

Low Back Pain in Young and Middle-Aged People

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Abstract: The low back pain in the young and middle-aged people is characterized by “so-called low back pain,” or nonspecific low back pain in which the cause is difficult to identify, that is more common compared with other age groups. Behind the high incidence of nonspecific low back pain of young and middle-aged people lies the fact that these people must maintain a high degree of activity of daily life at the time when the aging-related changes in the lumbar spine and tissues surrounding the lumbar spine start to occur, thus creating a gap between social needs and physical capabilities. Nonspecific low back pain must often be diagnosed based on exclusion, and it is important in particular to differentiate serious diseases such as spinal tumor and infectious spine diseases. Symptomatic therapies and instructions on daily life are performed mainly as the treatment methods, thereby it is important to eliminate patients’ anxiety by explaining that the condition is not a disease of malignant nature and that no concern is needed in this regard. In the case of acute pain, it is also important in the treatment to prevent the condition from becoming chronic. The onset of nonspecific low back pain involves various factors, and socio-psychological factors may also be involved as an important cause, besides structural and physiological abnormalities in the lumbar region. In responding to the complaint of low back pain, tackling this disease by grasping the whole picture of each patient’s life from the standpoint of a living function-related disease, instead of merely providing anti-inflammatory analgesics, is considered to lead to early social rehabilitation.

Key words: Low back pain; Young and middle age; Pathology; Treatment

Introduction

The frequency of low back pain increases as

age advances, and its prevalence in the elderly population of age 40 and older is as high as 20 to 40%. On the other hand, the prevalence of

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low back pain is about 10 to 25% in the age group from the late teens to age 40, defined here as young and middle-aged people, and in this age group the incidence of low back pain itself is relatively low. People in this age group are highly active in daily life and are exposed to various stresses. Unlike in the elderly, however, the aging-related changes are minimal in this age group. Due to these circumstances, therefore, low back pain in this age group is characterized by high incidence of “so-called low back pain”, or nonspecific low back pain without any clear-cut diagnosis being specified.

In this report, I will discuss nonspecific low back pain, which is clinically the most common low back pain in young and middle-aged people.

Characteristics of Low Back Pain in Young and Middle-Aged People —Nonspecific Low Back Pain

The causes of low back pain are diverse, as with headache and stomachache, and diseases with low back pain as the chief complaint involve various specialized fields. Among them, low back pain from the lumbar spine can be classified into the following three categories: (1) nonspecific low back pain, (2) radicular pain, and (3) pain due to serious spinal lesions. Serious spinal lesions include tumor, infection, and cauda equina syndrome.

The background of low back pain in young and middle-aged people is the gap between social needs and physical capabilities, caused by the need to maintain high degree of activity of daily life (ADL) at the time when age-related changes of the lumbar spine and the tissues surrounding the lumbar spine start. Low back pain whose cause is difficult to identify because of its onset with such a background is called nonspecific low back pain, and in young and middle-aged people it is characterized by more frequent nonspecific low back pain, compared with other age groups.

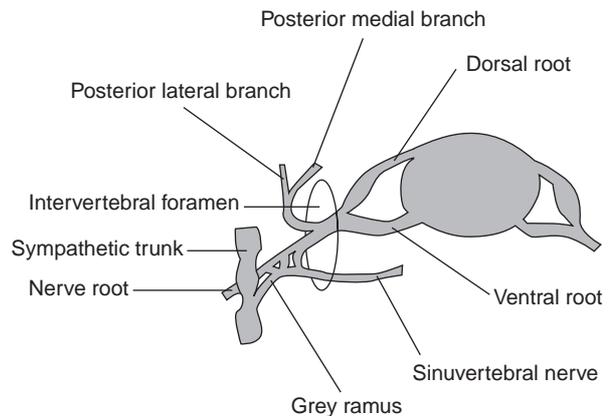


Fig. 1 Nerves related to low back pain

Pathology of Non-Specific Low Back Pain

There are not so many nerves related to low back pain as might be imagined, and they can be largely classified into dorsal and ventral rami of spinal nerves. Ventral rami of spinal nerves consist of spinal nerve roots, recurrent branches called sinuvertebral nerves, and grey rami that communicate with sympathetic nerves. Dorsal rami of spinal nerves consist of medial branches, distributed medially to the spine, and lateral branches distributed outside. Because nonspecific low back pain does not involve nerve root symptoms or cauda equina symptoms, nerves other than spinal nerve roots, which are sinuvertebral nerve, grey rami, medial branches, and lateral branches, are considered to be related to nonspecific low back pain (Fig. 1).

As to the areas innervated by these nerves,¹⁾ sinuvertebral nerves innervate epidural connective tissue, dura matter, posterior longitudinal ligaments, and discs, and grey rami innervate anterior longitudinal ligaments and uncovertebral joints. Among dorsal rami, medial branches innervate facet joints, multifidus muscle, and rotator muscle, and lateral branches innervate thoracolumbar fascia, intertransverse muscles, lumbar quadratus muscles, erectors, and skin of the low back region. Therefore, every region innervated by these nerves can

cause nonspecific low back pain, and it is difficult to systematically classify them. Also, clinical characteristics of low back pain from these regions are often similar, making differentiation of each difficult. It can be thus concluded that low back pain without occurrence of nerve root symptoms or cauda equina symptoms, is defined as nonspecific low back pain.

Specifically, acute low back pain often occurs due to injury-related elements, such as a minor change of body position, or lifting something carelessly in a half-sitting position. These elements include spraining of intervertebral joints and damage of interspinous ligaments. Also, small repeated movements, which even patients themselves do not notice, sometimes cause acute low back pain. On the other hand, chronic low back pain is often due to structural or physiological fragility in the lumbar part. These cause pain in the lumbar spine and surrounding tissues, which is the pathology of nonspecific low back pain.

In some cases of nonspecific low back pain, the source of pain becomes clear in the course of treatment, or as a result of the treatment, like low back pain due to facet joint, degenerative intervertebral disc, and fibrositis.

Diagnosis

An important point in diagnosis is to differentiate a serious disease without missing it. Serious spinal diseases are spinal tumor and infectious spinal diseases. As diseases in other fields besides orthopedics, a lesion in an organ that exists in the retroperitoneum (kidney, urinary duct, and pancreas), or a lesion in the uterus or the ovary in a female patient, can be accompanied by low back pain. Serious diseases include malignant tumor in the above-mentioned retroperitoneal organs, abdominal aneurysm, and metastasis of gastrointestinal cancer to the lumbar spine. These diseases should be kept in mind while making a differential diagnosis.

1. History-taking

For low back pain, considerable information can be often obtained by history-taking. It is important to ask for details on the onset of the low back pain, and about the presence of disorders in regions other than the lumbar region, such as the abdomen, reproductive organs, and urinary organs. In particular, confirmation on the presence of low back pain at rest is important. When low back pain is present regardless of rest or movement, it should be considered malignant tumor or diseases of internal organs. When pain is present in a lower limb in addition to low back pain, there is a high possibility of radicular pain instead of nonspecific low back pain. Also, as to chronic low back pain, it is important to ask patients' social background, such as the family environment, employment status, and the kind of work. Regarding the medical history, it is necessary to confirm history of injuries, subscribed steroids, presence of motor palsy, etc.

2. Physical findings

Regarding physical findings, it is important to examine not only the lumbar region but also the entire body. Locally, root symptoms and cauda equina symptoms should be checked. Tests should be conducted on muscle strength of the lower limbs, deep tendon reflexes, perception disorder, and the straight leg raising (SLR) for assessing the tension state of nerve roots. The SLR test technique is performed easily. The patient's leg is raised with the knee straight in the supine position. If pain is present on the backside of the thigh, and along the knee and the lower thigh at a raising angle of 70 degree or less, the test result is positive and suggests the presence of a nerve root symptom while the presence of nonspecific low back pain becomes doubtful.²⁾

3. Tests

Diagnostic imaging is useful for diagnosis by exclusion. X-ray examination is useful for low back pain with fever; low back pain that is

present even at rest; low back pain accompanied by weight loss, low back pain that occurs during long-term steroid use, and low back pain with a history of injury. In other words, such imaging tests are useful to make a differential diagnosis regarding tumor, infection, vertebral fracture, etc.

If there are findings suggesting a tumor or infection, blood tests are useful for peripheral blood, C-reactive protein (CRP), alkaline phosphatase, and various tumor markers, or imaging tests such as bone scintigraphy, CT, and MRI are also useful.

In the case of chronic low back pain, various block injections are sometimes conducted, though these are somewhat specialized, to find the source of pain.^{3,4)} Blocks include trigger point block, intervertebral joint block, posterior medial branch block, and epidural block. Each has not only a diagnostic but also a therapeutic significance. In the practice, caution must be used regarding bleeding tendency and the presence or absence of infection in block segments.

Treatment

1. The point in treatment of nonspecific low back pain

The point in treatment of acute nonspecific low back pain is, first, to eliminate the patient's anxiety by explaining that it is not a malignant disease and no concern is needed in this regard. Also, it is an important point in the treatment to prevent the pain from becoming chronic.

Even in the case of chronic nonspecific low back pain, it is important to eliminate patients' anxiety by explaining that it is not a malignant disease once a diagnosis is established, as in the case of acute pain. In addition, unlike in the acute case, chronic low back pain is associated with major detrimental factors involving not only organic elements but also psychogenic elements due to long-term pain, and this should also be addressed in handling patients with chronic pain. While the conventional goal of

the treatment of low back pain has been a complete elimination of the pain, currently the goal has shifted to aiming at social rehabilitation.⁵⁾ For this very purpose, it is important to explain to patients in advance how much can be cured, or the expected treatment efficacy, though sometimes judgment may be difficult. Long-term and purposeless hospitalization should be avoided, as it can inhibit improvement of low back pain.

2. Treatment of acute nonspecific low back pain

For acute nonspecific low back pain, symptomatic therapies are the mainstay of treatment, such as local heating/cooling, administration of analgesics, or nonsteroidal anti-inflammatory drugs (NSAIDs). The opinion that has in recent years brought about the most important change in the treatment of acute low back pain is about rest. Conventionally, rest has been considered the best measure for an attack of acute low back pain. Currently, however, giving guidance onto continuing normal activities as much as possible, though a few days' rest may be necessary in some cases, is said to prevent the acute pain from becoming chronic and eventually to speed up social rehabilitation.⁶⁾ It is now also said that long-term bed rest causes chronic disorder and makes rehabilitation more difficult.⁷⁾ Therefore, it is not necessary to force bed rest, unless the patient is in severe pain. When bed rest is needed, a posture to reduce lumbar lordosis should be taken. In either a supine position or a lateral decubitus position, the patient should rest with the hip joints and knee joints bent. In the supine position, a pillow or the like is needed under the knees.

It is reported that 80 to 90% of acute nonspecific low back pain usually heals within six weeks.⁸⁾ Because low back pain is a self-limited disease, if the symptom does not improve even after three or four weeks, further tests are needed to check for a potential serious disease and to find out the cause of the pain.

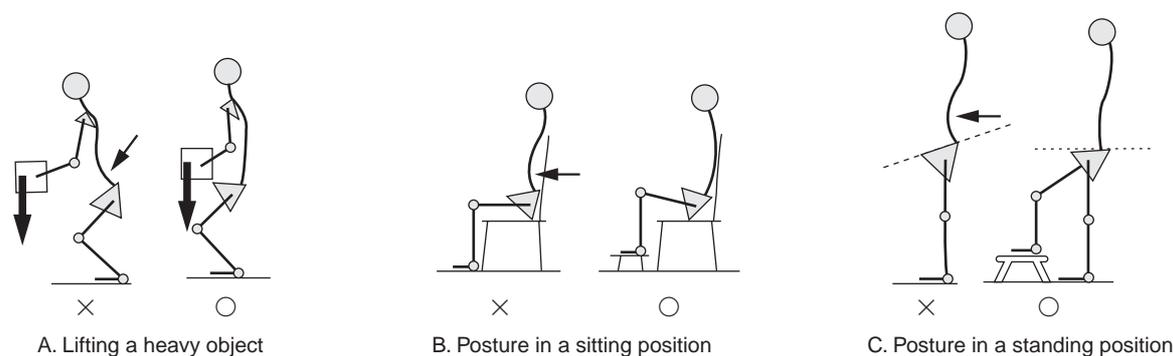


Fig. 2 Instruction on daily living

3. Treatment of chronic nonspecific low back pain

Generally, low back pain that lasts more than three months is called chronic low back pain. In many cases, chronic nonspecific low back pain is due to physiological and structural fragility in the lumbar region, and it is often caused by improper posture, which can be called a living functioning impairment. Specifically, the causes are considered to be weakness of the lumbar spine and muscles surrounding the lumbar spine, which maintain alignment (position and compatibility) of the entire spine, resulting in failure to maintain appropriate posture, instability of the lumbar spine, and excessive burden on muscles and fascia surrounding the lumbar spine.

Also, risk factors for making acute nonspecific low back pain chronic can be sociopsychological issues, such as complaints at work, financial problems, and legal problems, even more than clinical factors.⁹⁾ Therefore, the treatment that includes guidance on daily life and psychological approaches is needed.

(1) Guidance on daily life

In the treatment of chronic nonspecific low back pain, guidance on daily life is especially important and constitutes a central role of the treatment.¹⁰⁾ Either at the workplace or at home, the basics of caution in low back pain management are the same.

When lifting a heavy object, the load to the

posterior lumbar spinal soft tissues should be reduced by bringing the object as close to the body trunk as possible and shortening the distance between the lumbar part to the object (Fig. 2, A).

For a type of job that requires sitting for long hours, it is recommended to make the knee height higher than the buttock height, or to sit with the knees crossed, to reduce lordosis of the lumbar spine (Fig. 2, B).

In a standing posture, a footstool should be used to prevent excessive lordosis and to reduce muscle fatigue, because this can reduce lordosis of the lumbar spine and the burden on lumbar muscles by keeping the pelvis horizontal (Fig. 2, C). At any rate, the basic caution is to avoid keeping any one posture for long hours.

(2) Drug treatment

Pain is sometimes treated with NSAIDs and muscle relaxants, but for long-term use, it is necessary to choose drugs with low incidence of adverse reactions, such as gastrointestinal disturbance. If a drug is needed, the minimum necessary amount should be administered only for a necessary period, and routine long-term administration of one drug should be avoided.

Insufficient sleep leads to unhealthy feeling, which can sometimes prolong the period of low back pain. Adequate sleep at night is important, and administration of a sleeping pill is also important if there is sleep disorder.

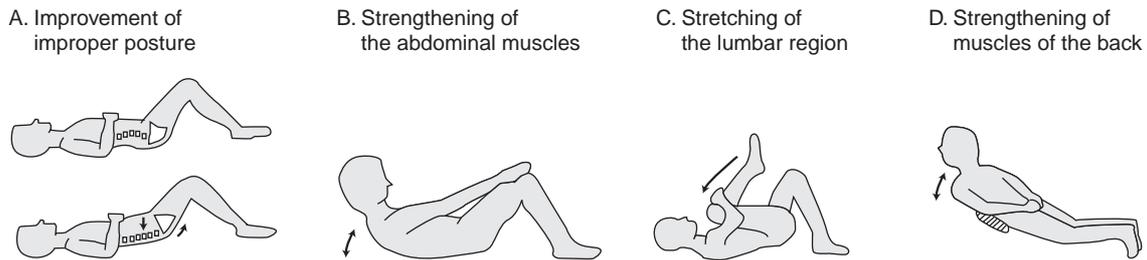


Fig. 3 Exercises for low back pain
(A, B, C, and D were cited from references 10, 11, 12, and 13, respectively.)

(3) Physical therapy

Therapeutic heating and traction are often conducted, but it is not clear if they are effective for chronic low back pain and if they change its natural course. From a viewpoint of relaxation, however, they are means that can reduce pain.

(4) Exercise for low back pain

The purposes of exercise for low back pain are (1) improvement of improper posture, (2) strengthening of the abdominal muscles and muscles of the back, and (3) acquiring flexibility of the soft tissues. There are four types of exercises, as shown in A to D in Fig. 3.

In exercise A,¹⁰⁾ draw up the knees while in a supine position, and in this posture, tighten the abdominal muscles, gluteal muscles, and hamstrings (biceps femoris muscle, semitendinous muscle, and semimembraneous muscle). Relax after fully tightening the muscles while paying attention not to lift the low back. This exercise aims to improve improper posture by reducing lordosis of the lumbar spine. In other words, when lordosis of the lumbar spine is excessive, shearing force on the lumbar spine increases, resulting in greater stress (load) on the posterior lumbar spinal tissues, which causes low back pain. Furthermore, when the abdominal muscles are weak or obesity is present, declination of the pelvis increases, resulting in excessive lordosis of the lumbar spine. Therefore, strengthening of the abdominal muscles prevents an increase in declination of the pelvis.

Exercise B¹¹⁾ aims to strengthen the abdomi-

nal muscles. Strengthening the abdominal muscles reduces lordosis of the lumbar spine, as mentioned earlier, and it also increases abdominal pressure, giving stability of the spine by creating a self-made corset. In this exercise, both the knee joints and the hip joints should be bent. Strengthening of the abdominal muscles does not necessarily require lifting the upper half of the body to the vertical position, and just maintaining the level of having the shoulders slightly lifted from the ground for about five seconds, is sufficient.

Exercise C¹²⁾ aims to achieve flexibility of the soft tissues surrounding the lumbar spine by stretching the lumbar part. Excessive lordosis of the lumbar spine often indicates the presence of the contracture of paravertebral muscles, inducing low back pain by sudden ante-flexion of the trunk. Stretching is important for this reason.

Exercise D¹³⁾ aims to strengthen the muscles of the back. Place a pillow under the lower abdominal region to decrease forward curving of the lumbar spine. Using this as a supporting point, lift the back upward. It is not necessary to strongly throw back one's head, and if the pillow is too large, excessive bending of the lumbar spine can occur. Also, pain of the facet joint and the posterior lumbar spinal tissues can be induced, so caution is needed.

Choose two or three types out of exercises A to D, and start with five to 10 repetitions of each exercise twice a day (morning and evening). It is important to gradually increase

types of exercises and frequency according to the condition. Basically, when low back pain is severe, exercise should not be done.

(5) Special therapy

Block therapy has diagnostic and therapeutic meanings, as mentioned in the section on diagnosis. If the pain source can be identified, the following therapeutic measures must be considered instead of continuing the block therapy routinely for a long time. For example, if blocking of posterior medial branches seems effective for chronic low back pain, it is necessary to consider percutaneous cauterization, etc., of their nerve, as a choice of the treatment.

Conclusion

In this report, I described mainly the pathology and the treatment of nonspecific low back pain, which occurs frequently in young and middle-aged people. Nonspecific low back pain involves many factors. Not only structural and physiological abnormalities in the lumbar region but also sociopsychological factors can be a major cause. Complex factors comprising of obesity, overwork, lack of exercise, and mental stress can induce low back pain as a complaint. Since nonspecific low back pain in young and middle-aged people must often be diagnosed by exclusion, a solid differential diagnosis should be performed. In my view, in responding to the complaint of low back pain, tackling this disease by grasping the whole picture of the patient's life, from the standpoint of a living function-related disease, instead of merely providing anti-inflammatory analgesics, leads to early social rehabilitation.

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