

Review Article

Awareness and current knowledge of chronic lower back pain

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Abstract

Sitting lifestyle and remote work habits increase risks of spine maladies. Among them, chronic lower back pain (CLBP) is an injury of the spine decreasing living levels by painful movement of affected people. In the research, we described recent achievements in diagnosis and investigation of reasons for CLBP and perturbations of the malady. The early stage can be stopped by proper active lifestyle proper regular exercising including swimming, yoga, and pilates. Blue labors and women are more

sensitive to CLBP, thus systematic sports habits are necessary in those groups for prevention of CLBP.

Key words

Suction, Wet cupping, Blood, Drawn out, Tiny cuts, Scalpel.

Introduction

The spine consists of 33 vertebrae, disks, the spinal cord, and nerves. The spine is the main support structure of our body. The backbone aids in moving (sitting, standing, twisting, and walking). Injuries of the back or problems related to vertebrae or spinal cords lead to pain in the back. A normal and healthy spine consists of 3 curves that give it an S-shape. These curves help absorb shock and protect from injuries.

Lower back pain is also named the pain of the lumbar region. The lumbar region is the area of the back that starts from the lower side of the ribcage. The lumbar region consists of 5 vertebrae from L1 to L5. This region provides support to the weight of the upper body. Intervertebral discs are present between two consecutive vertebrae which maintain the space between them. It acts like a shock absorber which provides cushion to the vertebrae while moving of the body.

The pain of the lower back is one of the most common problems in the world. It affects above 80% of adults. Lower back pain is also named the pain of the lumbar region and called also lumbago. The lumbar region is the area of the back that starts from the lower side of the ribcage. The lumbar region consists of 5 vertebrae from L1 to L5. This region provides support to the weight of the upper body. Back pain in the lumbar region can involve the tendon, ligaments, or muscles. Lower back pain can be acute, sub-acute, and chronic. The pain in the lumbar region which lasts for 12 weeks or more is considered chronic and the pain which feels sudden and lasts for a few days to a few weeks (less than 4 weeks) is considered acute lower back pain [1-3].

Most of the back pains of the lumbar region are short-lived or acute and disappear in a few days with proper care. Nearly 20% of patients having acute lower back pain develop chronic lower back pain (CLBP). Acute pain of the lumbar region is usually self-limited but patients with CLBP need to visit the doctor. Pain might be dull or stabbing in nature which makes it difficult for a patient to stand up straight or to move. Sometimes the pain continues on its own but the patient needs urgent care. When the pain feels after some type of injury, the pain feels with control problems of both bladder and bowel and back pain with weakness of one or both legs. Pain felt on coughing or while peeing also needs urgent care.

Types of lower back pain

There are 2 main most common types of lower back pain: mechanical or radical. In research, we classified both non-specific muscular and muscle spasms due to mechanical origin.

- **Mechanical pain:** back pain of the lower region is usually muscular spasms or nonspecific. This pain mostly emerges from the muscles, ligaments, and bones present around the spine. This pain is localized to the lower region of the back and hips. This pain is usually felt when the spine is loaded or felt while moving [4]. Muscle injury and vertebral fractures are mechanical pains included here resulted from accidents,
- **Radicular pain:** In this type pain radiates from the back and hips into the legs. This pain occurs when the nerve roots of the spinal cord are inflamed. The pain that tumbles the legs and foot is called sciatica. Sciatica is often caused by the compression of the spinal nerve root at the level of L5 and S1 (stenosis).

This pain is sharp and burning in nature which is associated with numbness dejecting in the legs. Sciatica gets worse with a certain type of movement like walking or sitting. This pain is usually one-sided. Radicular pain can occur due to the following reasons herniation of disc, diabetes, and injuries of nerve roots [5]. The other radicular pain forms are caused by aging natural processes, osteoporosis,

Incidence

According to a survey it has been estimated that about 80% or more people experience back pain in the lumbar region at some point in life [6]. According to an estimation, about 5% to 10% of cases will progress to CLBP [83, 84]. Every year about 7% of adults report the ailments of lower back pain [7]. Women are more affected by CLBP as compared to men [8, 9]. It has been estimated that females are about 2% more susceptible to CLBP as compared to males [10]. The prevalence of CLBP is 57.4 males and 70.3 females reported per 1000 population [11]. It is one of the most common health issues in older people.

Back pain is the most common health issue in older people [46, 47, 48]. According to a study people with age 65 or above are considered the second most common age group visiting their doctor due to lower back pain [49]. The prevalence of lower back pain increases progressively from the teen years [50] to the age of 60 years. The prevalence and incidence of CLBP rise with getting old [51, 52]. In older age, about 65- 85% of people present with musculoskeletal pain [53, 54] out of which 35-75% of patients have pain in the back [55]. According to a study conducted in Israel, the prevalence of CLBP is about 58% in 77-years-old people [56].

Risk factors

Epidemiological studies revealed occupational psychosocial and age-related risk factors that

lead to the development of CLBP [12]. Risk factors of CLBP that can be modified are mental problems like depression or anxiety, vigorous physical activities, injuries, excess weight, improper lifting, smoking, and immobility. Risk factors that cannot be modified are age-related changes in the body, gender, inheritance, low socioeconomic status, etc.

Mostly lower back pain resolved on its own within a few days or months [57] but some patients had CLBP which caused some disabilities. One of the most common risk factors of CLBP is age.

Gender:

Regardless of age, women are prone to CLBP as compared to males [58, 59, 10]. The chances of CLBP in women are 2 % higher as compared to males. The high rate of CLBP in women may be due to the complex biopsychosocial mechanism in females. Also, the rate of osteoporosis and osteoarthritis is much higher in females as compared to males which can also be a cause of CLBP in females [60, 10].

Occupation:

The main reason for lower back pain in working age is the type of occupation. If the occupation is associated with heavy objects lifting, bending, or twisting, this could affect in future pain in the lower region [61]. Work that required increased physical strength increased of chances of lower back pain in retired age [62, 63]. Also work in sitting position with little movement in remote style without changing position increases frequency of occurrence of ache.

Socioeconomic factors:

Increased smoking, low level of education and low socioeconomic status can have a relation with lower back pain in old age [58, 59]. It has been observed that the chances of lower back pain in educated people are much lower because of knowing, better treatment approaches, and adoption of healthy ways of living [64]. While people with poor socioeconomic status face

problems in seeking healthcare [65]. People who have limited resources generally avoid a doctor until their symptoms get worse which ultimately to the chronicity of lower back pain [66]. According to a study the chances of lower back pain in people with poor socioeconomic status were 1.4 times higher as compared to people with high socioeconomic status [59].

Causes of lower back pain:

Lumbar disc herniation (LDH)

LDH is the most common degenerative disease of the lumbar region of the spine. In this condition, the pulpous nucleus is composed of 80% water and the rest percent of the proteoglycan and collagen. Both proteins present in the intervertebral disc are displaced through the fibrous ring or external membrane [14]. With advancing age, the production of proteoglycans is reduced which causes dehydration or collapse of the disc. Splitting of disks strains on the outer fibrous ring results in tearing and fissuring. It enhances in herniation of the nucleus pulposus. Also, overloading of stress puts a large pressure on a healthy or normal disc which also results in leakage of intervertebral disc material through the fissured fibrous ring [15].

There are several causes of disc herniation reduction in retention of water and increase in the ratio of type one collagen in the nucleus pulposus, collagen destruction, and an increase in activity of the degrading systems such as apoptosis and inflammation. The increase in pressure on longitudinally located ligaments due to disc herniation leads to pain in the localized region. Radicular pain in the lumbar region is felt when the material of a disc puts pressure on the nerve root of the lumbar region which causes inflammation on ischemia of the nerve root. Connective tissue illnesses and congenital abnormalities i.e. short pedicle also cause LDH [16]. Patients present with the following signs and symptoms pain in the lower region of the back, radicular nature of pain, the pain increases with coughing or sneezing, pain grows with pressure application or remains in seated.

Annually about 5 to 20 patients with LDH are reported per 1000 adults. Although LDH can occur at any age it is more common in the 40s or 50s. Over the age of 35 years, its prevalence rate is about 4.8% among men and 2.5% among women. Therefore, the age of 35 years is unique when men are more at risk of back pain than women.

Dysfunction of facet joint

There are pairs of little joints present between the vertebrae of the spine. Between the opposing surfaces of these joints cartilage is present which reduces the friction between adjacent joints. Because of having more exposure to stress and load, the joints of the lumbar region are more vulnerable to injuries and degeneration. Lower back pain that originates from the facet joints is short-term initially and with time becomes chronic.

The prevalence of CLBP due to facet joint syndrome is about 15% and 41% [17]. It is a condition that resembles arthritis which leads to the degeneration of joints present between the bones of the spine. Cartilage present in these joints undergoes degeneration and inflammation which trigger the signals of pain. If the facet joints of cervical regions are involved it leads to pain in the neck and lower back pain occurs due to the involvement of facet joints of the lumbar region [18]. The prevalence of cervical facet syndrome is about 55% percent while the prevalence of lumbar facet dysfunction is 31% [19].

Clinically pain associated with dysfunction of the facet joint can be unilateral or bilateral, pain radiates to the buttocks and thighs, and pain non-detected below the knees [20]. Dysfunction of facet joints is considered the primary cause of CLBP in about 10% to 15% of adults. Degenerative conditions that lead to the dysfunction of facet joints include osteoarthritis of facet joints, spondylolisthesis, septic arthritis of facet joints, and the development of cysts within the synovial membrane of facet joints.

Some inflammatory conditions like rheumatoid arthritis and ankylosing spondylitis. Injuries or traumas of lumbar facet joints may include acute injuries resulting from falls, accidents, or injuries during sports or repetitive small injuries which is due to occupations that require continuous bending, twisting, or some gymnastics. Dislocation of facet joints also leads to CLBP. There are 2 types of dislocation of facet joints in the lumbar region of the spine 1) subluxation and 2) locked facet [21].

The severity of lower back pain depends on the number of affected facet joints and the involvement of nerve roots. Pain may be dull and localized in nature if one side of a single facet joint is affected, and bilateral pain may be felt if both sides of facet joints are affected. Referred pain felt in case of arthritis of facet joints.

Lumbar spinal stenosis (LSS)

It is a condition in which the space within the spine becomes narrow which builds pressure on nerves passing through it causing pain weakness and numbness. This condition mostly affects the cervical region and lumbar region [22]. Spinal stenosis affects the 3 distinct sites present in the vertebral canal. Firstly it affects the central canal of the vertebral canal secondly it affects the neural foramen, the third site affected by spinal stenosis is a lateral recess of the vertebral column [23, 24].

Factors that led to the development of LSS include:

- 1) Osteoarthritis of the spine in this condition the cartilage that covers the facet joint undergoes degeneration; due to friction between bones an abnormal growth of bones known as bone spurs develops which leads to the narrowing of the neural foramen.
- 2): degenerating diseases of discs due to the dehydration or flattening of intervertebral discs leads to the narrowing of intervertebral foramina.
- 3): thickening of a ligament.
- 4): deformity of the spinal cord

5): cysts or growths. LSS mostly occurs in older people age 50 or above, at young age it may occur due to some injuries and may be due to some congenital condition [25, 26].

LSS gets to worsen with time, but mostly without symptoms [27]. LSS presents with radicular pain, pain radiates towards one arm or leg or rarely affects both legs and arms. The intensity of pain may be dull or present with burning sensations. Feelings of numbness, tingling, or weakness travel down the legs or the arms. A patient may also present with bladder or bowel control.

Spondylolisthesis:

It is a condition in which one of the vertebral body dismantles its place on the other vertebrae present lower to it leading to mechanical pain or radicular pain. It may occur congenitally, may be acquired, or idiopathic in nature. It commonly occurs in the lumbar region of the spine and leads to CLBP [28].

There are 5 categories of spondylolisthesis named as:

- 1) degenerative spondylolisthesis.
- 2) isthmic spondylolisthesis.
- 3) dysplastic spondylolisthesis.
- 4) traumatic spondylolisthesis.
- 5) pathological spondylolisthesis [29].

Degenerative spondylolisthesis which mainly occurs in adult females as compared to males while isthmic spondylolisthesis is more common in males. The incidence of spondylolisthesis in childhood is about 4-6 percent with most of the cases reported with isthmic spondylolisthesis happening at the level of L5- S1 [30, 31]. Incidences rise in adulthood up to 5-10 percent with most cases of degenerative spondylolisthesis increasing rate in females mostly developing at the level of L4-L5 [30, 32, 33].

There are 5 grades of spondylolisthesis and the most common method used for the grading is named Meyerding's method of classification.

Grading is done on the basis of anterior translation percentage with respect to adjacent levels [34]. If the degree of vertebrae slip is from 1% to 25% it is considered grade 1 spondylolisthesis. Near 50% of vertebrae slip is named as grade 2 spondylolisthesis. In grade 3 the degree of vertebral slip is near 75%. In grade 4 the slippage of vertebrae is from 76% to 100%. If the slippage is above 100% the grade of spondylolisthesis is 5. The incidence of grade 1 is about 75% of all cases. Most spondylolisthesis occurs at L5 to S1 level and the second most commonly occurs at L4 and L5 level [35].

Lumbar Radiculopathy/ Sciatica

One of the most common complaints of the spine evaluated by surgeons of the spine or clinicians is radiculopathy of the lumbar region. It is a common condition affecting both genders, according to estimation, it is affecting about 3 to 5% of the total population [1]. The primary risk factor of lumbar radiculopathy is age, while it can also be the result of degenerative conditions of the spine [1]. It mostly affects males in their 40s and females in their 50s and 60s [2, 3]. Females, in certain populations, with careers having more physical involvement, are mostly affected by lumbar radiculopathy otherwise it mostly affects males [4].

Radiculopathy means pathology of nerve root along with paresthesia, anesthesia, loss of motor activities, and pain. It can occur in any part of the spine but most commonly it affects the cervical and lumbosacral region and less commonly impacts the thoracic region [5]. In lumbar radiculopathy patients present with pain in the lumbar region of the spine which radiates down in legs with a straight leg raising test is positive. Patients describe the pain as electric, sharp, stinging, or burning in nature with numbness or paresthesia. The strength of muscles is mostly preserved, only affected in severe cases of radiculopathy [6].

On the other hand, radicular pain is a single symptom arising from a single or more than one

nerve root. Sciatica name is given to the pain that feels because of the irritation of the sciatic nerve root. Sciatica is usually caused by the compression of the sciatic nerve in the lumbar region. Sometimes sciatica is confused with general lumbar back pain but sciatica can exceed the lower region of the back and also radiate down to the lower extremities. In the body, the sciatic nerve is considered the widest and longest nerve. The sciatic nerve runs from the lower region of the back crosses the buttock down to the legs and ends just below the knee. The sciatic nerve controls the muscles of the lower legs and also provides sensations to the skin of most of the legs and feet. The definition of sciatica excludes disorder but it is a symptom of other conditions that affect the root of the sciatic nerve. According to the estimations of some experts, about 40% of people experience sciatic pain once in their life. The primary etiology of lumbar radiculopathy is deteriorating spondyloarthropathies [2]. Disc herniation which causes the compression of the nerve root is also one of the leading causes of lumbar radiculopathy/ sciatica [6].

Lower back pain is common in the general population while the incidence of lumbar radicular pain is about 3-5% [7]. About 5 to 10% of patients present with lumbar back pain have sciatica. The yearly prevalence of sciatica related to discs is about 2%. Sometimes the prognosis of the condition is favorable, and pain and its associated disabilities resolve within 2 weeks [2]. On the other hand, about 30% of cases continue to suffer from ache for about 1 year or more [2]. Socioeconomic factors play an important role in the development of lumbar radiculopathy.

The incidence of lumbar radiculopathy due to the involvement of the disc is about 2%. In the working population, out of 13% incidence of lumbar region complaints, 11% are because of lumbar radiculopathy [8]. Its prevalence ranges from 9.9% - 25%.

Any activity that puts a persistent and excessive load on the vertebral column can be a risk factor for lumbar radiculopathy. Sportsmen and laborers are more prone to lumbar radiculopathy as compared to people with a sedentary lifestyle.

Before the age of 50 years, lumbar radiculopathy mainly occurs due to disc herniation while after the age of 50, it mostly occurs because of deteriorated changes in the spine. Causes of lumbar radiculopathy include degenerative conditions of the spine, disc lesions, and disc herniation that leads to compression of the nerve root [9]. Stenosis of the spine at the lumbar region may be congenital or happen due to degenerative conditions. Scoliosis, infectious diseases like osteomyelitis, and tumors (less common) are also the cause of lumbar radiculopathy [9].

The clinical presentation of radiculopathy depends on its etiology and nerve root involvement. Nature (dull, sharp, stabbing, burning, piercing) and location of the pain are important to note besides patients also complain of some neurological signs like loss of reflexes or loss of sensation and paresis. If neurological signs are not present then the condition will not be diagnosed as radiculopathy. Sciatica indications include:

- Pain in one leg is greater than pain in the lumbar region of the spine.
- Pain in the leg follows a pattern of dermatome [10].
- Pain travels below the knee ending in the toe or foot.
- Paresthesia and numbness in similar areas.
- Straight leg raise test shows positive results, even if pain increases.

Metabolic causes of CLBP:

Osteoporosis:

This is a condition in which bone mass is reduced and bones become so brittle and weak that even mild stress on bones or a fall can cause the fracture of bones. Fractures due to

osteoporosis occur mostly in the hips or spine. In the case of osteoporosis, due to the fracture, the vertebral body undergoes deformation which causes pain in the lower region of the back [67].

Osteomalacia:

This is a condition in which bones become weak due to the deficiency of vitamin D and calcium which is necessary for the maintenance of bone health. The dull pain due to osteomalacia mostly affects the lower region of the back, hips, and legs.

Infections of the spine that lead to CLBP:

Discitis:

Discitis is basically inflammation of the intervertebral disc. It is a serious infectious condition but seldom occurs. The basic function of the intervertebral disc is to provide cushion to the vertebrae. This condition causes much pain and discomfort. The most common bacteria which can cause discitis is *S.aureus*. *E.coli*, *S. pneumonia*, and fungi can also be a cause of this infection [68,69]. Infection of the disc may occur due to

- Direct inoculation of the organism
- Infection spread through blood
- Contiguous spread which is a less common condition [70].

Discitis is much more common in the adolescent population as compared to adults [71].

Osteomyelitis:

Infection of bones is known as osteomyelitis. It is an inflammatory condition that can be acute or chronic. Osteomyelitis is more common between the age of 2 to 12 years. The risk of osteomyelitis is high in patients having chronic diseases like diabetes and HIV. It is more common in smokers and alcohol abusers [72].

Paraspinal abscess:

It is a condition in which pus accumulates around the spinal cord. This condition usually occurs as a complication of discitis and osteomyelitis of the vertebral region. A paraspinal abscess is a

rare condition that accounts for about 0.2 to 1.2 cases out of 10,000 [73].

Tumors of the spine:

Common tumors that can metastasize to spines are breast tumors, lungs, thyroid tumors, and tumors of the kidney or prostate [78]. Some autoimmune diseases like rheumatoid arthritis or Crohn's disease can also cause CLBP [36, 37]. Tumors that can cause pain in the back can be primary (which originates from the spine) or secondary (which originates in other organs and later spread to the spine via blood or lymphatic drainage). Generally spine is prone to secondary tumors because of having a rich blood supply and a very close association with the venous and lymphatic drainage system [76]. The incidence of secondary tumors of the spine is 97 % which indicates that these are the most common tumors of the spine [77]. 70 % of secondary tumors involve the thoracic and thoracolumbar region of the spine and about 20 % of tumors involve the lumbar region and the sacrum region of the spine. The cervical region is less prone to metastatic tumors [76]. Some tumors of the spine are symptomless but eventually cause back pain and neurological deficits like weakness or numbness. Symptoms of spinal tumors depend on whether a tumor is benign or metastatic and also on the location of the tumor. The most alarming symptoms of tumors along with the pain are sudden weight loss, appetite loss, vomiting, nausea, or fever.

Primary tumors of the spine:

These tumors are normally benign in nature and most common in young adults [79]. The most common benign primary tumor of the spine is "hemangiomas" [80, 81]. Common cancerous primary tumors of the spine are multiple myeloma and osteosarcoma.

Secondary tumors of the spine:

Metastatic tumors account for 90 % of all tumors spine [82]. Secondary tumors originate in other organs or parts of the body and later spread to the spine.

Evaluation of chronic lower back pain:

To evaluate chronic lower back pain the first step is history taking and the second step is physical examination.

Physical examination:

Inspection:

The first step in the examination of lower back pain is inspection. In inspection firstly check the spine contour. For this purpose first, observe the patient in an upright standing position and then ask the patient to bend forward while standing and observe the posture of the patient. Check the curvature of the spine.

- Scoliosis: uneven hips, uneven shoulders, and curves in the spine.
- Kyphosis: normal posterior curvature of the upper portion of the spine.
- Lordosis: normal anterior curvature of the lower portion of the spine.

Palpation:

The second step is palpation which is done on 2 sites:

- Center of the spinal region.
- On the lateral sides to the central region of the spine
- (paraspinal area).

Provocation tests:

Straight leg raise test:

The straight leg raise test is also known as the Lasegue test. It is basically a provocation test that indicates the nerve root irritation in the lumbosacral region. To perform the leg raise test patient should be in a supine position. Then raise the fully extended leg of the patient up to 30 to 60 degrees. A straight leg raise test is considered positive if the patient feels pain by the flexion of the lower limb at an angle of fewer than 45 degrees. Straight leg raise test can be positive in many conditions but the most common is lumbar disc herniation. Another reason is the hypertrophy or cyst of facet joints [85, 86, 87].

The variant of the straight leg raise test:

In a variant of the Lasegue test, the leg of the patient is lowered to nearly 30 degrees and then the foot is flexed. Pain in the lower region of the back with often radiation down into the leg indicates a positive straight leg raise test variant [88].

Squat test:

This test is done to find out the pathologies of lower limbs [89].

Neurological examination:

Neurological assessment consists of

- Motor assessment
- Sensory assessment
- Reflex assessment

Investigations:

1. **Blood test:** To find out the signs of infection, and inflammation.
2. **Bone scans:** to detect the infections of bones and also for the assessment of bone fractures.
3. **Discography:** to assess the abnormalities of discs causing lower back pain.
4. **Electromyography:** to assess the muscle weakness and nerve control.
5. **Nerve conduction studies**
6. **CT:** It is advised to find out the cause of back pain related to abnormalities in soft tissue structures like spinal stenosis, rupture of a disc, and tumors.
7. **MRI:** to find out inflammation, and infections of both soft and bony tissues leading to back pain.
8. **X-ray:** to find out the fractures of the spine.
9. **Myelogram**

Treatment:

Non-pharmacological option:

Exercises:

Non-pharmacological options are used to treat chronic lower back pain without having serious pathology. Conservative physical exercises for the CLBP include Pilates, progressive relaxation,

and yoga. Physical therapies like massaging acupuncture, and spinal manipulation are also helpful in the conservation of CLBP.

Pilates:

It is a special exercising technique consisting of controlled breathing, movement, and stretching of the body. In the last 5 years, most clinical trials indicated that Pilates can be helpful in reducing pain and disabilities in different regions [90].

Swimming

The swimming especially breaststroke reduces spasms of the lumbar part. There are significant correlation in regular swimming and lower occurrence of CLBP. Harreby, et al. found that in 578 both sex group 68% of them reported a significant reduction of clbp after swimming 3 times per day. However, Cabri, et al. 2001 found that competitive swimmers have higher frequency in earlier age than leisure swimmers.

Yoga:

Yoga can be a conservative approach to treating chronic and non-specific back pain of lower origin. But in some cases improper selection of exercises, it increases pain [91]. B.K.S. Iyengar recommended all standing positions (asanas) like Vrkasana. After standing position he proposed salabhasanadhanurasana, bhujangasanasirsasana and sarvangasanacysles; upavisthakonasana and finished with uddiyana.

Conclusion

Chronic back pain or lumbago frequency is growing, due to increasing remote-living lifestyle, or muscular spasms. Diagnosis is an important part and should be available to first contact doctors. They should be checked by proper tests and then sent to orthopedics. Early diagnosis and prevention by frequent exercises like swimming yoga or pilates can be a habit to avoiding people from unpleasant consequences on early age. The disease is linked to lifestyle and aging. Therefore proper active lifestyle

should be promoted for changing habits of working physically people.

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