60 - ANTHROPOMETRIC EFFECTS DERIVING OF THE VARIATION'S INTENSITY IN CIRCUIT TRAINNING DURING MENSTRUAL CYCLE

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1. INTRODUCTION

The Menstrual Cycle (CM) is regulated by pituitary hormones, which are the follicle-stimulating hormone (FSH) and luteinizing hormone (LH), both are secreted in response to hormone release from the hypothalamus. The ovarian hormones, estrogen and progesterone, which are secreted by the ovaries in response to two hormones of pituitary. According to Guyton (1996), these various hormones are secreted in constant amounts throughout the monthly cycle of sexual woman, with speeds significantly different during the different phases of the cycle. The menstrual cycle can be characterized as rhythmic changes in the monthly rate of secretion of female hormones and corresponding changes in the ovaries and sexual organs during the woman's reproductive life that begins at puberty and ends at menopause. The result of the menstrual cycle is a mature egg released from the ovaries every month, so that only one fetus can start to develop at a time and uterine endometrium is prepared for implantation of the fertilized egg at the appropriate time of the month. During each month of the female sexual cycle, is the cyclical increase and decrease FSH and LH.

According to Guyton (1996), the first phase of follicular growth is moderate increase in the egg itself. It follows, then, the growth of additional layers of cells and, at this stage, the follicle is known as primary follicles. Part of the development process to this stage can occur in the absence of FSH and LH, but further development is not possible without the presence of these two hormones. As FLECK (2006), the intensity of strength training should be increased during this phase the menstrual cycle, due to lower concentration of cortisol, a hormone with catabolic effect and which has a higher concentration in the luteal phase. GUYTON (1996), reports that about 2 days before ovulation the speed of secretion of LH by the pituitary increases markedly. At the same time, FSH also increases and both hormones act in a synergistic, determining the rapid swelling of the follicle during the several days prior to ovulation.

The luteal phase is characterized by a marked increase in serum levels of progesterone, reaching its peak just after ovulation and are responsible for the increased basal body temperature observed in this phase. Simultaneously, the serum estrogen increases again at that stage, after significant reduction during ovulation. Secretion by the corpus luteum: role of LH. The corpus luteum is a highly secretory organ, which secretes large amounts of progesterone and estrogen. After the LH (especially what was secreted during the ovulatory surge) has exercised its action on granulosa cells, causing the process of luteinization, the luteal cells newly formed seem to be programmed to undergo a predetermined sequence of proliferation, increase in size ; secretion, followed by degeneration. In the last days of the MC, the corpus will be degenerating and the levels of estrogen and progesterone fall, triggering the onset of menses and a new cycle repeats. In the first hours following the expulsion of the egg from the follicle, granulosa cells remaining quickly become in luteal cells.

Fleck (2006) proposes that in the luteal phase the intensity or volume must be reduced over the period due to higher blood concentrations of progesterone, which is catabolic action on muscle. And it appears that variations in intensity resulting in better conditions for growth and repair muscle. There are studies suggesting that physical performance can vary considerably during different phases of the CM is likely to reflect changes in body temperature and metabolism that accompany the hormonal curves. While no data on the behavior of aerobic power and muscle strength, little is known about the behavior of the percentage of fat. The variations of intensity should occur according to the phase of the menstrual cycle in order to maximize the effects of training.

An interesting study published by Chen and Tang (1989), reports the effects of the menstrual cycle on respiratory muscle and lung function. The muscle strength was measured by the maximum static inspiration and expiratory pressures. The authors concluded that respiratory muscle endurance is reduced in the follicular phase (premenstrual) and highest in the luteal phase (post-menstrual). Bockler (cited Weineck, 1991) states that during the post-menstrual there is an improvement of physical fitness due to increased rate of estrogen and noradrenaline. And in the premenstrual phase, due to the increased rate of progesterone, there is significant reduction in rendimento.Sarwar, Niclas and Rutherford (1996) studied changes in muscle strength, state of relaxation and fatigue during the human menstrual cycle. The measures included maximum force of quadriceps and manual pressure, time for relaxation and fatigue index of quadriceps. It was reported 11% increase in the strength of the quadriceps and manual pressure in the post-menstrual. Accompanying the increases in strength, there was a reduction in the speed of relaxation and increased fatigue. Another similar study by Reis, Frick, Schmidtbleicher (2001), reports of strength variations in different training methods during the menstrual cycle.

The objective of this study was to investigate the percentage of body fat a woman, physically active, compared: baseline, 8 weeks of circuit training with constant load and 8 weeks of training with intensity varying according to the phases of the cycle period. The percentage of fat measured, showed no significant change from previous assessments, hence the interest to investigate the use of training with the variation of intensity.

1.1 Materials and Methods

The student was invited to participate in the study through informed consent given by the researcher during our personal trainer. Before starting the data collection, the student completed the instrument and answered a questionnaire with information relevant to the CM and the possible use of hormonal contraceptives. Evaluations were performed at the beginning of the program of 8 weeks of conventional training, at the end of this protocol, when started the special training and the last data collection was performed at the end of 8 weeks of training with intensity variation.

The student took 8 weeks of circuit training, with the alternate method by segment, with constant load within microcycles. The neuromuscular training was designed to collect RML (muscular endurance), which aims to develop the individual better cardiovascular fitness, is to perform everyday tasks, either to improve endurance in sports. As the name implies, the physical capacity to improve resistance to muscle fatigue. Through such training, can be a very obvious muscle definition due to the strengthening of the muscles (muscle tone) and the subsequent oxidation of the lipid layer due to subcutaneous training. Fleck (2006).

At the end of this phase, we evaluated the percentage of fat to begin the special training. It was then applied to the training intensity variation according to the phases of the menstrual cycle, microcycles had different intensities and the change was based on the completed form in advance by the student and the second assessment was conducted the week of July 10, 2009. The physical assessment was made of percentage of body fat percentage and current recommended using the protocol Pollock three-fold, BMI, weight and WHR. The why of physical performance can vary during the menstrual cycle, scholars attribute the change in concentration of different catabolic hormones which is matched by disinhibition of receptors to anabolic hormones. Fleck (2006) posits that sports training should be varied during the different phases of the menstrual cycle, taking into account that changes in hormone concentrations result in better conditions for growth and repair muscle in the follicular phase compared with the phase luteal.

Also according to Fleck (2006) should decrease the intensity during the luteal phase and increase it in the follicular phase in order to take advantage of the hormonal action in the body, increasing performance and overcompensation. Some authors also reported that some women perceive decreased sports performance during the menstrual flow, but several studies involving the testing of aerobic and anaerobic power, 1RM tests and was found that in fact there is some concern for women because they are at the stage of flow and therefore automatically "hold" the performance.

The load used was determined from the 1RM test, with the initial load test being proposed by Professor Head, with feeling of the student. The exercises and loads were:

Pectoral: Crucifix straight with dumbbells (4 kg) and Iso-pectoral apparatus (15 kg);
Dorsal: Row Pulley high (14 kg) and Low Row (14 kg);
Biceps: reverse threaded bar (6 kg) and thread the Cross over (5 kg);
Triceps: Triceps forehead with bar (4 kg) and triceps rope (5 kg);
Flexors and extensors of the lower limbs: Horizontal Leg Press (25 kg) Leg Extension (10 kg), leg curl (20 kg), Stiff with bar (6 kg);
Trapeze: Row standing with bar (5 kg) and Development with Dumbbells (4 kg);
Calf Muscle: Calf Raise (Unladen) and Calf unilateral leg press machine (20 kg);
Abductors and adductors: adductor Chair (20 kg) and Chair abductor (20 kg).

The circuit training for the student was to start training in cardiopulmonary training session after a session of 3 sets of 4 exercises, a passage of 5 minutes of aerobic another session consists of 2 series in 4 years and ending with 4 series of abdominal and passive stretching.

1.2 ANALYSIS AND DISCUSSION

INFORMATION ON THE ASSESSMENT OF PRE-TRAINING CONVENTIONAL 16/03/2009

Regarding the first assessment, before the conventional training, we obtained the following result:

Blood pressure: Systolic blood pressure: 110 mmHg (reference value: <130), Diastolic Blood Pressure: 67mmhg (reference value: <85).

Percent body fat was found the value of 26.3% considered healthy by the WHO (World Health Organization).

BMI of 22.5 kg/m2 was considered normal for adults.

WHR: Value found: 0.7 what is the group with Low Risk Estimate reference value <0.72.

INFORMATION ON THE ASSESSMENT OF POST-CONVENTIONAL TRAINING 11/05/2009

As to the evaluation performed after eight weeks of conventional training without the intensity variation in the phases of the menstrual cycle and before the start of training differently, we obtained the following result:

Blood pressure: Systolic blood pressure: 113mmhg (reference value: <130), Diastolic Blood Pressure: 68 mmHg (reference value: <85).

Percentage of body fat: It was verified the value of 24.7% considered healthy by the WHO (World Health Organization).

BMI was 22.41 kg/m2 in normal adult population.

WHR: Value found: 0.7 what is the group with Low Risk Estimate reference value <0.72.

INFORMATION ON THE ASSESSMENT OF POST-CONVENTIONAL TRAINING 10/07/2009

As to the evaluation performed after the end of eight weeks of training differentiated and observing the menstrual cycle and adjusting the amount of training, with that intensity variation in the phases of the menstrual cycle, we obtained the following result:

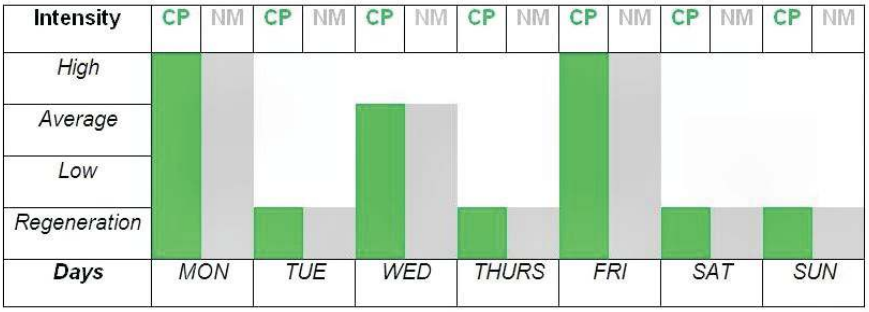
Blood pressure: Systolic blood pressure: 111mmhg (reference value: <130), Diastolic Blood Pressure: 69 mmHg (reference value: <85).

Percentage of body fat: It was verified the value of 21.72% considered healthy by the WHO (World Health Organization).

BMI was 21.87 kg/m2 in normal adult population.

WHR: Value found: 0.68 what is the group with Low Risk Estimate reference value <0.72.

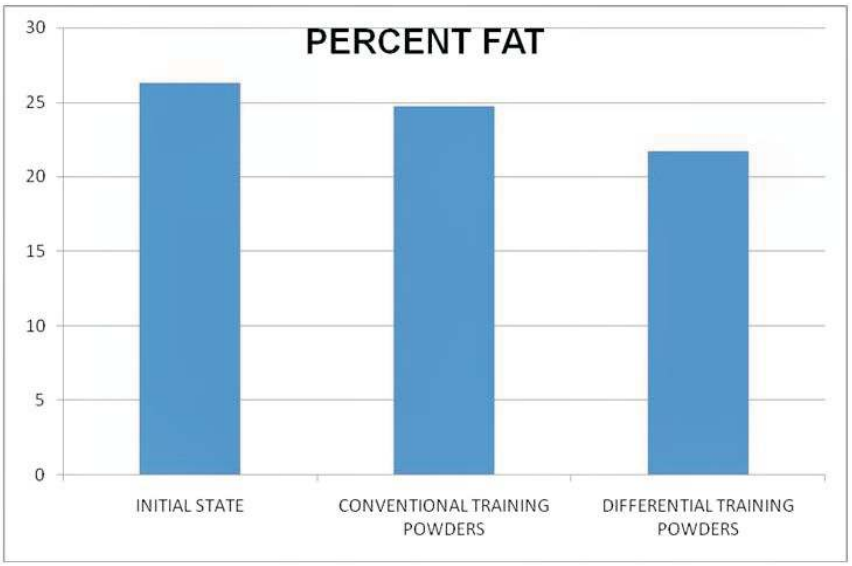
Example microcycles:



CP: Cardiopulmonary, NM: Neuromuscular

Some studies published recently, said that during the post-menstrual women athletes are the best performers and worst during the premenstrual phase and in the early days of flow. Janse, Thompson, Boot, Thom, Ruell (2001) published on the influence of the menstrual cycle phases in the contractile characteristics of skeletal muscle measured by electromyography. Data were collected during the menstrual, follicular and luteal phase. There were no significant changes in any of the parameters of muscle function during the menstrual cycle.

The percentage of fat showed significant negative change in relation to the pre-training and post-conventional. In the present study, the comparison approach; demonstrated the effectiveness of the proposed method, as can be seen:



1.3 CONCLUSION

The literature shows a tendency of improvement in physical performance in the post-menstrual, as already mentioned. In this study detected a significant reduction in body fat, assessed by the protocol of Pollock. The current study become relevant in the development of training programs, aiming to adjust the intensity of the training period of the menstrual cycle, following the example of Zakharov and Gomes (1992) reporting the use of mesocycle adapted to cyclic sports athletes, considering hormonal changes that characterize and influence each phase of the menstrual cycle.

Considering the issues neuro-muscular and/or psychological, the differences can also be attributed to factors such as learning, safety and motivation of the Personal Trainer, adaptation to the 1RM test. Some variables may have affected negatively the outcome of the study, such as the small number of evaluated and power that has not been monitored. It is worth mentioning that the student attendance was mandatory for the proper conduct of the study.

We thus conclude that the practice with varying intensity phases of the menstrual cycle brings gains in performance and reducing the percentage of fat when compared to conventional training. It is carrying out similar studies with larger control groups seeking to minimize such effects.

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ANTHROPOMETRIC EFFECTS DERIVING OF THE VARIATION'S INTENSITY IN CIRCUIT TRAINNING DURING MENSTRUAL CYCLE

SUMMARY:

the menstrual cycle is characterized by rhythmic changes in production and secretion of peptide adeno gonadotropic of pituitary which determine the beginning of the new growth in ovaries follicles. One of the follicles finally becomes mature and ovula in around 14 day. During the growth of follicles occurs mainly secretion of estrogen. After reproduction, follicle-secreting cells become in secret luteum, that large quantities of female hormones progesterone and estrogen. After 2 weeks, the luteum degenerates and, consequently, the hormones estrogen and progesterone ovarian decrease sharply-mind and begins to menstruation. Next, then, a new ovarian cycle; these hormones also influence the availability of different substrates for physical exercise, possibly also changes the circuit training performance. Workload variation has been discussed recently training as a way to mitigate hormonal changes arising from the menstrual cycle and consequently increase the effects of training. The present study was to examine the difference in the percentage of fat comparing eight weeks of training with constant load and eight weeks

of training with such intensity variation. The percentage of fat was analyzed by skin creases method and determined by the Protocol of Pollock using a clinical Cescorf skinfold. Significant difference was verified in the variables analyzed. We found that for this case variations of intensity can bring more satisfactory results, but not conclusive taking into account the number of assessed which was small it shows the importance of research to better attesting this hypothesis.

KEYWORDS: menstrual cycle; training circuit; varying intensity.

EFFETS SUR ANTHROPOMÉTRIE RÉSULTANT DES MODIFICATIONS DANS L'INTENSITÉ DE FORMATION DU CIRCUIT PENDANT LE CYCLE MENSTRUEL

Résumé :

le cycle menstruel est caractérisé par rítmicas modifications dans la production et de la sécrétion de peptide adeno-gonadotropicos de l'hypophyse qui déterminent le début de la nouvelle croissance de follicules ovaires. Un des follicules devient enfin parvenus à maturité et ovula environ 14 jours. Au cours de la croissance des follicules se produit principalement la sécrétion d'estrogènes. Après la reproduction, cellules sécréter follicule devient luteum secret, que de grandes quantités d'hormones femelles progestérone et oestrogène. Après 2 semaines, le luteum dégénère et, par conséquent, les ovarianos d'oestrogène et progestérone hormones diminuer fortement esprit et commence à menstruations. Ensuite, puis, un nouveau cycle ovarien ; ces hormones également influer sur la disponibilité des différents substrats pour l'exercice physique, éventuellement aussi modifications le circuit de formation des performances. Variation de la charge de travail a été discutée récemment formation comme un moyen d'atténuer les changements hormonaux découlant du cycle menstruel et par conséquent, augmenter les effets de la formation. La présente étude était d'examiner la différence entre le pourcentage de matière grasse de la comparaison de huit semaines de formation avec charge constante et huit semaines de formation avec ces variations d'intensité. Le pourcentage de matière grasse a été analysé par la méthode froissements de peau et déterminé par le protocole de Pollock, à l'aide d'un adipômetro de cescorf cliniques. Différence notable a été vérifiée dans les variables analysées. Nous avons constaté que dans ce cas les variations d'intensité peuvent apporter des résultats plus satisfaisants, mais pas concluante prenant en compte que le nombre de évalué qui était petit il montre l'importance de la recherche pour mieux attestant cette hypothèse.

MOTS-CLÉS : cycle menstruel ; formation circuit ; variation d'intensité.

EFECTOS SOBRE ANTROPOMETRÍA DERIVADOS DE CAMBIOS EN LA INTENSIDAD DE LA FORMACIÓN DE CIRCUITO DURANTE EL CICLO MENSTRUAL

RESUMEN:

el ciclo menstrual se caracteriza por cambios rítmicos en la producción y la secreción de péptido adeno-gonadotrópicos de hipófisis que determinan el comienzo del nuevo crecimiento en los ovarios folículos. Uno de los folículos finalmente es madura y ovula alrededor de 14 días. Durante el crecimiento de folículos se produce principalmente la secreción de estrógeno. Después de ovulación, las células secretoras del folículo se convierten en secreto luteum, grandes cantidades de hormonas femeninas progesterona y estrógeno. Después de dos semanas, el luteum degenera y, en consecuencia, las hormonas estrógeno y progesterona las hormonas ováricas, reducir drásticamente y comienza a la menstruación. De ello se deduce, entonces, un nuevo ciclo ovárico; estas hormonas también influyen la disponibilidad de diferentes sustratos para el ejercicio físico, posiblemente también cambios el circuito de rendimiento de formación. Variación de carga de trabajo se ha discutido recientemente formación como una forma de mitigar los cambios hormonales derivadas del ciclo menstrual y, por consiguiente, aumentar los efectos de la formación. El presente estudio era examinar la diferencia en el porcentaje de comparación de ocho semanas de entrenamiento con carga constante y ocho semanas de entrenamiento con tal variación de intensidad. El porcentaje de grasa fue analizado por el método de pliegues de piel y determinado por el Protocolo de Pollock mediante un medidor de grasa cescorf clínico. Se comprobó una diferencia significativa en las variables analizadas. Se encontró que para este caso las variaciones de intensidad pueden traer resultados más satisfactorios, pero no concluyentes teniendo en cuenta que el número de evaluaron que era pequeño lo muestra la importancia de la investigación a mejor que acredite esta hipótesis.

PALABRAS CLAVES: ciclo menstrual; formación circuito; variación de intensidad.

EFEITOS ANTROPOMÉTRICOS DECORRENTES DA VARIAÇÃO DE INTENSIDADE DE TREINAMENTO EM CIRCUITO DURANTE O CICLO MENSTRUAL

RESUMO:

O ciclo menstrual caracteriza-se por alterações rítmicas da produção e secreção dos hormônios gonadotrópicos da adeno-hipófise que determinam o início do crescimento de novos folículos nos ovários. Um dos folículos finalmente torna-se maduro e ovula em torno do 14° dia. Durante o crescimento dos folículos ocorre principalmente secreção de estrogênio. Após a ovulação, as células secretoras do folículo transformam-se no corpo lúteo, que secreta grandes quantidades dos hormônios femininos progesterona e estrogênio. Depois de 2 semanas, o corpo lúteo degenera, e, em conseqüência, os hormônios ovarianos estrogênio e progesterona diminuem acentuadamente e começa a menstruação. Segue-se, então, um novo ciclo ovariano; esses hormônios também exercem influência sobre a disponibilidade de diferentes substratos para o exercício físico, possivelmente também altera o desempenho no treinamento em circuito. A variação da carga de treinamento tem sido discutida recentemente como uma forma de amenizar as alterações hormonais decorrentes do ciclo menstrual e conseqüentemente potencializar os efeitos do treinamento. O presente estudo teve como objetivo analisar a diferença do percentual de gordura comparando oito semanas de treino com a carga constante e oito semanas de treino com a referida variação de intensidade. O percentual de gordura foi analisado pelo método das dobras cutâneas e determinado pelo protocolo de Pollock utilizando-se um adipômetro clínico CESCORF. Foi verificada diferença significativa nas variáveis analisadas. Concluímos que para esse caso a variação da intensidade pode trazer resultados mais satisfatórios, porém não conclusivos levando em consideração o número de avaliados que foi pequeno isso nos mostra a importância de serem feitas mais pesquisas para uma melhor comprovação desta hipótese.

PALAVRAS CHAVE: Ciclo menstrual; treino em circuito; variação de intensidade.

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