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Effects of mobilization treatment on sacroiliac joint dysfunction syndrome

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SUMMARY

OBJECTIVE: This study aims to reveal the short-term effects of exercise therapy and manual therapy plus exercise therapy on pain, quality of life, and physical examination results in the treatment of sacroiliac joint dysfunction syndrome (SIJDS).

METHODS: In this study, 64 patients who were participated were divided into two groups. The first group (exercise group) was assigned with the sacroiliac joint (SIJ) home exercise program and the second group (mobilization group) with the combined SIJ manual therapy and home exercise program. Physical examination tests, visual analog scale, and SF-36 evaluation were performed at the beginning of the study, at 24 h, at 1 week, and 1 month after the treatment.

RESULTS: Both groups showed that the rate of pain in the posttreatment, after the first week, and the first month; the presence of pain in the sacroiliac region; and VAS values of the patients with SIJDS compared to pretreatment values were clearly decreased ($p<0.05$). All tests performed in the SIJ physical examination showed significant improvement within both groups ($p<0.05$). However, there was no statistical difference between the two groups in 1-month period ($p>0.05$).

CONCLUSIONS: We found that the home exercise program and the manual therapy plus exercise program significantly improved pain intensity, quality of life, and the findings of specific tests in patients with SIJDS. In addition, superiority between the two groups in terms of pain intensity, quality of life, and specific tests was not determined.

KEYWORDS: Sacroiliac. Exercise. Mobilization.

INTRODUCTION

The sacroiliac joint dysfunction syndrome (SIJDS) is an ongoing controversial issue and an important source of low back pain (LBP)[1]. It has been emphasized in many studies that the pathologies of sacroiliac joint (SIJ) are a source of pain in the lumbar spine and hip region[2,3]. The prevalence of SIJDS in patients with chronic mechanical LBP is between 15 and 30%[4].

Confirmation of diagnosis with medical history and physical examination as well as different movement palpation tests and pain provocation tests are recommended[5,6]. The pain associated with SIJDS is tingling and blunt and can permeate to the gluteal region, lower and upper lumbar region, groin, abdomen, and the entire lower extremity[4,7].

Standard physical therapy interventions can be used to cure the underlying pathology and relieve symptoms of SIJDS[8,9]. The effectiveness of manipulation therapy has been presented in various studies and is recommended in the treatment of SIJDS[10]. A review of the literature reveals that there are very few studies analyzing the efficiency of manual therapy and SIJ dysfunction in patients with SIJDS. In this study, the effectiveness of manual therapy and SIJD exercises was analyzed in patients with a follow-up on SIJDS diagnosis and who are not responding to their current therapy.

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This study aims to evaluate the effects of SIJ manual therapy and home exercises on pain and quality of life in patients with SIJDS.

METHODS

In this study, we used data from 64 patients diagnosed with SIJDS based on their detailed anamnesis and SIJ-specific tests. Sample size was calculated using G*Power software. Analysis was done with *F* test for parameters such as effect size, 0.3, significance 0.05; power level 85%; the number of groups is 2; the number of measurements is 4, and dropout rate is 10%. We confirmed that this study would include a minimum of 64 subjects, with each group consisting of 32 subjects.

Subjects were randomized into two groups using the 1:1 ratio method. The first group (exercise group) was assigned with SIJ home exercise program (n=32), and the second group (mobilization group) with SIJ manual therapy and home exercise program (n=32). One patient in the exercise group dropped out of the study due to unbearable pain during the study period without completing the exercise program.

Inclusion criteria of the study were patients who had sacroiliac pain in the past month scored at least 3 points on visual analog scale (VAS), aged between 18 and 60 years, and diagnosed with SIJDS according to the diagnostic criteria recommended by the International Association for the Study of Pain. The patients should also be tested positive in at least three of six validated and reliable SIJD provocation and motion palpation tests. The validity and reliability of SIJD provocation tests have been conducted and resulted with at least three of six tests being positive and one having motion palpations test. These six provocation tests include distraction, compression, Gaenslen, posterior friction test, sacral thrust, and FABER tests[11].

Exclusion criteria were those with neurological deficits in the lower extremity, findings of sacroiliitis at X-ray, spondylolisthesis, a prediagnosed disease of central nervous system or peripheral nervous system, the presence of rheumatological disease, those who had major surgery of lower extremity and spine, and pregnant women.

Physical examination tests, VAS, and SF-36 evaluation were performed at the beginning of the study, at 24 h, at 1 week, and 1 month after the treatment, by a physiatrist experienced in manipulation.

Home exercise program consists of SIJ stretching and strengthening exercises. All patients were assigned stretching exercises such as hamstring stretches, hip adductor stretch, piriformis stretch, quadriceps stretch, one knee to chest stretch, both knees to chest stretch, lower trunk rotation, and pelvic rotation stretch. Strengthening exercises were assigned after stretching exercises. Isometric hip abduction/adduction strengthening and prone position lumbar/hip strengthening exercises were given as strengthening exercises (Figure 1). Each exercise should be repeated five times, two sessions a day. Home exercises were given to both groups for 3 weeks.

In our study, SIJ mobilization, mobilization techniques with anterior innominate, posterior innominate, maigne technique, selling technique, and stoddart cross technique were applied for three sessions (one session per week for 3 weeks) in the mobilization group (Figure 2). Each technique was applied to each patient, separately.

The study was approved by the Ethics Committee, Istanbul Medical Faculty, Istanbul University (approval number: 2013/795). All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional ethics committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from all individual participants who participated in the study.

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 24.0. Descriptive data were expressed as mean±standard deviation or number and frequency.

Figure 1. Stretching and strengthening exercises.

Figure 2. Mobilization techniques.

The distribution of the variables was controlled by Shapiro-Wilk test. The within-group comparisons were made using the Friedman test. A post hoc analysis with Wilcoxon signed-rank tests was conducted with a Bonferroni correction. Repeated-measure analysis of variance was used where appropriate, followed by Bonferroni post hoc test. The within-group categorical variables comparisons were made by Cochran's q test, followed by post hoc Dunn test. Between-group comparisons were performed by Kruskal-Wallis test to find the difference between pre- and posttreatment of the first month. A $p<0.05$ was accepted as statistically significant.

RESULTS

In this study, 63 patients who were participated were divided into two groups. The first group (exercise group) was assigned with the SIJ home exercise program (n=31) and the second group (mobilization group) with the combined SIJ manual therapy and SIJ home exercise program (n=32). The exercise group diagnosed with SIJDS consisted of 19 (61.3%) females and 12 (38.7%) males, and mobilization group had 24 (75%) females and 8 (25%) males (p=0.243). The mean age of the patients was 35.1±13.9 in the exercise group and 39.0±11.3 in the mobilization group (p=0.237). The body mass index values were 24.3±3.0 in the exercise group and 24.0±3.5 in the mobilization group (p=0.758). There was no significant difference in the initial values of the patients between the two groups ($p<0.05$).

Within-group comparison, both exercise and mobilization groups, showed that the rate of pain in the posttreatment, after the first week, and the first month; the presence of pain in the sacroiliac region; and VAS values of the patients with SIJDS compared to pretreatment values were clearly decreased ($p<0.05$). However, there was no statistical difference between the two groups in 1 month, pretreatment, and posttreatment period ($p>0.05$) (Table 1).

The quality of life of patients was evaluated by SF-36, and improvement was observed in five subparameters (physical function, physical role, body pain, vitality, and general health) in both exercise and mobilization groups ($p<0.05$). In the subparameters social function and emotional role, improvement was found only in the mobilization group, in posttreatment compared to pretreatment, at the end of the first month ($p<0.05$). In the mental health assessment, improvement was detected only in the exercise group in posttreatment at the first week ($p<0.05$). There was no statistically significant difference between the groups in the pre- and posttreatment at the end of the first month ($p>0.05$) (Table 1).

When examining the tests performed on our patients, the motion palpations tests were found to be 100% positive; and of the six provocation tests mentioned earlier, distraction and compression test results were 85.7%, Gaenslen 88.9%, posterior friction 93.7%, sacral thrust 100%, and FABER was 52.4% positive. All tests performed in the SIJ physical examination showed significant improvement within both groups ($p<0.05$), and no statistically significant difference was found between the two groups ($p>0.05$) (Table 2).

DISCUSSION

SIJD has been a controversial issue for years in terms of both diagnosis and treatment methods. Although the number of studies on the subject has increased in recent years, the role and importance of manipulation therapies are still not clear in the literature. In our study, we aimed to reveal the short-term effects of exercise therapy and manual therapy plus exercise therapy on pain, quality of life, and physical examination results in the treatment of SIJD.

The literature review and studies comparing manipulation and exercise treatments have shown that no difference was found between the two groups; in some, manual therapy

Table 1. Posttreatment comparisons of visual analog scale and SF-36 scores

		PreT. (0) Mean±SD	PostT. Mean±SD	PostT. 1 week (2) Mean±SD	PostT. 1 month (3) Mean±SD	p	Post hoc	Between-group differences at visit 0–3 Mean±SD	p
VAS rest Mean±SD (min/med/max)	Exerc	3.50±2.74 1/3/7	2.23±1.99 0/2/7	1.86±1.80 0/2/6	1.73±1.83 0/2/5	<0.001	$<0.001^{(0-3)(0-2)}$	1.76±2.54	0.236
	Mob.+ Exerc.	4.00±2.58 1/4/8	2.96±2.73 0/3/7	1.70±2.36 0/2/6	1.36±2.22 0/1/5	<0.001	$<0.001^{(0-3)(0-2)}$ $0.016^{(1-3)}$	2.63±2.55	
Vas activity Mean±SD (min/med/max)	Exerc	6.93±1.98 3/6/10	5.00±2.37 0/5/9	4.06±1.95 0/4/8	3.63±2.01 0/3/7	<0.001	$<0.001^{(0-3)(0-2)(1-3)}$ $0.003^{(0-1)}$	3.30±2.39	0.408
	Mob.+ Exerc.	7.60±1.95 3/7/10	6.16±2.53 0/6/9	4.66±2.17 0/5/7	4.03±2.15 0/4/7	<0.001	$<0.001^{(0-3)(0-2)}$ $0.002^{(1-3)}$	3.56±2.63	
SF-36 Physical fınction Mean±SD	Exerc	69.51±16.79	78.54±19.28	78.54±19.41	81.12±20.84	<0.001	$<0.001^{(0-3)}$, $0.012^{(0-2)}$ $0.007^{(0-1)}$	11.61±23.81	0.217
	Mob.+ Exerc.	70.66±18.17	73.66±16.60	74.33±16.22	78.83±15.95	<0.001	$<0.001^{(0-3)}$ $0.048^{(1-3)}$	8.16±11.70	
SF-36 Physical role Mean±SD	Exerc	51.14±14.76	58.66±8.18	57.24±8.44	56.06±13.06	0.004	$0.035^{(0-2)}$ $0.003^{(0-3)}$	4.37±17.45	0.580
	Mob.+ Exerc.	52.08±16.24	54.33±17.34	56.58±15.42	58.41±16.30	<0.001	$<0.001^{(0-3)(0-2)(1-3)}$ $0.016^{(1-2)}$	6.33±15.01	
SF-36 Body pain Mean±SD	Exerc	59.27±18.3	69.51±19.67	68.30±16.42	69.03±16.49	<0.001	$0.004^{(0-1)}$ $<0.001^{(0-3)}$	9.75±23.99	0.616
	Mob.+ Exerc.	60.58±16.59	72.16±20.11	70.75±20.35	68.41±20.51	0.003	$0.004^{(0-1)}$ $0.032^{(0-2)}$	7.83±21.56	
SF-36 Vitality Mean±SD	Exerc	53.87±16.91	62.41±16.37	61.61±15.45	61.45±18.17	<0.001	$0.002^{(0-3)}$, $0.022^{(0-2)}$ $0.016^{(0-1)}$	7.58±15.04	0.988
	Mob.+ Exerc.	55.66±17.02	65.33±17.41	64.33±17.79	64.16±17.66	0.023	$0.009^{(0-1)}$ $0.028^{(0-2)}$	8.50±19.43	
SF-36 Emotional role Mean±SD	Exerc	45.47±12.79	48.16±8.81	48.69±8.57	50.25±8.59	0.534	–	4.78±14.29	0.323
	Mob.+ Exerc.	41.88±14.06	44.66±10.49	45.77±9.47	49.66±8.07	0.010	$0.046^{(0-3)}$	7.7±14.33	
SF-36 General health Mean±SD	Exerc	52.25±15.59	58.70±18.43	59.03±18.72	59.83±19.16	<0.001	$0.001^{(0-3)}$, $0.005^{(0-2)}$ $0.010^{(0-1)}$	7.58±12.17	0.850
	Mob.+ Exerc.	50.83±15.37	57.83±13.93	57.16±13.24	57.66±14.66	0.019	$0.016^{(0-1)(0-2)}$ $0.028^{(0-3)}$	6.83±15.22	
SF-36 Social function Mean±SD	Exerc	74.19±15.45	79.83±16.67	79.83±16.02	79.83±17.49	0.059	–	4.83±17.28	0.301
	Mob.+ Exerc.	70.83±15.85	75.00±17.05	76.66±16.32	79.58±17.82	0.014	$0.014^{(0-3)}$	8.75±13.19	
SF-36 Mental health Mean±SD	Exerc	62.19±13.65	69.29±11.75	69.03±11.69	66.19±14.07	0.003	$0.030^{(0-2)}$ $0.016^{(0-1)}$	4.00±15.17	0.856
	Mob.+ Exerc.	61.73±14.54	66.26±13.72	66.63±12.88	67.46±14.16	0.276	–	5.73±14.08	

PreT: Pretreatment; PostT: Posttreatment; VAS: Visual analog scale; Exerc.: exercise group; Mob.+Exerc.: mobilization group.

Table 2. Posttreatment comparisons of sacroiliac joint dysfunction syndrome motion palpation and provocation tests.

	Group	PreT. (0)	PostT. (1)	PostT. 1 week (2)	PostT. 1 month (3)	Cochran's q p	Post hoc	PreT–Post T1. month difference (%)	p
Gillet	Exerc. (n)	31 (100)	22 (71)	17 (54.8)	11 (35.5)	<0.001	$<0.001^{(0-2)(0-3)}$ $=0.037^{(0-1)}=0.005^{(1-3)}$	64.5	0.868
	Mob.+ Exerc. (n)	32 (100)	15 (46.9)	13 (40.6)	10 (31.3)	<0.001	$<0.001^{(0-1)(0-2)(0-3)}$	62.5	
FF	Exerc. (n)	31 (100)	22 (71)	19 (61.3)	11 (35.5)	<0.001	$<0.001^{(0-2)(0-3)}$ $=0.033^{(0-1)}$ $=0.004^{(1-3)}$	64.5	0.926
	Mob.+ Exerc. (n)	32 (100)	16 (50)	13 (40.6)	11 (34.4)	<0.001	$<0.001^{(0-1)(0-2)(0-3)}$	65.6	
Standing FF	Exerc. (n)	31 (100)	22 (71.0)	18 (58.1)	13 (59.4)	<0.001	$<0.001^{(0-2)(0-3)}$ $=0.023^{(0-1)\,(1-3)}$	58.1	0.916
	Mob.+ Exerc. (n)	32 (100)	17 (53.1)	16 (50.0)	13 (40.6)	<0.001	$<0.001^{(0-1)(0-2)(0-3)}$	59.4	
Distrac.	Exerc. (n)	22 (71.0)	17 (58.4)	20 (64.5)	18 (58.1)	=0.015	$=0.018^{(0-1)}$	18.1	0.136
	Mob.+ Exerc. (n)	32 (100)	15 (46.9)	19 (59.4)	23 (71.9)	<0.001	$<0.001^{(0-1)(0-2)}$ $=0.018^{(0-3)}=0.049^{(1-3)}$	28.1	
Comp.	Exerc. (n)	22 (71.0)	16 (51.6)	20 (64.5)	19 (61.3)	=0.008	$=0.004^{(0-1)}$	13.6	0.478
	Mob.+ Exerc. (n)	32 (100)	20 (62.5)	24 (75.0)	27 (84.4)	<0.001	$<0.001^{(0-1)}$ $=0.010^{(0-2)}=0.036^{(1-3)}$	15.6	
Ganslen	Exerc. (n)	27 (87.1)	15 (48.4)	19 (61.3)	17 (54.8)	<0.001	$<0.001^{(0-1)(0-3)}$ $=0.009^{(0-2)}$	32.3	0.055
	Mob.+ Exerc. (n)	29 (90.6)	10 (31.3)	10 (31.3)	11 (34.4)	<0.001	$<0.001^{(0-1)(0-2)(0-3}$	62.0	
Thigh trust	Exerc. n (%)	31 (100)	19 (61.3)	23 (74.2)	21 (67.7)	<0.001	$<0.001^{(0-1)(0-3)}$ $=0.009^{(0-2)}$	32.2	0.153
	Mob.+ Exerc. (n)	28 (87.5)	9 (28.1)	10 (31.3)	12 (37.5)	<0.001	$<0.001^{(0-1)(0-2)(0-3)}$	57.1	
Faber	Exerc. (n)	18 (58.1)	10 (32.3)	12 (38.7)	16 (54.16)	0.001	$=0.001^{(0-1)}$ $=0.033^{(0-2)(1-3)}$	32.2	0.414
	Mob.+ Exerc. (n)	15 (46.9)	9 (28.1)	9 (28.1)	11 (34.4)	0.002	$=0.006^{(0-1)(0-2)}$	27.1	
Sacral thrust	Exerc. (n)	31 (100)	24 (77.4)	20 (64.5)	18 (58.1)	<0.001	$<0.001^{(0-2)(0-3)}$	41.9	0.378
	Mob.+ Exerc. (n)	32 (100)	21 (65.5)	21 (65.6)	22 (68.8)	<0.001	$<0.001^{(0-1)(0-2)(0-3)}$	31.3	

PreT: Pretreatment; PostT: Posttreatment; FF: Forward flexion; Distrac.: Distraction; Comp.: Compression; Exerc.: exercise group; Mob.+Exerc.: mobilization group.

was superior, while the exercise group improved significantly in others[12,13]. A systematic review by Assendelft et al. investigating the effect of manipulation in the treatment of chronic LBP suggests that manipulation therapy is not particularly beneficial than other traditional methods such as exercise therapy, needling, and analgesics[14]. In another systematic review, Standaert et al.[15] on LBP and Al-Subahi et al.[9] on SIJDS found the effectiveness of manual therapy and exercise, but not the superiority to each other.

Nejati et al. compared exercise therapy, manual therapy, and combination therapy in patients with SIJD and stated that exercise and manual therapy alone reduced pain and disability of the patients, but the combined therapy did not show a significant advantage[16]. In our study, similar to the one by Nejati

et al.[16], significant improvement in pain scores and quality of life was detected in both groups, but the significance of combination therapy was not shown to be superior to the exercise group. Few studies conducted on this subject have shown that the difference in patient selection, duration, and density of the application methods results in different outcomes.

Since there are no direct methods for the diagnosis of SIJDS, some tests that are specific to this joint have been defined[17]. According to the second criterion of the International Pain Study Association, SIJDS is diagnosed with pain felt in the SIJ region, which can be provoked by special provocation tests such as Gillet, Derbrolowsky, standing flexion, compression, distraction, FABER, Gaenslen, thigh push, sitting flexion, prone extension, supine to sit, Yeoman, tests, sacral sulcus tenderness, sacral compression, palpation of iliac crest spina iliaca posterior superior, and spina iliaca anterior superior while sitting and standing[17-20]. The reliability of these tests was found to be low, and these tests were positive in 20% of asymptomatic individuals and that the sensitivity and specificity of standing flexion and Gillet tests were poor compared with the SIJ block as the gold standard[21].

In studies conducted by Lasslett et al.[18], evaluating the same subject, three or more positive provocative tests showed 94% and 91% sensitivity and 78% specificity in both studies. They reported that three or more positive stress tests have a distinct ability for the diagnosis of SIJ pain[18,20]. In our study, we included patients receiving three positive provocative tests and one positive motion palpation test and found the lowest positivity in Faber test (52.4%) and other tests with (85.7–100%) good positivity.

The lack of a control group, due to ethical issues, is the limitation of this study.

CONCLUSIONS

As a result, we found that the exercise program and the manual therapy plus exercise program significantly improved pain intensity, quality of life, and the findings of specific tests in patients with SIJDS. In addition, superiority between the two groups in terms of pain intensity, quality of life, and specific tests was not determined.

AUTHORS' CONTRIBUTIONS

ND: Conceptualization, Methodology, Data curation, Investigation, Visualization, Writing – original draft, Writing – review & editing. **TS:** Software, Formal analysis, Validation, Writing – original draft, Writing – review & editing. **DD:** Conceptualization, Methodology, Resources, Formal analysis, Supervision, Project administration.

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