

# Low Back Pain and Sciatica Related with the Premenstrual Period in Patients with Lumbar Disc Herniation

## Lomber Disk Herniasyonlu Hastalarda Premenstruel Periyod ile İlişkili Bel ve Bacak Ağrısı

### ABSTRACT

**AIM:** We examined the clinical progress of low back pain and radicular pain during the premenstrual period in patients with lumbar disc protrusion and discussed the probable effective physiopathological mechanisms and laboratory results reported in the literature.

**MATERIAL and METHODS:** Fifty female patients with complaints of low back and leg pain, and with lumbar disc protrusion in their MRI investigations were included in the study. The pain was assessed using the modified "Low Back Outcome Scale of Greenough and Fraser" in the premenstrual and the normal postmenstrual periods.

**RESULTS:** There was an increase in the use of analgesic drugs and the need for rest during the premenstrual period ( $p<0.05$ ). The severity of pain was significantly different between the two periods and it was more severe at the premenstrual period ( $p<0.05$ ).

**CONCLUSION:** All the criteria that we chose from the modified "Low Back Outcome Scale of Greenough and Fraser" to assess the pain showed a significant difference between the premenstrual period and the normal period in our patients. This difference should be considered in the treatment strategies in the clinical setting. Patients should be re-evaluated for surgical decisions after the premenstrual period if possible.

**KEYWORDS:** Lumbar disc herniation, Low back pain, Premenstrual period, Sciatica

### ÖZ

**AMAÇ:** Lomber disk protrüzyonu olan olgularda klinik olarak bel ağrısının ve radiküler ağrının premenstrual dönemdeki seyrini inceledik ve etkili olabilecek fizyopatolojik mekanizmaları literatürde rapor edilen laboratuvar bulguları ile ilişkili olarak tartıştık.

**YÖNTEM ve GEREÇ:** Bel ve bacak ağrısı şikayetleriyle başvuran ve MR'ında lomber disk protrüzyonu olan 50 bayan hasta ile çalışma yapıldı. Olguların ağrıları hem premenstrual dönem, hem de menstruasyon sonrası normal dönem için "Greenough ve Fraser'in bel ağrısı sonuç skalası" modifiye edilerek değerlendirildi.

**BULGULAR:** Olguların premenstrual dönemde ağrı kesici ilaç kullanımı ve dinlenme ihtiyacı artıyordu ( $p<0,05$ ). Ağrının derecesinde her iki dönem arasında anlamlı bir farklılık vardı ve premenstrual dönemde daha şiddetliydi ( $p=0,000$ ).

**SONUÇ:** Olgularımızda ağrının değerlendirilmesi amacıyla modifiye ettiğimiz Greenough ve Fraser'in bel ağrısı sonuç skorundan seçtiğimiz kriterlerin hepsinde premenstrual dönem ve normal dönem arasında anlamlı farklılık vardı. Klinikte bu anlamlı farklılık tedavi stratejisinde dikkate alınmalıdır. Cerrahi karar için olgular mümkünse premenstrual dönemden sonra tekrar değerlendirilmelidir.

**ANAHTAR SÖZCÜKLER:** Lomber disk herniasyonu, Bel ağrısı, Premenstrual periyod, Siyatik

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## INTRODUCTION

The levels of gonadal steroids, estradiol and progesterone show fluctuations during the menstrual period. These fluctuations cause several physiological and psychological changes. Clinical manifestations of these changes are obvious during the premenstrual period in approximately 75% of females (11,13). The premenstrual syndrome is a phenomenon of of psychological (anxiety, irritability and depression), somatic and autonomous nervous system symptoms (breast and abdominal swelling, hypertension, extremity edema) related to a woman's menstrual cycle. Nonspecific complaints draw attention and the assessments are subjective. Therefore, discussions on the premenstrual syndrome or disorder are likely to be speculative. Laboratory studies trying to define this syndrome with objective criteria can be a subject of debate. Studies showing a low-grade inflammation during the premenstrual period have greatly contributed to the explanation of this process (9). Another complaint in the premenstrual period is the low back pain and radiculopathy. We examined the clinical progress of low back pain and radicular pain during the premenstrual period in patients with lumbar disc protrusion and we discussed the probable physiopathological mechanisms that have an effect, and the laboratory results reported in the literature.

## MATERIAL and METHODS

Fifty female patients complaining of low back and leg pain and with lumbar disc protrusion on their MRI investigations were included in the study. The age range was 17 to 52 years. Patients with disc protrusion only at one level on their lumbar MRI investigation were included in the study. The disc protrusion was at the level of L4-5 in 26 patients, at L5-S1 in 18 patients, and at L3-4 in six patients. Patients with motor deficit and menstrual abnormalities were excluded from the study. Low back and radicular pain originating from the protrusion was assessed using the modified "Low Back Outcome Scale of Greenough and Fraser" (2), both in the premenstrual and the postmenstrual periods (Table I).

The data were analyzed using the Mann-Whitney U and the t-test. The level of significance was set as  $p < 0.05$ . The means were assessed using the t-test.

## RESULTS

The mean of the frequency of analgesic use was 2.08 in the premenstrual period, whereas it was 3.24

in the normal period. The frequency of analgesic use was significantly higher during the premenstrual period ( $p < 0.05$ ).

The need for rest was high in both periods. However, the need for rest in patients describing a great need for rest during the majority of the day (mean=1.24) in the premenstrual period showed a significant decrease in the normal period to the degree of less than half of the day (mean=2.92) ( $p < 0.05$ ).

When the criteria of domestic chores or odd jobs were assessed, it was found that they were almost the same or slightly decreased compared to the those in the normal period (mean=4.62), whereas they were significantly decreased during the premenstrual period (mean=2.70) ( $p < 0.05$ ).

The sports or active social activities of the two groups were significantly different ( $p < 0.05$ ), with a mean of 1.26 for the premenstrual period and a mean of 2.34 for the normal period. The sports or active social activities in both groups were significantly decreased during the premenstrual period.

The patients declared that the low back pain during the normal period generally affected their getting dressed and they had more difficulty in getting dressed during the premenstrual period. The mean was 2.14 for the normal period and 1.70 for the premenstrual period ( $p < 0.05$ ).

Low back pain mildly affected the patients' sitting during the normal period (mean=1.90). The patients had moderate difficulty in sitting during the premenstrual period (mean=1.32) ( $p < 0.05$ ).

Their sleep pattern was mildly affected by their low back and leg pain during the normal period (mean=2.02); however, they had difficulty in sleeping during the premenstrual period (mean=1.38) ( $p < 0.05$ ).

The patients were asked to rate their pain over 100. There was a significant difference between the two periods (Figure I). Their pain was more severe during the premenstrual period. The mean was 3.18 for the normal period and 1.14 for the premenstrual period ( $p < 0.05$ ).

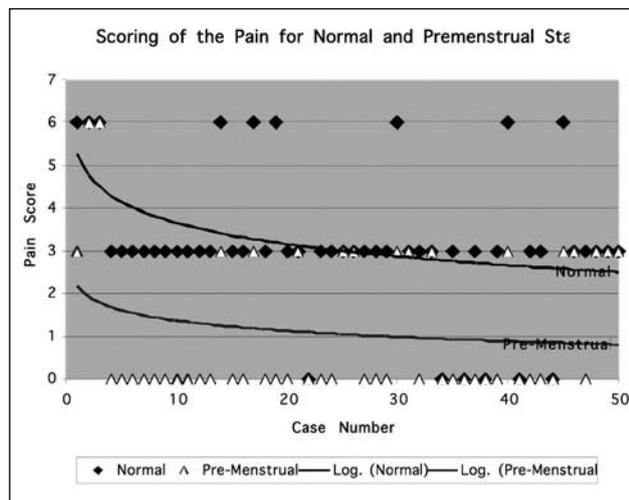
## DISCUSSION

The premenstrual period leads to low-grade inflammation. The levels of systemic inflammation markers such as C-reactive protein, proinflammatory cytokines and tumor necrosis factor are increased

**Table I:** Modified Low Back Outcome Scale of Greenough and Fraser

Parameters	Findings	Points
Analgesia	Never	6
	Occasionally	4
	Almost every day	2
	Several times each day	0
Resting	No need to rest	6
	Little rest needed occasionally	4
	Resting half the day	2
	More than half the day	0
Domestic chores or odd jobs	Normally	9
	Most or all but more slowly	6
	A few but not many	3
	None	0
Sport or active social activities	Like previous level	9
	A few less than before	6
	Some but much less than before	3
	None	0
Dressing	Unaffected	3
	Mildly affected	2
	Moderately affected difficult	1
	Severely affected impossible	0
Sitting	Unaffected	3
	Mildly affected	2
	Moderately affected difficult	1
	Severely affected impossible	0
Sleeping	Unaffected	3
	Mildly affected	2
	Moderately affected difficult	1
	Severely affected impossible	0
Scoring of the pain*	0-25	9
	26-50	6
	51-75	3
	76-100	0

\* Pain scoring from 0 to 100. 0= no pain, 100=the worst pain



**Figure 1:** There is a Significant Difference Between the Two Periods

during this period. The serum concentration of especially CRP is markedly increased in the menstrual cycle (9). The low-grade inflammation in the premenstrual period is considered to be responsible for the various symptoms and signs in this period. It has been reported that the low-grade inflammation during the menstrual cycle is associated with the physical (food cravings and swelling), psychological (anxiety, depression, etc) and clinical manifestations of pain presented in the premenstrual syndrome (3,9). Animal models have shown that mechanical compression on the nerve root causes motor and sensory loss, but it does not cause pain (1,7). The number of inflammatory mediators increases at the sites of disc herniation (4,5,7,8,12). The inflammatory mediators induce the release of metalloproteinase, which has an important role in disc degeneration (7,8). The inflammatory mediators playing a role in degeneration and pain also have a role in the low-grade inflammation in the premenstrual period and their serum levels increase (3,9). This low-grade inflammation process in the premenstrual syndrome explains the physiopathology of the increase in low back pain and radicular pain in disc herniation and nerve root compression.

The high plasma levels of estrogen and progesterone cause an increase in the capillary permeability. Peripheral vasodilatation also develops. The increased capillary permeability and hydrostatic pressure (peripheral vasodilatation) and enlarged intravascular volume have been reported to be the causes of edema occurring during the

menstrual cycle (11,13). Similarly, increased vascular permeability, intradiscal edema and increased inflammatory activity have been described in sites where nerve roots are compressed in disc protrusion (6). The similarity of these two processes is striking. In addition to the pathological process occurring in the nerve root, the disc is an avascular anatomic region fed by diffusion. The increased hydrostatic pressure and the vascular permeability in the menstrual cycle may cause an increase in the fluid transition to the interstitial area. This is a sign that edema may occur in the degenerated disc region, and this may worsen the nerve root compression in disc protrusion.

The emotional state also changes in the premenstrual period. It is well known that the changes in the emotional state may affect the perception of pain (9,13). Another factor affecting the degree of low back and radicular pain in disc protrusion during the premenstrual period may be the changes in the emotional state (anxiety, depression).

There was a significant difference between the premenstrual and the normal periods in all the criteria we chose from the "Low Back Outcome Scale of Greenough and Fraser" that we modified to use in the assessment of pain in our patients. The mentioned physiopathological mechanisms played a role in this difference. This significant clinical difference should be taken into consideration in the treatment strategies. The patients describing premenstrual syndrome should be referred to the gynecologist and the psychiatrist. Some authors also report that the female gender is a risk factor for failed back surgery (10). This may be associated with the premenstrual syndrome. Patients should be re-evaluated for the surgical decisions after the premenstrual period, if possible. We think that querying the patient regarding the premenstrual syndrome will reduce the risk of failed back surgery.

## REFERENCES

1. Cavanaugh JM: Neural mechanisms of lumbar pain. *Spine* 16:1804-1809, 1995
2. Grenough CG, Fraser RD: Assessment of outcome of in patients with low back pain. *Spine* 17:36-41, 1992
3. Hermes GL, Rosenthal L, Montag A, McClintock MK: Social isolation and the inflammatory response: Sex differences in the enduring effects of a prior stressor. *Am J Physiol Regul Integr Comp Physiol* 290:273-282, 2006
4. Igarashi T, Kikuchi S, Shubayev V, Myers RR: Exogenous tumor necrosis factor- $\alpha$  mimics nucleus pulposus-induced neuropathology. Molecular, histologic, and behavioral comparisons in rats. *Spine* 25:2975-2980, 2000

5. Kang JD, Stefanovic-Racie M, McIntyre LA, Georgescu HI, Evans CH: Toward a biochemical understanding of human intervertebral disc degeneration. *Spine* 22:1065-1073, 1997
6. Kobayashi S, Yoshizawa H, Yamada S: Pathology of lumbar nerve root compression Part I: Intraradicular inflammatory changes induced by mechanical compression. *Journal of Orthopaedic Research* 22: 170-179, 2004
7. Mulleman D, Mammou S, Griffoul I, Watier H, Goupille P: Pathophysiology of disk-related sciatica. I-Evidence supporting a chemical component. *Joint Bone Spine* 73:151-158, 2006
8. Mulleman D, Mammou S, Griffoul I, Watier H, Goupille P: Pathophysiology of disk-related low back pain and sciatica. II. Evidence supporting treatment with TNF-alpha antagonists. *Joint Bone Spine* 73:270-277, 2006
9. Puder JJ, Blum CA, Mueller B, Geyter CD, Dye L, Keller U: Menstruel cycle symptoms are associated with changes in low grade inflammation. *Eur J Clin Invest* 36(1): 58-64, 2006
10. Ragab S, Deshazo RD: Management of back pain in patients with previous back surgery. *Am J Med* 121(4): 272-278, 2008
11. Rosenfeld R, Livne D, Nevo O, Dayan L, Milloul V, Lavi S, Jacob G: Hormonal and volume dysregulation in women with premenstrual syndrome. *Hypertension* 51: 1225-1230, 2008
12. Takahashi H, Suguro T, Okazima Y, Motegi M, Okada Y, Kakiuchi T: Inflammatory cytokines in the herniated disc of the lumbar spine. *Spine* 21: 218-224, 1996
13. Winjhoven HAH, Vet HCW, Smit HA, Picavet HSJ: Hormonal and reproductive factors are associated with chronic low back pain and chronic upper extremity pain in women-The Morgen Study. *Spine* 31(13): 1496-1502, 2006