

Impact Of Rehabilitative Program On Patients With Low Back Pain – Muscular Origin Among Sports Science Collage Students In Mutah University - Jordan

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ABSTRACT

This study aimed to identify the effect of suggested rehabilitative program on patients with Mild Non-specific low back pain - muscular origin among Sport Science Collage Students in Mutah University - Jordan. Twenty One patients (18-22 y.o) were enrolled to the Rehabilitative Program that consists of Back Massage cupping for (5) minutes, Supine Sustained Lumbar Traction for (10) minutes, then immediately followed by a Slow motion Supine Bicycle Exercise for (5) Minutes. The Program lasted for (4) Weeks by (12) sessions. Variables (Temperature of right lower back, Temperature of left lower back, Trunk Forward range of motion, Trunk Backward range of motion, Pain, Daily Activity) were measured and compared before the beginning of the Program and (10) minutes after the twelfth session was finished. Wilcoxon test was used to determine the difference between pre and post measurements.

Results indicates that there was statistically significant difference between the pre and post measurements in favor of the post measurements. The Researchers Concludes that the use of the Program has a positive effect on patients with Mild Non-specific low back pain- muscular origin. The Researchers Recommends to conduct more follow-up similar studies at larger samples and in both males and females, as well as to conduct more similar studies in all other kinds of Non-specific low back pain.

Keywords: Sustained Lumbar Traction, Massage Cupping, Supine Bicycle Exercise, Low Back Pain- Muscular Origin, Low Back Temperature, Range Of Motion.

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Introduction:

Low back pain is one of the common and increasing diseases in the modern era that adults may experience during their lives and for several reasons (Owies & Mujalli, 2018) which may due to bad habits (Peloza, 2017). Mooney (2006) believes that back muscles atrophy is the fastest compared to any other muscle group. Also Low back pain appears to be the main reason for absence from work in many countries around the world.

Low back pain usually occurs in young people from the age of twenty and for several reasons- even among athletes - and is often a result of incorrectly lifting different weights or even

among former athletes in male athletics and in volleyball and gymnastics in females, causing a group of cumulative injuries that It begins with a cramp (Al-Qudah,2011).

Lo, Lei, Leng, Huang, Wang, Yu, Li, (2020) confirm that (42.2%) of young adults suffer from chronic lower back pain worldwide. And that the percentage is increasing steadily, according to which confirms that (30% -81%) of university students suffer from these chronic pain. Peloza (2017) believes that the global spread of low back pain, which may affect 90% of adults, is a serious matter, especially when it started to be experienced by young people. The condition may develop into a herniated disc and be difficult to treat, especially

for athletes and students studying sports specialties who exert great muscular effort.

Students are being prescribed analgesic and muscle relaxing drugs. In cases where the degree of pain increases, they are transferred to electrical treatment in the hospital far from their places of residence and away from the college in which they are studying, which may force them to search for any other means that do not remove them from the university and do not force them to repeat their absence from their lectures. Although there are many scientific studies confirming the effectiveness of using therapeutic exercises and therapeutic massage in cases of non-specific lower back pain muscle origin, they are unfortunately not used in the Jordanian Ministry of Health, so some students with muscle spasm may resort to the use of dry cupping or Cupping massage is an alternative to massage in the sports field in recent times (Al-kharabah, 2018), especially in light of the emerging Corona-19 pandemic, which makes it an ideal option instead of massage to prevent friction and hand contact with patients. What increased the use of cupping among athletes was the emergence of the world champion in swimming Michael Phillips (2016 AD), who showed signs of his use of cupping on his shoulders. Also, some students may have to seek help from sports rehabilitation specialists to give them some exercises that relieve muscle Spasm and spinal decompression in the lower back (Pelvic Decompression), such as stretching exercises for the lower back muscles, such as Hip Flexion Exercises (Supine knee bending towards the shoulders) , supine rolling and the Supine Bicycle exercise and many others (Owies & Mujalli, 2018) (Al- Qudah, 2011)(Al- Qudah & Bani Hani, 2013). And some students may use Lumbar Traction mobile units as after the permission of the attending physician (Shararak & Al Khalili,2020).

Cupping is one of the ancient traditional treatment methods, as it began with the pharaohs and its secrets remained the preserve of priests, and spread in the ancient Chinese civilization and became one of the most popular and widely used folk remedies, reaching through the generations to our current era in several types. It is a suction of the skin with a special cup in several methods that stimulate blood circulation and relieve pain, (Al-kharabah, 2018) abbreviates the methods of cupping used in the world in two main types, the first is wet Cupping, and it is used for a period of

(5) To (30) seconds. The second type is Dry Cupping, and its use ranges from (15-60) minutes. Flash Cupping and Massage cupping are similar to some types of massage, and the latter is widely used among athletes as an alternative to relaxing and healing massage.

The publications of the Jordanian Ministry of Health and Health Care in (2019 AD) indicate that the records of the main hospital (Al- Bashir) confirm that it received (75%) to (80%) of visitors who complain of pain in the back area for the year (2018-2019 AD), and the percentage of (20%) of the athletes who reviewed the National Center for Sports Medicine of the same year. A percentage (17%) of them suffered from non- specific lower back pain - muscle origin, from both males and females, which appears to be a high percentage.

After reviewing a large group of related scientific studies, the researchers confirmed that no scientific studies have been conducted investigating the effect of Cupping Massage, lumbar traction and therapeutic exercises in Low Back Pain-muscle origin. Therefore, researchers decided to study the effect of these methods on male students with Mild low back pain- muscle origin.

Objectives of the study:

The study aimed to identify the effect of the proposed rehabilitation program on patients with Mild low back pain - muscle origin among Sports Sciences Collage students in Mutah University- Jordan, according to variables (Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability).

Hypothesis of the study:

There are statistically significant differences at ($\alpha \leq 0.05$) between the pre and post measurements of the proposed rehabilitation program depending on the variable (Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability) among Sports Sciences Collage students in Mutah University- Jordan.

Limitations of the study:

The study addressed many limitations, including:

Spatial Limits: This study was conducted in the Physiology Laboratory at Mutah University – Al-Karak Governorate - Jordan.

Timeline: This study was conducted during the period between (20/9/2020 - 26/10/2020).

Human determinant: This study was conducted on Sports Sciences Collage students in Mutah University- Jordan, who were enrolled in practical courses in the first semester of the academic year 2020-2021.

Method, procedures:

Curriculum: Experimental Design

The researchers used the experimental method in designing the one-group, cardiac and post-test, due to its suitability to the nature of the study objectives.

Community and Study Sample: Participants

The study population and sample consisted of (24) patients with mild low back pain- muscle origin among Sports Sciences Collage students in Mutah University- Jordan, who were registered for practical academic courses in the first semester (2020-2021), where they were chosen by the deliberate method. Only (21) of them lasted the duration of the experiment. Table (1) shows the sample description.

Sample selection conditions:

1- Presence of final diagnosis of mild low Back Pain – muscle origin, by a specialist doctor (orthopedic).

2- approval of the specialist physician for patients to participate in the proposed program.

3- Not to be subject to any other treatment methods (during the application of the program).

4- Voluntary submission to the proposed program.

5- The patient should be free from any other associated diseases.

Table No. (1)

means and standard deviations of the subjects (n = 21) according to variables

Variables	Mean	S.D
Age (years)	19.8095	1.20909
Length (cm)	172.5714	3.54361
Mass (kg)	69.8095	3.01030
Right Lower back temperature (Celsius degree)	30.3524	.59297
Left lower back temperature (Celsius degree)	30.3286	.68128
Trunk forward Range of motion (degree)	50.4762	8.17080
Trunk backward Range of motion (degree)	17.4762	2.06444
Pain Score (degree)	2.1429	.35857
Daily Ability (degree)	.6190	.49761

Data in Table 1 shows the arithmetic averages and standard deviations of the study variables (Age, Height, Mass, Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability). To verify the normal distribution of the data, the Kolmogorov – Smirnov test was performed, Shown in Table(2).

Table No. (2)

Kolmogorov – Smirnov test for normal distribution of the study variables data: Age, Height, Mass, Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability

	Kolmogorov – Smirnov		
	Statistical value	D.F	Sig
Age (years)	.305	21	.000
Length (cm)	.195	21	.037
Mass (kg)	.189	21	.048
Right Lower back temperature (Celsius degree)	.295	21	.000
Left lower back temperature (Celsius degree)	.266	21	.000
Trunk forward Range of motion (degree)	.280	21	.000
Trunk backward Range of motion (degree)	.344	21	.000
Pain Score (degree)	.512	21	.000
Daily Ability (degree)	.397	21	.000

Data of Table No (2), depending on the value of the test and the associated level of significance, indicates that the data of the study sample do not follow the normal distribution, which does not allow the use of parameterized tests and allows the use of non-parametric tests to verify the hypotheses of the study.

Validate the study instrument:

The following tests were used in the study: Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability. Their apparent validity was verified through Access to a group of previous

studies such as the study of (Gati, Czimer, Cserhati, Feher, Olah, Kulisch, Mando, Bender. 2020), (Asiri, Tedla, Alshahrani, Ahmed, Reddy, Gular. 2020), (Lee, Heo, Park, Jeong, Kim, 2019), (Bilgilisoy, Kilich, Uchkun, chakir, Kolda, Toraman, 2018), (Owies & Mujalli, 2018), (Al- khararbah, 2018), (Fousekis, Kounavi, Doriadis, Mylonas , Kallistratos & Tsepis, 2016), (Pei, Shu, Derrik, Chen, Sheng & Lee. 2014), (Al-Qudah & Bani Hani, 2013), (Al-Qudah, 2011), (Mujalli, Sarhan & Outallah, 2007), (Hong & Wu & Wang, 2006)}. Then it was presented to a number of academic specialists to take their opinions. The content validity was calculated using the Lawshe Content Validity Ratio, which reached(0.85).

Procedures of the study:

The researchers took many procedures and reminds her of the following

1- The researchers determined the study sample through the assistance of an orthopedic specialist.

2- The researchers set the variables for the pre and post- tests through (safety of the used tools, lighting and temperature of the laboratory, etc).

3- The researchers have met the subjects, where they explained tests details and the nature of the procedures.

4- The researchers set the date for the pre and post-tests.

5- The physiotherapist had measured the tribal variables (Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability) , during the morning period after a full day's rest without any physical exertion.

6- The research team conducted Cupping Massage for each subject for a period of (5) minute.

7- The research team conducted lumbar traction for each subject for a period of (10) minute.

8- The patients performed the Bicycle exercise – supine position at slow motion, where they were allowed to take a 3-second break when feeling tired. The exercise lasted for (5) minutes, under the supervision of the research team.

9- The physiotherapist measured the post-tests for each subject after the end of session No (12) after 10 minutes had passed, then compared the measurements of the post tests with the pre- tests.

10- The researchers conducted the appropriate statistics to extract the results.

Variables of the study:

The study dealt with many variables: -

Independent Variables: Interventions

The proposed rehabilitative program consisting of:

1- Cupping Massage for (5) minutes for each session, by (12) sessions for (4) weeks.

2- Lumbar Traction for (10) minutes for each session, by (12) sessions for (4) weeks.

3- The Bicycle exercise for (5) minutes for each session, by (12) sessions for (4) weeks.

Dependent Variables: Outcome Measures

1- Temperature of the right lower back.

2- Temperature of the left lower back

Where a non-Contact Infrared Thermometer was used: with a serial number (SN: B101104179) (Pie, et al.2014)

3- Trunk forward Range of motion.

4- Trunk Backward Range of motion.

Standing position was used during the procedure. Medical Goniometer was used to measure range of motion. (Al-Qudah & Bani-Hani, 2013) (Al-Qudah, 2011), (Mujalli, Sarhan & Outallah, 2007)

5- Pain score (PS):

Where the Pain Rating Scale was used to measure the degree of pain (0-10) degrees where: (0 = without pain, 10 = very severe unbearable pain), (Al-Qudah & Bani-Hani, 2013) (Al -Qudah, 2011), (Mujalli, Sarhan & Outallah, 2007).

6- Daily ability(DA):

Where The Triple scale was used (0, 1, 2) degrees where: (Zero = inability, 1 = moderate ability, 2 = normal ability) (Al-Qudah & Bani-Hani, 2013) (Al-Qudah, 2011), (Mujalli, Sarhan & Outallah, 2007)

Statistical tools: Statistical Analysis

The statistical packages program (SPSS) was used to analyze the results, where:

1- Arithmetic means and standard deviation.

2- WilcoxonTest

Results:

Table No. (3) shows apparent differences in the subjects performance in variables (Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability) In the pre and post measurements.

Table (3)

Means of the variables in the pre and post measurements

Variables	Pre		Post	
	Mean	S.D	Mean	S.D
Right Lower back temperature (Celsius degree)	30.3524	.59297	34.3333	.24152
Left lower back temperature (Celsius degree)	30.3286	.68128	34.2762	.23644
Trunk forward Range of motion(degree)	50.4762	8.17080	89.0000	1.18322
Trunk backward Range of motion(degree)	17.4762	2.06444	29.2857	2.75940
Pain Score (degree)	2.1429	.35857	1.0000	.44721
Daily Ability (degree)	.6190	.49761	1.5238	.51177

Table No (3), variables values of the arithmetic averages in the post-measurement shows an improvement compared to the pre-measurement.

To determine the significance of this improvement, Wilcoxon test was used.

Hypothesis of the study:

There are statistically significant differences at ($\alpha \leq 0.05$) between the pre and post measurements of the proposed rehabilitation program depending on the variable (Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability) among Sports Sciences Collage students in Mutah University-Jordan.

Table No. (4)

Wilcoxon test between the pre and post measurements of subjects

Sig	Z value	Rank sum	Rank mean	Number	Rank indication	Variable
.000	-4.019 ^b	.00	.00	0	Negative	Right Lower back temperature

		231.00	11.00	21	Positive	(Celsius degree)
				0	Ties	
				21	Total	
.000	-4.020 ^b	.00	.00	0	Negative	Left lower back temperature (Celsius degree)
		231.00	11.00	21	Positive	
				0	Ties	
				21	Total	
.000	-4.018 ^b	.00	.00	0	Negative	Trunk forward Range of motion (degree)
		231.00	11.00	21	Positive	
				0	Ties	
				21	Total	
.000	-4.041 ^b	.00	.00	0	Negative	Trunk backward Range of motion (degree)
		231.00	11.00	21	Positive	
				0	Ties	
				23	Total	
.000	-4.179 ^c	210.00	10.50	23	Negative	Pain Score (degree)
		.00	.00	0	Positive	
				0	Ties	
				23	Total	
.000	-4.146 ^b	.00	.00	2	Negative	Daily Ability (degree)
		171.00	9.50	21	Positive	
				0	Ties	
				23	Total	

* Statistically significant at ($\alpha \leq 0.05$) level

Table (4) , The results of the Wilcoxon test and the level of significance associated with it, shows the presence of statistically significant differences between the pre and post measurement of the subjects in the variables (Temperature of the right lower back, Temperature of the left lower back, Trunk forward Range of motion, Trunk back ward range of motion, Pain Score , Daily ability) in favor of the post measurement, which indicates

the positive effect of Cupping Massage on patients with mild low back pain- muscle origin among Sports Sciences Collage students in Mutah University - Jordan.

Discussion:

The study aimed to identify the effect of the proposed rehabilitative program consisting of Cupping Massage, Sustained lumbar Traction, and Bicycle Exercise on patients with mild low back pain- muscle origin among Sports Sciences Collage students in Mutah University - Jordan. and as it seen from Table No. (4), the variables have shown statistically significant differences. The researchers can attribute the statistically significant improvement between the pre and post measurement and in favor of the post measurement at the level of the variables of the study as follows:

The temperature of the right side and the left side of the lower back showed a statistically significant improvement. The reason may be that Cupping Massage create a negative pressure inside the cup, known as suction (Evgeni & Lionid, 2016), where all fluids and blood moves toward the skin immediately. Markowski, Sanford, Pikowski, Fauvell, Cimino, Caplan, (2014) and Demir (2012) confirm that all fluids including chemical mixtures and nutrients are affected under the power of negative pressure caused by Cupping may stimulate blood circulation, which increase superficial body temperature. In this study, Cupping Massage was used, which could affect wide area of the back and neck, which resembles a deep massage in terms of effect (Hong & Wu & Wang, 2006) (Pie, et al. 2014), which may raise The temperature of the back and neck area. Thus, this may explain improvement in surface skin temperature in the left and right lumbar region. On the other hand (Evgeni & Lionid, 2016) believe that cupping may assist in the drainage of lactic acid trapped within contractile muscle fibers when blood circulation improves, which may make Cupping Massage a potential method of recovery (Demir, 2012), Therefore, researchers share the opinion (Al-Kharabah, 2018) that Cupping Massage method may be an alternative to some types of massage. Also, the Bicycle exercise may have an adaptive effect in restoring sufficient level of blood supply in the lower back region, which may contribute to improving the temperature in the right and left side in the lower back region.

This result is consistent with the findings of (Pie, et al. 2014), where it was found that the surface temperature of the skin rises statistically significant after 10 minutes of using dry cupping, despite the fact that he used it on the nerve points of the bladder according to Chinese medicine. It is scientifically related to reflexology field, which is quite another topic and completely different from

the current study, which studies the effect of Cupping Massage that combines deep massage and dry cupping. This result is also in agreement with the findings of the study (Al-Qudah & Bani Hani, 2013), where it was found that the surface temperature in the lower back improved in a statistically significant manner when undergoing a gradual and integrated physical rehabilitation program of therapeutic exercises, especially warm-up exercises, stretching, endurance and strengthening exercises performed in supine position (pelvic decompression), such as Hip Flexion exercises, supine rolling and Bicycle exercise and others.

Forward and backward Trunk Range of Motion, showed an improvement statistically significant. Researchers believe that this is due to three reasons, the first reason: it may be due to the Cupping Massage effect that improves blood circulation, increases amount of nutrients and oxygen to reach superficial muscles, releasing lactic acid, which relaxes muscle fibers gradually. So, that decreases mechanical reluctance and finally leads to achieve better range of motion. The second reason: it may be due to lumbar Traction effect, it stretch deep muscles in lower back. So, that decreases mechanical reluctance and finally leads to achieve better range of motion. It is clearly seen that the posterior muscles accomplished Eccentric Contraction during bending forward process, and concentric Contraction during bending Backward process, which may confirm muscles elasticity improvement. As for the third reason: it may be due to Bicycle Exercise effect. The reciprocal movements with legs for (5) minutes from supine position, where all the muscles of the lower back are in a state of lengthening (Spinal decompression) which is widely in use (Al-Qudah 2011), During pelvic rotation, muscles on both sides of the lower back contract and relax, respectively, which may adapt the muscles Efficiently to retain their main physical characteristics in terms of flexibility, strength and endurance which may enhance the improvement of the range of motion of the trunk.

This result is consistent with the findings of (Bilgilişoy, et al. 2019), which found that using mechanical Traction improves trunk range of motion. This result was also in agreement with (AL-Kharabah, 2018), which found that dry cupping improves range of motion of the trunk forward in a statistically significant manner. This

result was also in agreement with the findings of { (Owies & Mujalli, 2018) (Al-Qudah & Bani Hani, 2013) (Al-Qudah, 2011); (Mujalli, Sarhan & Outallah, 2007)} where they found that the range of motion improved statistically significant when undergoing a gradual and integrated physical rehabilitation program of therapeutic exercises, especially warm-up exercises, stretching, endurance and strengthening exercises performed in supine position (pelvic decompression), such as Hip Flexion exercises, supine rolling and Bicycle exercise and others.

Pain Score also showed a statistically significant improvement. This may be due to two reasons, the first reason: it may be due to the Cupping Massage effect that improves blood circulation, increases amount of nutrients and oxygen to reach superficial muscles and skin, increasing the amount of fluids that reduces the level of sensitivity in nerve endings and sensitivity of the muscle spindle and increases the pain threshold, (Hayashi, 2004). On other side, using Cupping Massage for 5 minutes during increasing skin temperature, the brain may secrete a group of hormones from the pituitary gland such as endorphins effect (natural pain killers), where (10) types of beta endorphins are secreted with peripheral effect, and (10) types, with central effect (Grant, 2015). Endorphin secretion is related with thermal treatment method (Mujalli, Sarhan & Outallah, 2007). So, the immediate relief of pain is associated with endorphin secretion. This may reduce the level of pain. As for the second reason: it may be due to the effect of using the sustained lumbar Traction method, which took a period of (10) minutes, which stretches lower Back deep muscles.

The results of the current study are consistent with the findings of (Gati, et al. 2020), (Asiri, et al. 2020), (Bilgiliyoy, et al. 2019), (Lee, et al. 2019)} who They found that Lumbar Traction reduces pain. Also, results are in agreement with the findings of { (Al-khararbah, 2018), (Fousekis, et al. 2016), (Hong & Wu & Wang, 2006) } who found That the use of cupping statistically significant reduces pain, pain score associated with quality of life and raises the level of pain threshold. At the same time, the results of the current study are in agreement with the findings of {(Owies & Mujalli, 2018) (Al-Qudah & Bani Hani, 2013) (Al-Qudah, 2011); (Mujalli, Sarhan & Outallah, 2007)} where they found that pain improved statistically significant when

undergoing an integrated physical exercise rehabilitation program of therapeutic exercises, especially warm-up exercises, stretching, endurance and strengthening exercises performed in supine position (pelvic decompression), such as Hip Flexion exercises, supine rolling and Bicycle exercise and others.

Daily activity showed an improvement in a statistically significant manner. Researchers believe that it is one of the most important variables, as it includes the improvement in all other variables, which could be due to the variety of treatment methods used in the proposed rehabilitative program, which included Cupping Massage as an alternative to massage, sustained Lumbar Traction and Bicycle exercise for a period of (4)weeks.

This result is consistent with { (Asiri, et al. 2020), (Bilgiliyoy, et al. 2019), (Lee, et al. 2019)} who found that Traction reduces disability statistically. While (Gati, et al. 2020) found that underwater mechanical Traction improves apparently disability without statistical significance. The difference in findings may be due to the nature of the two sample, in terms of age, used methods and disease category. Neuro-radiculopathy is a complicated stage of chronic disc herniation, while in the current study subjects category was non-specific pain.

Also this result is consistent with {(Al-khararbah, 2018), (Fousekis, et al. 2016), (Hong & Wu & Wang, 2006)} who found that the use of Cupping reduces disability and increases daily ability. At the same time, results are in agreement with the findings of {(Owies & Mujalli, 2018) (Al-Qudah & Bani Hani, 2013) (Al-Qudah, 2011); (Mujalli, Sarhan & Outallah, 2007)} where they found that daily ability improved statistically when undergoing an integrated physical rehabilitation program of therapeutic exercises that relieve muscle spasm and reduce spinal decompression that improve range of motion. (Roth, 2016) reported in that the decrease in pain and disability associated with range of motion are the basis for the criterion of returning to normal life.

There were a few limitations of the present study, including that long-term effects of the treatment were not obtained due to the limitation of time.

Conclusions:

The period of (4) weeks after undergoing Cupping Massage, Lumbar Traction and Bicycle Exercise has proven to be significant to reduce pain, improve Low back temperature, range of motion and daily activity. **Recommendations:**

More long term follow up studies are needed.

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