

## "The Effect of Sucking dry dates on walking/running on treadmill of some physiological variables of Kuwaiti Jiu-Jitsu players"

"تأثير مص التمر خلال المشي أو الجري على جهاز السير المتحرك لبعض المتغيرات الفسيولوجية للاعبين الجوجيتسو في دولة الكويت"

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### Abstract:

**Introduction:** Athletes try to enhance their physical performance in a variety of ways and nutrition is a key factor in optimizing sustained activity.

**Purpose:** The aim of this study was to investigate the effect of continuous sucking of dry dates on the walking/running on some physiological variables of Jiu-Jitsu players throughout a workout. **Methods:** Nine players of the Sidekick Academy Jiu-Jitsu club in Kuwait took part in this study. The age and physical characteristics of the subjects were: age ( $25 \pm 4$  years); height ( $173 \pm 6$  cm); body mass ( $86 \pm 26$  kg); percent body fat ( $20.5 \pm 9$  %); Body Mass Index (BMI) ( $28.4 \pm 7.3$ ); and  $Vo_2$  max ( $47.0 \pm 8.5$  ml/kg/min). This is a crossover study design where all subjects completed three experimental trials in a random order separated by 7–10 days. These trials consisted of the (control test) nothing was given on this test, (sucking dry dates 10 g. every 10 minutes), and (placebo test) of chewing on a piece of sugar free gum until the flavor is dissolved every 10 minutes. After an overnight fast (10-12h) the subjects ran on a treadmill at 75-85% of their Heart Rate max (HR max) to exhaustion. **Results:** There was a statistically significant difference in total distance (km) in One Way repeated measures ANOVA where the value of (F) is ( $F(2,16) = 5.66, P = 0.01, \eta_p^2 = 0.414$ ) and the (mean  $\pm$  SD) for the dates test was ( $13.00 \pm 2.07$  km), compared to control test ( $10.57 \pm 1.28$  km), and the placebo test ( $11.17 \pm 2.76$  km). There were no significant differences found in the physiological variables of this study. **Conclusions:** Based on the outcome of this study, we have found that sucking on dry dates continually during exercise can improve the overall total distance run of the subjects. Further studies are needed to understand the effects of dry dates consumption on overall performance.

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## الملخص:

**المقدمة:** دأب الرياضيون لإيجاد الوسائل والطرق المختلفة لتحسين أدائهم البدني، والمهاري بعدة طرق، وتعتبر التغذية أهم وأكثر الطرق المستخدمة لتحسين الأداء الرياضي. **الهدف من الدراسة:** تهدف هذه الدراسة لمعرفة مدى تأثير المص التمر على بعض المتغيرات الفسيولوجية للاعبين الجوجيتسو خلال المجهود البدني. **إجراءات الدراسة:** شارك في هذه الدراسة تسعة لاعبين من أكاديمية سايد كك لرياضة الجوجيتسو بالكويت. وكان (المتوسط  $\pm$  والانحراف المعياري) للمتغيرات الفسيولوجية لأفراد العينة قيد الدراسة على النحو التالي: السن ( $25 \pm 4$  سنة)؛ الطول ( $173 \pm 6$  سم)؛ وزن الجسم ( $86 \pm 26$  كجم)؛ نسبة الدهون في الجسم ( $20.5 \pm 9\%$ ) مؤشر وزن كتلة الجسم (BMI) ( $28.4 \pm 7.3$ ) والحد الأقصى لمعدل إستهلاك الإكسجين ( $Vo2\ max$ ) ( $47 \pm 8.5$  ملل/كجم/دق). ومن الإجراءات التي تم اتباعها في هذه دراسة أن يكمل أفراد العينة ثلاث تجارب تجريبية وبترتيب عشوائي والمدة بين كل تجربة وتجربة أخرى كانت من 7-10 أيام. وكانت هذه التجارب عبارة عن التجربة الأولى: (اختبار التحكم) حيث لم يتناول أفراد العينة أي شيء في هذا الاختبار ويتم المشي أو الجري على السير المتحرك حتى الوصول لمرحلة الإنهاك، والتجربة الثانية: (إختبار مص التمر) حيث يتم امتصاص التمر زنة 10 جم بعد كل 10 دقائق من المجهود حتى الدقيقة 80 من المجهود وبعدها لا يتم إعطاء افراد العينة اي شئى حتى الوصول لمرحلة الإنهاك من خلال المشي أو الجري على السير المتحرك، و الإختبار الثالث: (المادة الوهمية) حيث يتم مضغ قطعة علكة الخالية من السكر حتى تذوب النكهة كل 10 دقائق حتى الدقيقة 80 من الإختبار ويتم المشي أو الجري على السير المتحرك حتى الوصول لمرحلة الإنهاك. ومن إجراءات هذه الدراسة أن يكون المشارك في حالة صيام من (10-12 ساعة) قبل أداء أي من الإختبارات الثلاثة، وأن يتم المشي أو الجري على السير المتحرك بما يعادل من 75-85% من الحد الأقصى لمعدل ضربات القلب لكل فرد من أفراد العينة حتى الوصول لحالة الإنهاك. **النتائج:** من أهم توصلت إليه نتائج هذه الدراسة أن هناك فرق ذات دلالة إحصائية في إجمالي المسافة المقطوعة (كم) في إختبار تحليل التباين الإحادي للقياسات المتكررة (One Way ANOVA repeated measures) حيث كانت قيمة (F) هي: ( $F(2,16) = 5.66, P = 0.01, \eta_p^2 = 0.414$ ) و (التوسط  $\pm$  الانحراف المعياري) لإختبار مص التمر كان ( $13.00 \pm 2.07$  كم) ، مقارنة باختبار التحكم ( $10.57 \pm 1.28$  كم) ، واختبار المادة الوهمية ( $11.17 \pm 2.76$  كم). ولم تكن هناك فروق ذات دلالة إحصائية للمتغيرات الفسيولوجية لهذه الدراسة. **الاستنتاجات:** بناءً على نتيجة هذه الدراسة، وجد أن مص التمر خلال المجهود البدني يمكن أن يؤدي إلي زيادة المسافة المقطوعة وزيادة والجهود المبذول خلال ممارسة الأنشطة الرياضية. كما تبين أن هناك حاجة لمزيد من الدراسات لفهم وإدراك تأثير تناول التمر على المجهود البدني وتحسين الأداء العام.

## Key Words:

Sucking of dry dates, Jiu–Jitsu players, performance, physiological variables.

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## **Introduction:**

Dry dates have a special status for Arabs and Muslims as it is one of the most important fruits of the desert. The significance of the dates lies in its place in the religious teachings of Islam. Where the dates mentioned in the Holy Qur'an in chapter 19 verse 25, and it is the first food to break the fast after a day of fasting in the Month of Ramadan following the Prophet's teaching (*peace be upon him*). Dry dates is a good source of essential vitamins such as B<sub>6</sub>, K, and A, as well as many minerals, including Potassium, Manganese, Magnesium, in addition to the fiber and antioxidants. However, dry dates is high in calories in form of carbohydrates; (Fructose, Glucose, and Sucrose). (3, 20, 21) The percentage of carbohydrates in dates ranges from 70-80% of the dates components. These carbohydrates are characterized by rapid digestion, absorption and transfer into the blood, each 100 grams of dates contains 67-83 grams of carbohydrates, which produce 274 calories. (1,3,14)

Carbohydrates are one of the most important sources of energy for the body during physical activity and sport, which provide the glucose, and glycogen that is needed for energy production. In case of low glycogen storage as a result of physical activity some physiological changes occur. The symptoms of these changes are low blood sugar, known as hypoglycemia, as well as a reduction in glycogen in the working muscles which is call Peripheral fatigue, and the reduction of work out rate. (7,10)

There are many studies that have demonstrated that eating carbohydrates before or during the workout has a positive impact on performance for athletes, and these studies have shown that consuming

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carbohydrates has a positive effect by increasing the duration of cycling, as well as the impact on sprinting, and intermittent training. The positive effect of carbohydrates consumption was also evidenced in team sports performance such as racket games. (5,9,16,18,19)

There is a fierce race among athletes in different fields of sports to find various ways to improve performance and enhance excellence, or to beat their opponent, and to break a record. These tools differ between what is lawful and what is not permitted, and against the regulations governing different sports. Some of the lawful ways to enhance athletic performance, such as changing or increasing training loads and altering athlete diet and training conditions. While in the other hand doping, or taking various drugs and hormones is considered unlawful, and against the regulations of (fair play).

Currell et al. (2008) found that drinking glucose and fructose mixed solution increased bike riding time by 8% compare to drinking glucose syrup only, and by 19% from the control group, which consumed water only. (8)

Foskett et al. (2008) studied the effect of consuming a carbohydrate - electrolyte syrup solution on the level of glycogen in the muscles during intermittent running and compared it to a diet rich in carbohydrates. They found that the intake of the carbohydrate solution increased the durability of the performance in the persons participating in this experiment by increasing the running time and the distance covered, the explanation may be due to the increase in the concentration of glycogen in the working muscles. (11)

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Research and studies are conducted continuously to find available and permissible means that may improve or enhance the performance of athletes that has no side effects on the health of the athletes or hamper the performance of the players or go against fair play regulation. One of the most important field of studies are nutrition manipulation and diet alteration of the athlete and its impact on performance, and one of the most important nutritional elements, which is researched extensively in the field of sports is carbohydrate. Carbohydrate is one of the most important sources of energy during the physical activities, where each gram of carbohydrate yield 4 calories. (2,5,9,13) The purpose of this study was to investigate the effect of continuous sucking of a dry date on the performance and some physiological variables throughout a workout.

### **Methods:**

### **Subjects:**

Nine Jiu–Jitsu players of the Sidekick Academy martial arts club in Kuwait (Shuwaikh Industrial) took part in this study where the physical characteristics (mean  $\pm$  SD) were (age:  $25.4 \pm 3.8$  y; height:  $173.1 \pm 6.1$  cm; weight:  $86.1 \pm 25.8$  kg; percent of body fat:  $20.5 \pm 8.9$  %; Body Mass Index (BMI):  $28.4 \pm 7.3$ ;  $VO_{2\max}$ :  $47.0 \pm 8.5$  ml.  $kg^{-1}$  .min $^{-1}$ ). All the subjects taking part in this study received medical clearance from their physician before they took part in this study, as well as they had a pre-exercise health evaluation. They completed health and training history questionnaire and read and signed the written informed consents forms. Procedures and protocol were approved by the Research Committee at the Public Authority for Applied Education & Training – Kuwait (PAAET), and the Department of the Physical Education and Sport at the College of Basic Education.

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## **Procedures & Protocol:**

All subjects completed three experimental trials, the first visit was to collect a base line data only, and the three trials afterword was done in a counter – balance design, each of these trials was separated by 7 – 10 days.

(25) All trials have been done in the same laboratory and under the same environmental conditions, and at the same time for every subject. (4,6,18,26)

The subjects instructed to refrain from strenuous physical activities, and asked to abstain from caffeine, tobacco, consumption for 24 hours before each trial. (26) They should also had repeated their recorded diet for 24 hours, as close as possible before the first visit for every trial, (18) they should have been fasting for (> 10 hours) before every trial. (4,5) All subjects kept an exercise diary for 48 hours before each test for repetition before each test. (6)

## **Experimental Design:**

In the study at first visit, every subject was familiarized with the test procedures, protocol, purpose and the benefit of this study before the test. The researchers clarified any questions or inquiry by the subjects about data gathering before beginning any procedures. Each subject signed a subject consent form. During the first visit, date, time, and body temperature were recorded. Age was recorded to the nearest one year, height was measured to the nearest 0.5 cm, and body weight was measured to the nearest 0.5 kg. Body composition was recorded using (Bodystat 1500, Isle of Man, British Isles), according to manufacturer instructions specified in the user's manual. The Body Composition Analyzer was used to determine the percentage body fat; it is based on the bioimpedance method and is designed to give a level of accuracy that is comparable with hydrostatic weighing. Sensor pads were

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placed on the subject's right wrist and ankle. A sensor cable attaches to the sensor pads and plugs into the Analyzer. The Analyzer generates a harmless low-level electrical current, which flows through the body. The bioimpedance analyzer derives total body water from the impedance. Total body water is used to estimate fat mass and fat free mass assuming a normal (fixed) hydration status of the body.

On each visits upon arrival of the subjects Polar short – range radio telemetry heart rate monitor was fitted to subjects (Polar Vantage NV, Polar Electro, Oy, Finland) then the subjects was required to sit quietly in a quiet place for 15 min, after 15 min, the resting value for the fallowing measurements was taken resting heart rate(RHR), resting blood glucose (RBG), using (Accu –Chek Performa, Roche Diagnostics GmbH, Mannheim, Germany), and the resting blood lactate (RBL) using (Accutrend Plus, Roche Diagnostics GmbH, Mannheim, Germany).

Before performing the trials, each subject undertook a continuous incremental test to exhaustion on treadmill to determine the maximum oxygen consumption ( $VO_{2\text{ max}}$ ); T 150 with controller unit: (*Cosmed, Rom, Italy*), Quark B2: (Breath by breath pulmonary gas exchange measuring device Gas analysis:(*Cosmed, Rom, Italy*), was used to measure expired-air. ECG monitored and recorded: (*Cosmed, Rom, Italy*). Borg 20 point scale of perceived exertion (RPE) was used to determine the work-out intensity every 10 min. through the trails. <sup>(6)</sup>

Before every test the subjects were asked if they like to use the bathroom to empty their bladder before any testing begins, then subject was allowed

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15 min. warm – up which include jogging at varies speeds, as well as many types of different stretching, at the end of the 15 min. warm – up section, the test took place.

1. Control test for which the collection of base line data was gathered during this test the subjects did not received any treatments of any kind.
2. Sucking dry dates (10 g) test of every (10 min) until the 80<sup>th</sup> minutes.
3. A placebo test of chewing on a piece of sugar free gum until the flavor is dissolved every (10 min.) until the 80<sup>th</sup> minutes.

This was a crossover design where all subjects completed three experimental trials in a random order after an overnight fast of (10-12h) the subjects ran on treadmill at 75- 85% of the Heart Rate max (HR max) to exhaustion all trials separated by 7–10 days each. These tests were control (nothing was given), sucking dry dates (10 g) test of every (10 min) until the 80<sup>th</sup> minute, and a placebo test of chewing on a piece of sugar free gum until the flavor is dissolved every (10 minutes.) until the 80<sup>th</sup> minutes.

Throughout the trials bottled water (0.800 ml) was available for subjects throughout the work-out, and if the subject needed more water another bottle was provided, to ensure adequate hydration during the entire experiment, the total amount of water consumed was recorded. (11,23) Control panel was completely covered throughout all the trials so the subjects could not compare his performance from one trial to another regarding a distance or time of the work-out. All these trials were conducted in the same laboratory and under the same environmental condition of temperature (22° C).

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### **Statistical Analysis:**

All data were analyzed using SPSS for windows version 22.0 (SPSS, Inc., Chicago, IL. USA). A one – way ANOVA with repeated measure, as well as t-test was used to analyze the overall differences in the physiological responses and the performance of the subjects to the trials. Significance differences will be set at the ( $P \leq 0.05$ ) level of confidence, results of the descriptive statistics were presented as a mean  $\pm$  standard deviation and standard.

### **Results:**

#### **The physiological variables:**

**Table (1): The physiological variables (mean  $\pm$  SD) of the tree trials (N = 9)**

<b>Variables</b>	<b>Test</b>	<b>Control</b>	<b>Sucking</b>	<b>Placebo</b>
<b>Resting Heart Rate (RHR)</b>		<b>(68.1 <math>\pm</math> 9.71 b.pm)</b>	<b>(70.2 <math>\pm</math> 8.51 b.pm)</b>	<b>(68.8 <math>\pm</math> 10.12 b.pm)</b>
<b>Post-test HR (PHR)</b>		<b>(140.0 <math>\pm</math> 11.99 b.pm)</b>	<b>(140.6 <math>\pm</math> 13.16 b.pm)</b>	<b>(140.2 <math>\pm</math> 12.08 b.pm)</b>
<b>Avg. HR</b>		<b>(137.8 <math>\pm</math> 8.29 b.pm)</b>	<b>(135.5 <math>\pm</math> 10.00 b.pm)</b>	<b>(134.6 <math>\pm</math> 10.30 b.pm)</b>
<b>Body Temperature</b>		<b>(38.1 <math>\pm</math> 0.26 °C)</b>	<b>(38.2 <math>\pm</math> 0.28 °C)</b>	<b>(38.1 <math>\pm</math> 0.30 °C)</b>
<b>Blood Glucose</b>		<b>(5.03 <math>\pm</math> 0.36 mmol/L)</b>	<b>(5.36 <math>\pm</math> 0.37 mmol/L)</b>	<b>(5.14 <math>\pm</math> 0.41 mmol/L)</b>
<b>Blood Lactate</b>		<b>(4.79 <math>\pm</math> 0.62 mmol/L)</b>	<b>(5.17 <math>\pm</math> 0.90 mmol/L)</b>	<b>(4.79 <math>\pm</math> 0.78 mmol/L)</b>
<b>Perceived Exertion (RPE)</b>		<b>(15.44 <math>\pm</math> 2.30)</b>	<b>(16.11 <math>\pm</math> 1.70)</b>	<b>(15.78 <math>\pm</math> 2.59)</b>

As it shows in table (1) there were no statistically significant differences found in all the physiological variables in this study in one-way repeated measures ANOVA test at ( $P \leq 0.05$ ) level of confidence.

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### The total distance:

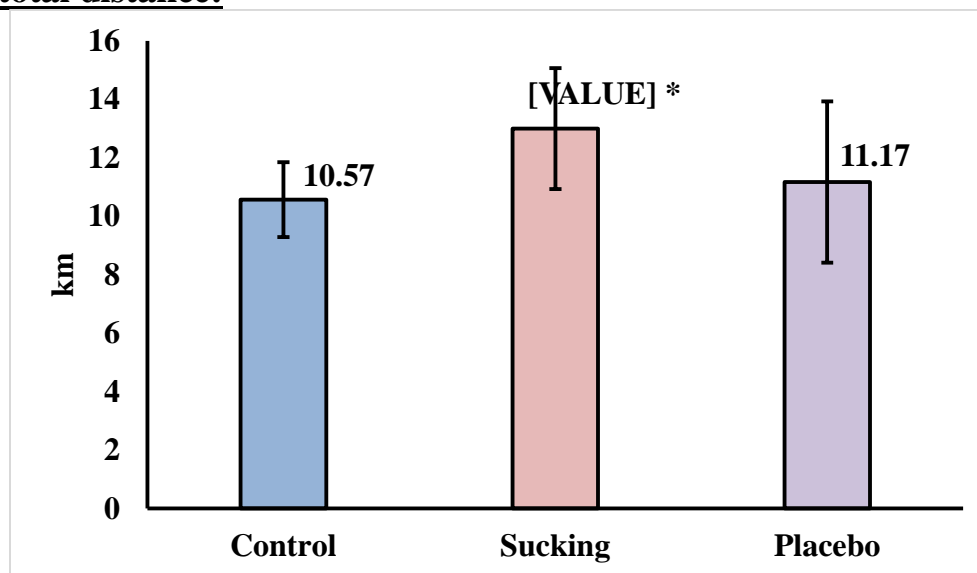


Figure 1 – Total distance (mean  $\pm$  SD) in km

\* A significance difference of the total distance in (km) for the sucking dry date.

There was a significance difference of the total distance in (km) test in the one-way repeated measures ANOVA test the value of (F) is (F (2,16) = 5.66, P = 0.01,  $\eta_p^2 = 0.41$ ). As it shows in figure 1. Bonferroni post hoc test showed that sucking dry dates significantly increased the total distance run test were the (mean  $\pm$  SD) for the sucking dry dates was (13.00  $\pm$  2.07 km), compared to the control test (10.57  $\pm$  1.28 km), and the placebo test (11.17  $\pm$  2.76 km).

### The total test time:

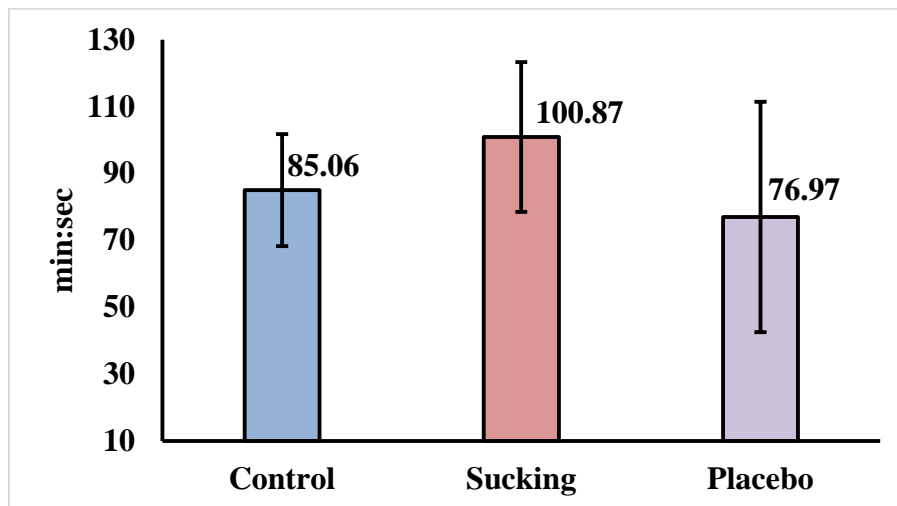


Figure 2 – Total time (mean ± SD) in min:sec

In figure 2 the total time for the work-out the one-way repeated measures ANOVA showed that there was no significant difference in the total time of the three tests where the F value was ( $F(2,16) = 2.19, P = 0.08, \eta_p^2 = 0.28$ ).

There was no significant difference found in three tests for water consumption were (F) value was ( $F(2,16) = 0.76, P = 0.49, \eta_p^2 = 0.88$ ).

### Water consumption:

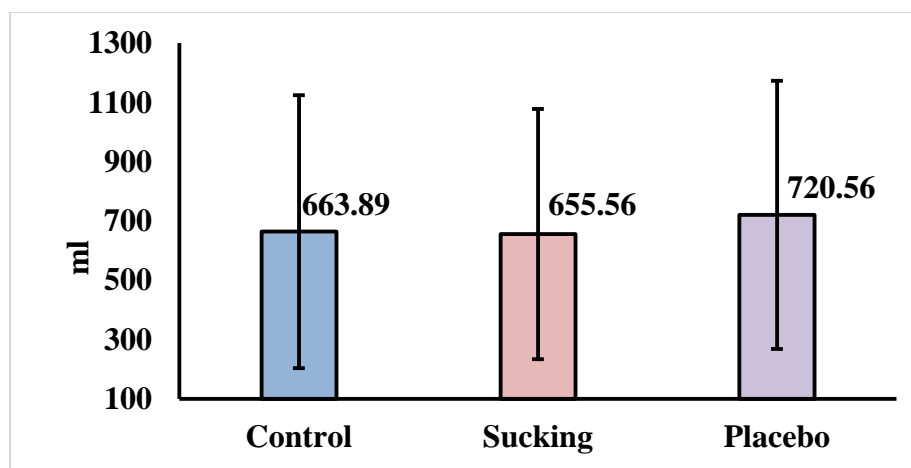


Figure 3 – Water consumption (mean ± SD) in ml

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As it shows in figure 3, there were no significant differences found in water consumption in one-way repeated measures ANOVA test between the three test the (F) value were (F (2,16) = 0.76, P = 0.49,  $\eta_p^2 = 0.88$ ).

### **Discussion:**

The main finding of this study that the performance of the subjects was enhanced in regard to the total distance by 18.5% for the sucking test compared to the control test and by 13.8% compared to the placebo test, and this increase in performance is consistent with other published studies.

(12,17,22,24) As well as, this study shows that there, is no adverse effects on any of the physiological variables in this study, this finding is corresponds with other studies that there is no fear of in regard to carbohydrate feeding of athletes or what known as the rebound or reactive hypoglycaemia; rapid glycogenolysis and a reduction lipolysis and fat oxidation during exercise. (15)

The results of the one-way repeated measures ANOVA showed that there was a significant difference of the total distance in (km) test were the value of (F) is (F (2,16) = 5.66, P = 0.01,  $\eta_p^2 = 0.41$ ). Bonferroni post hoc test showed that sucking dry dates increases the total distance run test were the (mean  $\pm$  SD) for the sucking dry dates was (13.00  $\pm$  2.07 km), compared to the control test (10.57  $\pm$  1.28 km), and the placebo test (11.17  $\pm$  2.76 km).

These results support the hypothesis that sucking dry dates influences performance for the Jiu-Jitsu players. When comparing the three-test using the (t-test) with paired samples test we found that there is a significant difference between control test and the sucking test were the t value was (t (8) = 4.49, p < 0.02).

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**Conclusion:**

In conclusion, and Based on the outcome of this study, we have found that sucking on dry dates continually during exercise can improve the overall performance of the subjects; (total distant). And has no effects on physiological factors, farther studies are needed to understand the effect of dry dates consumption on physiological and performance of the athletes.

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