

SPECIFIC THERAPEUTIC METHODS IN LUMBAR FACET SYNDROME  
TREATMENT: PRELIMINARY STUDY

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**ABSTRACT:**

**Introduction:** Specific therapeutic methods (STM) are manual techniques used to treat tissue blockade.

Aim of this research is to determine efficacy of STM in treatment of lumbar facet syndrome (LFS).

**Patients and methods:** The study included 60 patients suffering from LFS (65% women) aged ~47. The patients were treated ~24 days with the following 2-8 procedures: osteopathy, "myofascial release", acupuncture, acupressure, "cupping", neurodynamic, proprioceptive neuromuscular facilitation, kinesiotherapy, "kinesio-type taping", homeopathy and electrotherapy. All patients were evaluated at admission and discharge through: a. pain scale with visual analogue scale (VAS) marked with numbers 1 to 10 (1 being state of no pain, 10 being state of maximum pain); b. disability with so-called Oswestry index (ODI) expressed in percentages (0-20% being minimum, 80-100% being complete disability); c. quality of sleep, rated through modified Pittsburgh index of sleep quality (PSQI) expressed between 0 (very poor) and 4 (very good). The assessment of improvement in pain intensity and level of disability was conducted via subtraction of values noted before treatment from values at the end of treatment, while the assessment of sleep quality improvement was conducted via subtraction of values noted at the end of treatment from the values noted before treatment. Non-parametric statistical analyses were used.

**Results:** significantly lower values of VAS ( $p < 0.0001$ ) and ODI ( $p < 0.0001$ ), significant increase in PSQI ( $p < 0.0001$ ) at the end in relation to the beginning of treatment, as well as significant correlation between decrease in pain and disability ( $r = 0.3292$ ,  $p = 0.0105$ ). No significant difference in pain ( $p = 0.9856$ ) and disability ( $p = 0.9171$ ) decrease was noticed between sexes.

**Conclusion:** STM is efficient in the treatment of pain attacks in patients of both sexes suffering from LBS.

**Key words:** Specific therapeutic methods: lumbar facet syndrome, manual techniques

**INTRODUCTION**

Specific therapeutic methods represent a type of complementary medicine and treatment without medication and surgery. It is a diagnostic and therapeutic approach which is almost completely unknown in our health system. Specific therapeutic methods are conducted through holistic approach. The cause of medical condition will be more important than symptoms, so that the patient will be treated in entirety (physically, emotionally, psychologically, spiritually), and not only their illness. This is a manual technique, so the problem is explored manually – therapist/osteopath will em-

ploy palpation skills to ascertain the location of tension and blockade in the tissue, which cause pain and discomfort. After that, various techniques are used to free the tissue from tension, improve blood flow, decrease pain, improve mobility, general wellbeing, and finally "starts up" the self-healing system.

**AIM OF RESEARCH**

The aim of this research is to ascertain the efficacy of specific therapeutic methods in treatment of lumbar facet syndrome (LFS),

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## PATIENTS AND METHODS

This prospective study was published at the Polyclinic of sports medicine (Community Health Center Tuzla) between November 23<sup>rd</sup>, 2016 and February 23<sup>rd</sup>, 2018, and included 60 randomly chosen patients. Average age of patients at the beginning of treatment was 47±12.5 (14-68) years. The group of male patients comprised of 21 members, aged in average 47±11.1 (21-63). The group of female patients comprised of 39 members, aged in average 47±13.3 (14-68). They were all previously examined neurologically, neuro-radiologically and neuro-physiologically, and they all showed evidence of damage in lumbar portion of the spine (annular swelling, protrusions or intervertebral disk prolapse located at levels L3/L4, L4/L5, L5/S1, narrowing of spinal and/or neural canal, spondylolisthesis, spondylosis) and radicular compromises on at least one level (L3, L4, L5 and S1). Number of 54 patients were previously treated with medications, as well as some of these therapeutic approaches: physical therapy, chiropractic treatment, or were treated in a spa. Therapeutic procedures included: osteopathy (59 patients), "myofascial release" (MFR) (19 patients), acupuncture (25 patients), acupressure (17 patients), "cupping" therapy (26 patients), neuro-dynamics (29 patients), proprioceptive neuromuscular facilitation (PNF) (7 patients), kinesiotherapy (60 patients), "kinesiotape" (14 patients), homeopathy (11 patients) and electrotherapy (44 patients). Therapeutic procedures were conducted in the above-mentioned order. The main therapeutic procedure in treating those suffering from chronic lumbar facet syndrome was osteopathy, while every other procedure was used as supporting therapy.

Pain scale with visual analogue scale (VAS) was determined for all patients upon admission and discharge. This scale is used mostly to measure severity of pain. It can also be used to measure other clinical parameters, where a value is assigned to certain activity or condition. The VAS scale is a strip 10 cm or 100 mm long, marked with centimeter values in numbers 1 to 10. Number 1 represents the state of no pain, while number 10 represents the state of maximum possible pain. Also, at the beginning and end of therapy, so-called Oswestry index (Oswestry Low Back Pain Disability Index - ODI) was used to estimate disability in all patients. The questionnaire consists of 10 groups of questions related to pain intensity, personal hygiene, getting up, walking, sitting, standing, sleeping, social life, traveling, change in pain intensity. Every question offers 6 choices as answer. Greater score means the condition is worse. Total score is 50, and results are presented in percentages. Calculating the scores is simple, adding up scores from every group of questions, i.e. summing them up and inserting in the following formula in order calculate the level of disability: total sum of scores / 50 X 100 = % disability. The results are interpreted as follows:

- 0% - 20% (minimum disability): patient can cope with almost all activities of daily life; there is no need for treatment, although sometimes help is required with getting up or standing up. If neces-

sary, exercise and body weight reduction are recommended.

- 21% - 40% (moderate disability); patients may experience pain and difficulties while sitting down, getting up or standing up; traveling and social life are impaired, so that patients may be absent from work; personal hygiene, sleeping and sexual activities may not be significantly impaired.
- 41% - 60% (severe disability): primary issue with these patients is pain, so they may experience significant difficulties with traveling, personal hygiene, social life, sexual activities and sleeping; detailed diagnostic treatment is recommended.
- 61% - 80% (very severe disability): pain in the back affects all aspects of daily life and work, active treatment is necessary.
- 81% - 100% (complete disability): patients are bed-ridden and careful diagnostic processing is necessary.

Oswestry questionnaire is very specific and is used to measure functional abilities of patients with lumbar pain. Estimating improvement in pain intensity and level of disability with treatment was conducted through subtracting values noted at the end of treatment from those noted at the beginning of treatment.

Also, at the beginning and at the end of treatment, the quality of sleep was evaluated in all patients using modified Pittsburgh sleep quality index (Pittsburgh Sleep Quality Index - PSQI) which is expressed in the range between 0 (very poor sleep), 1 (poor sleep), 2 (average sleep), 3 (good sleep) and 4 (very good sleep). Pittsburgh Sleep Quality Index - PSQI is an efficient instrument which is used to measure quality and pattern of sleep in adults. This questionnaire differentiates sleep quality by measuring seven components: subjective sleep quality, sleep latency, sleep duration, usual sleep efficacy, sleep disorders, use of sleep medication and sleep dysfunction during past month.

Analysis of sexes included comparing levels of recovery from pain and levels of improvement of functionality. Also, we represented data distribution for sleep quality assessment and percentages of disability before the beginning and end (after) of treatment.

Statistical methods for non-parameter samples were used for statistical calculations: Spearman correlation, Wilcoxon test, Mann Whitney test, Chi test, and values  $p < 0.05$  were considered statistically significant. Data processing was conducted in statistical software AR-CUS QUICK STAT - Biomedical. All patients gave their written consent for this research.

## RESULTS

### Entire sample analysis

Values of pain intensity parameters before and at the end of treatment, as well as level of improvement, determined through VAS in patients treated for chronic lumbar facet syndrome, are represented in Table 1. Significantly lower value of VAS parameters was noticed

at the end of treatment, compared to value before of treatment ( $p < 0.0001$ ). Parameters of levels of disability, measured with ODI in patients suffering from chronic lumbar facet syndrome before the beginning and end of therapy are represented in Table 2. Before the beginning of therapy, 24 patients showed complete disability, while at the end, 56 of them showed minimal disability (Figure 1). It was established that disability measured with ODI showed significantly lower values at the end in comparison to the beginning of treatment ( $p < 0.0001$ ).

Significantly positive correlation was noticed between the difference in pain and difference in disability, which is a measure of improvement in the entire group

of patients treated for chronic lumbar facet syndrome ( $r = 0.3292$ ,  $p = 0.0105$ ) (Figure 2).

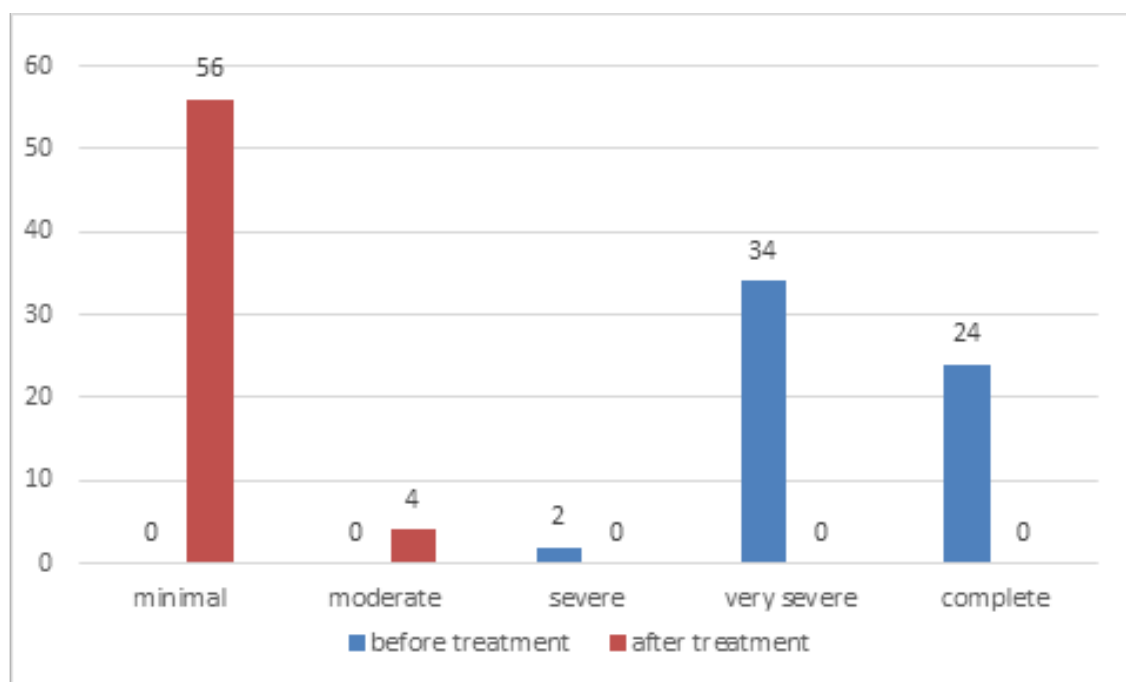
Parameters of sleep quality measured with PSQI in patients suffering from chronic lumbar facet syndrome before the beginning and end of treatment are shown in Table 3. Significant improvement in sleep quality ( $p < 0.0001$ ) measured with PSQI, at the end of treatment, compared to the value before beginning of treatment. Before treatment 48.3% of patients experienced very poor sleep, 25% poor, 16.7% average, and only 10% good sleep. At the end of treatment, 73.3% of patients experienced very good sleep, while the rest (26.7%) had good sleep (Figure 3).

**Table 1.** Parameters of pain intensity in patients treated for chronic lumbar facet syndrome, measured with Visual Analogue Scale (VAS), before the beginning (Before), at the end of treatment (End), and improvement (Difference) which marks the difference in pain intensity at the end versus the beginning of treatment of patients treated for chronic lumbar facet syndrome

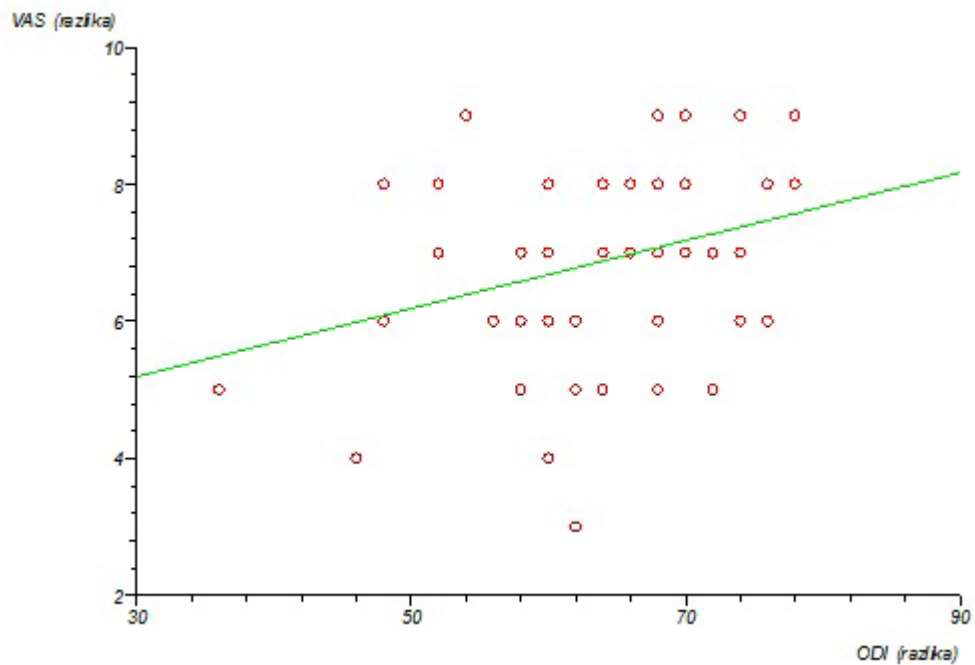
VAS	Mediana	Percentile (25-75)	Min.	Max.
Before	9	8-10	6	10
End	2	1.75-3	1	5
Difference	7	6-8	3	9

**Table 2.** Parameters of disability (in percentages) for patients treated for chronic lumbar facet syndrome, measured with Oswestry Low Back Pain Disability Index (ODI), before the beginning (Before), at the end of treatment (End), and improvement (Difference) which marks the difference in pain intensity at the end versus the value before beginning of treatment of patients treated for chronic lumbar facet syndrome

ODI	Mediana	Percentile (25-75)	Min.	Max
Before	80	74-84	44	98
End	10	10-18	2	32
Difference	64	58-68	36	78



**Figure 1:** Level of disability measured with Oswestry Low Back Pain Disability Index (ODI) in patients treated for chronic lumbar facet syndrome before the beginning and at the end of treatment.

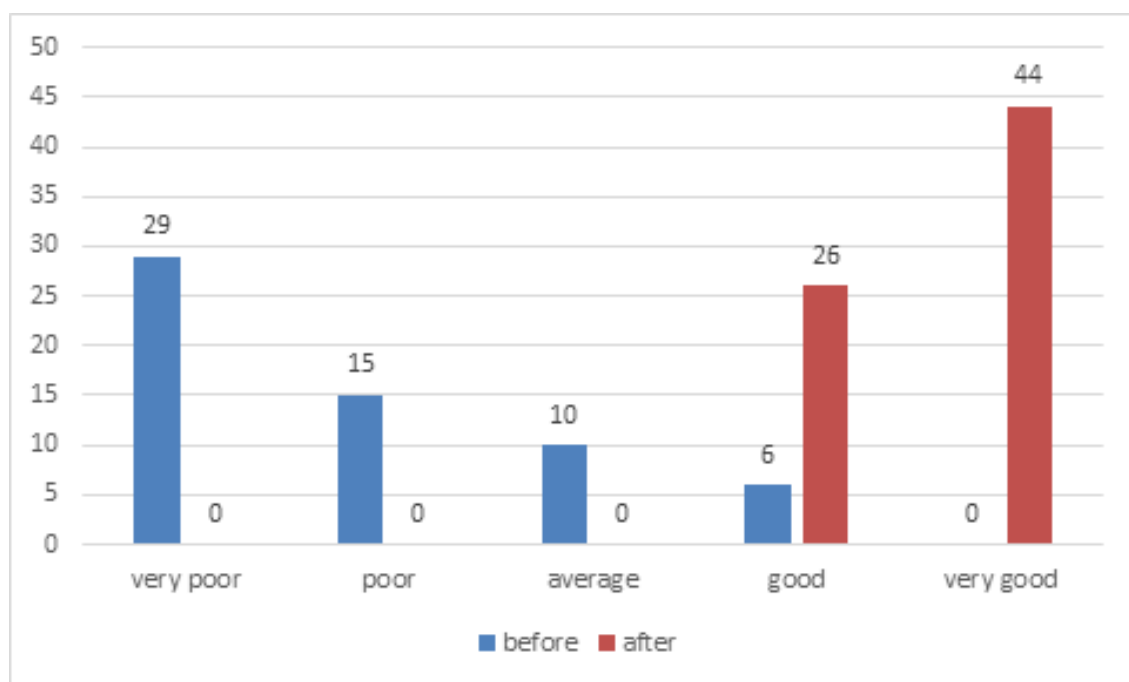


$r=0.3292$ ;  $p=0.01054$

**Figure 2:** Correlation of difference in pain, measured with Visual Analogue Scale (VAS) difference in disability measured with Oswestry Low Back Pain Disability Index (ODI) in patients treated for chronic lumbar facet syndrome

**Table 3.** Parameters of sleep quality measured with modified Pittsburgh Sleep Quality Index (PSQI) before the beginning (Beginning), at the end of treatment (End) in patients suffering from chronic lumbar facet syndrome

PSQI	Mediana	Percentile (25-75)	Min.	Max
Beginning	1	0-2	0	3
End	4	3-4	3	4
Difference	3	2-3	1	4



**Figure 3:** Sleep quality assessed through modified Pittsburgh Sleep Quality Index (PSQI) before and after of treatment in patients suffering from chronic lumbar facet syndrome

**Gender analysis**

**Analysis of male patients**

Values of parameters of pain intensity before the beginning and at the end of treatment, as well as the level of improvement measured with VAS in male patients treated for chronic lumbar facet syndrome are shown in Table 4. Significantly lower value of VAS parameters

was noticed at the end of treatment, in comparison to the value before beginning of treatment ( $p < 0.0001$ ). Parameters of disability in male patients treated for chronic lumbar facet syndrome measure with ODI before the beginning and at the end of treatment, as well as improvements which mark the difference in pain intensity at the end versus the beginning of treatment, are shown in Table 5.

**Table 4.** Parameters of pain intensity in male patients treated for chronic lumbar facet syndrome, measured with Visual Analogue Scale (VAS) at the beginning (Before), at the end of therapy (End), and improvement (Difference) which signifies the difference in pain intensity at the end versus the beginning of treatment

VAS	Mediana	Percentile (25-75)	Min.	Max
Before	9	8-10	6	10
End	2	1-3	1	4
Difference	7	6-8	4	9

**Table 5.** Parameters of disability (in percentages) in male examinees treated for chronic lumbar facet syndrome, measured with Oswestry Low Back Pain Disability Index (ODI) before the beginning (Before), at the end of treatment (End), and improvement (Difference) which marks the difference in pain intensity at the end in relation to the beginning of treatment.

ODI	Mediana	Percentile (25-75)	Min.	Max
Before	78	74-82	44	94
End	14	10-18	6	22
Difference	66	58-68	36	76

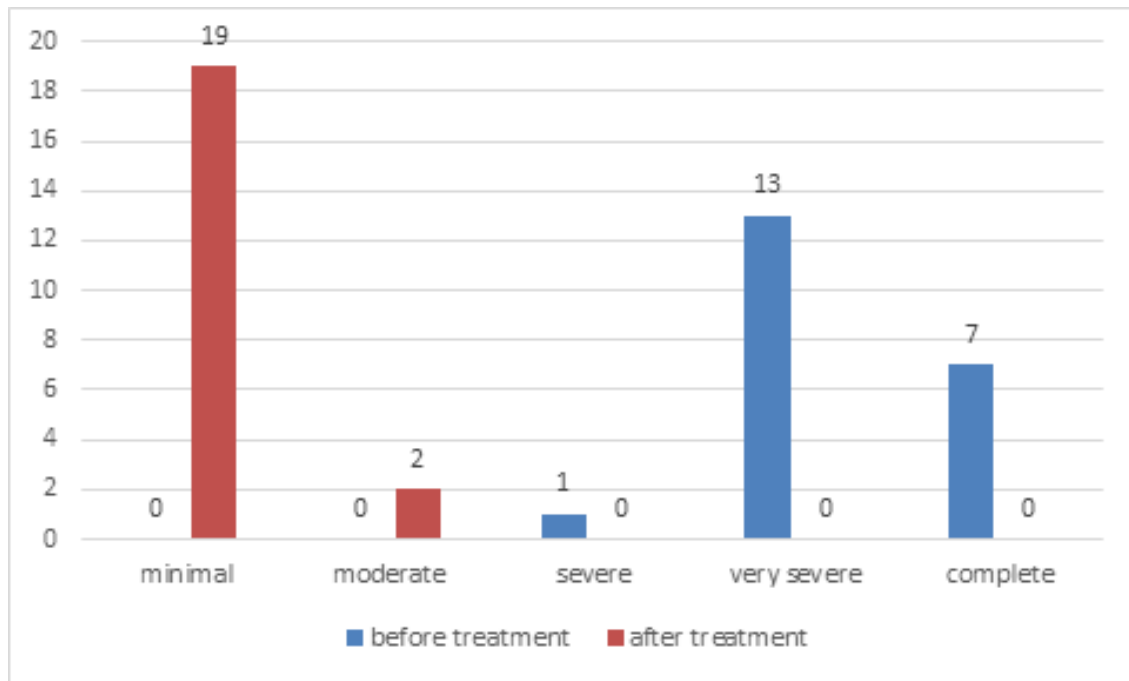
Distribution of levels of disability, measured with ODI in patients suffering from chronic lumbar facet syndrome, at the beginning and end of treatment of male patients, is shown in Figure 4. At the beginning of treatment, 7 patients exhibited complete disability, while at the end of treatment 19 showed minimal disability (Figure 4). It was established that disability measured with ODI had significantly lower values at the end of treatment, in comparison to the very beginning ( $p < 0.0001$ ).

There is insignificant correlation between difference in pain and difference in disability in male patients treated for chronic lumbar facet syndrome ( $r = 0.2435$ ;  $p = 0.2848$ ).

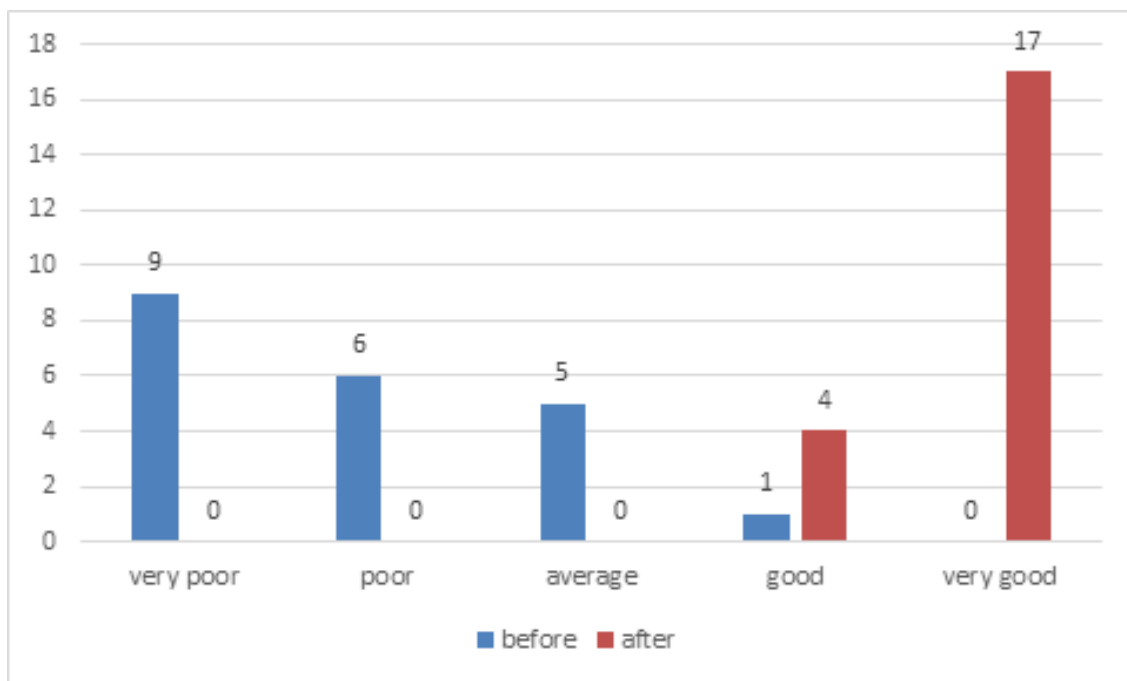
Parameters of sleep quality measured with PSQI in male patients suffering from chronic lumbar facet syndrome at the beginning and end of treatment are shown in Table 6. **Significant improvement in sleep quality (measured with PSQI) was noticed at the end of therapy in comparison to the one before beginning ( $p = 0.0001$ ). Before the beginning of treatment, 48.3% of patients experienced very poor, 25% poor, 16.7% average, and only 10% good sleep. At the end of treatment, 73.3% of patients experience very good sleep, while the rest (26.7%) good sleep (Figure 5).**

**Table 6.** Sleep quality parameters, measured with modified Pittsburgh Sleep Quality Index (PSQI) before the beginning (Before), at the end of treatment (End) in male examinees treated for chronic lumbar facet syndrome

PSQI	Mediana	Percentile (25-75)	Min.	Max
Before	1	0-2	0	3
End	4	4-4	3	4
Difference	3	2-4	1	4



**Figure 4:** Level of disability measured with Oswestry Low Back Pain Disability Index (ODI) in male patients treated for chronic lumbar facet syndrome before the beginning and at the end of treatment



**Figure 5:** Sleep quality measured with modified Pittsburgh Sleep Quality Index (PSQI) before the beginning and end of treatment in male patients treated for chronic lumbar facet syndrome

**Analysis of female patients**

Values of parameters of pain intensity before the beginning and at the end of treatment, as well as levels of improvement measured with VAS in female patients treated for chronic lumbar facet syndrome are shown in Table 7. Significantly lower values of VAS parameters was noticed at the end of treatment, in relation to the value before beginning ( $p < 0.0001$ ). Parameters of disability in female patients treated for chronic lumbar

facet syndrome measured with ODI before the beginning and end of treatment, as well as improvement, signified through the difference in pain intensity at the end versus the one before beginning of treatment, are shown in Table 8. Before the beginning of treatment, 17 patients exhibited complete disability, while at the end, 37 of them experienced minimal disability. It was established that disability measured with ODI had significantly lower values at the end in relation to the values before beginning of treatment ( $p < 0.0001$ ).

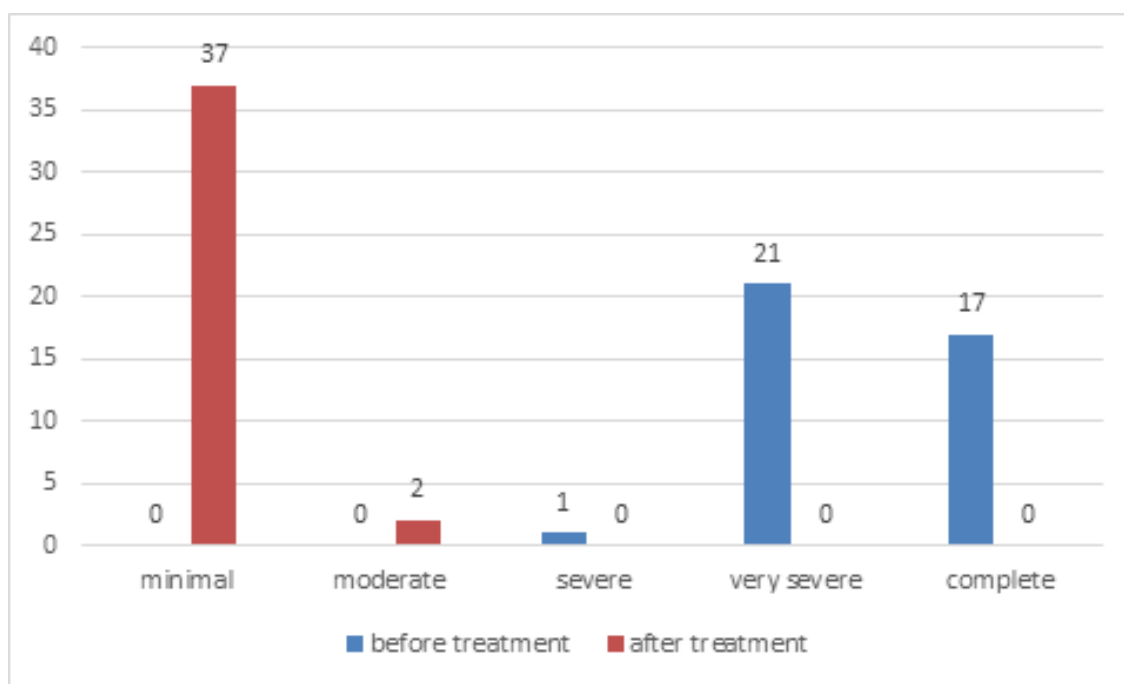
Distribution of levels of disability measured with ODI in female patients suffering from chronic lumbar facet syndrome before the beginning and end of treatment is shown in Image 6.

**Table 7.** Parameters of pain intensity in female patients treated for chronic lumbar facet syndrome measured with Visual Analogue Scale (VAS) before the beginning (Before), end of treatment (End), and improvement (Difference) which signifies the difference in pain intensity at the end versus the one before beginning of treatment

VAS	Mediana	Percentile (25-75)	Min.	Max
Before	9	8-10	6	10
End	2	2-2.5	1	5
Difference	7	6-8	3	9

**Table 8.** Disability parameters (shown in percentages) in female patients treated for chronic lumbar facet syndrome measured with Oswestry Low Back Pain Disability Index (ODI) before the beginning (Before), end of treatment (End), and improvement (Difference) which signifies the difference in pain intensity at the end versus the beginning of treatment

ODI	Mediana	Percentile (25-75)	Min.	Max
Before	80	74-85	54	98
End	14	12-18	2	32
Difference	64	59-69	46	78



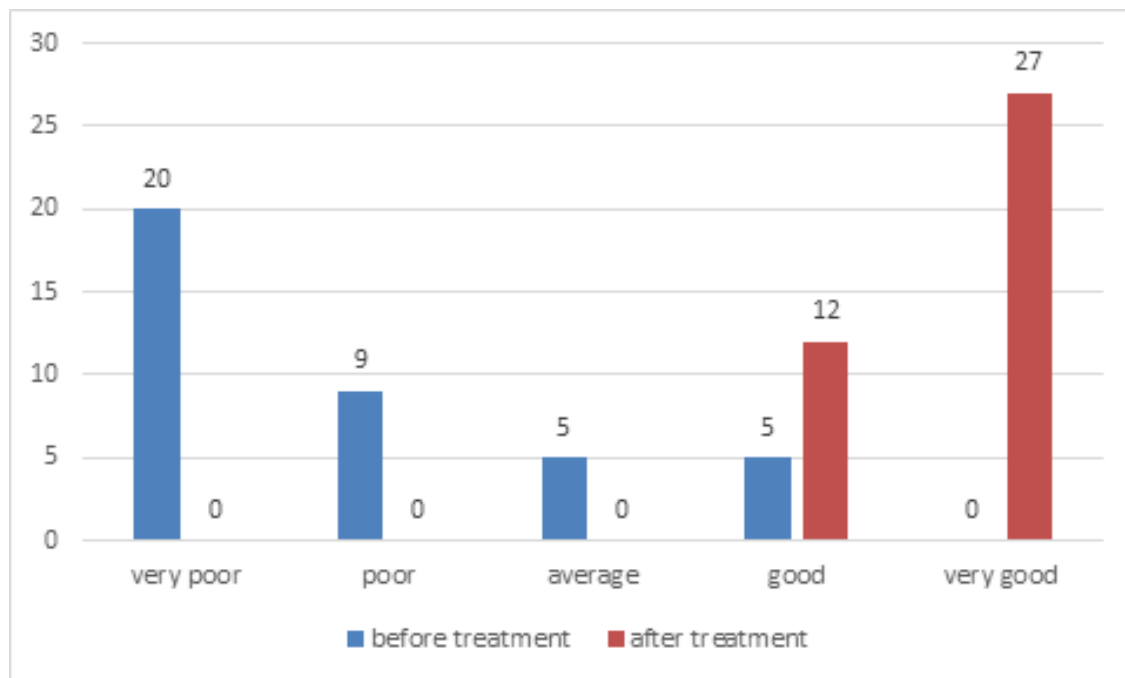
**Figure 6:** Levels of disability in female patients treated for chronic lumbar facet syndrome measured with Oswestry Low Back Pain Disability Index (ODI) before the beginning and at end of treatment.

There is a positive and significant correlation between the difference in pain and difference in disability, as a measure of improvement in female patients treated for chronic lumbar facet syndrome ( $r=0.3709$ ;  $p=0.0206$ ). Sleep quality parameters measured with PSQI in female patients suffering from chronic lumbar facet syndrome at the beginning and end of treatment are showed in Table 9. significant improvement in sleep quality measured with PSQI at the end of treatment versus the very beginning ( $p<0.0001$ ). At the beginning of treatment,

51.3% of female patients experienced very poor sleep, 23.1% poor, 12.8% average, and only 12.8% good. At the end of treatment, 69.2% of the patients experienced very good, while the rest (30.8%) good sleep (Figure 7). Significant difference between genders was not noticed in pain intensity reduction measured with VAS ( $p=0.9856$ ) and reduction in disability measured with ODI ( $p=0.9171$ ) at the end of treatment versus the beginning.

**Table 9.** Sleep quality parameters measured with modified Pittsburgh Sleep Quality Index (PSQI) before the beginning (Before) and end of treatment (End) in female patients treated for chronic lumbar facet syndrome

PSQI	Mediana	Percentile (25-75)	Min.	Max
Before	0	0-1.5	0	3
End	4	3-4	3	4
Difference	3	2-3	1	4



**Figure 7:** Sleep quality measured with modified Pittsburgh Sleep Quality Index (PSQI) before the beginning (Beginning) and at the end of treatment (End) in female patients treated for chronic lumbar facet syndrome

**DISCUSSION**

More than 90% cases of proven discus hernia, changes appear on levels L4-L5 or L5-S1, which will affect the roots of L5 or S1, less often L4. These compressive radiculopathies project to the posterior side of the leg and dorsal side of the foot (1, 2). Hartvigsen states that one of the main causes of disability in world population is actually pain in the lower back (3). In persons with lower back pain it is sometimes difficult to identify specific pain localization. Treatment of lower back pain in people who are socially and economically endangered is very difficult. Most people with new episodes of lower back pain recover quickly, however, recurrence of these episodes is common, and in a small percentage of people, lower back pain becomes permanent and affects disability (1, 2).

In accordance with expectations of effect of these methods, significantly lower values of VAS parameters were noticed at the end, in comparison to the beginning of treatment, in the entire number of patients. Efficacy of specific therapeutic methods is shown through the fact that at the end of therapy, 56 patients experienced minimal disability. Significant reduction in disability in patients, measured with ODI at the end of the treatment, also confirms this statement. In accordance

with expectations, there is significant positive correlation between pain reduction and disability reduction as a measure of improvement in the total number of patients treated for chronic lumbar facet syndrome. Pain reduction is followed by reduction in disability and increase in functionality and vice versa. Choice of methods which increase functionality, i.e. reduce disability, also reduces pain, because these two variables are in mutual correlation.

Foster et al., in their guide for preventing and treating lower back pain, recommend treating lower back pain in the order: using medications, x-ray imaging, and surgical treatment (4). In our sample, surgical treatment was indicated for 25% of patients, while it was later indicated on only 5% of them, which is another confirmation of values of this kind of therapeutic approach in people suffering from chronic lumbar facet syndrome.

As expected, as another measure of improvement, male patients showed significantly lower values of VAS and ODI parameters at the end of treatment, in comparison to the beginning. In relation to the complete sample, mildly positive, albeit insignificant, correlation between pain level difference and disability difference as a measure of improvement in male patients treated for



chronic lumbar facet syndrome, can be explained by relatively small sample. As in the total sample, significantly lower values of VAS and ODI parameters were noticed at the end in comparison to the beginning of treatment, as well as significant positive correlation between difference in pain and difference in disability as a measure of improvement in female patients treated for chronic lumbar facet syndrome. It is important to mention that there is no significant difference between genders in reduction of pain and disability levels at the end versus the beginning of treatment. Male patients were treated longer than female ones, but this does not reach significant values.

As expected, within the scope of improving parameters of quality of life, that is, reducing pain and disability, as well as improving functionality, there is also improvement in sleep quality. Namely, it is well known that pain stimuli activate ascendent reticular activation system responsible for staying awake. In our example, pain relief causes the intermittence of influx of sensory stimuli to ascendant reticular formation, which is important in sleep regulation. Namely, mechanisms of pain occurrence are continually in interaction with mechanisms which can modulate the sense of pain, but the result of pain modulation can be relief, but also increase of pain. Ascendant antinociceptive system, mediated by afferent myelinated type A $\beta$  fibers, stops the signals of pain toward supraspinal structures. This is known as "control gate theory". It explains, for example, the efficacy of transcutaneous electrical nerve stimulation (TENS) in pain reduction, but also the mechanism of postherpetic neuralgia, due to loss of afferent inhibition through A $\beta$  type fibers and noninhibited bombardment of pain stimuli through A $\delta$  and C fibers (5, 6).

To sum up, through specific therapeutic methods we influenced stimulation of deep sensibility fibers directly (acupuncture), but also kinesthetically through stimuli (core stability exercises, yoga and qi gong). Of course, other mechanisms may influence pain modulation, such as releasing endogenous morphines or influencing the vegetative system, which would require further research.

American osteopathic association proved that osteopathic manipulative treatment significantly reduces pain and improves the functionality status in patients, including pregnant and postpartum women with non-specific acute and chronic LFS (6). Based on the results of our study, it can be concluded that specific therapeutic methods are very efficient in treating patients suffering from chronic lumbar facet syndrome, that this method is simultaneously and equally efficient in reducing pain and disability, and significantly improves the patients' quality of life.

## CONCLUSION

Specific therapeutic methods (osteopathy, myofascial release, acupuncture, acupressure, cupping therapy, neurodynamics, proprioceptive neuromuscular facilitation), kinesiotherapy, "kinesiotype", remedial ther-

apy) have shown to be efficient in treating patients suffering from chronic lumbar facet syndrome by reducing pain and levels of disability.

There is a positive correlation between pain intensity measured with Visual Analogue Scale and level of disability measured with Oswestry Low Back Pain Questionnaire Index, so that significant pain reduction also significantly reduces level of disability.

Significant differences were not noticed in terms of efficiency of specific therapeutic procedures in treatment of patients suffering from chronic lumbar facet syndrome between genders.

At the end of treatment of patients suffering from chronic lumbar facet syndrome, significant improvement in sleep quality was noticed in comparison to the beginning of treatment.

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