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ORIGINAL

DEMOGRAPHİC AND CLİNİCAL DİSTRİBUTİON OF ATHLETİC PATİENTS DİAGNOSED WİTH LUMBAR DİSC HERNİATİON VİA MAGNETİC RESONANCE IMAGİNG İN TURKEY

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Abstract

Many factors account for the higher incidence of lumbar disc herniation among Turkish sportsmen. Any sport involving repetitive forces, such as a competitive race, can also increase the risk of herniated discs among athletes. This causes lower back pain that progressively worsens over time. Any activity or sport requiring a great deal of repetitive movement or running stresses the body's muscles and cushions the spine. This study was done to determine the demographic and clinical distribution of athletes diagnosed with Lumbar Disc Herniation by magnetic resonance imaging. The survey included 211 sports patients for this reason. Patients who participated in sports were analyzed based on their disc herniation severity, number, duration, degree of education, and place of residence. Using SPSS 20.0 package software, the data were examined. The results of this study indicate that 48% of sports patients had a contained hernia, and 52% had an uncontained hernia. The results have many theoretical and practical implications. The present study is a vital addition to the growing body of research on athletes and the diseases that come from their repetitive behaviors. Practically, the present study provides the Turkish sports department with information that can be used to establish strategies for preventing the disease prevalence of lumbar disc herniation in athletes.

Keywords: Sports patients, Lumber Disc Herniation, magnetic resonance imaging

1. INTRODUCTION

It has been widely recognized that Lumbar Disc Herniation is a frequent cause of back and neck pain in Turkish athletes and sportsmen. Due to the constant pressure, they experience on "concurrent microtraumas" and the spine, which are almost thought incapable of recovery [1, 2], the condition is believed to be significantly more prevalent in athletes than in other patients. Athletes and sportsmen are more likely to suffer from bulging or herniated discs due to their regular participation in repetitive physical activities. Every time these patients participate in sports, they are observed to have recurrent stress on their muscles and spinal column. Suppose the disc of a sports patient is already fragile or compromised due to degenerative disc disease or old age. In that case, a little injury or a misstep during athletic exercise might result in a herniated or bulging disc. Low back discomfort is one of the most prominent complaints of athletes at all levels of competition [3-5]. Marco and Evans [6] noted that 10 to 15% of athletes would have low back pain. Dancing, football, and other sports that place greater stress on the "lumbar spine" are believed to be associated with a higher incidence of low back pain than less physically demanding activities.

A joint working group of the American Society of Neuroradiology, the American Society of Spine Radiology, and the North American Spine Society define a disc herniation as the localized protrusion of nucleus pulposus, cartilage, fragmented apophyseal bone, or fragmented annulus fibrosus beyond the intervertebral disc space [7]. MRI is one of the most commonly used advanced radiological tests in patients diagnosed with symptomatic disc herniation based on history and physical examination [7, 8]. The purpose of the present study is, therefore, to investigate the demographics of sports patients diagnosed with Lumber Disc Herniation, to assess the Clinical distribution of sports patients diagnosed with Lumber Disc herniation, and to consider magnetic resonance imaging in assessing the demographic and clinical distribution of sports patients diagnosed with Lumber Disc Herniation. There is a large body of literature on Lumbar Disc Herniation in patients. Still, relatively few researchers have examined the demographic and clinical distribution of athletes anticipated to be diagnosed with Lumbar Disc Herniation. Thus, the present study intends to employ a quantitative research approach to investigate the outcomes. Following a summary of the research's context, the literature about the variables under inquiry is examined, followed by an explanation of the methodology, the findings, and a discussion of the results.

2. LITERATURE REVIEW

According to the American collaborative working group, bulging is not a hernia; the disc tissue diffuses beyond the apophyseal ring's boundaries (more than fifty percent of the apophyseal ring's circumference). There might be symmetrical or asymmetrical bulking. According to the group's definition, the hernia is classified into two subcategories: protrusion and extrusion. If the base width of the ruptured disc is more than the length of the section that surpasses the disc space, it is referred to as protrusion; otherwise, it is referred to as an extruded hernia. If the ruptured disc material has a neck, it is considered an extruded hernia [9, 10]. A high-intensity zone corresponds to an annular fissure in the posterior annulus. It may represent an acute annular fissure or vascularized granulation tissue in the disc substance next to the fissure[11, 12]. MRI is the imaging modality of choice for diagnosing suspected LDH. In addition, it has a diagnostic accuracy of 97% and a high rate of observer agreement [1]. The LDH has been detected most frequently in athletes due to several factors. Ice hockey is a popular activity in many nations, and numerous studies have established the mechanism and prevalence of Lumber disc herniation and lower back pain among athletes. In the earliest years of their careers, 95 percent of hockey players had lumbar spine pain, according to research. This study uses magnetic resonance imaging to determine the association between demographic and clinical data in individuals with lumbar disc herniation (MRI). Thus, it is also intended to determine which lesion is responsible for the symptoms of the athlete patients and to what extent in patients who present to a clinician with a particular clinical picture, while another objective is to examine the demographic information of patients diagnosed with lumbar disc herniation. The objective of this study was to retrospectively review the file records of athletes with lumbar disc herniation and to determine the association between the data gained from this evaluation and the anamnesis and examination findings in the sports patient's file.

Repeated extension, flexion, and load-type axial movements performed on the spine by athletes result in low back discomfort, despite their superior strength and flexibility compared to the general population or average patients. Several studies have revealed different injury trends in the lumbar spine, highlighting the increased stress placed on the lower back by elite athletes [1, 3, 13]. Lumbar Disc Herniation, which typically happens during athletic activity, requires effective treatment and management on the field to prevent and manage potential issues. These disorders are caused by numerous sports activities, such as football, which is popular in the United States, with some players engaging in the activity in their early adolescence and contributing to higher-level practice and competition between the ages of 15 and 18 [5, 14]. Due to the potentially destructive nature of cervical spinal cord injuries acquired during football, the incidence of these injuries is increasing. Herniated lumbar discs are frequent among athletes and can result in increased morbidity and playing time loss, putting their athletic careers in danger.

3. MATERIAL AND METHOD

3.1. Inclusion and Exclusion Criteria

The computerized archive of our hospital's radiology clinic was scanned, and 211 athletes with lumbar disc herniation who underwent lumbar MRI between January 2018 and January 2022 were included in the study. Male and female athletes between the ages of 25 and 70 were included in the study. Among these, in addition to those with lumbar disc herniation, athletes with vertebral fracture, congenital structural vertebral deformities (hemivertebrae, block vertebra, transitional vertebra, etc.), spondylolisthesis (grade 2 and above), spondylodiscitis, inflammatory spondyl arthropathy (ankylosing spondylitis and other spondyloarthropathies), primary or metastatic vertebral neoplasia were excluded.

To guarantee uniformity during the investigation of the connection between symptoms and lesions, sports patients who had previously undergone surgery for lumbar disc herniation were eliminated. The MRI sequences for the lumbar region were T1 Sagittal, T2 Sagittal, and T2 Axial. The thickness of the section was 4 mm, and the flip angle was 90 degrees. Even though the T1-weighted sagittal sequence does not give adequate contrast between the dural sac and nerve roots, the general anatomical appearance of each structure can be evaluated. While the bone marrow appears dark on T2-weighted imaging, the disc may seem bright or dark depending on the athlete's age. There is a stark contrast between disc tissue and CSF, which appears brighter. Due to the high signal intensity in CSF, axial T2-weighted images differentiate nerve roots effectively. The pain complaints of the athletes were categorized as "no leg discomfort," "pain in a single leg," and "bilateral leg pain." Among the symptoms of athletic patients, a walking distance of fewer than 200 meters was identified as "Neurogenic Claudication." Those who could not walk due to severe pain were excluded from this group. Using the terminology provided by the International Association for the Study of the Lumbar Spine in 1981, we adopted the term "contained herniation" for cases when the posterior longitudinal ligament is intact.

In contrast, the phrase 'full herniation' or 'non-contained herniation' has been applied to the posterior longitudinal ligament tear [1, 15]. On the lumbosacral vertebra X-ray, the vertebrae from the last vertebra with a rib (terminology/alternative: elevation) to the sacrum were counted while determining the lesion level. As conditions for being classified as a lumbar vertebra, the absence of a rib (term/alternative: elevation) and the presence of interlaminar space and disc space on both sides were acceptable. Hence, vertebrae having transverse processes on one or both sides and sacral missiles were also accepted as lumbar vertebrae. According to their severity of disc herniation, the number of disc herniations, length of symptoms, educational standing, and place of residence, the athletes were analyzed separately. The survey data were analyzed statistically using the SPSS 20.0 package tools.

4. FINDINGS

Table 4.1. Descriptives Summary

Variables		N	%
Gender	Female	106	50,2
	Male	105	49,8
Educational Status	Secondary School	41	19,4
	High School	80	37,9
	Bachelor’s Degree (Hangi derece olduğu belirtilmeli: Lisans varsayıldı)	90	42,7
Place of Residence	Rural	99	46,9
	Urban	112	53,1
Variables	**Minimum**	**Maximum**	**Mean ± Std. Deviation**
Age	20	70	44,91±7,77
BMI	18,90	29,30	22,86±1,92

First, descriptive statistics on the athletes were calculated as part of the study. For categorical data, percentages and ratios were used. The mean, standard deviation, minimum and maximum values were employed for measurement variables.

Following the research's descriptive statistics, hypothesis tests were conducted. Based on the central limit theorem, parametric hypothesis tests were conducted. The t-test was used to compare the means of independent groups, whereas the chi-square test was employed to examine the associations between categorical variables. We examined the mean BMI and age of athletes with and without neurogenic claudication, non-contained disc herniation, and bilateral midline disc herniation, as well as those with and without multi-level lesions. The results of the analysis are described in Table 4.2.

Table 4.2. Descriptives and Significance level

Variables		**N**	**Mean of Age**	**Standard Deviation of Age**	**p**
Neurogenic Claudication	No	203	44,79	7,86	>0,05
	Yes	8	48,25	4,26	
Non-contained Disc Herniation	No	102	44,96	7,73	>0,05
	Yes	109	44,89	7,85	
Bilateral Midline Disc Herniation	No	192	44,69	7,64	>0,05
	Yes	19	47,26	8,88	
Variable		**N**	**Mean of BMI**	**Standard Deviation of BMI**	**p**
Multi-level Lesion	No	164	22,73	1,83	>0,05
	Yes	47	23,29	2,15	

The mean BMI of athletes with neurogenic claudication, non-contained disc herniation, or bilateral midline disc herniation did not differ statistically significantly (p>0.05). Similarly, it was discovered that there was no statistically significant difference (p>0.05) between the average age of athletes with and without multi-level lesions. Using chi-square analysis, the correlations between the categorical variables of the athletes were explored. Each analysis was examined independently.

Table 4.3. The relationship between educational level and multi-level lesion, non-contained disc herniation, bilateral midline disc herniation, and neurogenic claudication

		Educational Status					
		Secondary School	High School	Bachelor's Degree	Total	X^2	p
Multi-level Lesion	No	33 (%20,1)	66 (%40,2)	65 (%39,6)	164 (%100)	2,808	0,246
	Yes	8 (%17)	14 (%29,8)	25 (%53,2)	47 (%100)		
Non-contained Disc Herniation	No	30 (%29,4)	58 (%56,9)	14 (%13,7)	102 (%100)	67,558	0,000
	Yes	11 (%10,1)	22 (%20,2)	76 (%69,7)	109 (%100)		
Bilateral Midline Disc Herniation	No	39 (%20,3)	74 (%38,5)	79 (%41,1)	192 (%100)	2,210	0,331
	Yes	2 (%10,5)	6 (%31,6)	11 (%57,9)	19 (%100)		
Neurogenic Claudication	No	40 (%19,7)	78 (38,4)	85 (41,9)	203 (%100)	1,339	0,512
	Yes	1 (%12,5)	2 (%25)	5 (%62,5)	8 (%100)		

There is no statistically significant correlation between the athletes' education amount and multi-level lesions, bilateral midline disc herniation, or neurogenic claudication (p>0.05). On the other hand, a statistically significant correlation between education level and non-contained disc herniation (p<0.05) was discovered. Examining the table reveals that persons with a higher degree have proportionally more disc herniations that are not confined.

Table 4.4. Relationship between the place of residence (Rural-Urban) and non-contained disc herniation, bilateral midline disc herniation, and neurogenic claudication

		Place of Residence				
		Rural	**Urban**	**Total**	**X^2**	**p**
Non-contained Disc Herniation	No	52 (%51)	50 (%49)	102 (%100)	1,307	0,253
	Yes	47 (%43,1)	62 (%56,9)	109 (%100)		
Bilateral Midline Disc Herniation	No	90 (%46,9)	102 (%53,1)	192 (%100)	0,002	0,967
	Yes	9 (%47,4)	10 (%52,6)	19 (%100)		
Neurogenic Claudication	No	94 (%46,3)	109 (%53,7)	203 (%100)	0,811	0,368
	Yes	5 (%62,5)	3 (%37,5)	8 (%100)		

There was no statistically significant relationship between the place where the sports patients/participants lived and non-contained disc herniation, bilateral midline disc herniation, and neurogenic claudication (p>0.05).

Table 4.5. Relationship between duration of symptoms and multi-level lesion, contained disc herniation, non-contained disc herniation, and leg pain

		Duration of Symptoms						
		1-3 Months	**3-12 Months**	**1-10 Years**	**More than 10 years**	**Total**	**X^2**	**p**
Multi-level Lesion	No	53 (%32,3)	76 (%46,3)	25 (%15,2)	10 (%6,1)	164 (%100)	44,989	0,000
	Yes	3 (%6,4)	10 (%21,3)	21 (%44,7)	13 (%27,7)	47 (%100)		
Contained Disc Herniation	No	21 (%19,3)	40 (%36,7)	30 (%27,5)	18 (%16,5)	109 (%100)	15,312	0,002
	Yes	35 (%34,3)	46 (%45,1)	16 (%15,7)	5 (%4,9)	102 (%100)		
Non-contained Disc Herniation	No	34 (%33,3)	47 (%46,1)	16 (%15,7)	5 (%4,9)	102 (%100)	14,708	0,002
	Yes	22 (%20,2)	39 (%35,8)	30 (%27,5)	18 (%16,5)	109 (%100)		
Leg Pain	No	15 (%88,2)	2 (%11,8)	0 (%0)	0 (%0)	17 (%100)	94,573	0,000
	Single Leg	41 (%21,9)	84 (%44,9)	46 (%24,6)	16 (%8,6)	187 (%100)		
	Both Legs	0 (%0)	0 (%0)	0 (%0)	7 (%100)	7 (%100)		

There were statistically significant correlations (p<0.05) between the length of athletes' symptoms and multi-level disc herniation, non-contained disc herniation, and leg pain. Hence, those with a symptom duration of 1-10 years had a higher incidence of multi-level lesions, whereas those with a symptom duration of 3-12 months had a higher incidence of contained and non-contained disc herniation and discomfort in a single leg. The length of symptoms for all individuals with pain in both legs exceeds ten years.

Table 4.6. The relationship between leg pain and lesion level, multi-level lesion, lateral disc herniation, and bilateral midline disc herniation

		Leg Pain					
		None	**Single Leg**	**Both Legs**	**Total**	**X^2**	**p**
Lesion Level	Single	16 (%9,8)	147 (%89,6)	1 (%0,6)	164 (%100)	18,995	0,000
	Multi	1 (%2,1)	40 (%85,1)	6 (%12,8)	47 (%100)		
Lateral Disc Herniation	No	3 (%17,6)	9 (%52,9)	5 (%29,4)	17 (%100)	42,716	0,000
	Yes	14 (%7,2)	178 (%91,8)	2 (%1)	194 (%100)		
Bilateral Midline Disc Herniation	No	14 (%7,3)	176 (%91,7)	2 (%1)	192 (%100)	37,064	0,000
	Yes	3 (%15,8)	11 (%57,9)	5 (%26,3)	19 (%100)		

The athlete's leg pain was statistically correlated with lesion level, multi-level lesion, lateralized disc herniation, and bilateral midline disc herniation (p0.05). Those with multiple-level lesions had a higher incidence of double leg discomfort. On the other hand, patients with a single-level lesion are more likely not to experience leg pain or to be unilateral. Patients with lateral disc herniation are more likely to experience single-leg discomfort, whereas individuals without the condition are likelier to experience no pain or pain in both legs. Individuals with bilateral midline disc herniation have a greater incidence of no discomfort or bilateral pain, whereas those without have a greater incidence of single-leg pain.

Table 4.7. The differences between means of ages in terms of lesion levels

Variables		N	Mean of Age	Standard Deviation of Age	p
L2-L3 Hernia	No	207	44,81	7,79	0,115
	Yes	4	51	3,55	
L3-L4 Hernia	No	170	44,40	0,59	0,046
	Yes	41	47,09	7,60	
L4-L5 Hernia	No	83	43,45	8,59	0,027
	Yes	128	45,88	7,07	
L5-S1 Hernia	No	119	45,71	7,37	0,095
	Yes	92	43,91	8,20	

There was no statistically significant difference between the average ages of athletes with L2-L3 or L5-S1 hernias ($p>0.05$). In addition, there is a statistically significant difference in the mean age according to the existence of L3-L4 and L4-L5 hernias ($p<0.05$). Those with both L3-L4 and L4-L5 hernias are older on average.

Table 4.8. Differences between the means of BMI values in terms of lesion levels

Variables		N	Mean of BMI	Standard Deviation of BMI	p
L2-L3 Hernia	No	207	22,84	1,93	0,409
	Yes	4	23,65	1,07	
L3-L4 Hernia	No	170	22,75	1,78	0,192
	Yes	41	23,28	2,38	
L4-L5 Hernia	No	83	22,96	1,91	0,545
	Yes	128	22,79	1,93	
L5-S1 Hernia	No	119	22,59	1,80	0,021
	Yes	92	23,20	2,02	

No statistically significant difference exists between the L2-L3, L3-L4, and L4-L5 hernia groups' mean BMIs ($p>0.05$). A statistically significant difference exists between the groups' mean BMI ($p <0.05$). Individuals with

L5-S1 hernias have a mean BMI greater than those without.

Table 4.9. Relationship between lesion levels and leg pain

		Leg Pain					
		None	Single Leg	Both Legs	Total	X^2	p
L2-L3 Hernia	No	16 (%7,7)	184 (%88,9)	7 (%3,4)	207 (%100)	1,673	0,433
	Yes	1 (%25)	3 (%75)	0 (%0)	4 (%100)		
L3-L4 Hernia	No	9 (%5,3)	160 (%94,1)	1 (%0,6)	170 (%100)	30,910	0,000
	Yes	8 (%19,5)	27 (%65,9)	6 (%14,6)	41 (%100)		
L4-L5 Hernia	No	12 (%14,5)	71 (%85,5)	0 (%0)	83 (%100)	11,644	0,003
	Yes	5 (%3,9)	116 (%90,6)	7 (%5,5)	128 (%100)		
L5-S1 Hernia	No	13 (%10,9)	105 (%88,2)	1 (%0,8)	119 (%100)	7,838	0,020
	Yes	4 (%4,3)	82 (%89,1)	6 (%6,5)	92 (%100)		

The connection between L3-L4 hernia, L4-L5 hernia, and L5-S1 hernia and leg pain is statistically significant ($p<0.05$). Individuals with L3-L4 hernias have a higher incidence of leg pain-free, a lower rate of leg pain in only one leg, and a higher rate of leg pain in both legs. Individuals without L4-L5 hernias are more likely not to experience leg pain than those who do. Those with an L4-L5 hernia have a higher incidence of unilateral and bilateral leg discomfort. Those without L5-S1 hernias are likelier to have no leg pain than those with L5-S1 hernias. Those with an L5-S1 hernia have a higher incidence of unilateral and bilateral leg pain.

Table 4.10. Distribution of Lumbar Hernia Levels

VARIABLES		N	%
L2-L3 Hernia	No	207	98,1
	Yes	4	1,9
L3-L4 Hernia	No	170	80,6
	Yes	41	19,4
L4-L5 Hernia	No	83	39,3
	Yes	128	60,7
L5-S1 Hernia	No	119	56,4
	Yes	92	43,6

In our statistics, the L2-L3 hernia is the rarest, while the most common hernia is the L4-L5 hernia, with 60.7%.

5. DISCUSSION

Depending on age and gender, the prevalence of symptomatic lumbar disc herniation (LDH) among athletes in Finland and Italy ranges between 1% and 3%. In Turkey, it's approximately 3%. [16, 17]. The ratio of male to female athletes as patients are nearly 2:1, according to reports. The prevalence of LDH is greatest among those aged 45 to 65 and declines with age in the population older than 65 [8, 18, 19]. In our study, the mean age was 44.91, and the male-to-female ratio was equal to one. The increase in disc degeneration explains why the prevalence of LDH decreases with age in athletes [18]. L4-L5 and L5-S1 are the levels at which LDH is most frequently discovered in athletes aged 25 to 55, and it has been observed that there are more cranial segments in the population of athletes aged 55 and older [8, 18].

Moreover, elderly athletes are at an elevated risk for L2-L3 and L3-L4 disc herniations (21). Similarly, according to our study, the frequency of hernias in the cranial segments increases as the lesion degree rises. In another study, the nucleus pulposus component of the herniated mass content of athletes with LDH who underwent discectomy reduced with age, and the annulus fibrosus component became predominant [20]. According to past research, in patients with a clinical diagnosis of LDH, there may be a correlation between the hernia development process and age. Clinical findings were used to make the diagnosis in the investigations that led to these conclusions. Unfortunately, there is no precise correlation between clinical and radiological hernia diagnosis. There may be herniated discs that are asymptomatic.

Disc herniation can be discovered incidentally in athletes receiving lumbar MRI for multiple purposes [21-23], which is not related to clinical symptoms. This apparent contradiction stems from doctors and radiologists defining disc herniation differently. Hernia is an anatomopathological term, not a clinical notion, according to the American joint study group's definition of disc herniation. If the disc material extends beyond the confines of the intervertebral disc, space can only be determined radiologically or with a surgical examination. This study was conducted on radiologically diagnosed athletes and sports patients. In this study, the radiological archive was scanned so that the disc herniation findings in sports patients who received lumbar MRI with or without disc herniation-related complaints could be more clearly distinguished by age, educational status, location of residence, gender, and Body Mass Index.

The North American Spine Society adopted the standard classification of disc diseases, the American Spine Radiology Society, and the American Neuroradiology Society in 2014 [24] and revised in 2015. This classification was subsequently endorsed by the American Academy of Orthopaedic Surgeons, the American Academy of Physical Medicine and Rehabilitation, the American College of Radiology, the American Association of Neurological Surgeons, the Congress of Neurological Surgeons, the European Society of Neuroradiology, Spine Physiotherapy, and the Sports and Occupational Disease Rehabilitation Association (according to Derek Google Scholar). According to this classification, the link between the disc and neural structures is the most important factor in disc herniation classification. Herniations can be evaluated depending on the integrity of the annulus.

Literature indicates that the highest occurrence of disc herniation in athletes with low back pain occurs between the ages of 30 and 50 [8, 25]. According to the literature, the mean age was determined to be 44.91 in our study. L4-5 was the most prevalent hernia level across all decades of published research [26]. According to the literature, the L4-5 level was the most prevalent hernia level in the present investigation, with a prevalence of 60.7%. Multiple hernias have been observed to occur between 6% and 20% of the time [26]. In this study, the incidence of multiple hernias was roughly 22%. In our study, bilateral midline disc herniation incidence in athletes with unilateral leg pain was minimal. Literature indicates that if a significant midline disc herniation is present, the primary complaint of the athlete may be low back pain (24). This outcome was predictable.

In this study, bilateral leg discomfort was similarly associated with an increased likelihood of bilateral midline lesions. Grading of disc herniations according to grade in various series revealed a range between 40% and 59% for L5-S1, 37% and 57% for L4-L5, 3% and 9% for L3-L4, 0% and 2% for L2-L3 and L1-L2, respectively (25-29). It was reported that the L4-L5 level was higher than all series (60.7%). In addition, the L2-L3 level was recorded at a lower rate (1.9%) than the other series.

Numerous writers argue that the clinical symptoms and signs of upper lumbar disc herniations are atypical and may not reflect the actual level. In rare clinical situations, disc herniations at the upper lumbar level should be considered. In the present investigation, it was underlined that the characteristics of compressive root symptoms in L1-L2, L2-L3, and L3-L4 disc herniations are nonspecific and may be polyarticular or exhibit an unusual image [27, 28]. This study also revealed that the incidence of unilateral leg discomfort reduced with increasing lesion severity. This conclusion can be explained by the fact that the posterior longitudinal ligament is wider and permits less lateralization in the upper lumbar region. The longer duration of symptoms and higher mean age of non-contained lesions show that they are a natural consequence of confined lesions. The results of this study indicate that 48% of sports patients had a contained hernia, and 52% had an uncontained hernia.

5.1. Theoretical and practical implications

This study has numerous theoretical and practical implications. Theoretically, the study contributes to the knowledge of diseases caused by repetitive movements and activities in athletes. While the current study explored the clinical and demographic characteristics of sports patients, it contributes to the growing body of knowledge on sports disc herniation and its numerous associated demographic and clinical aspects. The practical contributions of this study are especially notable since the Turkish government must take precautions to protect the health and safety of athletes who suffer from numerous muscular or disc herniation issues due to sports participation.

5.2. Limitations and future research indications

Owing to the cross-sectional nature of the investigation, only a small number of athletes were investigated for the disc herniation problem in the present study. Future studies can increase the sample size for positive results. In addition, the present study employed a "quantitative research design;" in the future, qualitative research methods may be used to ascertain the perspectives and experiences of athletes regarding the effects of sporting activities on their health. Patients who participated in sports were analyzed based on their disc herniation severity, number, duration, degree of education, and place of residence. Researchers in the future can adjust the variables to obtain different outcomes. The context of the current study is Turkey, so along with future methodological decisions, the context of future research can also be varied.

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