

## THE RELATIONSHIP BETWEEN FEMALE SEXUAL DYSFUNCTION AND MYOFASCIAL PAIN SYNDROME AND THE EFFECT OF INTERFERENTIAL CURRENT THERAPY ON FEMALE SEXUAL FUNCTION

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### ABSTRACT

**Objective:** To investigate the relationship between female sexual dysfunction (FSD) and myofascial pain syndrome (MPS) and the effect of interferential current therapy (ICT) for MPS on FSD.

**Material and methods:** A total of 37 premenopausal patients aged between 18-50 years who had regular menstrual cycles and sexual relationships and trigger points on their upper trapezius muscles were included in the study. Thirty healthy volunteer participants were selected as the control group. The Female Sexual Function Index (FSFI), Beck Depression Inventory (BDI), and Visual Analog Scales (VAS) scores of both groups were compared. Subsequently, ICT was used to treat MPS patients. In ICT, a current intensity of 4.000 Hz, and 40-100 Hz AMF was delivered; the intensity was adjusted to the bearable sensorial threshold of each patient. Using VAS, BDI, and FSFI scores, the MPS patients were reevaluated 1 and 2 months after completing the therapy.

**Results:** FSD was detected in 64.9% of the MPS patients and in 30% of the control group; there was a significant intergroup difference ( $p=0.005$ ). Overall FSFI score was significantly lower in the MPS patients than in the healthy control group. After treatment, the VAS, BDI, and FSFI scores improved in the MPS group. Pretreatment and post-treatment, the 1st and 2nd month mean FSFI scores were  $23.20\pm4.75$ ,  $24.80\pm4.30$  and  $25.10\pm4.90$ , respectively ( $p<0.0001$ ). As for FSFI subscale scores, a statistically significant improvement was detected only in the pain during intercourse, orgasm and sexual arousal scores.

**Conclusions:** Our results have demonstrated that MPS involving only a restricted anatomical region adversely affects female sexual function. A significant improvement was observed in FSFI scores following the treatment of MPS.

**Key words:** sexual dysfunction, myofascial pain syndrome, effect of interferential current therapy.

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### Introduction

Female Sexual dysfunction (FSD) is one of the more prevalent problems observed in the general population<sup>(1)</sup>. In various studies, depending on the descriptive criteria used, different rates of FSD prevalence have been reported. Large-scale epidemiological studies have reported FSD prevalence as high as 37.9-60% and sometimes approaching 90% during the late postmenopausal period<sup>(2,3)</sup>. Female sexual dysfunction has a multifactorial etiology that is affected by many biological and psychological causes and chronic diseases. Several chronic pain conditions (e.g., fibromyalgia and

rheumatoid arthritis), chronic diseases (e.g., diabetes and hypertension), and psychiatric disorders negatively impact female sexual function<sup>(4,7)</sup>. Generally, female sexual dysfunction includes the lack of sexual desire and arousal, orgasm disorder, and pain during intercourse.

Myofascial pain syndrome (MPS) is a hyperirritable spot in a palpable taut band of skeletal muscle fibers and is characterized by referred pain, the development of sensory changes, and local twitch response<sup>(8)</sup>. Generally pain can be felt in the head, the neck, and in the upper and lower abdominal quadrants. However, MPS can manifest focal involvement at only one trigger point.

Frequently, fatigue, sleep disorder, anxiety, and depression accompany MPS. The incidence and prevalence of MPS varies considerably, and it was reported in nearly 30-50% of the patients seeking medical aid and presenting with pain complaints involving the musculoskeletal system<sup>(9)</sup>. Sexual dysfunction is prevalent in patients suffering from chronic pain that was reportedly associated with psychological factors<sup>(10,11)</sup>. The present investigation has analyzed the correlation between myofascial pain syndrome and sexual function and also investigated the impact of interferential current therapy on the treatment of pain, depression, and sexual function.

### Material and methods

In this prospective study, informed consent was obtained from all patients, and the study was approved by the ethics committee. A total of 37 premenopausal patients aged between 18-50 years who had regular menstrual cycles and sexual relations and at least one trigger point on their upper trapezius muscle were included in the study. To identify trigger points, the criteria recommended by Simon et al. were used<sup>(12)</sup>. The diagnostic criteria included the presence of regional pain, palpable taut bands, a tender nodule on the taut band with pressure, referred pain, and local twitching. A detailed medical history was obtained from all the patients. Patients with medical or psychiatric disease(s) and/or those receiving antidepressant therapies were excluded from the study. A total of 37 premenopausal female patients with MPS were evaluated at the Department of Physical Medicine and Rehabilitation. A laboratory examination was performed, including a complete blood count and the erythrocyte sedimentation rate test. Interferential current therapy was used for the MPS patients.

For interferential current therapy (ICT), the stimulating electrodes were connected to a model CT 3000 PROSTIM electrical stimulator. The stimulator was set to produce an interferential current with a 4,000-Hz carrier frequency, a 100-Hz premodulated beat frequency, 40- 100 Hz AMF was delivered and was adjusted to the bearable sensorial threshold of each patient. Twenty minutes of stimulation was applied using 4 electrodes placed around the trigger points at the upper part of the trapezius muscle. ICT consisted of 15 sessions and administered 5 times per week over 3 weeks.

Healthy volunteer group without any serious disease or disability consisted of hospital staff or friends of patients with MPS. We selected the 30 female members of the reference group who were similar to our population of patients: 18 to 50 years of age, premenopausal, and having a heterosexual relationship. The pain severity was evaluated using the Visual Analog Scales (VAS) 10 mm in length, and the numbers of tender points were recorded. The potential depressive state was evaluated by the Beck Depression Inventory (BDI), and a relevant cut-off score of 17 points was used during the assessments. Sexual functioning was evaluated using the Female Sexual Function Index (FSFI) for all of the subjects. The FSFI is a brief, multidimensional self-report questionnaire and assesses sexual response in women over the past 4 weeks.

The questionnaire consists of 19 items measuring women's sexual function on six dimensions: arousal, lubrication, orgasm, satisfaction and pain. The overall score and the subscores of sexual functional status for the MPS patients and the control group were calculated as previously described by Rosen et al<sup>(13)</sup>. A total FSFI score of less than 26.55 points was proposed as a diagnostic criterion for female sexual dysfunction. One and two months post-treatment, the MPS patients were reevaluated using the VAS, the BDI, and the FSFI scores; the scores obtained were compared with the pretreatment values.

### Statistical evaluation

For statistical analyses, the SPSS 16 Windows (SPSS Inc., Chicago, Illinois, USA) software program was used. For comparisons of numerical values, Student's t-test and the Mann-Whitney U-test were used; for categorical data, the chi-squared test and Fisher's exact test were used. Correlations were determined with Spearman's correlation test. The treatment responses (relative to baseline) were evaluated using the paired t-test and the Wilcoxon signed-rank test. In all of the tests,  $p < 0.05$  was accepted as statistically significant.

### Results

In the MPS patients, the mean duration of the complaints relating to myofascial pain and the VAS score were  $75.85 \pm 87.64$  months (range: 6- 360) and  $5.76 \pm 2.79$  (range: 1- 10), respectively. The mean age, the body mass index and the educational level of the MPS patients and the control subjects were

comparable (Table 1). According to the total FSFI score, FSD was identified in 64.9% of the MPS patients and only 30% of the control group with a significant intergroup difference (p= 0.005). Overall FSFI score were significantly lower in the MPS patients than in the healthy control group (Table 2).

	MPS patients	Control group	P value
Mean Age (yrs)	36.3±8.7	35.2±9.1	0.5
Mean BMI (kg/m2)	25.1±3.4	24.8±4.2	0.72
Education level			0.1
Illiterate	2	1	
Primary school	23	10	
High school	7	11	
College	5	8	

**Table 1:** Clinical characteristics of patients with fibromyalgia and control subjects.

	Patients with MPS	Control group	P value
BDI score (mean ± SD)	15.8±9.1	8.2±5.9	< 0.0001
Total FSFI	23.20±4.75	28.30±4.59	< 0.0001
Sexual desire	3.32±0.80	4.01±1.04	0.02
Sexual arousal	3.49±0.89	4.30±1.16	0.002
Lubrication	4.18±1.10	5.31±0.83	< 0.0001
Orgasm	3.86±0.79	4.81±0.97	< 0.0001
Sexual satisfaction	4.11±1.14	4.93±0.86	0.008
Pain during intercourse	4.20±1.10	5.08±1.11	0.001

**Table 2:** Comparison of the BDI and FSFI scores of MPS patients and the control group.

Diminished lubrication and orgasm were the most common sexual problems in the MPS patients. The mean BDI scores were significantly lower in the MPS patients than in the control group. In the MPS group, a significant negative correlation was found between the BDI and the total FSFI scores (r= -0.42, p= 0.01).

However, significant improvement was obtained in the MPS group after the treatment, and the VAS, BDI, and FSFI scores improved as well. The pretreatment and post-treatment 1st and 2nd month mean VAS scores were respectively 5.57±2.77, 2.28±2.27, and 2.62±2.59, which demonstrated significant improvement (p< 0.0001).

In conjunction with the VAS scores, the mean BDI score improved 2 months after the treatment when compared to pretreatment period (p= 0.011) (Table 3). The pretreatment and post-treatment 1st and 2nd month mean FSFI scores were 23.20±4.75, 24.80±4.30, and 25.10±4.90, respectively (p< 0.0001). FSFI improvement below FSD cut off is not clinically significant. After ICT, FSFI score increased to normal level (>26.55) in only 4 patients. The FSFI subgroups of pain during intercourse, orgasm, and sexual arousal demonstrated a statistically significant improvement. Also a statistically insignificant improvement was noted in the lubrication, sexual desire, and satisfaction domains (Table 3).

	Pretreatment	Post-treatment Scores (mean ± SD)		P value
		1 month	2 months	
VAS scores (mean ± SD)	5.76±2.79	2.28±2.27	2.62±2.59	< 0.0001
Total FSFI	23.20±4.75	24.80±4.30	25.10±4.90	< 0.0001
Sexual desire	3.32±0.80	3.52±0.73	3.51±0.69	0.46
Sexual arousal	3.49±0.89	3.81±0.75	3.90±0.91	0.03
Lubrication	4.18±1.10	4.35±1.00	4.50±1.02	0.09
Orgasm	3.86±0.79	4.23±0.84	4.11±0.96	0.01
Sexual satisfaction	4.11±1.14	4.32±0.88	4.45±1.12	0.1
Pain during intercourse	4.20±1.10	4.56±1.15	4.62±1.21	0.002
BDI score (mean ± SD)	15.8±9.1	13.0±8.7	12.8±9.7	0.011

**Table 3:** : The impact of interferential current therapy applied for myofascial pain syndrome on the VAS, FSFI, and DBI scores .

**Discussion**

The exact pathophysiology of MPS is not fully known. However, current human and animal studies have demonstrated an association between the integrative mechanisms in the spinal cord and increased electrical activities on latent and active trigger points<sup>(8,14)</sup>. Decreased adenosine triphosphate and glycogen concentrations and the enhanced release of bradykinin, which makes tissue more susceptible to stimuli, prostaglandin, histamine, serotonin, P

substance, and leukotrienes locally activate afferent sensorial and autonomic reflexes and induce local pain at tender trigger points<sup>(15)</sup>. The patients usually suffer from pain and pain-related limited mobility; lethargy, local induration, and autonomic dysfunction are also noted. Along with these clinical manifestations, chronic pain patients suffer from multiple psychological disorders in comparison to normal individuals. Diseases associated with chronic pain are closely related to depression (depending on the duration and the severity of pain). Esenyel et al evaluated their MPS patients using the Beck Depression scale and the Taylor Manifest Anxiety scale<sup>(16)</sup>, and they determined the rates of depression (22.9%), severe depression (4.8%), and higher anxiety scores (89.3%) as indicated in parentheses. Additionally, these previous researchers reported a significant post-treatment improvement in these parameters. In our study, the Beck depression scale scores disclosed evidence of depression in 37.8% of the patients. However, we also detected a significant improvement in depression at postoperative month 1, and the improvement was maintained throughout the 2<sup>nd</sup> month when compared with the pretreatment status.

There are various treatments for myofascial trigger points such as manual therapy, electric therapy, cold and heat therapy, local anesthetic, and needle injection. These methods commonly decrease muscles shortening and increase local blood flows of trigger points. Interferential current therapy has a suppressing effect on the sympathetic segment of the automatic nervous system to reduce severe pain and a stimulating effect on blood circulation to improve tissue oxygen supply and to rapidly eliminate toxic metabolic products.

Various studies have investigated the correlation between FSD and psychological factors such as depression and anxiety<sup>(17-19)</sup>. In a current study, Shaer et al looked for the influential FSD factors in 344 female participants<sup>(17)</sup>. The authors reported the prevalence of FSD as 59.1%, and for FSD-related factors, they indicated the presence of depression and male partner-related factors, such as premature ejaculation, erectile difficulties, perception of a smaller phallus by the female partner, and unsatisfactory foreplay<sup>(17)</sup>. Burri et al evaluated a total of 930 white British female participants aged between 18- 85 years (119 monozygotic twin pairs, 67 dizygotic twin pairs, and 558 single twins) using the FSD Index, the Female Sexual Distress Scale, and the Anxiety Sensitivity Index<sup>(18)</sup>.

The authors found that the phenotypic associations among anxiety sensitivity, sexual distress, and FSD were all significant. Their trivariate analysis indicated that additive genetic factors accounted for approximately 75% of the covariance between anxiety sensitivity and FSD, 35% of the covariance between anxiety sensitivity and sexual distress, and 11% between sexual distress and FSD<sup>(18)</sup>. All of these data demonstrate the important psychological influence of FSD. Pain or any systemic disease evoking this psychological aspect of FSD might adversely influence female sexual function.

Current investigations have demonstrated the increased prevalence of FSD in patients with fibromyalgia compared with control groups and indicated the impact of FSD on all the subgroup scores of FSFI<sup>(20,21)</sup>. However, depression was detected as one of the most important causative factors of FSD<sup>(22)</sup>. Aydin et al evaluated relationship between the sexual and psychiatric status of 48 premenopausal female patients with fibromyalgia<sup>(20)</sup>. The authors indicated that when compared with the control group, apart from lubrication, all FSFI subtype scores were significantly lower, and diminished sexual desire (62.5%) was the most prevalent problem in fibromyalgia patients<sup>(20)</sup>. The same authors reported a strong correlation between FSFI and BDI scores in fibromyalgia patients, which was not found among control group patients. There is a relationship between fibromyalgia and FSD. This correlation can be between MFP syndrome and FSD. In the present study, a significant correlation between MPS and FSD was found. In addition, the FSFI scores in MPS patients were significantly lower relative to the control group. These outcomes have demonstrated that the sexual functions of women with MPS or fibromyalgia were equally affected. Conversely, another study estimated lower FSFI scores in FMS patients with or without depression and claimed that major depression had no negative impact on sexuality<sup>(23)</sup>.

Chronic painful diseases such as MPS adversely affect quality of life. Whether pain induces a depressive state or whether depression sustains pain is still a matter of debate. Whatever the case, it should not be forgotten that pain and depression can evoke each other leading to a vicious cycle. This vicious cycle can adversely affect sexual function. A significant correlation was found between VAS scores, and the FSFI substantiates the relevant data.

Therefore, one of the main objectives in the treatment of MPS patients should be to break the pain-depression cycle to improve patient's quality of life. Treatment alternatives for MPS patients include physical therapy applications, such as ICT, TENS, and ultrasonographic procedures, dry needling, trigger point injections, sprays, and traction techniques(24). In a prospective randomized controlled study, the techniques of local anesthetic injection (Lidocaine 1%), and dry needling in patients with MPS were compared<sup>(25)</sup>. The investigators reported a significant decrease in the Beck depression scores 4 weeks after the treatment, and this decrease was maintained up to the 12<sup>th</sup> month without any differences between the treatment groups. In the present study, a significant improvement was detected in the VAS and the BDI scores after treatment. In addition, a statistically significant improvement was observed in the total FSFI and FSFI subscale scores related to the domains of pain during intercourse, orgasm and sexual arousal. However statistically insignificant improvements were noted in domains the of lubrication, sexual desire, and satisfaction

The present study has several limitations. The lack of a placebo group is the most important limitation of this study. Secondly, this was a single-centered study with a limited number of patients. Factors related to male partners, such as premature ejaculation, penile size, and erectile dysfunction were not investigated.

## Conclusions

The results of our study revealed the adverse impact of MPS in a restricted anatomic region on female sexual functions. A significant correlation existed between the BDI, VAS and FSFI rating scores. The psychological conditions and particularly the sexual functions of MPS patients consulting at physical therapy clinics should be investigated. Significant improvement was observed in the post-treatment BDI, VAS, and FSFI scores. Statistically, the most significant improvement was observed in the FSFI scale subgroups of pain during intercourse, orgasm, and sexual arousal. These findings should be confirmed by larger scale case studies.

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