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An Aerial Perspective of Sciatica Syndrome



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ABSTRACT

Pain in the lower limbs may be skeletal, vascular, visceral or neurological in origin. One of the most common neurological causes is sciatica neuritis which follows an attack of lumbago causing pain of sciatic distribution in one limb, associated with paraesthesia. The pain is made worse by coughing or sneezing. It is a disease of early & middle life & occupational causes may be evident. The manuscript encloses the brief knowledge on sciatica nerve and its distribution, dermatomes, history and origin of sciatica.



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INTRODUCTION-

It is merely a symptom and not an illness. Pain that originates in the back and travels down one or both lower limbs is the symptom.^[1] Sciatica is a shooting pain that runs along the cutaneous distribution of the sciatic nerve and its terminal branches, primarily the common peroneal. The dorsum of the foot is typically affected by pain that typically starts in the gluteal area or even higher and travels down the back of the thigh and the lateral side of the leg.^[2] For the purpose of testing for nerve root compression and determining the severity of spinal cord injury, knowledge of the dermatomes (segmental innervation of the skin) and myotomes (segmental innervation of muscles) is crucial.^[3]

Materials -

History^[4]: Greco-Roman clinicians expertly characterized this illness, but for many centuries, knowledge of the malady was impeded by their poor diagnostic and treatment skills. It wasn't until 1934 that the herniated lumbar disc was identified as a key contributor to sciatica, thanks to Mixter & Barr's seminal study. According to Sigerist, the sciatica attack's suddenness and sharpness made primitive people think it was a demonic magic trick, similar to the witch's arrow that the Germans used or the elf's arrow that the early British used. For instance, among Egyptians in extremely rural areas, the notion that junin (devils) causes sciatica is still common. By the fifth century BC, sciatica was a generally acknowledged, if poorly defined, condition in Ancient Greece. Although the contemporary definition of sciatica had at least one specific clinical description, sciatica was the term used at the time to refer to any ailment involving the hip in general. Ancient Greeks understood scoliosis and kyphosis, as shown by countless statues from the era. According to Hippocrates, the disease was more common in the summer and fall. Due to the more strenuous physical activity involved in farming and athletic training during these seasons, sciatica cases were more common. However, the Hippocratic literature suggests that the enhanced seasonal capabilities of the sun could dry up joint fluid and result in symptoms. In contrast, Hippocrates noted that the condition was more prevalent among the aristocratic classes, particularly those who could afford the pleasure of frequent horseback riding. Hippocrates also claimed that the term "scoliosis" was used broadly to refer to practically all types of spine curvatures. Pliny and Cato, two Roman authors, freely discussed sciatica in their works. The Romans, like the Greeks, continued to equate sciatica with a variety of pathological conditions, including gout, osseous tuberculosis, hip dislocation, and poliomyelitis. Repeating numerous earlier

observations made by Soranus, Caelius Aurelianus observed that sciatica was frequent among all age groups but that it was most common in middle-aged people in the fourth century following the birth of Christ. A strong, excruciating pain that radiated from the lower back through the buttocks, perineum, popliteal fossa, calf, foot, and toes was the hallmark of the condition he described. A significant low-back spasm, sensory abnormalities, and in severe cases, muscular wasting of the affected lower body were all present along with the discomfort. Caelius Aurelianus noted that claudication and constipation often accompanied these problems. He claimed that because of these challenges, people with sciatica have to adjust their posture when urinating. He saw that such straining caused pain in the toes in one group, while he observed a "woodenness," a crooked posture, and an inability to bend forward in the other. Caelius Aurelianus proposed a number of origin theories for the syndrome based on associations he had noticed. The condition may be brought on by abrupt movements or jerks during exercise, unauthorized digging in the ground, carrying a heavy object from a low position, resting on the ground, a sudden shock, a fall, or frequent and excessive sexual contact. Further out, he thought that stopping hemorrhoidal bleeding would cause a sciatica episode, especially in a sexually active male. With bed rest, massage, heat, and passive range-of-motion exercises, Caelius Aurelianus managed the syndrome. He suggested leeches, scorching coals, skin hooks, and bloodletting for more challenging situations. "Sweet marjoram, rosemary leaf, wine, and olive oil" were blended with wax and preserved in an earthen jar for future use as a plaster by Octavia, the sister of Augustus and Mark Antony's first wife, to alleviate sciatica. Paul of Aegina frequently conflated sciatica with gout in his writings from the seventh century. He thought that thick humour that interfered with the hip joint's articulations was what produced sciatica symptoms. From the buttock and groin area to the knee, and frequently as far as the foot's extremities, sciatic pain could be felt. In chronic situations, Paul suggested burning the joint in "three or four places" to prevent problems if conservative treatments proved ineffective. Ancient Hebrew medicine coexisted with the Greco-Roman system of medicine and showed some acquaintance with both sciatica and the sciatic nerve. The ancient Arabs were geographically close to the Hebrews and were also acquainted of the Greco-Roman medical heritage, which included sciatica. The Hebrew name for the sciatic nerve, gid-ha-nasks, and the Arabic word for the sciatic nerve, irk ol-nasha, are actually extremely similar. In his works from the second part of the ninth century, Serapion Senior described using a hot cautery to cure sciatica. His contemporaneous Razes in Baghdad stated to have successfully treated 1000 cases of sciatica, primarily by bleeding one of the lower extremities a procedure for which he invented four

distinct and quite complex ways. About 150 years later, Avicenna advocated meixaragl (picrotoxin) for the treatment of sciatica but was less physically harsh.

Origin of SCIATIC: Greek ischiadikos, from ischiad-, ischias sciatica, from ischion ischium; Middle French sciatique; Late Latin sciaticus; Alteration of Latin ischiadicus of sciatica. In 1586, the term "sciatica" was first used.^[5]

Definition:

"Sciatica is a syndrome characterized by pain in the distribution of the sciatic nerve or its component nerve roots, radiating along its posterior or lateral aspect from the back into the buttock and into the lower extremities in extreme cases^[6], with predisposing factors towards herniation such as vertebral degenerative changes with history of trauma, age, gender, climate, and true sciatic neuritis. The phrase "prolapsed intervertebral disc" is also used to describe pain anywhere along the sciatic nerve's route.^[7]

Anatomy of Sciatic Nerve- The greater sciatic notch is located between the greater trochanter and the ischial tuberosity, runs downward between the greater trochanter and the ischial tuberosity, passes through the posterior aspect of the thigh, and terminates over the lower third by dividing into the tibial and common peroneal nerves. The sciatic nerve is the largest and longest nerve. It is the largest branch of the sacral plexus. It is made up of 5 roots. While motor neurons govern the limb musculature, sensory neurons carry signals from the relevant part of the CNS. The tibial nerve, which originates from the L4 S1 S2 S3 roots and divides into three genicular, muscular, cutaneous, and lateral branches, is the largest branch of the sciatic nerve. It crosses the popliteal vessels from the lateral to the medial side and lies superficially. The smallest division of the sciatic nerve, the common peroneal nerve (L4 and L5, S1 and S2), lies superficially because the tibial nerve's extension starts at the superior angle of the fossa and extends to the lateral angle laterally to the medial border of the biceps femoris before continuing downward and forward and winding around. Two cutaneous branches and three genicular branches emerge in the fossa from the superficial and deep peroneal nerves' penetration of the posterior-lateral portion of the fibula's neck over the peroneus longus.^[8]

Dermatomes- The region of skin that is innervated by a single spinal segment or nerve root is known as a dermatome. Assigning the neurologic "level" to a spinal cord lesion and determining if the sensory loss on a limb corresponds to a single spinal segment (which

would indicate the lesion is of that nerve root or radiculopathy) are their main uses. Due to the overlap of contiguous dermatomes, injury to one nerve root may result in either no anesthesia or a localized loss of sensation. The sensory level in people with spinal cord illness is defined by these small regions, which are referred to as "signature zones." [3]

Sciatic nerve:

It is the body's thickest nerve and the greatest branch of the sacral plexus, with Root values of L4, L5, S1, S2, and S3. 2 parts: The anterior major rami of L4, L5, S1, S2, and S3 create the tibial portion, which supplies the semitendinosus, semimembranosus, long head of the biceps femoris, ischial head of the adductor magnus, and semitendinosus. The dorsal divisions of the anterior primary rami of the L4, L5, S1, S2, and S3 together comprise the peroneal portion, which supplies the short head of the biceps femoris. [9]

To differentiate peripheral nerve/nerve root/plexus lesions: A pattern of muscle weakness, lack of response, and sensory disruption that cannot be attributed to a lesion of a single nerve root or peripheral nerve indicates a plexus injury. In contrast to lesions limited to peripheral nerves, lesions involving the plexus or roots frequently present with proximal limb muscle weakness. [10]

Causes of Sciatica [11]

Sciatica is defined as the pain in the distribution of sciatic nerve or its component nerve roots. The syndrome now has been accepted as caused by lumbar disc prolapse in most case, but there are some predisposing factors towards herniation such as degenerative changes in vertebral column and a history of some kind of trauma. Age, sex and climate also play the role, but sciatica can occur due to true sciatic neuritis. Other than PID (prolapse intervertebral disc) there are many such diseases of spinal.

Symptoms [12] - In most cases, the onset is subacute and sciatica is frequently preceded by lumbar pain 'lumbago' which may have occurred intermittently for years. The sciatic pain may immediately follow an injury, such as a strain or fall or there may be a latent interval of days or even weeks. After two or three days of pain in the lumbar spine the pain radiates down the back of one leg from the buttock to the ankle. It is often possible to distinguish three elements in the pain. Pain in the back, aching in character and intensified by spinal movements. Pain deep in the buttocks and thigh, also aching or growing in character and influenced by the posture of the limb. Pain radiating to the leg and feet and momentarily

increased by coughing and sneezing. When the first sacral root is compressed the pain radiates to the outer border of the foot. When the pressure is upon the fifth lumbar root it spreads from the outer aspect of the leg to the inner border of the foot. In general, the pain is intensified by stooping, sitting and walking. The patient feels usually most comfortable lying in bed on the sound side with the affected leg slightly flexed at the hip and knee. There is often a feeling of numbness, heaviness or deadness in the leg, especially along the outer border of the foot. There are muscular hypotonia and slight wasting, not only of the muscles supplied by the sciatic nerve, but also the gluteus and sometimes of all the muscles of the lower limb. Compression of the fifth lumbar root may cause weakness of the peronei, but the ankle jerk is preserved, the knee jerk may be slightly exaggerated, but if the fourth lumbar root is involved it may be diminished. The plantar reflex is flexor. There is tenderness on pressure in the buttock and thigh, straight leg rising is limited by pain and stretching the sciatic nerve by extending the knee with the hip flexed causes severe pain. There is rarely much sensory loss though often there is some blunting of light touch and pinprick over the outer half of the foot and three outer toes and lower part of the outer aspect of the leg when the first sacral root is involved. Scoliosis is often associated with sciatica, the lumbar spine being flexed towards the affected side, less frequently towards the opposite side. Some rigidity of the lumbar spine is usually present and there may be a tender spot at the level of the fifth lumbar transverse process (Roger and Bannister, 1984).^[13]

Musculoskeletal Examination:

Gait: The patient of sciatica has a typical gait of walking i.e., antalgic gait, very typical limping while walking.

Posture: The shape/curvature of the lumbar spine is altered and the restricted motility too. There may be loss of normal lumbar lordosis. The paraspinal muscular spasms produce list to one or other side on standing, known as sciatica scoliosis.^[8]

Special tests –

Straight Leg Raise Test (SLR): According to current science, the straight leg raise test can be performed in a variety of methods. One method is to request that the patient elevate his straight legs while laying horizontally on a level surface, such as a bed or the floor. Another technique involves the examiner cupped hands holding the individual's heel while explaining the inspection to the individual. After that, the heel is gradually lifted off the level ground

while the knee is extended. Normally, the leg can be elevated up to eighty to ninety degrees without discomfort. To avoid pelvic rotation, the examiner's opposite hand should rest on the pelvis. When a patient complains of pain, the afflicted nerve root is stretched, preventing further elevation of the leg, and this angle is measured with a goniometer. The patient is next questioned about the location of their pain. As SLR diminishes, so does the level of discomfort. Although it may be uncomfortable for the patient, it is recommended that the leg be raised to the utmost height permitted in order to achieve the desired degree of elevation. The lumbosacral nerve roots, spinal disc, and sciatic nerve will all experience traction during the test.

During the first thirty degrees of the leg raise; the sciatic nerve and its extensions are stimulated. The spinal nerves, Dura matter extensions, and nerve roots of the fourth, fifth lumbar and first and second sacral segments are stretched between thirty to seventy degrees with two to six millimetres excursion. Movement and tension begin in the sciatic notch and progress down the sacrum over the pedicle, and finally to the intervertebral foramen. When the lower limb is elevated to seventy degree, the nerve's passage past the surrounding structures grinds to a halt. As a result, the aforementioned structures are subjected to increased strain after seventy degrees. This test is more useful diagnostically in determining the severity of pain and prognostically in determining the outcome of treatment. Crossed leg discomfort is a sign of a disc herniation and indicates a dismal prognosis. ^[14,15]

Schober's Examination: This test is used to evaluate lumbar flexion capacity, which is simply the ability to bend the lower back. According to spine motility; pain in motion often indicates a mechanical explanation for lumbar syndromes. Painless or free motions do not include simple mechanical pain in the lumbar region ^[16]. Technique ^[17,18]: To begin, points are marked at the level of the spinal illicia, or roughly at the level of fifth vertebrae, which are ten cm above and five cm below the lumbosacral joint. The inspector next places one finger five cm below the location and another ten cm above it. Following that, the subject is directed to touch his toes without bending his knees, and the distance between them is measured during flexion and extension. As a result, the flexion and extension indices are provided, and the sum of their values produces the flexibility index, which is normally 6 cm. If the Schober's index is less than 5 cm, lumbar flexion is restricted.

Tenderness ^[19]: Local tenderness can be ruled out by the presence of trigger points in the lumbar region and limbs. Paraspinal tenderness is measured by applying pressure on the

paraspinal muscles and vertebral column. The degree of tenderness, which is also measured with the Straight raise leg test, which elicits tenderness during restricted leg lift, is important in identifying how bad the issue.

Walking Time test ^[19]: Before and after therapy, the patient's duration of walking over a distance of ten meters was assessed.

Differential diagnosis- disc lesion, spondylolisthesis, attrition of disc, sacroiliac arthritis, secondary deposits in the spine, benign tumors, Hip arthritis, intermittent claudication. ^[20]

Discussion - The tibial portion of the sciatic nerve receives its fibers from the ventral division of the ventral rami of L4-L5 and S1, S2, and S3, whereas the common peroneal component receives its fibres from the dorsal division of the ventral rami of L4, L5, S1 and S2.^[21]

Course and Relation of Nerve Root: The nerve is situated in front of the piriformis and is covered by its fascia in the pelvis. Within the Gluteal Area: The bigger sciatic foramen is where the sciatic nerve enters the gluteal region beneath the piriformis. It slopes downward with a slight lateral convexity between the greater trochanter and the ischial tuberosity. Gluteal maximus and, sporadically, the thigh's posterior cutaneous nerve. The hip capsule and the upper, transverse adductors magnus fibers are situated in the deep (anterior) portion of the hip joint, as well as the quadratus femoris, obturator externus, and ascending branch of the medial circumflex femoral artery. The medial region contains the inferior gluteal nerve, arteries, and posterior cutaneous nerve of the thigh. The sciatic nerve travels vertically downward from the lower border of the gluteus maximus in the back of the thigh to the superior angle of the popliteal fossa (where the upper 2/3 and lower 1/3 of the thigh meet), where it splits into the tibial and common peroneal nerves. The relationships of its thigh are as follows. The sciatic nerve is superficially (posteriorly) crossed by the long head of the biceps femoris. The adductor magnus, in a deep (anterior) position, supports the nerve. The medial area of the thigh contains the semi-tendinosis, semi-membranous, and posterior cutaneous nerves. Lateral biceps femoris. At the knee or the pelvis, the tibial and common peroneal split often occur. Medial Popliteal Nerve (Tibial Nerve): The longest sciatic nerve terminal branch is this one. It provides the skin for the lateral and posterior regions of the lower third of the leg. As it descends into the bone, the popliteal artery follows the lateral, posterior, and medial sides of the popliteal fossa. The popliteal vein runs between the nerve and artery along its whole length. Before entering the back of the leg, the nerve travels through the soleus muscle, where its branches are The medial two-thirds of the planter area of

the foot are supplied by the Medial Planter, while the Lateral Planter is a foot muscle that supports the remaining foot muscles. It also provides the Abductor hallucis, Flexor digitorum brevis, and Flexure hallucis brevis muscles. The terminal branch of the smaller sciatic nerve that arises in the lower portion of the thigh is known as the Common Peroneal Nerve or Lateral Popliteal Nerve. It descends via the popliteal fossa, closely following the medial border of the biceps muscle. The lateral head of the gastrocnemius muscle is superficially crossed as it exits the fossa. Then, after passing behind the fibula's head and wrapping lateral around the bone's neck to pierce the peroneus longus muscle, it splits into two terminal branches. The superficial peroneal nerve provides the skin over the distal third of the anterior portion of the leg and the dorsum of the foot in addition to the peroneus longus and peroneus brevis muscles. Deep peroneal nerve: This nerve provides the tibialis anterior, extensor hallucis longus, peroneus tertius, and extensor digitorum longus with blood flow.^[22]

REFERENCES

1. Somen Das, A Concise Textbook of Surgery, 4th edition reprint 2007, Calcutta, Pg. 52
2. B. D. Chaurasia, Human Anatomy, Vol. 2, edited by Krishna Garg, 5th edition 2010, Pg. 96.
3. Evidence-Based Physical Diagnosis (Second Edition), 2007
4. Ioannis Karamelas, M.D., Angel N. Boev III, M.S., Kostas N. Fountas, M.D., Ph.D., Joe Sam Robinson, Jr., M.D., Neurosurg Focus. 2004; Available from-[<http://www.medscape.com/viewarticle/468462>].
5. Available from-. www.merriam-webster.com/dictionary/sciatic
6. Dr. Pooja S. Halankar. Dissertation on “Evaluation of The Efficacy Of Treatment Protocol As Per Classical Guidelines In Gridhrasi - A Comparative Clinical Trial”. July 2017.
7. Anantkumar Shekokar, KanchanShekokar. Principles and Practices of Agnikarma.2nd ed. Pune: Shantuprakashan; 2007. p.47.)
8. Dr. Bhagyesh P, Dr Vishwanath W. Efficacy of Virechana in patients of Gridhrasi[sciatica] who previously underwent Shodhana basti chikitsa- An Open Clinical trial.
9. B. D. Chaurasia, Human Anatomy, Vol. 2, edited by Krishna Garg, 5th edition 2010, Pg. 92.
10. Brain's textbook of neurology, Pg. 434
11. ManoranjanSahu- Rasna Guggulu-Shodhana-Gridhrasi-KC-VV-2002 IPGT&R, Jamnagar, Gujarat
12. ManoranjanSahu-rasna guggulu-shodhana-gridhrasi-kc-vv-2002 IPGT&R, jamnagar, Gujarat
13. Dr. Pooja S. Halankar. Dissertation on “Evaluation of The Efficacy of Treatment Protocol As Per Classical Guidelines In Gridhrasi - A Comparative Clinical Trial”. July 2017.p 15-16
14. Charnley J: Orthopaedic signs in the diagnosis of disc protrusion. Lancet 1: 186-192, 1951-/ Falconer MA. McGeorge M, Begg Ca: observations on the cause and mechanism of symptom production in sciatica and low back pain. J Neurol Neurosurg Psychiatry 11: 13-26. 1948.
15. Goddard MD. Reid JD: Movements induced by straight leg raising in the lumbosacral roots, nerves and plexus, and in the intrapelvic section of the sciatic nerve. J Neurol Neurosurg Psychiatry 28: 12-18, 1965/ Inman Vt, Saunders JB: the clinic- anatomical aspects of the lumbosacral region. Radiology 38: 669-678, 1942
16. Waxman Se, Tripp DA, Flamenbaum R. The mediating role of depression and negative partner responses in chronic low back pain and relationship satisfaction. I pain 2008(5): 434-42. Doi: 10.1016/j.jpain.2007.12.007.
17. Schaller A, Dintsios CM, lcks A, Reibling N, Froboese L., Promoting physical activity in low back pain patients : six months follow up of a randomized controlled trial comparing a multicomponent intervention with a low intensity intervention Clin Rehabil.2016; 30(9):865-77.doi: 10.1177/026921551568730.
18. Ullrich Jr. Peter F, MD, Lower back pain symptoms, Diagnosis, and treatment, www.spine-health.com (2015)

19. Review article: IAMJ; ISSN-23205091; www.iamj.in; IAMJ volume 3; Issue 5; May 2015-" A comparative clinical trial between Dhanyamla sahita and rahita erandamoola basti in katigata vaata" by Dr Sampat Priyanka Deepak, PG Scholar, Dept. of Panchakarma, C A R C, Nanded, Pune, Maharashtra, India; Pg no-1443-1444
20. Dr. Pooja S. Halankar. Dissertation on "Evaluation Of The Efficacy Of Treatment Protocol As Per Classical Guidelines In Gridhrasi - A Comparative Clinical Trial". July 2017, p 28-29
21. Dr. Pooja S. Halankar. Dissertation on "Evaluation of The Efficacy Of Treatment Protocol As Per Classical Guidelines In Gridhrasi - A Comparative Clinical Trial". July 2017, p 22
22. Dr. Pooja S. Halankar. Dissertation on "Evaluation of The Efficacy Of Treatment Protocol As Per Classical Guidelines In Gridhrasi - A Comparative Clinical Trial". July 2017, p 23-25