Observational Study

Sexual Function in Patients with Chronic Lumbar Disc Herniation. Is Epidural Steroid Injection Helpful?

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Background: Pain due to lumbar disc herniation is common; most patients have significant sexual dysfunction, including a lack of interest and satisfaction. Transforaminal epidural steroid injections are one of the most frequently preferred interventional procedures for treating lumbar disc herniation.

Objective: Our study aimed to determine the effect of transforaminal epidural steroid injections on sexuality in patients with chronic lumbar disc herniation.

Study Design: An observational study.

Setting: A training and research hospital pain management center.

Methods: Our study included sexually active patients aged 18–60 years with lumbar disc herniation who underwent a transforaminal epidural steroid injection. All patients were evaluated with the Numeric Rating Scale (NRS-11), pain during sexual activity, Oswestry Disability Index (ODI), Short-Form 12 (SF-12), and Hospital Anxiety and Depression Scale (HADS) at pretreatment and at one and 3 months posttreatment. Also, the International Index of Erectile Function (IIEF) and Female Sexual Function Index (FSFI) were used to evaluate sexual function for men and women, respectively. A power analysis was conducted using an effect size of 0.7. Statistical analyses were performed using appropriate tests (Friedman, Shapiro-Wilk test).

Results: Sixty patients (30 men and 30 women) were evaluated. The mean (SD) age of the patients was 46.60 (8.1) years, the mean (SD) body mass index (BMI [kg/m^2]) was 29.2 (5.52), and the pretreatment pain duration was 69.0 (3–240) months. A statistically significant difference was found in the NRS-11 and NRS-11 scores for sexual activity, ODI, SF-12, and HAD scores at one and 3 months posttreatment compared to pretreatment. In women, there was a significant improvement in total FSFI at 3 months posttreatment ($P < 0.05$). For male sexual function scores, there was a significant improvement in the total IIEF score at one and 3 months posttreatment compared to pretreatment ($P < 0.001$).

Limitations: Our study has several limitations: it was conducted at a single-center, it did not assess the relationship between disc herniation severity and sexual dysfunction, it had a short 3-month follow-up, and it did not evaluate minimal clinically important differences or placebo effects. Despite these limitations, the study's strength lies in being the first to examine transforaminal epidural steroid injection's effect on sexual function.

Conclusions: Transforaminal epidural steroid injection is an effective treatment in the short-to-medium term for pain, depression, and disability scores;, it also has a positive effect on sexual function in both men and women.

Key words: Epidural, injection, lumbar disc herniation, pain, sexuality, sexual function, sexual dysfunction, pain free

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Sexual health is defined as "a state of physical, emotional, mental and social well-being about sexuality; it is not merely the absence of disease, dysfunction or infirmity" and is identified by the World Health Organization as a fundamental part of well-being (1). Sexual dysfunction significantly affects quality of life and depends on various physiological, pharmacological, and psychological factors. Sexual intercourse is a physical activity that requires particular physical movements, such as lumbar flexion, for both men and women in specific positions (2). A healthy and painless musculoskeletal system, especially in the lumbar region and hip, requires a healthy sexual life.

Chronic pain is associated with physiological (pain, limited mobility, medications) and psychological (depression, avoidance) problems that can cause sexual dysfunction. Pain and comorbid psychological diseases are essential risk factors for sexual problems in patients with chronic musculoskeletal pain (3). Low back pain (LBP) is one of the most common types of chronic pain; 81% of patients with chronic LBP have significant sexual dysfunction, including a lack of interest and satisfaction (4).

Pain management strategies for LBP pain due to lumbar disc herniation (LDH) include nonpharmacologic and pharmacologic treatment options, such as medication therapy, physical therapy, rehabilitation, spinal interventions, and surgery. Spinal interventions under fluoroscopy guidance are frequently performed and are often effective if pain persists despite medication and/or physical therapy.. Transforaminal epidural steroid injections (TESIs) are among the most frequently preferred interventional procedures for LDH. It is an effective treatment option in the short-to-medium term in selected cases that have been clinically and radiologically evaluated (5-7).

To our knowledge, no studies have investigated the effect of TESIs on sexual function in patients with LDH. However, there have been studies on LBP and sexual function. The vast majority of studies evaluating sexual function after treatments for LBP focus on pre- and postsurgical evaluation (8,9). In a systematic review, improvements in sexual activity and function were found post spine surgery (9). A limited number of studies have investigated the effect of therapy options, except for surgery, on sexual function in patients with LDH (10,11). In a study of the effect of an interdisciplinary pain rehabilitation program on sexual function, only men showed a significant increase in sexual satisfaction; improvements did not occur in sexual function for either men or women (10). The only study investigating the effect of physical therapy and an exercise program on male sexual function found that physical therapy improved erectile dysfunction and premature ejaculation (11). Therefore, our study aimed to investigate the effect of TESIs on sexual function in women and men. We hypothesized that TESIs would lead to significant improvements in not only pain, but also multiple domains of sexual function, including desire, arousal, lubrication, orgasm, and satisfaction.

Methods

Design and Study Population

Our study protocol was approved by our hospital's Ethics Committee and carried out in accordance with the ethical standards specified in the Helsinki Declaration (Ethics approval number 4074). Written, informed consent was obtained from all patients..

We designed an observational clinical study. Patients who had a TESI for chronic low back and/or leg pain due to LDH from March 2022 through March 2023 were included in the study. Inclusion criteria were sexually active patients between the ages of 18 and 60 years; LBP and radicular pain; symptoms that had persisted for at least 3 months; and unilateral, single-level disc herniation confirmed by magnetic resonance imaging. Exclusion criteria were having contraindications for spinal interventions; a history of lumbar spine surgery; lumbar spinal stenosis; cardiovascular, neurological, or psychiatric disease; or sexual disorders.

In our study, we only used the TESI technique. TESI was preferred because it provides more targeted delivery to the affected nerve root and perineural area, which is particularly relevant in unilateral, single-level lumbar disc herniation. Compared with the interlaminar route, TESI ensures a more precise drug distribution and may yield better outcomes in radicular pain (12,13). To maintain methodological consistency and avoid variability in drug spread that could confound the assessment of sexual function, we limited the study to the transforaminal approach.

Measures

The pain intensity (Nurmeric Rating Scale [NRS-11]) and pain during sexual activity (NRS-11 during sexual activity) were recorded on an 11-point numerical scale.

The Oswestry Disability Index (ODI) was used to assess disability. It is a 10-item scale, and each question is scored from 0 to 5, with lower scores indicating better

functional status (14). The hospital anxiety and depression scale was also administered. It has 2 sections: the Anxiety (HAD-A) and Depression (HAD-D) subgroups. It is a self-report scale and a reliable tool for detecting depression and anxiety in a hospital medical outpatient setting (15).

The Short-Form 12 (SF-12) was used to assess quality of life. This questionnaire is a shortened version of the SF-35. A mental component score (MCS-12) and a physical component score (PCS-12) are available. Test scores range from 0 to 100, with higher scores indicating a better quality of life (16).

The International Index of Erectile Function (IIEF) and the Female Sexual Function Index (FSFI) were used to evaluate sexual function for men and women, respectively. The IIEF, a 15-item self-administered questionnaire, was developed in 1997 to assess sexual dysfunction in men (17). The IIEF evaluates male sexuality under 5 subheadings: erectile function (IIEF-EF), orgasmic function (IIEF-OF), sexual desire (IIEF-SD), intercourse satisfaction (IIEF-IS), and overall satisfaction (IIEF-OS). The FSFI, a 19-item self-report instrument, was developed in 2000 to evaluate sexual function in women (18). The scale has 6 domains of female sexuality: desire (FSFI-D), arousal (FSFI-A), lubrication (FSFI-L), orgasm (FSFI-O), satisfaction (FSFI-S), pain (FSFI-P), and total score (FSFI). Both the IIEF and FSFI have reliability and validity in the Turkish population (19,20).

The sociodemographic data such as age, gender, body mass index, marital status, and smoking status of all patients were recorded. Patients were evaluated at pretreatment and at one and 3 months posttreatment.

Procedure

The transforaminal approach was used for the epidural steroid injection. This is an effective epidural steroid injection method, since the injectate spreads to the anterior epidural space (21). The patients were placed prone, and a pillow was placed under their abdomens to flatten lumbar lordosis. The injection site was cleaned 3 times with a povidone-iodine solution and then covered with a sterile drape. A fluoroscope was used, and adequate angles were given to clearly visualize the relevant anatomic region. The skin area at the needle entry point was anesthetized with 5 mL of 2% prilocaine before advancing, under intermittent fluoroscopic guidance, the tip of a 22-G, 10-cm Quincke needle. When the epidural space was approached, the lateral view confirmed whether the needle was in the subpedicular region. Then, 1 to 2 mL of contrast medium was injected. After no vascularity was observed, 3 mL mixture of 8 mg of dexamethasone and 1 mL of 2% lidocaine was injected.

Patients were monitored for adverse effects for one hour before discharge. All procedures were performed by a pain medicine specialist with at least 10 years of experience, with the same fluoroscopy unit (Ziehm Vision R, Ziem Imaging) used for intermittent imaging.

Statistical Analysis

Based on the improvement in sexual functions at 3 months posttreatment, we planned to include 26 patients in each group, with an effect size of 0.7, a 95% CI, and a power of 80% (22). IBM SPSS Statistics 25.0 (IBM Corporation) was used for the statistical analysis. Normality distribution was assessed using the Shapiro-Wilk test. The mean (SD) was used in those with normal distribution, and the median (min–max) was used in those without for descriptive analyses. In the comparison of repeated dependent variables, the Friedman t test was used for those that were not normally distributed. The Kendalll W test was used to calculate the effect size of the Friedman test. P values < 0.05 were taken to indicate significant correlations, and the Bonferroni correction was used to calculate the adjusted P value.

Results

Sixty patients (30 men and 30 women) were evaluated (Fig. 1). Four men and 4 women were not married. Sixteen of the patients smoked, and 5 men drank alcohol. The mean (SD) age of the patients was 46.60 (8.1), the mean (SD) body mass index (BMI [kg/m^2]) was 29.2 (5.52), and the pretreatment pain duration was 69.0 (3–240) months (Table 1).

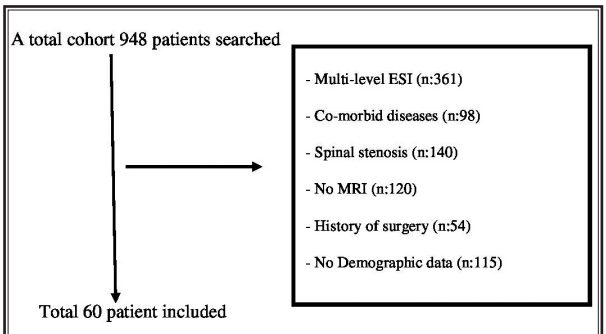

Fig. 1. *Flow diagram of patient selection, including the number of patients assessed, excluded, and included in the study (n = 60).*

In all patients, there was a statistically significant difference in NRS-11, NRS-11 during sexual activity, ODI, MCS, PCS, HAD-A, and HAD-D scores at posttreatment months one and 3 compared to pretreatment. However, when the months one and 3 posttreatment follow-ups were compared, no statistically significant difference was found between the groups (Table 2). Clinical parameter scores and pretreatment and posttreatment comparisons of them in women patients are shown in Table 3. In the women patients, there was a statistically significant difference in NRS-11, NRS-11 during sexual activity, ODI, MCS, PCS, HAD-A, and HAD-D scores at posttreatment months one and 3 compared to pretreatment ($P < 0.05$). Only in the MCS score was there a statistically significant improvement seen in the comparison between posttreatment months one and 3 ($P < 0.05$). For the women patients' sexual function scores, there was a statistically significant improvement in the total FSFI and FSFI-D scores at posttreatment month 3 compared to pretreatment ($P < 0.05$). No statistically significant change was detected in FSFI-A, FSFI-L, FSFI-O, FSFI-S, and FSFI-P scores during both follow-ups.

Clinical parameter scores and pretreatment and posttreatment comparisons of them in men patients are shown in Table 4. In men, there was a statistically significant difference in NRS-11, ODI, MCS, and PCS scores at posttreatment months one and 3 compared to pretreatment ($P < 0.05$). For the men patients' sexual function scores, there was a statistically significant improvement in total IIEF and IIEF-OS scores at posttreatment months one and 3 compared to pretreatment. Compared to pretreatment, a statistically significant increase was observed at posttreatment month one IIEF-EF and IIEF-OF scores and at posttreatment month 3 IIEF-IS scores ($P < 0.05$). No major complications occurred. A minor immediate adverse event, vasovagal syncope, occured in only 3 patients; no additional problems were reported at either follow-up.

Table 1. *Demographic and clinical characteristics.*

Variable		Value (n = 60)
Age, yrs, mean (SD)		46.60 (8.1)
Pretreatment pain duration, months, mean and range		69.0 (3–240)
BMI, mean (SD)		29.2 (5.52)
Gender (n, [%])	Men	30 (50.0%)
	Women	30 (50.0%)
Smoker (n, [%])	Yes	16 (26.7%)
	No	44 (73.3%)
Alcohol use (n, [%])	Yes	5 (8.33%)
	No	55 (91.67%)
Marital status (n, [%])	Married	52 (86.67%)
	Unmarried	8 (13.33%)

BMI: Body mass index (kg/m^2)

Discussion

Sexuality is one of the most complicated aspects of human life, with physiological and psychosocial effects. Chronic LBP deteriorates sexual life because of physical pain, limited range of motion, fear of movement, and comorbid depression. Epidural steroid injections are recommended as a minimally invasive treatment for patients with LBP due to LDH.

In our study, we investigated the effect of fluoroscopy-guided TESIs on sexual function in patients with chronic LBP. In both genders, the pain, disability, and quality of life scales were statistically significantly

Table 2. *Pain, depression, quality of life and sexual function values of all patients.*

	Pretreatment (0)	Posttreatment Month One (1)	Posttreatment Month 3 (3)	*P* (0-1)	*P* (0-3)	*P* (1-3)
NRS-11	7.67 (1.84)	4.60 (2.31)	4.31 (2.30)	< 0.001*	< 0.001*	1.00
NRS-11 sexual activity	5.07 (2.95)	3.68 (2.60)	3.73 (2.75)	0.004*	0.016*	1.00
ODI	41.77 (15.51)	30.37 (15.11)	27.77 (14.58)	< 0.001*	< 0.001*	0.495
MCS	39.64 (9.68)	44.39 (9.94)	48.33 (10.21)	< 0.001*	< 0.001*	0.003*
PCS	31.83 (5.78)	37.99 (8.07)	40.20 (9.67)	< 0.001*	< 0.001*	0.232
HAD-A	7.92 (4.29)	6.60 (3.07)	6.73 (3.92)	0.009*	0.034*	1.00
HAD-D	7.63±3.94	6.45 (3.77)	6.08 (3.70)	0.002*	0.003*	1.00

Values are expressed as mean (SD). Back pain (Numeric Rating Scale [NRS-11]), pain during sexual activity (NRS-11 sexual activity), Oswestry Disability Index (ODI), mental component score (MCS), physical component score (PCS), Hospital Anxiety and Depression Anxiety (HAD-A), Depression (HAD-D). Friedman test was used for repeated measures (nonparametric data distribution). *$P < 0.05$ is statistically significant.

Table 3. *Pain, depression, quality of life and sexual function values of women patients*

	Pretreatment (0)	Posttreatment Month One (1)	Posttreatment Month 3 (3)	*P* (0-1)	*P* (0-3)	*P* (1-3)
NRS-11	7.88 (1.79)	4.62 (2.00)	4.31 (2.20)	< 0.001*	< 0.001*	0.98
NRS-11 sexual activity	5.35 (2.71)	3.58 (2.90)	3.69 (2.95)	0.02*	0.04*	1.00
ODI	41.53 (15.89)	31.13 (11.26)	29.73 (13.80)	0.003*	0.002*	0.502
MCS	36.57 (9.23)	40.80 (10.48)	46.24 (11.32)	< 0.001*	0.04*	0.008*
PCS	30.99 (5.10)	36.09 (5.96)	38.23 (9.79)	< 0.001*	< 0.001*	0.58
HAD-A	9.27 (4.29)	7.30 (3.07)	7.47 (3.52)	0.02*	0.04*	1.00
HAD-D	8.37 (3.80)	6.87 (3.71)	6.50 (3.50)	0.02*	0.02*	1.00
FSFI	19.26 (7.70)	21.69 (6.96)	23.24 (8.40)	0.11	0.01*	0.78
FSFI-D	2.54 (1.21)	2.82 (1.32)	3.26 (1.36)	0.59	< 0.001*	0.14
FSFI-A	2.96 (1.34)	3.32 (1.42)	3.47 (1.91)	0.11	0.14	1.00
FSFI-L	3.43 (1.72)	4.02 (1.29)	4.14 (1.84)	0.15	0.12	1.00
FSFI-O	3.40 (1.76)	3.78 (1.61)	3.86 (1.86)	0.55	0.45	1.00
FSFI-S	3.69 (1.38)	3.84 (1.45)	4.28 (1.35)	1.00	0.07	0.26
FSFI-P	3.24 (1.75)	3.89 (1.53)	4.22 (1.34)	0.07	0.04	1.00

Values are expressed as mean (SD). Back pain (Numeric Rating Scale [NRS-11]), pain during sexual activity (NRS-11 sexual activity), Oswestry Disability Index (ODI), mental component score (MCS), physical component score (PCS), Hospital Anxiety and Depression Anxiety (HAD-A) Depression (HAD-D), Female Sexual Function Index desire (FSFI-D), arousal (FSFI-A), lubrication (FSFI-L), orgasm (FSFI-O), satisfaction (FSFI-S), pain (FSFI-P). Friedman test was used for repeated measures (nonparametric data distribution). *$P < 0.05$ is statistically significant.

Table 4. *Pain, depression, quality of life and sexual function values of men patients*

	Pretreatment (0)	Posttreatment Month One (1)	Posttreatment Month 3 (3)	*P* (0-1)	*P* (0-3)	*P* (1-3)
NRS-11	7.40 (1.85)	4.50 (2.62)	4.60 (2.72)	< 0.001*	< 0.001*	1.00
NRS-11 sexual activity	4.40 (2.99)	3.27 (3.07)	3.40 (3.08)	0.200	0.550	1.00
ODI	42.00 (15.39)	29.60 (18.34)	25.80 (15.29)	< 0.001*	< 0.001*	0.73
MCS	43.39 (9.12)	48.12 (8.55)	50.67 (8.55)	0.02*	< 0.001*	0.43
PCS	32.66 (6.36)	39.89 (9.47)	42.16 (9.29)	< 0.001*	< 0.001*	0.71
HAD-A	6.57 (3.91)	5.90 (4.65)	6.00 (4.25)	0.52	0.94	0.52
HAD-D	6.90 (4.01)	6.03 (3.86)	5.67 (3.94)	0.12	0.17	1.00
IIEF	49.43 (15.39)	57.70 (12.60)	57.07 (13.21)	< 0.001*	0.01*	1.00
IIEF-EF	21.63 (7.03)	24.43 (5.21)	24.03 (4.98)	0.03*	0.14	1.00
IIEF-OF	6.97 (2.83)	8.67 (1.95)	8.17 (2.71)	< 0.001*	0.21	0.74
IIEF-SD	6.23 (2.19)	7.20 (1.64)	6.97 (1.77)	0.10	0.34	0.88
IIEF-IS	8.17 (3.77)	9.57 (3.83)	10.17 (3.59)	0.07	0.01*	0.77
IIEF-OS	6.43 (2.44)	7.83 (1.72)	7.73 (1.68)	< 0.001*	< 0.001*	1.00

Values are expressed as mean (SD). Back pain (Numeric Rating Scale [NRS-11]), pain during sexual activity (NRS-11 sexual activity), Oswestry Disability Index (ODI), mental component score (MCS) and a physical component score (PCS), Hospital Anxiety and Depression Anxiety (HAD-A) and Depression (HAD-D). International Index of Erectile Function erectile function (IIEF-EF), orgasmic function (IIEF-OF), sexual desire (IIEF-SD), intercourse satisfaction (IIEF-IS) and overall satisfaction (IIEF-OS). Friedman test was used for repeated measures (nonparametric data distribution). *$P < 0.05$ is statistically significant.

improved at follow-up. There was a statistically significant increase in the FSFI and FSFI-D in women. For men's sexual activity scores, it was seen that there was a more significant improvement compared to women. In men, especially at posttreatment month one, there was a statistically significant increase in all sexual function scores, except for IIEF-SD and IIEF-IS scores, compared to pretreatment. This statistically significant increase

continued to be seen in total IIEF scores and IIEF-OS scores at posttreatment month 3.

Low back pain is the leading cause of disability worldwide and tends to be chronic. When conservative treatments have failed, a TESI is performed depending on the pathology causing the LBP. Fluoroscopy, the most commonly used imaging guide in spinal interventions, helps to direct the needle to the accurate target by imaging the relevant bone mark according to the injection based on the patient's reported symptoms and physician examination. TESIs are effective for comorbid issues as well as LDH (23,24). It is recommended for patients with LDH as a cost-effective method that provides good clinical results similar to surgical interventions and has no or few side effects (25).

According to the results of our study, fluoroscopy-guided TESIs can provide statistically significant improvements in pain, disability, and quality of life scores for both genders. In particular, pain mostly causes disability in patients (26). It would also be correct to say that the quality of life of a patient with disability and pain is impaired. We believe that disability and quality of life improvement are possible with a decrease in pain. Patients with LDH are often reluctant to perform their activities of daily living due to pain.

It has been shown that there is improvement in depression and anxiety scores after TESI procedures (26-28). In our study, there was a statistically significant improvement in anxiety and depression scores after TESI treatment. This effect was also observed in women; although there was a decrease in anxiety and depression scores in men, no statistically significant result was found. However, the fact that depression scores are normally lower in men than in women may have affected this result (29). We think that if more men had been included in our study, this problem could have been eliminated. It is difficult to comment, because anxiety and depression scores were not evaluated separately for men and women in previously published studies (9,30).

Sexual activity requires an intact musculoskeletal system, especially in the lumbar region. In biomechanical studies, it has also been shown that lumbar flexion and extension movements are significant during sexual intercourse (31,32). Painful lumbar movements can cause pain during sex and, thus, a decrease in libido, sexual satisfaction, and the frequency of sexual intercourse and orgasm. In addition to pain, a deterioration in quality of life, disability, and accompanying anxiety and depression in patients with chronic pain are additional factors that disrupt sexual function. Berg, et al (8) reported a postsurgical improvement in sexual function in both genders with LBP.

In our study, all of the factors that may affect sexual function were evaluated. Although pain and all pain-related clinical parameters improved in women, only sexual desire and total sexual function scores significantly improved by posttreatment month 3 compared to pretreatment scores. Although improvements were seen in all parameters related to sexual function, the finding of statistically significant results in desire and total scores may indicate that decreasing pain scores may have a greater effect on these parameters. Also in our study, in men, most sexual function scores improved. Loh-Doyle, et al (33) found higher rates of erectile and ejaculatory dysfunction in men with chronic pain (33). Demir, et al (34) reported that the higher incidence of erectile dysfunction in patients with disc herniation may be due to pressure on the sacral roots (34). The significant short-term improvement in sexual function in men in our study may be due to reduced pain and disability.

Limitations

Our study has several limitations. First, it is a single-center study. Second, the relationship between the level and severity of disc herniation and sexual dysfunction was not examined. Third, there was a short follow-up period of 3 months, and minimal clinically important differences in sexual function tests were not evaluated. Additionally, whether these tests were sensitive or whether the positive result was due to a placebo effect, could not be evaluated. Although the initial patient pool consisted of 948 individuals, only 60 met the strict inclusion criteria, which may limit the generalizability of our findings and introduce potential selection bias. Despite these limitations, our study is the first to investigate the effect of TESIs on sexual function, which is a strength of the study.

Conclusion

TESIs are an effective treatment in the short-to-medium term for pain, depression, and disability in patients with lumbar disc herniation. They have also been reported to have a positive effect on sexual function in both men and women. However, randomized controlled studies are needed to show that they also

have a long-term effect. Future studies should focus on long-term follow-up to assess the durability of the observed benefits of TESIs, particularly regarding sexual function. Randomized controlled trials with larger sample sizes and the inclusion of control groups are necessary to strengthen the evidence base. Additionally, investigating underlying mechanisms and potential gender-specific responses may provide deeper insights into treatment outcomes.

Author Contributions

This study was designed by RS, TS, TG. The data were analyzed by RS and GE, and the results were critically examined by all authors. GE had a primary role in preparing the manuscript, which was edited by RS. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work.

References

1. World Health Organization. Sexual and Reproductive Health and Research (SRH). Geneva, Swiss Confederation. www.who.int/teams/sexual-and-reproductive-health-and-research/key-areas-of-work/sexual-health/defining-sexual-health
2. Oliva-Lozano JM, Alacid F, López-Miñarro PA, Muyor JM. What are the physical demands of sexual intercourse? A systematic review of the literature. *Arch Sex Behav* 2022; 51:1397-1417.
3. Katz H, Newton-John TRO, Shires A. Sexual difficulties in the population with musculoskeletal chronic pain: A systematic review. *Pain Med* 2021; 22:1982-1992.
4. Bahouq H, Allali F, Rkain H, Hajjaj-Hassouni N. Discussing sexual concerns with chronic low back pain patients: Barriers and patients' expectations. *Clin Rheumatol* 2013; 32:1487-1492.
5. Ozturk EC, Sacaklidir R, Sencan S, Gunduz OH. Caudal epidural steroid injection versus transforaminal ESI for unilateral S1 radiculopathy: A prospective, randomized trial. *Pain Med* 2023; 24:957-962.
6. Manchikanti L, Knezevic E, Knezevic NN, et al. Epidural injections for lumbar radiculopathy or sciatica: a comparative systematic review and meta-analysis of Cochrane review. *Pain Physician* 2021; 24:E539-E554.
7. Kaye AD, Manchikanti L, Abdi S, et al. Efficacy of epidural injections in managing chronic spinal pain: A best evidence synthesis. *Pain Physician* 2015; 18:E939-E1004.
8. Berg S, Fritzell P, Tropp H. Sex life and sexual function in men and women before and after total disc replacement compared with posterior lumbar fusion. *Spine J* 2009; 9:987-994.
9. Malik AT, Jain N, Kim J, Khan SN, Yu E. Sexual activity after spine surgery: A systematic review. *Eur Spine J* 2018; 27:2395-2426.
10. Flegge LG, Barr A, Craner JR. Interdisciplinary pain rehabilitation and sexual functioning: Treatment outcomes and patient preferences. *Pain Pract* 2023; 23:785-792.
11. Yazici CM, Sarifakioglu B, Guzelant A, Turker P, Ates O. An unresolved discussion: Presence of premature ejaculation and erectile dysfunction in lumbar disc hernia. *Int Urol Nephrol* 2013; 45:659-667.
12. Kwak SG, Choo YJ, Kwak S, Chang MC. Effectiveness of transforaminal, interlaminar, and caudal epidural injections in lumbosacral disc herniation: A systematic review and network meta-analysis. *Pain Physician* 2023; 26:113-123.
13. Sacaklidir R, Yilmaz H, Ozturk EC, Gunduz OH, Sencan S. Comparison of the use of peripheral nerve stimulator and Quincke needle for lumbar transforaminal epidural steroid injections. *Turk Neurosurg* 2024; 34:480-484.
14. Yakut E, Düger T, Oksüz C, et al. Validation of the Turkish version of the Oswestry Disability Index for patients with low back pain. *Spine (Phila Pa 1976)* 2004; 29:581-585; discussion 585.
15. Aydemir Ö, Güvenir T, Küey L, Kültür S. [Hospital Anxiety and Depression Scale Turkish form: Validation and reliability study]. Article in Turkish. *Türk Psikiyatri Der* 1997; 8:280-287.
16. Soylu C, Kütük B. Reliability and validity of the Turkish version of SF-12 Health Survey. *Turk Psikiyatri Dergisi* 2022; 33:108.
17. Rosen RC, Riley A, Wagner G, Osterloh IH, Kirkpatrick J, Mishra A. The international index of erectile function (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology* 1997; 49:822-830.
18. Rosen R, Brown C, Heiman J, et al. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2000; 26:191-208.
19. Oksuz E, Malhan S. [Reliability and validity of the Female Sexual Function Index in Turkish population]. Article in Turkish. *Sendrom* 2005; 17:54-60.
20. Akkus E, Kadioglu A, Esen A, et al. Prevalence and correlates of erectile dysfunction in Turkey: A population-based study. *Eur Urol* 2002; 41:298-304.
21. Mahmoud AM, Shawky MA, Farghaly OS, Botros JM, Alsaeid MA, Ragab SG. A systematic review and network meta-analysis comparing different epidural steroid injection approaches. *Pain Pract* 2024; 24:341-363.
22. Cohen J. The t-test for means. *Statistical Power Analysis for the Behavioral Sciences, Revised Edition*. Academic Press, New York, 2013, pp 19-74.
23. Zaina F, Tomkins-Lane C, Carragee E, Negrini S. Surgical versus non-surgical treatment for lumbar spinal stenosis. *Cochrane Database of Syst Rev* 2016; CD010264.
24. Song JH, Lee WY, Cho KR, Nam SH, Park KD, Park Y. Fluoroscopy-guided transforaminal versus caudal epidural steroid injection for chronic pain after spinal surgery: A retrospective mid-term comparative study. *J Pain Res* 2021; 14:2129-2138.
25. Sencan S, Sacaklidir R, Gunduz OH. The immediate adverse events of lumbar interventional pain procedures in 4,209 patients: An observational clinical study. *Pain Med* 2022; 23:76-80.
26. Rogers AH, Farris SG. A meta-analysis of the associations of elements of the fear-avoidance model of chronic pain with negative affect, depression,

anxiety, pain-related disability and pain intensity. *Eur J Pain* 2022; 26:1611-1635.

27. Sariyildiz MA, Batmaz İ, Yazmalar L, Güneş M, Yahya Turan Y. The effectiveness of transforaminal epidural steroid injections on radicular pain, functionality, psychological status and sleep quality in patients with lumbar disc herniation. *J Back Musculoskelet Rehabil* 2017; 30:265-270.
28. Roberts ST, Willick SE, Rho ME, Rittenberg JD. Efficacy of lumbosacral transforaminal epidural steroid injections: A systematic review. *PM R* 2009; 1:657-668.
29. Kuehner C. Why is depression more common among women than among men? *Lancet Psychiatry* 2017; 4:146-158.
30. Elsharkawy AE, Lange B, Caldas F, Alabbasi AH, Klassen PD. Predictors and long-term outcome of sexual function after surgical treatment for single-level lumbar disk herniation among patients in a German spine center. *Clin Spine Surg* 2018; 31356-362.
31. Sidorkewicz N, McGill SM. Documenting female spine motion during coitus with a commentary on the implications for the low back pain patient. *Eur Spine J* 2015; 24:513-520.
32. Sidorkewicz N, McGill SM. Male spine motion during coitus: Implications for the low back pain patient. *Spine (Phila Pa 1976)* 2014; 39:1633-1639.
33. Loh-Doyle JC, Stephens-Shields AJ, Rolston R, et al. Predictors of male sexual dysfunction in Urologic Chronic Pelvic Pain Syndrome (UCPPS), other chronic pain syndromes, and healthy controls in the Multidisciplinary Approach to the Study of Chronic Pelvic Pain (MAPP) Research Network. *J Sex Med* 2022; 19:1804-1812.
34. Demir Ö, Öksüz E, Erdemir F, Akıncı AT. Erectile dysfunction in patients with lumbar herniated disc. *Chron Precis Med Res* 2022; 3:46-51.