

Impact Of Cupping Massage and Modified Spinal Decompression Therapy With Core Stabilization Exercise In Lumbar Bulging Disc Management

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ABSTRACT:

BACKGROUND: The positive effects of using deferent methods of Spinal decompression therapy (SDT) has been established when combined with other treatment modalities. While SDT had recently been used as a conservative treatment for lumbar disc Herniation (LDH), Lumbar Traction combined with Cervical traction as one intervention has not been used before. It was theoretically suggested by (Al-Qudah, M.K) as a modified method named Whole Spinal Decompression Therapy (WSDT), but clinically was not approved yet.

OBJECTIVE: The aim of the presented work is to identify the effectiveness of treatment program of Cupping Massage (CM), WSDT [Positional Sustained Lumbar Traction (PSLT) combined with Mechanical Sustained Cervical Traction (MSCT)] and Core Stabilization Exercise (CSE) on patients with (L4-L5) (L5-S1) Mild bulging disc.

METHODS: In this study, Nine outdoor male athletes patients were randomly chosen from Al-Karak Governmental Hospital to apply Supine Soft Full Back, Shoulders and Neck CM for (10) minutes, WSDT for (20) minutes and Core Stabilization exercise by (18) sessions for (6) Weeks. The results were analyzed using the SPSS system.

RESULTS: indicates that there was statistically significant difference between the pre and post measurements in favor of the post measurements in terms of Trunk Forward & Backward range of motion, Lumbar Forward & Backward range of motion, Pain, Daily Activity.

CONCLUSIONS: The present study demonstrated that the use of the treatment program has a positive effect on patients with Mild bulging disc.

Keywords: Lumbar Bulging Disc, Lumbar-Cervical Traction, Whole Spinal Decompression Therapy, Cupping Massage, Core Stabilization exercise, Range of Motion, Pain Score, Daily Ability.

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INTRODUCTION:

Low Back Pain is a common musculoskeletal problem with a lifetime prevalence of 90% in the general population [29]. Specific Low back pain (SLBP) is often work-related and is commonly observed among world population. SLBP occurs mostly due to Lumbar Disc Herniation [13]. Those disorders are mainly associated with heavy physical loads on lower back during carrying heavy objects, falling down and Road Accidents. Ninety five percent 95% of the herniated lumbar disc occurs at the L4-L5 and L5-S1 spinal levels, especially in 25 to 55 years of age. While for individuals aged above 55 years it is more common above these spinal levels [13].

Previous studies have suggested a U-

shaped curve relationship between physical activity and low back pain, indicating that both low and high levels of physical activity can cause low back pain [16]. Athletes spend more time in sports activities, and they experience higher mechanical loads on their spine. Such musculoskeletal stress can accumulate over years of participation in professional sports from adolescence to adulthood, depending on the type, intensity, frequency, and duration of sports [36]. Many studies have investigated the prevalence of low back pain in athletes [20,34] reported that the global percentage of low back pain has reached 42.2% among youth, and 30%-81% among Universities students.

The treatment of disc herniation is widely varied between surgical and conservative methods. Traditional Wet cupping is widely used in Arabic world, While dry cupping is globally

used as conservative treatments to release pain, disability, and also to improve range of motion. But cupping massage (CM) is more widely used among Athletes [2]. CM also increase lower, upper back and neck temperature in non specific neck and back pain treatment [32,17]. It also could be beneficial as some deep therapeutic massage techniques [2,17]. On the other hand, in the light of global Corona Pandemic restrictions, CM remains more safe than traditional massage, it prevents direct physical contact with patients.

An improved form of traction therapy has recently been used represented as spinal decompression therapy (SDT), which decreases the pressure by delivering nutrients and oxygen to the intervertebral disc and vertically increase intervertebral space and restore disc height. The decompression is created by altering the angle of traction force to target the level of affected disc [22,21].

In the UK and the US, lumbar traction is used by 41% and 77% of outpatient rehabilitation providers respectively [5]. While Various methods of traction had recently been used as a conservative treatment for lumbar disc Herniation (LDH), Lumbar Traction combined with Cervical traction as one intervention has not been used before. It was theoretically suggested by (Al-Qudah, M.K) as a new conservative treatment method, but clinically was not approved yet.

Therapeutic exercise is one of the most common conservative treatments, which mostly include core stabilization exercises (CSE). It can assist the activation of the deep fibers of lumbar Multifidus muscle through low loaded isometric activity [23]. CSE seemed to decrease pain intensity and improve functional ability in specific low back pain (LBP) when added to the routine physical therapy [33]. However, the overall effectiveness remains uncertain [25].

Effectiveness of SDT when combined with other treatment modalities has been suggested [11], but the clinical effectiveness of combined Lumbar traction with Cervical traction remains uncertain, as well as when it combines with CSE. Therefore, the aim of the current study was to assess the efficacy of treatment program of cupping massage, Lumbar traction combined with Cervical traction as one intervention and CSE in lumbar bulging disc rehabilitation.

2. Methodology

2.1. Participants

This study aimed to assess the efficacy of cupping massage, Lumbar traction combined with Cervical traction as one intervention and CSE in lumbar bulging disc rehabilitation. Nine

outdoor male athletes patients (n=9 mean age: 21.33) from Al-Karak Governmental Hospital, since 2nd of October to 14th December 2020 presented with (L4-L5) (L5-S1) Mild bulging disc confirmed by MRI report with radiating symptoms for over three months were included in the study. Subjects who had infection with COVID-19 or had osteoporosis, vertebral fracture, previous back surgeries, history of prolonged use of corticosteroids, artificial disc or other spinal implants, malignancy, cauda equina lesions, in addition to LBP due to other conditions such as sacroiliac joint pathology or muscle tightness were excluded from the study. All the subjects signed a written informed consent form prior to their participation in the study. The study was approved by the ethical committee of Ministry of Health and Health Care, Amman, The Hashemite Kingdom Of Jordan.

2.2. Experimental design

Subjects who fulfilled the criteria were assigned to the study as one experimental group. they received Supine Soft Full Back and Neck CM for (10) minutes, Positional Lumbar Sustained Traction (PLST) Combined with Cervical Mechanical Sustained Traction (CMST) for (20) minutes, Core Stabilization exercise by (18) sessions for (6) Weeks. Outcome measures were assessed before and after the treatment period to measure ROM, pain intensity and daily ability with the scales outlined below.

2.3. Outcome measures

2.3.1. Numerical Rating Scale (NRS)

Pain score was estimated through selecting out of 10, the number that best describes the intensity of pain, where 0 indicates "no pain" and 10 indicates "the worst possible pain".

2.3.2. Daily Ability Scale (DAS)

Daily Ability scale assessed the influence of LBP on daily activities. The scale describes the daily ability degree, where 0 indicates "hard ability for daily living tasks", 1 indicates "moderate ability for daily living tasks" and 2 indicates "normal ability for daily living tasks". Oswestry Disability Index ODI was not used because the subjects completely refused to answer the whole Questioner because of section N.8, due to their bedouins eastern cultural restrictions. Researchers respect their privacy,

and took a general scale that ignores their own sexual life details.

2.3.3. Range Of Motion (ROM)

Range of motion was assessed from standing position. Trunk Forward & Backward range of motion were measured by Medical Goniometer. Lumbar Forward & Backward range of motion were measured by Schober's test, using a regular meter tape.

2.4. Interventions

2.4.1. Cupping Massage (CM)

Simi prone position was used with special pillows for supporting the torso. Sterilization, lubrication was applied before every session. then, soft CM was applied for back, shoulders and neck, for 10 minutes. Disposable silicon cups measuring 3 cm and 6 cm were used to fit the back, shoulders and neck area.

2.4.2. Whole Spinal decompression therapy (HSDT)

HSDT was conducted [Supine Mechanical Sustained Cervical Traction (MSCT) via medical mobile cervical traction devise (Ospine-NTD-500), combined with Supine Positional Sustained Lumbar Traction (PSLT) (Hip Flexion) (HF)], then the hip was manually extra pulled and rotated. The whole procedure amid to execute a nonsurgical spinal decompression. Cervical Decompression force was manually controlled and raised gradually in the terminal part of the treatment. Each subject in the study received approximately 20 minutes of Whole Spinal Decompression Therapy.

The treatment programme included 3 phases:

- Phase 1: The first two weeks, 6 sessions: before the bingeing, pressure during MSCT was raised gradually from 16-20 PSI, with Maximum HF as PSLT.

- Phase 2: The second two weeks, 6 sessions: before the bingeing, pressure during MSCT was raised gradually from 16-21 PSI, with Maximum HF as PSLT.

- Phase 3: The last two weeks, 6 sessions: before the bingeing, pressure during MSCT was raised gradually from 16-22 PSI, with Maximum HF as PSLT.

Forceful physical activities that compress the disc were prevented. CSE was described and conducted at the beginning of the second phase (third week).

2.4.3. Core stabilization exercises (CSE)

CSE program as defined, including activation of Lumbar Multifidus and Transverses Abdominis muscles from crook lying, bridging, and quadruped position as described by Puntumetakul [30], for 10 repetitions with 10 seconds hold in each repetition. Participants were asked to perform the CSE three times daily as a home program in addition to one set during each session under the therapist supervision.

3. Results

3.1. Statistical analysis

The data were analyzed using statistics software SPSS version 22, significant values were set at $p < 0.05$. Wilcoxon Signed Ranks Test was used to know the significance between pre and post intervention.

Nine subjects completed the intervention (mean age: 21.33 ± 1) in the study. Demographic and baseline characteristics of the subjects mentioned in Table 1.

3.2. Numerical Rating Scale

The scores showed a significant change before and after the intervention with difference in Mean Ranks, Based on positive ranks: ($z = -2.719$) where $p = .007$) (showing 5.00 – 0.00). The intervention showed an absolute change. (Table 3).

3.3. Daily Ability Scale (DAS)

The scores showed a significant change before and after the intervention with difference in Mean Ranks, Based on positive ranks: ($z = -2.762$) where $p = .006$) (showing 0.00 – 5.00). The intervention showed an absolute change. (Table 3).

3.4. Range Of Motion (ROM)

The scores of ROM showed significant changes before and after the intervention in term of the following variables: Trunk forward ROM with difference in Mean Ranks, Based on negative ranks: ($z = -2.675$) where $p = .007$) (showing 0.00 – 5.00). Trunk Backward ROM with difference in Mean Ranks, Based on negative ranks: ($z = -2.699$) where $p = .007$) (showing 0.00 – 5.00). Lumbar forward ROM with difference in Mean Ranks, Based on

negative ranks: ($z = -2.666$) where $p=.008$) (showing 0.00 – 5.00) , and Lumbar Backward ROM with difference in Mean Ranks, Based on negative ranks: ($z = -2.670$) where $p=.008$) (showing 0.00 – 5.00). The intervention showed an absolute changes. (Table 3).

4. Discussion

The aim of the study was to evaluate how the treatment program of CM, HSDT and CSE affect pain, daily ability and range of motion in patients with mild lumbar bulging disc.

The results showed that a 6-week of CM, HSDT and CSE significantly reduced pain, increased daily ability and improved range of motion. It was found that all patients who suffer from sciatica, have relieved their symptoms completely, suggesting that treating the herniated disc and reducing the pressure can prevent or relieve secondary problems such as sciatica and LBP. CM could relax superficial muscles, increase lower back temperature and increase pain threshold [2,28,17,15]. On the other hand, CM could allow other next modalities to act effectively. HSDT reduces the intradiscal pressure and vertically increases the intervertebral space and restore disc height allowing nutrients and oxygen supply to the disc [21], this relief of compression can promote regeneration of diseased disc [6], and therefore HSDT may relieve pain secondary to disc hernia and other symptoms more than other SDT modalities due to its dual mechanical effect, it tracts the vertebral column upward and downward at the same time.

In addition, the effect of CSE that provide stability and decrease the risk of subsequent injury through the activation of deep trunk muscles, which is useful in treating the pain, disability and limited range of motion in chronic LBP [27,23,3,4].

The results are consistent with prior studies of Dry Cupping (DC) or Wet Cupping (WC) in the treatment of chronic LBP [31,1], where Cupping reduce pain and disability and increase ROM. Results are also consistent with prior studies of DC and CM in the treatment of nonspecific LBP [2,17]. where DC and CM reduce pain and disability and increase ROM. On the other hand, Results are consistent with prior studies of DC and CM in the treatment of chronic neck pain [32,10] ,where DC and CM reduce pain and disability.

The results are consistent with prior studies of SDT in the treatment of chronic lumbar

disc herniation [14,6,22] where reduction of pain intensity, improvement in activities of daily living and increase ROM were found, in addition to studies of chronic LBP treated by CSE as the pain and functional disability were reduced [33,26,12], and range of motion was increased [4].

Although CSE might be beneficial for patients with chronic LBP, CSE alone might not be sufficient for best improvement in patients with serious physical limitations to functional recovery [35]. It has been recommended that the combination of SDT and other treatment protocols would be useful for patients with discogenic LBP [22,8].

Hong & Wu & Wang (2006) [17] studied the effect of CM on 70 patients with nonspecific LBP, Significant improvement on the visual analogue scale and daily ability were found. Another study included 50 patients with chronic neck pain, Significant improvement on the visual analogue scale and disability were found due to the efficacy of CM [32], which suggests that pain relief can be related to stimulation of blood circulation, which decrease muscle tone, and that may improve ROM, and rise pain threshold and increase superficial tissue temperature, also that may stimulate Endorphin secretion, known by the natural pain killers mechanism.

Asiri, et al. (2020) [7] reported that SDT via specific three-dimensional lumbar traction was associated with pain relief and disability reduction. Lee, et al. (2019) [19] also reported that SDT via lumbar lordotic curve-controlled traction (L-LCCT) or traditional traction was associated with pain relief and disability reduction. Bilgilişoy, et al, (2018) [9] studied 118 patients with lumbar radiculopathy due to Lumbar disc herniation, results showed that the use of traditional traction from different positions is associated with reduction of pain and disability, and increase of lumbar ROM, which suggests that pain relief can be related to the restoration of disc height for chronic discogenic LBP.

Choi et al. (2015) [11] compared the effect of SDT and general traction therapy on pain, functional capability, and straight leg raising of 30 patients with herniated lumbar disc who received three sessions per week for four weeks. Both groups have shown significant improvement and no statistically significant differences were found, which could be related to the same basic principles of both modalities. As stated by the author, combining more treatments or increasing the duration might give different findings. In the present study, the duration of

treatment was longer in addition to the CSE program.

Another study included 35 patients with lumbosacral disc herniation reported a significant reduction of pain on the visual analogue scale in the group who received SDT via DRX9000 compared to intermittent mechanical traction. The author concluded that for patients with discogenic LBP, SDT can be used as an effective treatment without serious complications [18].

The results are consistent with prior studies of CSE in the treatment of chronic lumbar disc herniation. Owies & Mujalli, (2018) [27] reported that CSE was associated with pain relief and disability reduction, and improvement in ROM. Al-Qudah & Bani Hani, (2013) [3] found that CSE was associated with pain relief and improvement in daily ability degree and ROM. Also a prior study of CSE in the treatment of chronic LBP found that CSE was associated with pain relief and improvement in daily ability degree and ROM [4].

The previous studies have examined the CM and SDT with or without CSE separately, not as a combined treatment. The findings of the current study show the positive effects of the combined treatment of CM, HSDT and CSE in patients with lumbar bulging disc. There were few limitations of the present study, including that long-term effects of the treatment were not obtained due to the limitation of time.

5. Conclusions

A combination of CM and modified SDT with CSE has proven to be significant to reduce pain and disability, increase ROM in subjects with Lumbar bulging Disc. The researchers recommend MRI for future studies, where it could be used as a post intervention assessment tool, which will warrant robust measurement of the mechanical displacement of the disc. Also, Oswestry Disability Index ODI was not used because of bedouins eastern cultural restrictions, so we recommend to ignore the Section N.8 when conducting trails in such communities.

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Table No. (1) Descriptive Statistics : Demographic and baseline characteristics of the subjects

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Age	9	20.00	23.00	21.3333	1.00000	.107	.717	-.643	1.400
Height	9	1.70	1.80	1.7656	.02920	-1.447	.717	2.936	1.400
Weight	9	70.00	80.00	73.4444	2.92024	1.447	.717	2.936	1.400
BMI	9	21.85	26.12	23.5820	1.29759	.678	.717	.698	1.400
Trunk forward ROM	9	30.00	41.00	34.2222	3.80058	.729	.717	-.314	1.400
Trunk backward ROM	9	10.00	15.00	12.5556	1.66667	-.124	.717	-1.137	1.400
Lumbar forward ROM	9	.30	2.70	2.0000	.76158	-1.559	.717	2.496	1.400
Lumbar backward ROM	9	.50	1.00	.7778	.17159	-.134	.717	-.825	1.400
Pain Score	9	2.00	3.00	2.6667	.50000	-.857	.717	-1.714	1.400
Daily Activity Score	9	.00	1.00	.5556	.52705	-.271	.717	-2.571	1.400
Valid N (listwise)	9								

Paired Samples Statistics						
			Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Trunk forward ROM (Degree)	Pre	34.2222	9	3.80058	1.26686
		post	86.4444	9	1.58990	.52997
Pair 2	Trunk backward ROM (Degree)	Pre	12.5556	9	1.66667	.55556
		post	29.1111	9	1.05409	.35136
Pair 3	Lumbar forward ROM (cm)	Pre	2.0000	9	.76158	.25386
		post	6.3556	9	.43621	.14540
Pair 4	Lumbar backward ROM (cm)	Pre	.7778	9	.17159	.05720
		post	3.4556	9	.46667	.15556
Pair 5	Pain Score (Degree)	Pre	2.6667	9	.50000	.16667
		post	.3333	9	.50000	.16667
Pair 6	Daily Activity Score (Degree)	Pre	.5556	9	.52705	.17568
		post	1.8889	9	.33333	.11111

Table No. (2) Outcome variables between pre and post measurements for the subjects

Table No. (3) Wilcoxon Signed Ranks Test : Comparison of outcome variables between pre and post measurements for the subjects

Ranks						
		N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Pre-post Trunk forward ROM (Degree)	Negative Ranks	0	.00	.00	-2.675 ^b	*.007
	Positive Ranks	9	5.00	45.00		
	Ties	0				
	Total	9				

Pre-post Trunk backward ROM (Degree)	Negative Ranks	0	.00	.00	-2.699 ^b	*.007
	Positive Ranks	9	5.00	45.00		
	Ties	0				
	Total	9				
Pre-post Lumbar forward ROM (cm)	Negative Ranks	0	.00	.00	-2.666 ^b	*.008
	Positive Ranks	9	5.00	45.00		
	Ties	0				
	Total	9				
Pre-post Lumbar backward ROM (cm)	Negative Ranks	0	.00	.00	-2.670 ^b	*.008
	Positive Ranks	9	5.00	45.00		
	Ties	0				
	Total	9				
Pre-post Pain Score (Degree)	Negative Ranks	9	5.00	45.00	-2.719 ^c	*.007
	Positive Ranks	0	.00	.00		
	Ties	0				
	Total	9				
Pre-post Daily Activity Score (Degree)	Negative Ranks	0	.00	.00	-2.762 ^b	*.006
	Positive Ranks	9	5.00	45.00		
	Ties	0				
	Total	9				

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

c. Based on positive ranks.