

Sexual intercourse before exercise has a detrimental effect on lower extremity muscle strength in men

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ABSTRACT

Introduction The question of whether sexual intercourse can harm athletic performance is a long-debated topic since first sport competitions were invented. Therefore, due to the lack of solid evidence, we aimed to evaluate the effects of sexual intercourse on muscle training performance.

Materials and methods Physically and sexually active, 50 men (age=29.3±1.14 years) were enrolled in the study. Participants completed three weight training sessions and all sessions were at the same time of the day. The maximum weight was adjusted in the first session. In the second and third sessions, they performed five repetitions of the squat with their maximum weight for each set with a total of five sets after participating in and abstaining from sexual intercourse the night before, respectively. The duration of sexual intercourse was measured with a stopwatch.

Results The mean duration of sex was measured to be 13.8±3.61 min. Furthermore, the mean lifted weight before sex was calculated to be 109.4±11.41 kg and the mean lifted weight after sex was calculated to be 107±11.05 kg. According to obtained data, sexual intercourse has a significant detrimental effect on maximum weight in squat training (p=0001).

Conclusion Results demonstrate that sexual intercourse within 24 hours before exercise have detrimental effect on lower extremity muscle force, which suggests that restricting sexual activity before a short-term activity may be necessary.

INTRODUCTION

In sport industry, sexual intercourse is infamous about its believed detrimental effects on athletic abilities.^{1,2} Many coaches and trainers advise their athletes to stay away from sex before a competition. Even the famous boxer Muhammad Ali said in one of his interviews that sexual fasting was helping him to become more aggressive and therefore improve his athletic performance.³ Like Muhammad Ali, the vast majority of athletes believe abstaining from sex preserves their strength and prepare them to get the right mental state.^{4,5} Although it is an essential topic for sports and sexual medicine, literature is very limited and confusing. Therefore, some athletes and coaches are not sure of the effect of sex on athletic performance.⁶

Although there are various reports about the effect of sexual activity on athletic performance, none of these studies provide any reliable data but assumptions.^{4,7,8} However, the first reliable report was published by Johnson.⁹ The author evaluated the grip strength on the following day of sexual intercourse

by using a hand grip dynamometer. No significant difference was reported compared with the abstinence. This result was also supported by two relatively more recent studies.^{10,11} Furthermore, three studies were published in last year. The first study was conducted by Valenti *et al*,¹² who evaluated the negative effect of sexual intercourse on lower extremity muscle force 12 healthy young men. In that study, the authors did not report any significant differences in lower extremity muscle force between the abstinence and partaking sexual intercourse occurred a night before. The second and third studies were published by Zavorsky *et al*.^{13,14} The authors evaluated some parameters of physical exercise performance such as; strength, balance, agility, reaction time, anaerobic power and maximal oxygen uptake in 10 young and healthy males. The authors did not report any significant differences in any of the measured parameters between the abstinence and partaking sexual intercourse occurred a night before.^{13,14}

In the light of the available data and due to the lack of a consensus about this topic, we decided to evaluate the potential effects of sexual intercourse resulting in an orgasm on lower extremity strength in physically active men.

MATERIALS AND METHODS

Participants

Fifty physically and sexually active men agreed to participate in the study. The mean age of participants was 29.3±1.14, and the mean body mass index was 22.86±0.76. Participants were semi-professional athletes (including basketball, football, squash and tennis players) who exercised at least 3 days a week in their normal routines. All participants had a steady and active (two to three times a week) sexual relationship with their partners. Participants were non-smokers and drank alcohol occasionally. The demographic data of the participants are presented in table 1. Inclusion criteria were determined to be the absence of knee injury history and absence of any medications or supplements that might enhance physical performance. Men with chronic diseases or knee injuries were excluded. Those with irregular sexual partners and irregular strength training routines were also excluded. A health history questionnaire was completed by all participants.

Study design

Participants completed three sessions, 7 days apart (figure 1). All sessions were conducted at the same time of day. They avoided excessive



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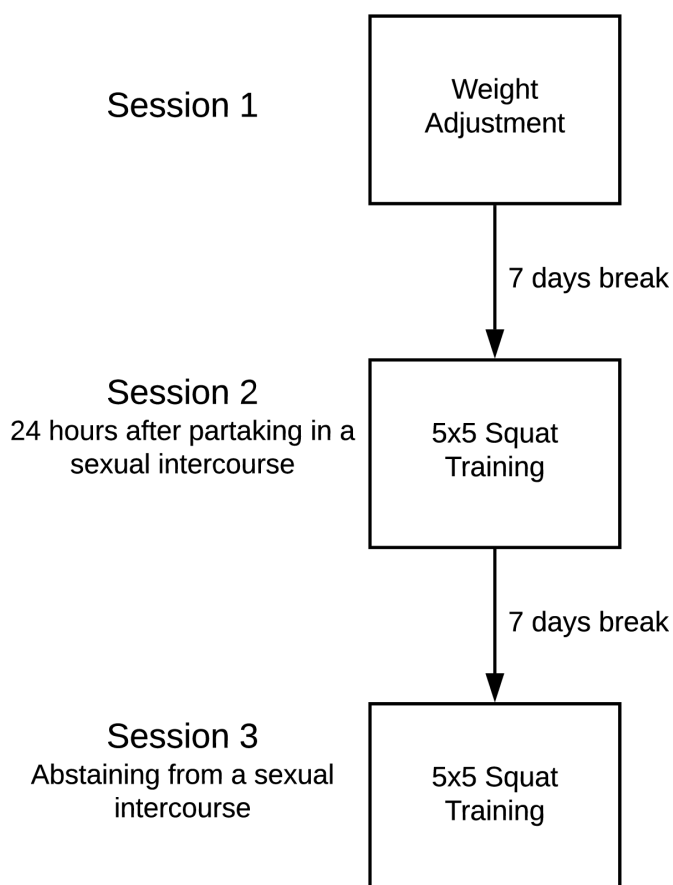
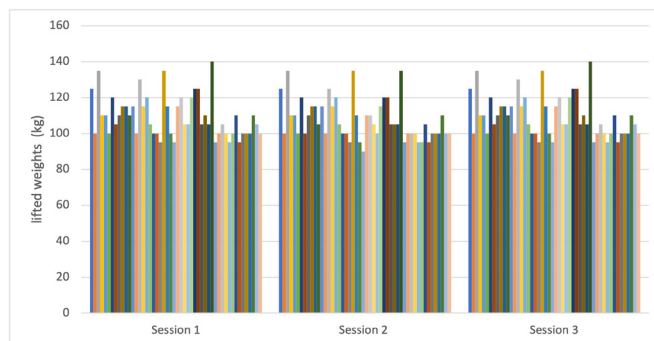
Table 1 Patient demographic characteristics (n=50)

Parameter	Mean±SD
Age (year)	29.3±1.14
Height (cm)	181.3±4.31
Weight (kg)	75.3±5.66
BMI (kg/m ²)	22.86±0.76
Duration of sexual intercourse (minutes)	13.8±3.61
Max weight (kg) (before sex)*	109.4±11.41
Max weight (kg) (after sex)†	107±11.05

*Maximum lifted weight in kilograms during squat exercise without sexual intercourse.
†Maximum lifted weight in kilograms during squat exercise 24 hours after sexual intercourse.
BMI, body mass index.

physical activity and alcohol for 24 hours before the sessions. They maintained their regular diet, which mainly consisted of high-protein foods and carbohydrates. Because the diet of the participants was similar, we decided to not change their diet. All participants stated that they slept at least 8 hours before the sessions.

Participants were instructed in a basic definition of sexual intercourse. They were told that sexual intercourse should last 3–20 min. Participants were given a stopwatch to measure the duration of their sexual intercourse. All participants achieved orgasm and met the criteria of the study. Participants were not allowed to have more than one sexual encounter in the 24 hours before a session. Intercourse had to be male active;

**Figure 1** The diagram of the working flow.**Figure 2** The graph of the weights lifted by each subject in the first, second and third sessions. Each column represents the lifted weight of an individual.

therefore, only missionary position was allowed, which was verified through surveys as well as verbal confirmation.

Participants were asked to perform squats to measure their lower extremity strength. This activity was chosen because the squat is one of the multiple joint movements performed in a closed kinetic chain.¹⁵ Participants performed five sets of five repetitions in an Olympic power rack (Technogym S.P.A., Via Calcinaro, 2861 47521 Cesena-Italy). There was a 1 min recovery gap between each set. The maximum weight was adjusted in the first session. In the second and third sessions, participants performed five repetitions of squats at their maximum weight for a total of five sets after participating in or abstaining from sexual intercourse the night before (figure 2). The participants were allowed to modify the load if they felt it was more than they could handle. We then calculated the mean weight they lifted.

Statistical analysis

Data were analysed using software (SPSS, V.23.0; IBM). The Kolmogorov-Smirnov normality test was performed to determine the distribution. Afterwards, the paired sample t-test was used to compare the groups, and the results were reported as the mean and the ±SD. The statistical significance was set at $p < 0.05$. In addition, a power analysis was conducted using G-Power¹⁶ with the power $(1 - \beta)$ set at 0.95 and $\alpha = 0.05$ two tailed to determine the statistical power. The minimum sample size was determined to be 42 individuals with the effect size of 0.5.

RESULTS

The mean duration of sex was 13.8 ± 3.61 min. Intercourse lasted no longer than 19 min and no less than 5 min. All participants fulfilled the requirement to engage in sex in the 24 hours before the second session. The following week all participants abstain from sex in the 24 hours before the last session.

The mean lifted weight before sex was 109.4 ± 11.41 kg; the mean lifted weight after sex was 107 ± 11.05 kg. The results revealed a statistically significant effect of sex on maximum weight in squat training ($p = 0.001$). We also evaluated the correlation between the length of sexual intercourse and the lifted weight. We conducted a Spearman's multivariate analysis and found that the length of sexual intercourse and the lifted weight were negatively correlated. However, this negative correlation is not statistically significant ($r = -0.131$, $p = 0.366$).

DISCUSSION

In our study, we aimed to evaluate the effects of sexual intercourse on lower extremity strength in physically active men. The results revealed that having sexual intercourse within 24 hours of a physical performance had a detrimental effect on lower extremity muscle force. Our findings suggest that abstention from sexual activity before an athletic competition might improve athletic performance. However, as this topic has been long debated, the results should be discussed in detail.

Sexual intercourse might affect not only physical conditions but also physiological states. In the physiological aspect, sexual intercourse activates both the parasympathetic and sympathetic nervous systems, as physical activities do. According to some animal studies,^{17–19} which focused on orgasm and its effects, the release of dopamine and serotonin provides relaxation immediately after orgasm. However, shortly after the orgasm, neurotransmitter levels tend to return their baseline values. This relaxation phase is called the refractory period, and it continues more or less thirty minutes.²⁰ Therefore, the refractory period that occurred after sexual intercourse cannot affect physical activity the day after.

Another thesis is that sexual activity may decrease plasma testosterone, which is directly associated with strength and muscle mass.^{21,22} This effect has been evaluated by many authors. Previously, it was believed that sexual intercourse was caused to a decrease in testosterone levels.⁵ However, in one particular study, it was reported that primates' plasma testosterone levels were the same before and after ejaculation.¹⁹ Furthermore, plasma testosterone levels may increase in both women and men after sex and may decrease if they abstained long enough.²³ However, according to a recent study; anabolic hormones, such as testosterone, have little effects on the muscle mass and the strength.²⁴ This study suggests that plasma testosterone levels may not have any significant effects of the muscle's force generating ability. Rather than hormonal changes, the muscle strength relies mostly on phosphocreatine, type of muscle fibre and neuromuscular attributes.²⁵

Some studies have evaluated the relationship between sexual activity and athletic performance based on laboratory-graded exercise tests.^{10,11} These studies did not find any detrimental effect of sex on athletic performance. Moreover, cross-sectional data in marathon runners suggested that partaking sexual intercourse in 48 hours was not harmful to their running performance.²⁶ Furthermore, Johnson⁹ could not show any detrimental effect on grip strength due to sexual intercourse in former men athletes.

In a recent study, Valenti *et al*¹² evaluated the lower extremity muscle force by measuring knee extension and flexion torque after men engaged in or abstained from sexual intercourse within the previous twelve hours. The participant performed knee extension and knee flexion exercise. After the peak and average knee extension and knee flexion torque was determined, knee extension and knee flexion torque found similar before and after sexual intercourse. Another studies, published by Zavorsky *et al*,^{13,14} which evaluated strength, balance, agility, reaction time, anaerobic power and maximal oxygen uptake in 10 young men. The authors reported no statistically significant difference in exercise performance between abstaining and partaking sexual intercourse. However, these studies characterised by small sample size, use of laboratory-based exercise test and no use of elite athletes. There are no solid evidence that sex is harmful or not on the athletic performance.

The results of our study reveal statistically significant negative effect of sex on lower extremity muscle force. The participants lifted less weight when they engaged in a sexual intercourse, a night before, compared with abstention. However, 2 kg of difference between lifted weights may not be clinically significant. Moreover, we did not find any significant correlation between sex and athletic performance.

The study has several limitations that need to be addressed. First, the participants were not professional athletes, but physically active men who train themselves 3–4 times a week in a gym and semiprofessional sportsmen. Therefore, our results may not reflect the changes in professional athletes. Moreover, due to characteristics of participants, we did not obtain any data for women. Furthermore, our exercise protocol only involved the knee and hip joint. We did not evaluate whole-body exercise strength, which mirrors the demands of the sport. We did not measure testosterone levels, so the potential change of plasma testosterone levels is unknown. In addition, we did not evaluate the psychological aspect of having an orgasm, so we did not know if aggression would be lost. In addition, neither the researchers nor the subjects were blinded and the sequence of intercourse/abstinence was not randomised. These are the areas of future studies to evaluate the physiological and psychological effects of sexual intercourse on athletic performance.

We also have some advantages against the other studies. First, we have instructed the participants about the exact duration of sexual intercourse. In addition, only the missionary position was allowed. Thanks to this protocol we were able to evaluate the participants on an equal level.

CONCLUSION

Our study demonstrates that participating in sexual intercourse 24 hours prior affected lower extremity muscle force. However, due to nature of the topic it is hard to conduct an optimised study. Therefore, the effect of sex on athletic performance is still not clear, and additional studies should be done.

Main messages

- ⇒ Sexual intercourse might affect lower extremity muscle force in physically active men.
- ⇒ We suggest to athletes abstain from sexual intercourse before a sports competition.
- ⇒ The length of sexual intercourse and the lifted weight are negatively correlated. Therefore, shorter intercourse may not harm any athletic performance.

Current research questions

- ⇒ We did not measure testosterone levels in this study therefore the potential change of plasma testosterone levels is unknown. Do testosterone levels vary due to sexual intercourse? It should be evaluated in additional studies.
- ⇒ We did not evaluate whole-body exercise strength in this study, which mirrors the demands of the sport. This situation raises a new question. What kind of study design can evaluate whole body strength?
- ⇒ We did not obtain any data for women. Therefore, this question comes to mind. Do women athletes affect like men from sexual intercourse?

What is already known on the subject

- ⇒ We know that literature is very limited and confusing about this topic.
- ⇒ We know that, in sport industry, many coaches and trainers advise their athletes to stay away from sex before a competition.
- ⇒ We also know that the available data in the literature is not enough to come to a conclusion.

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