuberculosis, the appropriate drug is instituted. If the spinal anatomy has been destroyed due to infection, surgical correction and restoration of the anatomy to as near normal as possible is to be carried out to prevent pressure on the spinal cord and subsequent paralysis.

Mechanical low back pain:

By far the majority of patients suffer mechanical low back pain. This is due to stiffness of the low back muscles. The stiffness includes disorder in rotation, flexion, lateral bending (sideways bending) and backward bending movements. This stiffness can be familial in occurrence. Many persons have thick set muscles and broad frames, though not necessarily being on the fat side. More often this stiffness is acquired due to poor posture over the years and lack of exercise which makes the muscles tighter. A sudden strenuous activity results in snapping of the muscles of the back.

Some have a slender build and are thus prone to low back disorders as the spinal muscles are too long (if they are tall individuals) and thin to be strong for postural activity. Such persons suffer recurrent back pain all through the back, from the cervical to the lumbar region, on maintaining a fixed posture such as sitting or standing. The slender category are usually very flexible (though there are exceptions), and flexibility should not be encouraged in this group as it would further reduce muscle strength. In contrast is the person who is very stiff and of a moderate build, who benefits by exercises which improve muscle flexibility.

It is easier to induce flexibility in muscles that are tight than to make flexible muscles tighter. The latter often takes a very long time. If the slender person gains weight and broadens, the muscles become stronger. In other words, there is a specific geometry of shape, strength, rigidity and flexibility that determines the susceptibility to mechanical low back disorders. Obviously, our growth patterns are not under voluntary control but are endocrinal and genetic. A healthy understanding of body geometry and its impact on low back pain is important.

Importance of posture and proper muscle tone:

Sitting hunched in a chair, rounding the lumbar region, increases pressure on the muscles and produces muscle fatigue. Over the years the muscles tighten. Caving of the chest while sitting produces a deformity of the dorsal spine leading to premature degenerative changes. Poor mattresses, curling up into the fetal position while sleeping, oversleeping, are some of the other habits that make for stiff and unhealthy muscle tone.

Currently, my youngest patient with a low back problem is 16 years old. This is hardly the age to suffer such a health problem. Enquiry revealed that the patient rarely exercised or participated in any kind of body movement even in school, postural patterns were poor and added to this was a lack of awareness of the impact of all this. Many of us are not aware of our body posture, the way we move, sit or stand. This is very important as it affects mechanical stability. It requires not medical knowledge, but common sense and constant observation. Basic body sense should be inculcated in children.

When we stand, many of us, push the stomach out, curving the lumbar spine forward. The pelvic and abdominal organs are pushed forward. The muscles, subjected to a kind of backward bend, become unhealthy and stiff. When we sit, the shoulders are often drawn up, compressing the cervical nerves and vertebrae in the long run.

Some of us are naturally flexible in bending forward and others while bending backward. The levels of flexibility can sometimes be as good as in a trained individual. The exact reason is still not understood but patterns of daily usage certainly influence this condition to some extent.

It is important to maintain a certain degree of flexibility and rigidity to avoid low back pain. Excessive rigidity or flexibility is harmful. A violin string that is too tight can snap during usage and one that is too loose does not have the right resonance. It is not important to practice all the complicated asanas to prevent back pain, but a few important ones are necessary.

The role of weak abdominal muscles:

Low back pain can result if the abdominal muscles are weak, whether or not one has a sagging abdomen, as the abdomen drags the spine forward producing constant traction on the spinal muscles. This is why some women develop low back pain for the first time during pregnancy: the muscles of the lower back are not strong enough to resist the force of the pregnant uterus pulling the spine forward. If these muscles are excessively trained and hardened as in body builders, the spine becomes rigid as the diaphragm which is attached to

the abdominal muscles becomes inflexible.

When we sit or stand, the muscles of the back are in constant activity to maintain the posture. If a person's occupation requires constant sitting, certain parts of the body are overused. This leads to overstraining of the other muscles. For example, a violinist playing in the sitting position has no opportunity to bend back but only forward. Over the years the spinal muscles cannot stretch backwards. Thus, a certain range of movement and functional capacity is lost.

A computer professional who sits in front of the screen all day has contracted hamstring muscles as the thigh is constantly flexed. Restricting the duration and number of hours of sitting, standing or traveling as the case may be is prudent.

Repeatedly contracting or stretching a muscle is harmful if steps are not taken to use the body in the opposite direction. If a muscle is maintained in the same posture or used in a repetitive movement, the consistency of the muscle changes over the years. Muscles have a visco-elastic property. Excessive one-sided strain harms healthy functioning. Circulation is hampered and so is proper oxygenation. As use of the muscle in the opposite direction is avoided, a minor movement in that direction may precipitate a strain or a tear due to muscle stiffness. Hence harmonious usage is essential.

When we move, sit or stand, muscle activity is so automatic that we tend to take it for granted. It is important that the spine be kept flexible in all directions. Hence we must practice a few asanas in turning the body in different directions. Exercising the back muscles must never be in a jerky manner. A steady state of stretch or contraction is more conducive to tissue health.

The normal physiological response of a muscle to an initial stretching stimulus is to resist the stretch. If the stretch is maintained for a certain period of time, the muscle gently elongates, the resistance diminishes and electro-physiologically the entire muscle is quiet. Blood flow to the muscle is increased. The quality of flow soothes the cells. Daily practice maintains the softness and hardness of muscles. Proper toning occurs.

In dynamic jerky stretches (the muscle being stretched and immediately contracted before it has had time to adjust its reaction to the initial stretch), the muscle contracts to a smaller length than the initial, i.e., before the exercise started and the next day the muscle is tighter. Hence, frequent tears are more common in jerky exercises. This never happens in steady state practice as there is no momentum produced (movement is absent) to damage the muscle. Flexibility programmes (which do not mean only stretching but both rigidity and flexibility) are very important. More important is alignment in muscle stretches. Every muscle has a certain anatomical direction in which it has to be stretched. Deviation from this can cause injuries.

Symptoms of the patient:

The most urgent complaint is that of pain. The nature of pain may be dull, stabbing, diffuse

or a combination of all these. This can be localized in the area of the pathology pointed out by the patient. The pain may begin suddenly without any previous history. The situation may be similar to that of a slipped disc in that the back 'freezes' when the patient bends down to pick up something. Or, the pain may be brought on by a sudden violent sneezing bout, to persist thereafter. Depending on the patient's threshold of pain, it is described as mild, moderate or severe. The pain varies from time to time. It can be worse in the early mornings to get milder at the end of the day, or vice versa. As the body is maintained in a fixed position for many hours during sleep, the muscles tend to stiffen. This can increase the pain. During the day, movement releases muscle spasm, and the pain lessens.

The pain is aggravated by driving, poor posture while sitting or standing, riding a two-wheeler; jogging or walking definitely inflame the pain — not always during the movement, but hours later. Pain may be related to specific directional movements. It waxes and wanes, disappearing after a variable period of time or becoming a chronic ailment. Occupational low back pain is a common in people who maintain the same posture for many hours.

The patient is able to localize the pain accurately. It can be in the lower back centrally, or to the sides, or the entire lower back. It may radiate to the buttock if a nerve is pressurized at a higher level, or to the leg. Degenerative spinal joint disease can cause pressurization of the nerve roots in the spinal canal without concurrent disc disease and hence the radiation of pain.

Stiffness is the other principal symptom. The patient complains of limitation of movement in specific directions. Like the pain factor, stiffness varies from time to time. A climate controlled atmosphere can definitely stiffen the muscles.

The third factor is limitation of movement. The patient may complain of restriction in flexion, or bending the spine backward or sideward, or a combination of bending forward and rotation. The pain may be aggravated by any of these movements.

To Summarize:

Pain of varied nature- dull, stabbing, aching etc

Local or diffuse pain in the back

Stiffness of the back

Pain made better or worse by movement

Medical management:

Relieving the pain is the first and foremost job of the physician. If the pain is severe this might require rest in bed for a few days or, in severe cases, a few weeks, along with analgesics to relieve pain. If the pain started after lifting a heavy object, the injury may be more severe. The proper method of lifting should be followed. It is necessary to bend the knee, but it is more important to take the load of the object on the biceps muscle and not the back in the process of lifting. The spine can be, and has to be, stretched forward (there is no need to keep an erect spine) and not bent forward which, if it happens, is the sole cause of injury. Moreover, even if the technique is right, if the weight is more than the person's body

can manage (for the height of the body, strength of the bones, and thickness of the spinal muscles), injury can result.

The mattresses used for sleeping must be hard and supportive. A foam mattress is better avoided. Sleeping on the floor is not suitable for all and hence not a correct advice that is often doled out. This instruction has to be individualized. A coir or cotton mattress is preferable for most. Use of the lumbar belt is not advisable as it hampers spinal muscle flexibility and makes the patient dependent on extrinsic support. Our body must develop its own intrinsic ability to sit or stand and perform chores. The belt with a shoulder harness can however be used for those involved in manual work.

As early as possible, the patient must be weaned off analgesics, and exercises should be instituted to strengthen the spine. Pain may still persist when the exercises are begun. As the muscles are stretched and soothed, the pain lessens. Of course, it is harmful to exercise when there is too much pain. But it is important to understand that too much rest is counter-productive as it further stiffens the tissues. Within certain limits of pain, exercise must be begun, and monitored by the physician.

When an injury occurs the tissues are contracted. If left alone, a kind of permanent tightness occurs and the tissues resist stretching later. It is this situation that causes pain at the first attempt. The patient may not be aware whether the pain which increases during exercise is due to wrong techniques applied, or a healthy kind of pain due to initial attempts.

This requires the guidance of a qualified physician. Usually, healthy pain disappears after a few days. The wrong kind worsens. If we are sensitive to our body, it is possible to differentiate between the two kinds of pain. So pain is not “good or bad”. When a healthy person attempts a hamstring stretch for the first time, pain and soreness will result for a few days (which will later subside). One must understand why the pain arose and not avoid exercising just because pain persists.

Exercises prescribed according to common medical concepts are not always useful as they lack range of movement and certain anatomical tenets are not followed. For example, if the thighs are flexed and brought to touch the stomach, it stretches the spine; but there are many points to observe on how the abdominal muscles should be used, whether or not the thighs should be kept together, manner of breathing, etc.

Extension exercises done with an injured back will most certainly aggravate the pain in the majority of cases. The action of muscles in this pose is against gravity and, as the back is already weak, any strain in this direction causes more pain. It is essential to remove pain first by different postures and then load the muscles by lifting the legs (which means that the person lifts a weight against gravity), to build strength on the spinal muscles. Later, extension exercises like Salabasana can be done. In a small proportion of patients, these exercises do relieve pain. It only means that the spine was ready to practice them.

Stretching the hamstrings to improve tone and flexibility is important for a patient with low back pain, especially if the muscles are tight. Generally, the patient is advised to lift and raise the leg as high as possible in the hope of stretching the muscle. But this method will

not improve flexibility as the leg cannot be stretched without being pulled up. Moreover, the position of the pelvis, the position of the leg on the floor, the position of the inner groin of the stretched leg, all have to be carefully adjusted.

To Summarize:

Pain relief using drugs, rest, traction etc

Exercises to relieve pain

Yogic management:

Again, relieving the pain forms the main object of management. If the pain has been reduced with analgesics, the patient can tolerate the strain of exercises better. Unless rehabilitation is done, the patient can never recover fully. The pain may subside, but deep-seated dysfunction will persist.

Simple asanas like Pavanamuktasana with or without pillows, Uttanasana with support, progressing to twisting postures near the wall like Bharadvajasana and Marichyasana, dog pose, stretching the hamstrings in hasta and Supta Padangusthasana with assistance, are necessary.

Depending on the clinical condition and age group of the patient, the nature of the body with regard to flexibility and rigidity, recovery can be expected in three to four weeks. Thereafter, the patient should continue to practice yoga without discontinuance, as the condition may recur. This does not mean that the situation is incurable; but in order to prevent degeneration and de-conditioning of muscles, which occur rapidly with lack of regular exercise, maintenance of therapy is essential.

All standing poses are very useful to contract, stretch and strengthen the spinal muscles and to relieve pain. Props can be used whenever needed. The patient must learn not to overstretch or under stretch the muscles; neither is conducive to the health of the spine. Dog pose is invaluable.

The range and geometry of movements are far more sophisticated in yoga, which is methodical in its approach. If the patient is regular in practice, a pain-free back is possible. Usually, the female body is softer and suppler due to hormonal reasons. But, nowadays, women are as stiff as men due to faulty posture and lack of exercise, particularly flexibility enhancing ones. During the menstrual cycle, a woman can practice certain exercises to relieve back pain; if the pain is severe, all recommended asanas can be practiced.

What is needed to relieve pain is full flexibility in forward bends. A healthy back can easily flex to the floor either sitting or standing. Initially the exercises are used to gently stretch the muscle under pain, which is generally constricted. Hence the exercises work like traction which creates space.

Later, after a certain range of movement is achieved, both contraction and extension of the muscles are necessary. There are times when no amount of exercise will help when a muscle is under spasm. Even rest and analgesics may not help to the needed extent. The patient must understand when to give rest to the body, when to use an analgesic, when to exercise.

Patience and perseverance are needed to ensure full recovery. Finally, keep your weight controlled; maintain a good posture while sitting and standing. These are very necessary. Many of us sit erect for a short period of time and then tend to hunch and back or neck pain is usually worse towards the end of a day as our awareness wanes! We need to be ever conscious of posture. Of course, occasionally slouching may not damage the spine but we tend to slouch most of the time.

To Summarize:

Enhancing flexibility in the affected part

Realignment of muscles and bones

Availability of a variety of yoga poses

Learn yoga poses under the monitoring of a physician

For further clarifications please contact your physician.

Tips for a healthy back (includes the entire back)

1. Sit very erect always
2. Avoid prolonged sitting if your job involves being seated always
3. Stop smoking and avoid alcohol
4. Exercise daily – include both flexibility and strength training in this routine
5. Use a thin pillow of a soft material- avoid the so called special pillows meant for such ailments.

Can back pain be prevented?

It certainly can be, if one takes the following measures

1. Include a session of yoga in your daily routine
2. Avoid slouching and develop awareness of your body habits and posture
3. Keep your weight under control
4. Use firm non sagging mattresses.
5. Include proper lifting techniques.

Who is most likely to develop spinal pain?

1. Those who maintain a sit for several hours without movement- the duration of sitting is variable – all human beings have different thresholds for this.
2. Those who stand long hours without a break.
3. Extremely slender persons- as their spinal muscles are weak and lack postural-strength retaining capacity.
4. Obese persons-as their body is too immobile and awkward to be carried about.
5. Couch potatoes in sloppy postures.

How is spinal pain diagnosed?

1. Clinical examination
2. Radiological procedures- X-ray. MR and a CT scan. Not all are needed for each patient.
3. Blood test to rule out infections and other pathologies.
4. Lifestyle of the patient is most important.