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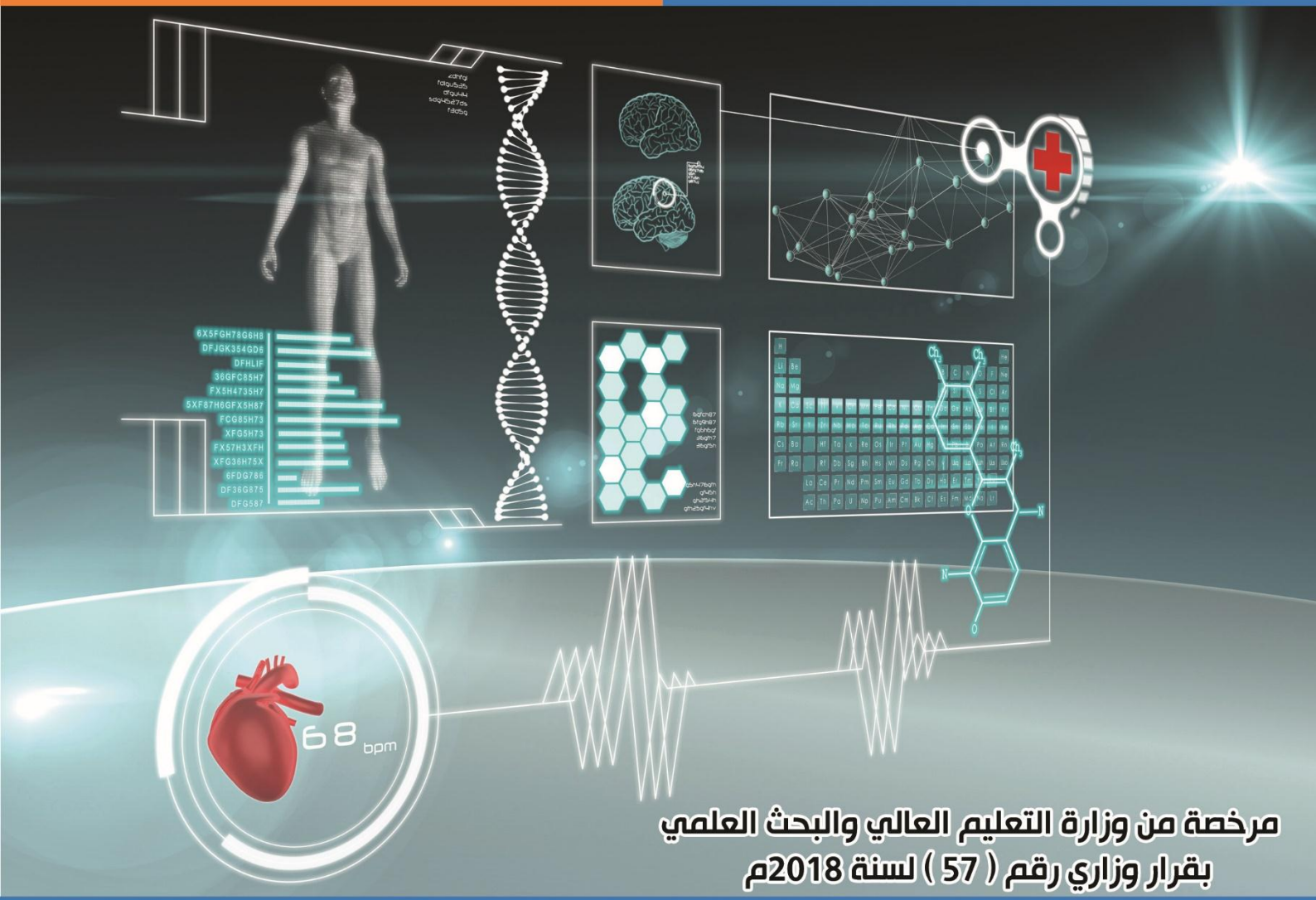

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Combined Effect of Cold Packs, Fastum Gel Phonophoresis and Therapeutic Exercises in Low Back Pain Treatment.

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Abstract

***Background**: Low back pain is one of the most common musculoskeletal disorders in both developed and developing countries. Many people are experiencing such problem through their lifetime. **Aim**: The study aim was to investigate a combined effect of cold packs, fastum gel phonophoresis and therapeutic exercises in low back pain treatment. **Methods:** Pre - post study design was carried out to investigate efficacy of cold packs, fastum gel phonophoresis and therapeutic exercises in low back pain. This study was conducted in the Yemeni Center for Sports Medicine in Sana'a. Fifteen male patients with low back pain aged 26-45-year old were involved, all of whom had definitive evidence of low back pain problems. All patients received cold packs, fastum gel phonophoresis, and therapeutic exercises. Treatment was applied 3 times a week for 6 weeks (18 seasons). Pain level, function performance and range of motion were measured pre and post treatment. **Results:** The results of this study revealed that there is a significant difference in pain level, functional performance, and range of motion, in addition to good results in percent of improvement in all variables. **Conclusion:** Combination of colds packs, fastum gel phonophoresis with therapeutic exercises for the treatment of Low back pain is very effective and helpful in reducing time and cost of treatment.*

Keywords: Low back pain, Cold packs, Fastum gel phonophoresis, Therapeutic exercises.

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Introduction

Low back pain (LBP) is one of the most common musculoskeletal disorders in both developed and developing countries. It has become an increasing problem around the world. The prevalence of low back pain has been reported to vary between 49-90% and it is expected to increase considerably in the near future as the population becomes more aged globally[1-3]. In industrial countries LBP is considered one of the most common causes of work absence and disability, producing a large social and economic burden on society[4,5]. Epidemiological studies showed that 50% of the population over the age of 20 years has experienced low back pain at least once in lifetime[3,6].Clinical studies also show findings of many abnormalities in the spine of people with LBP[7]. Many others researchers[8-12] have reported that 85% of the patients with LBP don't have any specific cause to injury, while[13]emphasized that

97% of patients have mechanical injury in muscles, ligaments or soft tissues as pain resource. Often problem stay classified as nonspecific status[14] or repetitive status[15].

Mc lesson[16] & Ernst[17], reported that people whom don't play recreational and physical activities would be more vulnerable to suffer from LBP than those who practice such activities. Caillet[18] stated that muscles weakness of back gluteal region, and feet, in addition to loss of flexibility of vertebral column are the most important causes which lead to LBP. Reinstrom[19]pointed that injury of lumber region presents about 80-90% from total of vertebral column injuries.

Deyo&Kent[9] showed that around 85% of patients who seek medical care for LBP don't receive a specific diagnosis, while Krismer & Tulder[20] reported that only 10-15% of patients have has received specific diagnosis. Werner et al. [21] found that there was no significant sign between acute and chronic phases, except in intensity, duration, and attack frequencies. Physiotherapy remains the mainstays for treating LBP as seen by many clinicians and researchers[21-24.]

Physiotherapy modalities are favorable, when they are accompanied with others medical methods due to its safe use [25, 26], in addition to its effective role in relief pain, regain of function and prophylactic of recurrence [27].

In Yemeni society, LBP is a common health problem among many people of different age and gender due to some bad daily life social habits spread among Yemenis, for example Khat chewing habit during which individuals are setting in a position that might be harm their low back body area. There are many ways and methods that can be used for treatment of LBP, however the efficiency of many therapeutic interventions is questionable. Hence this research study was conducted in a design of a treatment program consisting of three physical therapy modalities with the aim to decrease LBP symptoms to the minimal level or relieve them if possible.

Aim of the Study

The aim of this study was to investigate the combined effect of cold packs, fastum gel phonophoresis, and therapeutic exercises in low back pain treatment.

Subjects and Methods

Pre and post study design was carried out to investigate efficacy of cold packs, fastum gel phonophoresis and therapeutic exercises in low back pain. This study was conducted in the Yemeni Center for Sports Medicine in Sana'a city, Yemen from March to May 2018. Fifteen male patients clinically diagnosed as LBP were selected as volunteers to participate in this study. Their age ranged from 26 to 45 years, their height ranged from 162 to 172 cm, while their weight ranged from 65 to 83 kg, and duration of illness ranged from 6 to 11 month. The study variables were included the suggested treatment program which consist of cold packs, fastum gel phonophoresis, and therapeutic exercises as independent variables and pain intensity, function performance, and back range of motion as dependent variables.

- ***Instrumentation***

The instrument include Visual Analogue Scale (VAS) to measure pain intensity, stop watch to calculate time in minutes while the patients performed the Timed Get Up and Go Test (TGUGT) and Universal goniometer to measure range of motion (ROM).

- ***Procedures***
  - ***Evaluation procedures:*** All subjects agreed to participate in

the study by completing an informed consent form. Patients were asked to report their pain level by using a VAS. The active back range of motion was measured by using universal goniometer. The ages of subjects were recorded and their heights and weights were measured. Subjects were given verbal instructions concerning the purpose and procedures of the study.

- ***Tests and measurements***
  - **Pain intensity:** Pain intensity was measured according to procedures described by[28]. Pain intensity was reported on a scale from zero (represent no pain) to ten (severe pain).
  - **TGUGT:** It is measured using the method reported by Podsiadlo et al., (1991)[29]. This test reflects the basic function mobility of subjects. The patients were seated on chairs, then asked to stand up, walk 3 meters, turn around, return and sit again. Two trails were conducted, first trial- practice trial and second trail – final score.
  - **Back range of motion:** It's measured using universal goniometer. The fulcrum was centered over the tested back in zero state, then requested patient to bend his back to forwards, backwards, and both of sides. After that examiner records the angles which goniometer has readed in degrees.
  - All tests and measurements were done before and after end of six weeks of treatment.
- ***Treatment procedures:***

A treatment program consists of three therapeutic modalities: cold packs, fastum gel phonophoresis, and therapeutic exercises was used and followed up.

- **Cold packs:** Sammons Preston Cold Packs wrapped in a wet towel (ColPac Chilling Unit Model C 3521 – 03, Sammons Preston, IL, U.S.A.) are used. The temperature of cold packs was between 5 – 15 c, which applied on the lumbar region for (15 -20)minutes.
- **Fastum gel phonophoresis:** Sonopuls , model 491 , made by ENRAF Nonius, Nitherlands) was used for perform fastum gel phonophoresis according to following parameters (cycle 50% , frequency 1 MHz , intensity 1.5 w/ cm^2, time 5 - 10 minutes). Sessions were applied for 18 session every other day.
- **Therapeutic exercise:** The therapeutic exercise program consists of supervised lumbar strengthening exercises (sit – up, leg lift, roll -up, lateral leg lift) and stretching exercises(knee to shoulder, side stretch, chair stretch, cat stretch).

Each exercise was performed for (3) Sets; each set was(10) repetitions. The suggested treatment program was designed referring to scientific references and previous studies related to our study like[22-24,30].

The statistical analysis was performed using statistical package SPSS. Descriptive statistics as mean, standard deviation, minimum and maximum were calculated. The t-test was calculated to compare the main differences between pre and post treatment results. Furthermore, the percent of improvement was calculated. P-value of <0.05 was used as a level of significance.

Results

- ***General characteristics***

The study sample consisted of 15 patients with LBP. The mean age of patients was (31.13 ± 4.39) years, their weight (73.07 ± 4.89) kilogram, their height (166.60 ± 3.42) centimeters, and their mean duration of illness was (7.87±1.36) months. Table 1.

- ***Results of VAS***

As observed in table 2 the mean value of Visual Analogue Scale (VAS) pre and post treatment. The mean value of pretreatment was 4.83 ± 0.89, and post treatment was 1.33 ± 0.82. These results revealed a significant difference in pain intensity (decrease in pain intensity after treatment) with t = 15.65; p-value < 0.05.

- ***Results of TGUGT***

The mean value of TGUGT pre and post treatment. The mean value of pretreatment was 42.80± 1.23 and post treatment was 25.38 ± 4.98. These results revealed a significant difference in functional balance during gait and standing after treatment with t =13.37; p-value < 0.05. Table 2.

Results of ROM

As observed in table 3 which show the mean value of ROM of <vertebral column pre and post treatment (flexion , extension , side bending to right and to left).The mean value of pre-treatment for flexion, extension , side bending to right and to left were 42.51±1.29;11.95 ± 2.14 ; 17.30±1.14; 17.06±1.01 respectively, while the mean value of post treatment were 66,61 ± 2,28;17.93+1.19; 22.75+1.76 ; 21.07+1.06 respectively. These results revealed significant difference in ROM after treatment with t= 4.87; 9.49; 10.09; 10.55 respectively; p-value < 0.05.

- ***Results of percent improvement***

The percent of improvement in all variables, which were 72.46%; 40.70%; 56.69%; 50.04%; 31.50%; 23.51% respectively. These results revealed a significant improvement in all variables. Table 4.

Table 1: General characteristics of the patients.

Variable	Mean± SD	Minimum	Maximum
Age / years	31.13 ± 4.39	26	45
Height / cm	166.60 ± 3.42	162	172
Weight / kg	73.07 ± 4.89	65	83
Duration /month	7.87 ± 1.36	6	11

Table 2: The difference between the mean values of the VAS and TGUGT pre and post treatment

Item	Pre-treatment Mean±SD	Post-treatment Mean±SD	t-test	P-value
VAS	4.83 ± 0.89	1.33 ± 0.82	15.65	< 0.05
TGUGT	42.80 ± 1.23	25.38 ± 4.98	13.37	< 0.05

Table 3: The difference between the mean values of the ROM pre and post treatment

ROM		Mean	SD	t-test	P-value
Flexion	Pre	42.51	1.29	4.87	< 0.05
	Post	66.61	2.28		
Extension	Pre	11.95	2.14	9.49	< 0.05
	Post	17.93	1.19		
Side bending to RT	Pre	17.30	1.14	10.09	< 0.05
	Post	22.75	1.76		
Side bending to LT	Pre	17.06	1.01	10.55	< 0.05
	Post	21.07	1.06		

Table 4: The mean values and percent of improvement between pre-post treatment.

Variables		Mean values pre treatment	Mean values post treatment	Percent of improvement
VAS(degree)		4.83	1.33	72.46
TGUGT(seconds)		42.80	25.38	40.70
ROM (degree)	Flexion	42.51	66.61	56.69
	Extension	11.95	17.93	50.04
	Side bending to RT	17.30	22.75	31.50
	Side bending to LT	17.06	21.07	23.51

Discussion

The results of this study revealed that all study variables were improved after (6) weeks of using suggested treatment program. We found that the combined effect of three physical therapy modalities: cold back, fastum gel phonophoresis and therapeutic exercises have positive effect in the treatment of LBP, when compared with pretreatment values. This improvement could be due to the possible following explanation.

Cold packs constrict blood vessels, numbs painful areas, help relax muscle spasms, reduce nerve transmission of painful symptoms, and provide temporary relief of pain[31, 32]. The effect of cold on pain may act like other sensory stimuli on the pain gate mechanism, and may lead to the release of endomorphine and encephalins by the same mechanism[33]. Also there is a reasonable expectation that the application of cold would reduce muscles spasm and so allow an increase ROM[32]. Cold can also reduce muscles spasticity, perhaps through its influence on skin receptors and late on the muscles spindle[34]. These results coincided with the results obtained by previous studies of Knight[35] who reported that cold packs in combination with other modalities could be effective in decreasing pain in cases of LBP.

Fastum gel phonophoresis had anti-inflammatory and local anesthetic effects, and used in the management of pain and inflammation in musculoskeletal conditions[36,37]. In phonophoresis in addition to deep heating, it is used to enhance percutaneous absorption of drugs[38, 39,40]. So, in the phonophoresis we had double action: effect of ultrasound (thermal and mechanical effects) in addition to the effect of fastum gel which inhibit pain, and so permit for more improvement in the limited ROM[41].

Pain level improvement it was due the effects of fastum gel that evoked a number of pharmacological effect deep within back soft tissue, including analgesia, reducing inflammation, and inhibition of prostaglandins production. These result agreed with results obtained by another studies of Klaiman[36]. Robertson and Baker[42] who reported that phonophoresis method is effective method in decreasing pain and improving ROM. Nevertheless, phonophoresis of fastum gel proved much efficient in reducing pain. Therapeutic exercises have certain mechanism to improve ROM, relief pain, improve functional performance, in addition to its sedative effect[43]. Significant difference showed in this study were consistent with those observed and recorded by[22-24]. The finding of this study can be supported by findings of Al-Sultani[22] who reported that application therapeutics exercises lead to development maximum strength, improvement trunk ROM, and decrease pain.

From the result of this study and the previous studies it can be noticed that combined effect of three physical therapy modalities: cold packs, fastum gel phonophoresis, and therapeutic exercises had played a significant role in treatment and improvement of symptoms with LBP. Also, the result of this study provide evidence that the use of suggested treatment program is effective and safe. However, this method of treatment after six weeks (18 seasons) lead to decreasing level of pain to minimum with no side effects, as well as improved function and ROM of spine in all directions.

Conclusion

According to the results of this study, it can be concluded that there were clinical and statistically significant differences between pre and post treatment with good percent of improvement in all study variables.

Recommendations

Combination of cold packs, fastum gel phonophoresis with therapeutic exercises for the treatment of LBP is very effective and leads to decrease time and cost of treatment.

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