

IPSILATERAL SCIATICA ON FEMORAL NERVE STRETCH TEST IS PATHOGNOMONIC OF AN L4/5 DISC PROTRUSION

ANTONIOS N. CHRISTODOULIDES

From the General Hospital, Piraeus, Greece

The straight leg raising test and the femoral nerve stretch test exert traction on the sciatic and femoral nerve, and the lumbosacral plexus and roots. In 40 patients with a suspected L4/5 disc protrusion, ipsilateral sciatica was induced by the femoral nerve stretch test. We believe that this is a pathognomonic sign of a lateral protrusion at L4/5 level.

The clinical signs in patients with lumbar disc protrusion have been classified by O'Connell (1943) as spinal, tension and neurological. The best known tension signs are pain in the distribution of the sciatic nerve on straight leg raising (SLR) and in the anterior femoral area on performing the femoral nerve stretch test (FNST).

For the SLR test the patient lies supine and the leg, with the knee straight, is passively raised: the test is positive if sciatica is experienced at an angle of less than 90°. This test is usually positive in patients with disc protrusion at either of the last two intervertebral spaces, negative or slightly positive in L3/4 protrusions and negative when the protrusion is higher.

For the FNST the patient lies prone and the knee is passively flexed to the thigh; the test is positive if the patient experiences anterior thigh pain. This test is usually strongly positive in patients with protrusions at L2/3 and L3/4, slightly positive or negative in L4/5 protrusions and negative in cases with a lumbosacral protrusion.

Both tests cause a downward and slightly lateral movement of the relevant nerve, its nerve roots and the intradural rootlets (Goddard and Reid 1965). This affects the spinal cord over a span of one or two vertebrae, greater distally than proximally. Movement decreases with advancing age so that after the age of 55 years this is minimal or absent.

During the SLR test, movement of the L4 root is

maximal at its foramen, and less more proximally in its rootlets, depending on the degree to which it enters into the formation of the lumbosacral cord and thus forms part of the sciatic nerve. The larger the L4 component of the sciatic nerve, the greater is the movement induced.

A similar pattern applies to the FNST, this time depending on the degree to which it enters into the formation of the femoral nerve. The L4 root moves downwards, pulling on the L5 root in proportion to the L4 involvement in the lumbosacral cord. The L4 root has the greatest downward movement when the FNST is performed; this can be seen during a lumbar laminectomy.

In patients with a myelographically verified lateral disc protrusion at L3/4, SLR never produces anterior thigh pain; this can be explained by the small downward movement of the L4 root, the relaxation at the L2 and L3 roots during the test and the fact that the L4 root is one space below the relevant intervertebral disc.

PATIENTS AND METHODS

In several patients with symptoms and signs of lateral L4/5 disc protrusion, we noted that ipsilateral sciatica was produced by the FNST on the affected side. We therefore studied a series of 200 cases operated upon for an L4/5 disc protrusion at the General Hospital, Nicosia, Cyprus; the Evangelismos Hospital, Athens; and the Government Hospital at Piraeus, Greece. In the cases from Cyprus, particularly before the introduction of metrizamide, operation was commonly performed for lumbar disc protrusion on the symptoms and signs alone, without myelography.

The patients were considered in three groups according to the angle at which sciatica was induced by the SLR test. In 41, this angle was less than 30°, in 90 it was between 30 and 60° and in 69 it was over 60°.

A. N. Christodoulides, MD, Neurological Surgeon
Department of Neurosurgery, Government General Hospital, Piraeus,
Greece

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In 26 of the first group and in 14 of the second, ipsilateral sciatica was experienced during the FNST; this was more intense in the first group of patients; no patient in the third group experienced sciatica. All 40 patients with this sign had myelography. In 38 of them a lateral L4/5 disc protrusion was shown and two had negative results. These two patients had persisting symptoms and therefore had operations. In both cases, very laterally placed disc protrusions were found and removed.

In all 40 cases, only minimal movement of the nerve root could be demonstrated at operation, this was especially so in the first group. In 20 cases the protrusion was anterior to the root, which was flattened, stretched and angulated over the protrusion. In 12 cases the protrusion was lateral to the root, pushing it medially and stretching it. In eight cases the protrusion was in the axilla of the root, pushing it laterally and stretching it.

When the operation was performed with the patient in a prone position only the FNST could be performed, but in the lateral position both FNST and SLR could be carried out. On SLR definite movement of the root could be seen as it was stretched over the protrusion or around it, although we were very careful to avoid excess tension in the paralysed patient. On FNST in most patients we found only some lateral movement of the dural sac and also minimal lateral movement, more at L4 than at L5. In nine cases there was obvious movement and stretching of the root.

In these clinical cases it was obviously impossible to know the degree to which the L4 root entered into the

formation of the lumbosacral trunk or whether there was any malformation of the plexus or abnormality in the exit of the roots.

DISCUSSION

The L4 and L5 intervertebral foramina are longer and narrower than the others, giving greater chance of pressure between discs and bone. The L4 and L5 roots run a sigmoid course through the intervertebral foramina, impinging first on the inferomedial aspect of the upper pedicle and then on the superior and lateral aspects of the pedicle below. The roots cross obliquely and come into relation with the disc in the lower and outer part of the foramen.

We believe that when sciatica is induced by the FNST, movement of the L4 root pulls on the L5 root which is inflamed and already tense. Therefore, in patients with suspected L4/5 disc protrusion, the induction of sciatica during the FNST is diagnostic of a lesion at this level.

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