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Original Article

Effect of sexual abstinence on physical performance in combat sports: A pilot study

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Abstract
Sexual activity is often associated with a negative influence on physical performance. Likewise, sexual abstinence before a sport activity is not only a recent trend. Although scientific data points to none or small effect. On the other hand, testosterone levels could be positive affected by sexual restraint. This pilot study aims to test a complex research approach to measuring effect of sexual abstinence on sport performance in combative sports. Sample consists of two athletes aged 26 years. The length of the relationships with their partners was 4±1.4 years. Both were tested three times in the ten days. Testing protocol included blood sample (testosterone level), hand dynamometry, Wingate test, YMCA bench press test, reactometry and determination test. Supplementing qualitative data was collected through daily record form and closing interview. Period of sexual restraint lasted one week. Although there is no united trend, results show some changes in physical and psychical abilities in both cases. Also changes in sexual fantasy, spontaneous arousal and appetence, moods or concentration were reported by participants. This pilot study uses a comprehensive design and suggest new ways for future research, which is needed due to lack of empirical data in this issue.
Keywords: sexual behaviour, martial arts

Introduction

Sexual abstinence is still used to enhance sport performance. This tendency could grow with athletes' competition level (Vajda, 2016). Sexual abstinence before a sport activity is definitely not only a recent trend. It has already been known it in Ancient Greece where people believed that male power can be increased with retention of semen and even today it is possible meet prominent trainers with such a claims. (Bishop, 2012). Although empirical studies show sexual activity has minimal or no effect on athletic performance. This result was showed in studies where the sexual activity was carried out a day before the testing session (Boone & Gilmore, 1995; Johnson, 1968; Sztajzel, Périat, Marti, Krall, & Rutishauser, 2000). A little effect was observed in short time after sexual activity (within two hours), however, that disappeared with a sufficient recovery time (Boone & Gilmore, 1995; Pupiš, Raković, Stanković, & Savanović, 2010). There is another point of view which claims that sexual activity could be often associated with dangerous behaviour for the performance (night time activities, lack of sleep, alcohol intake) (Anshel, 1981). Sexual activity affects the organism by calming effect, reduces stress and suppresses aggression (SayfollahPour, Heidary, & Mousavi, 2013). This may become a negative factor in combat and contact sports where there is a considerable degree of aggressiveness often required. This could also be supported by studies showing elevated levels of testosterone during sexual abstinence (Exton et al., 2001; Jiang, Xin, Zou, & Shen, 2003; Krüger et al., 2003). It is possible to track some connections between the testosterone levels and performance in combat sports. Study, which compared winners and losers in a judo fight, turned out that the winners had higher level of testosterone and more pronounced secretion during the fight itself. This increased secretion correlated with motivation to win (Suay et al., 1999). Expecting competition or fighting increases both cortisol and testosterone levels (Salvador, Suay, González-Bono, & Serrano, 2003). Likewise, the testosterone level affects a degree and willingness to take the risk involved (Kuzawa, Georgiev, McDade, Bechayda, & Gettler, 2016) and it also is an important determinant of aggressiveness (Mougios, 2006). From the physiological point of view, testosterone plays a great role in anabolic processes of muscle growth. Positive effect in strength is known as well (Bhasin et al., 1996). These findings indicate possibility of positive effect of sexual abstinence to performance in combat sports through increased testosterone level.

Frequently used hypothesis pointing to energy expenditure during a sexual activity does not seem to be relevant for combat sports. Energy output values for normal sexual activity of men are relatively low. Measured energy consumption 101 ± 52 Kcal with the intensity 4.2 ± 1.3 Kcal/min (Frappier, Toupin, Levy, Aubertin-Leheudre, & Karelis, 2013) does not represent meaningful value. Another source says intensity 3 METS for sexual activity (Casazza et al., 2013). In comparison of this data to usual training loads of combat athletes, it does not look like a serious issue. A frustration degree from the prolonged abstinence could be more important factor than energy retained during this phase. Willingness to maximum training effort could be affected by an

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inappropriate frustration level (Thorton, 1990). Objective knowledge on effect of sexual activity and inactivity is crucial for planning and possible increasing sport performance. Thus, the purpose of this pilot study was to examine the research design for the future use and track the possible weaknesses and gaps.

Methods

The research participants were two male athletes who take part in a regular physical activity. Both have rich experience in combative sports. The age of these two athletes was the same, i.e. 26 years. The length of the relationships with their partners is 4±1.4 years. None of them in the research sample was aware of any health problems that could have anyhow affected the results of hormonal testing.

The schedule of the study was created to give enough time for effective sexual abstinence. The whole study took ten days as described in detail below:

1. 24 hours before the measurement without significant physical activity of higher intensity (48 hrs without strength training) and 12 hours without sexual activity
2. 1st day – measurement (already with sexual abstinence)
3. 2nd-8th day – normal daily mode and training load with sexual abstinence
4. 9th day – measurement after sexual abstinence (24 hrs before measurement without significant physical activity of higher intensity and 48 hrs without strength training)
5. 9th day – sexual activity involving orgasm
6. 10th day – measurement (12 hrs before measurement without sexual activity)

Each measurement contained the same testing protocol. It consisted of the following:
1) Hormonal testing of testosterone levels. Venous blood collection was used, and then an external company provided testing procedure. Blood samples were labelled by individual codes without persons' names.
2) A hand grip dynamometer using digital analyser MIE via standard conditions.
3) A Wingate test with one 30 second round. Participants completed suitable warm-up, then cycled for 3 minutes before and 3 minutes after the test to cool down carefully. The Excalibur Sport PFM 2006 device was used for this test.
4) The YMCA bench press test according to (YMCA of the USA & Golding, 2000). Participant in this test tried to make maximum number of repetitions (weight = 36 kg) in the rhythm of 60 beats per minute for each position chance. The test ended when the participant was unable to keep the rhythm.
5) The Vienna test system. a) A reaction test – We measured a simple choice reaction in 3 minutes test. b) A determination test which assesses the reactive stress tolerance, attention and reaction speed by using multiple stimuli (sound and various visuals). The participants reacted by pressing the appropriate buttons or pedals. The test presentation is adaptive and leads to over-challenging the participants (stress element). The 6 minutes test version was used. Results were supplemented by a questionnaire to write down eventual changes in sexual fantasy, spontaneous arousal and appetence, moods, level of daily activity, concentration, need of physical activity or sport, and quality of eventual training. The whole testing schedule ended with short interviews about research design.

Ethics:

Research was approved by ethics committee of Masaryk University.

Results

There was no unambiguous trend in comparison of participants in testosterone levels test. While there was a decrease in levels (-10%) at participant no.1 in connection with sexual abstinence, participant no. 2 showed a significant increase (+32%). However, in both, there was a slight decrease following day after sexual activity. The measurement of the handgrip dynamometer showed in both cases a decreased performance. Participant no.1 achieved only 80% of his first result even in the third measurement.

The drop between the measurements was always 10%. In case of participant no.2, there was a slight decrease, but it is not significant (up to 5%). However, this decrease indicates that the increasing level of testosterone (+ 32%) may not be acutely manifested in maximum strength. The increase occurs only with a chronic increase in levels that can boost the effectiveness of strength training.

There was a significant increase of performance in the YMCA bench press test recorded after sexual abstinence for both participants, however, the performance of participant no.2 dropped down to the first measurement's level after sexual activity. Participant no.1 had inconsistent results in the Wingate test. A peak power significantly decreased in the last testing session after sexual activity, but average power was the lowest in the first measurement. The best average power was in testing after sexual abstinence.

This could relate to reluctance to the third testing session, which was recorded in end interview with this participant. On the other hand, participant no.2 gave the best in the last measurement after sexual activity. Results of the physical performance testing are summarized in Table 1.

Table 1.

Proband/Testing method	Measurement 1.	Measurement 2.	Measurement 3.
Dynamometry (N)			
P1	633	572	509
P2	700	689	667
Average output/body weight (W*kg)			
P1	8,16	8,76	8,39
P2	8,66	8,85	8,92
Max. output/body weight (W*kg)			
P1	13,66	13,62	11,34
P2	11,94	11,81	12,74
Fatigue index = (Wmax-Wmin)*100)/(Wmax)			
P1	62,27	54	43,48
P2	50,92	45,77	49,8
YMCA bench press test (pts.)			
P1	46	53	51
P2	101	121	100

Testing of the reaction time showed inconsistent results. There were no or small changes in the reaction time, but both participants got better outcomes in motoric reaction after the sexual abstinence. The determination test seems to be affected by the sexual abstinence in the research sample. Both participants got better scores of correct reactions. To sum up, there is a possibility of better psychical condition of participants in testing session following the sexual abstinence and also the day after the sexual activity in the selected tests. On the other hand, participants reported that there is eventuality of affecting the results by learning about the process from every testing try.

Table 2 Reaction test

	Measurement 1.			Measurement 2.			Measurement 3.		
Proband	Av. Reaction time (s)	Av. Motoric reaction time (s)	Correct reaction	Av. Reaction time (s)	Av. Motoric reaction time (s)	Correct reaction	Av. Reaction time (s)	Av. Motoric reaction time (s)	Correct reaction
P1	257	89	28/28	233	69	28/28	234	66	28/28
P2	210	78	28/28	209	50	28/28	218	60	28/28

Table 3. Determination test

	Measurement 1.			Measurement 2.			Measurement 3.		
Proband	Correct reaction (n)	Wrong reaction (n)	Passed impuls (n)	Correct reaction (n)	Wrong reaction (n)	Passed impuls (n)	Correct reaction (n)	Wrong reaction (n)	Passed impuls (n)
P1	310	15	11	330	23	7	326	23	12
P2	301	28	14	336	21	12	332	14	6

Discussion

The main purpose of this pilot study was to examine the research design for the future use and track the possible weaknesses and gaps. From this point of view, we can state that multiple variables could be tested during one research (see, (Vouyoukas, 2011). There is some space for additional tests, especially for hormone testing. The examination of the level of cortisol and prolactin is recommended, although secretion of prolactin may not be affected by abstinence (Exton et al., 2001). Those tests could bring more complex results required for the understanding of this topic. Nevertheless, there is some confusion also in the current design, which came out from the final interview. For the future use of this research design, it is necessary to track the physical and mental activity during the whole session more closely. The workload of the participants affect their mood, which

is a well recognized determinant of sexual arousal (Carvalho, Pereira, Barreto, & Nobre, 2017). Fatigue coming from the job and other daily activities seem to be one of the most important factors in the perception of changes in sexual appetence and spontaneous arousal. Both of these factors fluctuated depending on the workload, although number of both grows with the progress in sexual abstinence. There was also change in the "quality" of sexual fantasy, which became "deeper and more specific". On the other hand, the ability of concentration was decreased, particularly monotonous activities. These clues lead to a thought whether it is even possible to state "no effect" on athletic training. Almost whole life is filled by the intensive experiences arising from the partners' life, which affect major part of the human beings. A prior study also reveals that combative athletes feel some changes in mental component of sport performance (Vajda, 2016). The complex testing including psychological and physical performance and the biological indicators as it was used in this research is a conceivable way to understand this issue. I assume a great individuality in future results, although the sample in this study is insufficient. The key factor could be testosterone reaction on abstinence. Competitiveness and aspiration rate in athletes could be influenced by higher testosterone levels. Results show this phenomenon for participant no.2 who had a significant positive change in testosterone and at the same time improved performance in the YMCA bench press test and the Wingate test. In the reaction test, an acceleration tendency during testing following sexual abstinence was observed, too. Naturally, there are many multidisciplinary factors in sport which affect testosterone levels besides the sexual abstinence, for example, resistance training (Lusa Cadore et al., 2009; Scudese et al., 2016) or presence of attractive women (J. R. Roney, Simmons, & Lukaszewski, 2010; James R. Roney, Lukaszewski, & Simmons, 2007). A laboratory performance test alone probably cannot bring on complete understanding of connection between an athlete's sexual life and sport performance, without sufficient supplementary data. What more, in many sport disciplines, which include anticipation of the opponent or teammates, it will be necessary to run some field experiments. Only in this way, performance in those sports could be fully classified. Such designs are already used in combative sports, too (see, (Suay et al., 1999).

Conclusion

Combination of different performance, medicine a psychological testing methods can produce results which could help understand relation between sexual activity, abstinence and sport performance. Unfortunately, laboratory tests will never be able to contain the complexity of game-based sports or martial arts, where interactions with teammates or rivals play an important role. Eventually, we will have to run more field tests if we want to fully understand this issue.

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