

# Relationship between Lumbar Herniated Disc with Flat Feet

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## ABSTRACT

The Aims of this stud was to prepare the clinician of the relation between LDP and flat foot patient and the further studies on this subject to improve types of physiotherapy to treat those patients with flat foot. Twenty-five cases of flat foot patient who had lumbar disc prolapse were reported for 5 years (2003-2008). The radiological finding particularly MRI of lumbosacral spine and histopathological examination were discussed and analyzed. All patients were treated surgically by total removal of the lumbar disc prolapse of calcified disc which were reduced by tapping in site. This study demonstrates the relationship between the flat foot deformity as a predisposing factor which lead to precipitate the lumbar disc prolapse which occurs mainly at levels of L3/ L4.

**Keywords:** Lumbar disc prolapses - flat foot patient - physiotherapeutic measures

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## INTRODUCTION

Lumbar disc prolapses (herniation) represents one of the most common problem that a neurosurgeon will be called upon to evaluate. It is estimated that 50% of working adults will experience back pain in any given year of any number many will be found to harbor a herniated lumbar disc (1). Neurosurgeons, while having extensive training in the management of disorders of the brain and peripheral nervous system, nevertheless the spend the majority of their career treating patient with spinal disorder (2). Of these patients more than 50% will harbor diseases of lumbar spine, including, LDP, furthermore, over 296000 intervertebral disc operation are performed in the united states per year (3). The intervertebral disc is composed of three parts, the annleus fibrosus the nucleus pulposus, and the cartilaginous end plates the annleus fibrous is tough outer ring composed of 10 to 12 concentric layers of fibrous tissues and fibrous cartilage it is re-inforced ventrally by anterior longitudinal ligament and dorsally by posterior longitudinal ligament (4&5).The nucleus pulpous, contained within this outer ring and slightly dorsal to the midpoint is a remnant of the notochord and composed of a softer form of cartilage (6&7). In the child, the nucleus pulpous is semifluid but it becomes more solid and fibrous with age (8&9). Each lumbar intervertebral disc is bound to the vertebral body above it by a thin plate of hyaline cartilage and to vertebral body below it by similar thin plate of hyaline cartilage.

## MATERIALS AND METHODS

All the flat foot patient who was schedules for lumber laminoectomy were eligible for this study which was carried at the neurosurgical department of Al-khadymia teaching hospital and Al-mooswy private hospital and Alsaady private hospital. We exclude the patients who were considered normal feet, the vast majority of the patient were males 80% whereas female consisted aminor percentage 20%, the average age of the patients was 25 years old the range was between (20-40) years. Type of the laminoectomy which was over the lumber region, it was formal laminoectomy or hemilaminectomy by using the manual lumber laminoectomy set. The patient was operated in different theaters with careful selection of the patient was done that based on the results of the MRI of lumbosacral spine and plain X.R of

LSS as a marker prior to the time of operation. When the results of MRI of LSS for those patients who were being flat foot suggested that patient had actually LDP which was associated with flat foot , Abolus dose of (1 gm) of claformmethotrixem plus 1 gm of Ampiclox which were given (I.V 20-30) minutes before indication of anesthesia and repeated every one hour, Allprecautions were taken to ensure asepsis during reurosurgery in the theater and in the neurosurgical ward with all measures to diagnose and isolate any source of infection Post-operative-dressing –change and removal the sutures was done at 10th post-operative day follow up was done ,based on the clinical examination ,plain X-R of the LSS ,MRI of LSS the histopathological examination was revealing the tissue – changes with in the lumbar disc materials after which had been removed .

## Statistical analysis

Data were expressed as the means of three independent experiments. Statistical comparisons of the results were performed by Chi-square using SPSS ver.19. Significant differences (P<0.05) among the parameters.

## RESULTS AND DISCUSSION

Age incidence had shown that n 60% of the cases the age was below 25 years and 10 cases was above 25 years old, in percentage of 40% (Table 1). The most common sex incidence of lumbar disc prolapse in the flat foot patient was in the male more than female patient (table 2). In Table (3) had shown the commonest level of the lumber disc prolapse in the flat foot patient was L3/L4 in 60% of the case which were diagnosed by the MRI of the lumbar spine. The presence of the hypertrophy clligamentum flavum which was usually associated with lumber disc prolapsed Table (4). In patient who had flat foot in 80% of the cases while the remaining cases had normal sized ligamentum flavum in 20% of the cases Table (5), had detected, the association of calcified changes in the prolapsed lumber disc in 80% of the cases and had shown the characters' in pathological features of the lumber disc prolapse in the flatfoot patient. The severe and moderate degree of flat foot patient shown a big, rapid lumber disc prolaps with hyper trophiedligamentum flavum, that in 40% of cases for each degree of the flat foot whether it was moderate or severe white the mild flat foot patient had shown that 20% (table 6).

**Table1:** Age related to LDP in patient with flat foot

Age	Patient No.	%
Above 25 years old	10	40
Below 25 years old	15	60
Total	25	100

$X^2= 4.00$   $df=1$   $p\text{-value}= 0.046$

**Table 2:** Sex distribution related to the disc prolapse

Gender	Patient No.	%
Male	20	80
Female	5	20
Total	25	100

$X^2= 36.00$   $df=1$   $p\text{-value}= 0.00$

**Table3:** The comments level of LDP related to flat foot patient

Case	Patient No.	%
L5/C1	5	20
L4/L5	5	20
L3/4	15	60
Total	25	100

$X^2= 32.00$   $df=2$   $p\text{-value}= 0.00$

**Table 4:** ligamentumflavum related to LDP in flat foot patient

Case	Patient No.	%
Hugpertyphy	20	80
Normal size Ligament	5	20
Total	25	100

$X^2= 36.00$   $df=1$   $p\text{-value}= 0.00$

**Table5:** LDP associated with calcification

Case	Patient No.	%
Calcified disc	20	80
Non calcified	5	20
Total	25	100

$X^2= 36.00$   $df=1$   $p\text{-value}= 0.00$

**Table 6:** Degree of the deformity of flat foot patient related to LDP

Case	Patient No.	%
severe	10	40
moderate	10	40
mild	5	20
Total	25	100

$X^2= 8.00$   $df=2$   $p\text{-value}= 0.018$

## DISCUSSION

The lumbar disc prolapsed in the flat foot patient is common in the IRAQI population from our study mostly young, aged persons. we see more cases nowadays which were diagnose early by the presence of MRI in the medical service, it seems the incidence of the lumbar disc prolapsed in the flat foot patient increases because of modern life and heavy physical work. The function of the

nucleus pulposus is to resist compressive forces with the spine where is the main function of the annulus fibrosis is to withstand horizontal and torsional tension (6). The function of the spine is primarily biomechanical that is, it is involved in the transference of loads placed on the head trunk, and extremities and it acts as a protected armor for the spinal cord (6). The motions that the spine is capable of undergoing under normal physiological loads are

determined by both the anatomical geometry of the osseous and ligamentous structures and the mechanical properties of these structures. The spinal motion has degrees of the freedom, which refers to the number of unique independent motions. The spine has six degrees of freedom in translation and rotation about the axis. The translational modes refer to the movement of one vertebra either forward or backward, left or right up or down compared with the adjacent vertebra. The rotational modes refer to the angler bending either in flexion-extension laterally to the left or right, or as axial, twisting to the left or right (8). Ref. (6) proved that posture of the patient affected motion and biomechanical of the spine and ligamentous stability of these spine. Because of the severe flat foot deformity usually affects the posture of that patient who is suffering from the congenital deformity, which is considered as a predisposing factor which play a major role in the pathogenesis of the lumbar disc prolapsed. Ref. (10) showed through some mechanical tests on the lumbosacral spine with particular reference to the intervertebral disc that the deformity of the extremities may affect the biomechanical properties of the spine and ligamentum flava and the intervertebral. While Ref. (6), showed through his clinical 6 observations by clinical biomechanics of the spine. But Ref. (7), showed some mechanical properties of the third lumbar 1968 inter laminar ligament (ligamentum flavum) that ligamentum flavum reveals degenerative changes like thickening and hypertrophied when the ligament structures of the spine must be able to perform the dual function of allowing physiologic movements of the spine while resisting motion between the vertebra beyond these physiologic limits. It seems that physiologic movement are affected strongly by the posture of the patient who are suffering from flat foot deformity especially in those patients who aged below (25) years old aged group as shown in our study. Ref. (9) show through mechanical 9 disorders of the low back, while most of the load on the spine is borne by the vertebral body, 18% of the composite load, 45% of the torsional strength and variable amount of the stability of the spine are contributed by the facet joint. So from my study the compressive load might be folded in the flat foot patient because abnormal distribution of the strength of loads, to abnormal posture of the patient this might lead to change normal gait of the patient and this gait which is close related to the center of the weight of the body we can see that the most biomechanical changes which are occurred at level of the L3/ L4 as that is shown in our study table. So, the flat foot deformity leads to change of the center of the weight of the patient and affects the posture of the patient and these affects depend on the severity of the deformity of flat foot in one hand and on the age of the patient on the other hand. The abnormal changes in the ligamentum flavum in the size consistency of the ligamentum to be thick and hypertrophy of the patient who is suffering from flat foot deformity that was revealed in the study the explanation of that I think there is a rapid degenerative change because the ligamentum flavum is acting beyond the physiological movement and under heavy work or exertion of the flexion and extension. the tending of the I.V.D of lumbar spine to be calcified. Because of rapid and large amount of the watery- content are lost which is due to continuous compressive strength which is acting on the disc. through the vertebral body of the spine as show in table (6).

## CONCLUSION

The flat foot deformity should be considered as a predisposing factor which play major role in the precipitation of the lumbar disc. The lumbar disc prolapses usually occur at high level of the lumbar spine. The neurosurgeon when plans to work on lumbar spine for those patients with flat foot should be put in his mind that he may face calcified lumbar disc. The removal of the corresponding ligamentum flavum of the prolapsed lumbar disc, it is mandatory work by which to achieve more decompression of the neural structures. To encourage further studies on this subject to improve our tools in therapy particularly medical treatment and physiotherapeutic measures.

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