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The Relationship between Lumbar disc Prolapse and Flat Foot

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ABSTRACT:

Background:

Lumbar dick prolapse (herniation) represents one of the most common problems that a neurosurgeon will be called upon to evaluate. It was estimated that 50% of working adult will experience back pain in any given year.

Aim:

1. To alert the clinician of the relation between LDP and flat foot patient.
2. To encourage future studies on this subject to improve types of physiotherapy to treat those patients with flat foot.

Materials and Methods:

A retrospective study on 25 cases of flat foot patients who were scheduled for lumbar laminectomy were eligible for this study which was carried at the neurosurgical department of Al kadhimiya teaching hospital. Al mousawi private hospital and Al saadi private hospital during 5 yrs period between 2003 – 2008.

Results:

Age incidence had shown that in 60% of the cases the age was below 25 yrs. And 10 cases were above 25 yrs old in percentage of 40%.The most common sex incidence of lumbar disc prolapse on the flat foot patient was in the male more than female patient.The commonest level of the lumbar disc prolapse in the flat foot patients was L3/L4 60% of the cases, which were diagnosed by the MRI of the lumbar spines.

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Conclusion:

The flat foot deformity should be considered as a predisposing factor which plays a major role in the precipitation of the lumbar disc prolapse.

The Aims of this study

1. To alert the clinician of the relation between LDP and flat foot patient
2. To encourage further studies on this subject and to improve types of physiotherapy to treat those patient with flat foot.

Introduction:

Lumbar disc prolapsed (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 [1]. Of any number many will be found to harbor herniated lumbar disc. Neurosurgeons, while having extensive training in the management of disorders of the brain and peripheral nervous system, nevertheless the spent the majority of their career treating patient with spinal disorder. Of these patient 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[2]. The intervertebral disc is composed of three parts: the annulus fibrosis, the nucleus pulpous, and the cartilaginous end plates [3-5] the annulus fibrous is tough outer ring composed of 10 to 12 concentric layers of fibrous tissues and fibrous cartilage it is re-enforced ventrally by anterior longitudinal ligament and dorsally by posterior longitudinal ligament. 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. In the child, the nucleus pulpous is semi fluid but it becomes more solid and fibrous with age. 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.

Patient and methods:

All the flat foot patient who were scheduled for lumbar laminectomy were eligible for this study which was carried

at the neurosurgical department of Al khadymia teaching hospital, Al mooswy privet 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 a minor percentage 20% (Table 2) the average age of the patients was 25 years old the range was between 20-40 years. Type of laminectomy which was done over the lumbar region, it was formal laminectomy or hemilaminoctomy by using the manual lumbar laminectomy set. The patient were 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, A bolus dose of 1 gm. of claform methotrixem plus 1 gm. of Ampiclox which were given I.V 20-30 minutes before indication of anesthesia and repeated every one hour. All precautions were taken to ensure asepsis during neurosurgery in the theater and in the neurosurgical ward with all measures to diagnose and isolated any source of infection.Post-operative-dressing-change and removal the sutures was done at 10^{th} post-operative day. Follow up was done and based on the clinical examination, plane X-R of the LSS, MRI of LSS. The histopathological examination was revealing the tissue-changes within the lumbar disc materials after which had been removed.

Result:

Age incidence (Table 1) had shown that in 60% of the cases the age was below 25 years and 10 cases was above 25 years old 40%. The most common sex incidence of lumbar disc prolapsed in the flat foot patient was in the male more than female patient (Table 2). (Table 3) had shown the commonest level of the lumbar disc prolapsed in the flat foot patient was L3/L4 in 60% of the cases which were diagnosed by the MRI of the lumbar spine. (Table 4) had shown the presence of the hypertrophied ligament flavum which was usually associated with lumbar disc prolapsed in the patient who had flat foot in 80% of the cases while the remaining cases had normal sized ligament flavum in 20 %of the cases. (Table 5) had revealed that the association of calcified changes in the prolapsed lumbar disc in 80% of the cases and had shown the characteristic in pathological features of the lumbar disc prolapsed in the flat foot patient.

The severe and moderate degree of flat foot patient shown a big rapid lumbar disc prolapsed with hypertrophied ligamentum flavum that in 40 % of the cases for each degree of the flat foot whether it was moderate or severe while the mild flat foot patient had shown that 20% (Table 6).

Table (1): Age related to LDP in patient with flat foot.

	No. of pat.	%
Above 25 years old	10	40
Below 25 years old	15	60
Total	25	100

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Table (2): sex distribution related to the disc prolapsed in flat foot patient

	No. of pat.	%
Male	20	80
Female	5	20
Total	25	100

Table (3): The commonest level of LDP related to flat foot patient

	No. of pat.	%
L5/S1	5	20
L4/L5	5	20
L3/L4	15	60
Total	25	100

Table (4): ligamentum flavum related to LDP in flat foot

	No. of pat.	%
Hypertrophied Ligament	20	80
Normal size ligament	5	20
Total	25	100

Table (5): LDP associated with calcification in flat foot patient.

	No. of pat.	%
Calcified disc	20	80
Non-calcified	5	20
total	20	100

Table (6): Degree of deformity in the flat foot patient is related to LDP

	No. of pat.	%
Severe flat foot	10	40
Moderate flat foot	10	40
Mild flat foot	5	20
Total	25	100

Discussion

The lumbar disc prolapsed in the flat foot patient is common in the Iraqi population from our study mostly young aged person. 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 increase because of modern life and heavy physical work. The function of the nucleus pulpous is to resist compressive forces with the spine, where the mean function of the annulus fibrosis is to withstand horizontal and tensional tension [6]

The function of the spine is primarily biomechanical that is, involved in the transference of loads placed on the head, trunk, and extremities and it acts as protected armored for the spinal cord [6]. The motions that, the spine is capable of undergoing 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 sex degrees freedom the in translation and the in rotation about age axis. The translational

modes refer to the movement of one vertebra either forward or backward, left right up or down compared with the adjacent vertebra. The rotational mods 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].Panjabi MM, Oda T, Crisco inj othop Res 1993 provide 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 major role in the pathogenesis of the lumbar disc prolapsed [8].Brown T 6. Hansen RJ Yorra AJ 1957 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 flavum and the intervertebral [10].White AA panjaby MM 1990 showed through his clinical [6] observations by clinical biomechanics of the spine an Nachemson [7] AL-Evans JH showed some mechanical properties of the third lumbar 1968 inter laminar ligament (ligamentum flavum) that ligamentum flavum reveals degenerative changes like thickening and hypertrophy when the ligamentum structure 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 specially in those patient who aged below 25 years old aged group as shown in the our study.Fartan HF 1973 show through mechanical [9] disorders of the low back, while most of the load on the spine is born by the vertebral body, 18% of the compressive load, 45% of the torsional strength and the variable amount of the stability of the spine are contributed by the facet joint. So from my study the compressive load might folded in the flat foot patient because abnormal distribution of the strength of the loads. Due to abnormal posture of the patient this might lead to change normal gait of the patient and this gait which is closed related to the center of the weight of the body and 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 3). So the flat foot deformity leads to change of the center of the weight of the patient's body and affects the posture of the patient so this affects depend on the severity of the deformity of the flat foot in one hand and on the age of patient on the other hand.The abnormal changes in the ligamentum flavum in the size and its consistency, the ligamentum is to be thicken and hypertrophied so 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 ligamantum flavum is acting beyond the physiological movement and under heavy work or exertion of the flexion and extension [10].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 the (Table 5).

Conclusion:

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

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العلاقة بين الانزلاق الغضروفي القطني و تسطح القدمين

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الخلاصة

تمت الدراسة خمسة و عشرين حالة لمرضى المصابين بانزلاق غضروفي قطني مع تسطح القدمين دراسة استرجاعية خلال الفترة من 2003- 2008 الذين ادخلوا في مستشفى الموسوي الاهلي ومستشفى السعدي الاهلي في مدينة البصرة و اجريت لهم فحوصات الرنين المغناطيسي والرقائق الشعاعية بواسطة الاشعة السينية للفقرات القطنية و الفحص النسيجي الختبري و تم اجراء التداخل الجراحي بفتح الفقرات القطنية و الفحص النسيجي المختبري و تم اجراء التداخل الجراحي بفتح الفقرات القطنية وازالة الغضروف القطني المنزلق و اعادته بواسطة الطرق الى مكانة لكونة متكلس و اظهرت نتائج الدراسة بان نسبة التكلس في الغضروف القطني لهولاء المرضى عالية لدى مرضى تسطح القدمين وان تسطح القدم هو احد العوامل المساعدة على الانزلاق الغضروفي القطني المبكر وان اكثر مستوى يحدث في هذا النوع من الانزلاق هو بين الفقرتين القطنيتين الثالثة والرابعة.

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