26 - NUTRITIONAL INTERVENTIONS IN THE TREATMENT AND IN THE PREVENTION OF THE ATHLETIC AMENORRHEA

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INTRODUCTION

From the first Olympic Games accomplished in 776 B.C. in Old Greece, which represented the cradle of the search of relationships between nutrition and physical acting, athletes and trainers look for a special feeding capable to increase the physical income and to improve the acting [1].

Historically there was not an encouragement of the feminine participation in sporting games, because it was presumed that women were not physiologically capable to participate in physical activity of high intensity and long duration. Only starting from 1900 it was permitted the female participation in the Olympic Games, and before 1960 it was only allowed to women to run up to 800 meters. The feminine marathon was incorporate starting from 1984, being evidenced the lack of incentive to the feminine sport [2].

With the increase of the feminine participation in the sport, they were noticed their benefits: physiologic effects (as the breast cancer prevention and of osteoporosis), psychological effects (as the better acceptance of the body and larger self-esteem) and social effects (avoiding the pregnancy in the adolescence and the involvement with drugs) [4].

However, the practice of sports of high intensity results in problems of health, as evidenced in competition athletes that present high incidence of menstrual irregularities like athletic amenorrhea, irregular cycles and the interruption ovulation cycles, independently of the type of practiced sport. Most of the time, the younger and those submitted to more intense training, as the marathon runners, present a larger prevalence of menstrual irregularity than the others [5].

The athletic amenorrhea is the absence of menstrual cycles characterized by low levels of circulating estrogen. There are several factors associated to the athletic amenorrhea: the frequently mentioned are the low caloric consumption, the intensity of the training, the retard of the beginning of the menstrual function, the disturbances of the digestion, the stress, the low corporal weight and the low percentile of corporal fat [6, 7].

In the elapsing of the last years in spite of the crescent interest in the sports nutrition a high occurrence of disinformation still exists, so much observed in the athletes as in their trainers that frequently take the responsibility for the dietary control, offering great risks for the integrity of the athlete's health [3]. Due to this reality, this work has as objective approaches the psychopathological aspects, etiological and nutritional of the treatment of the athletic amenorrhea, thus providing a better income of the training.

METHODOLOGY

It was accomplished a search in the scientific literature of epidemic, clinical and reviewing studies on athletic amenorrhea, using the following: athletic amenorrhea, female athletes, nutritional state and dietary consumption. The texts were found using the data basis of MEDLINE, PubMed, LILACS and Scielo. They were found good researches just in Portuguese and English language, published in the period of 1985-2006.

LITERATURE REVIEW

Prevalence and Incidence

The prevalence of menstrual dysfunction, luteum phase deficiency, oligomenorrhea, amenorrhea and pubic delay, it is larger among the women athletes' group when compared to the general population. Several factors can predispose and to contribute for the development of the menstrual irregularities during the program of physical activity, being considered risk factors, among them, low weight, tenor of corporal fat and states hypo-estrogenic [23]. The psychological and physiologic stress induced by the competition and for the intense physical training can increase the production of androgenic adrenals and modify the metabolic clearance of estrogens, exercising an important role in the etiology of the amenorrhea [11, 12].

Studies concluded that the incidence of the amenorrhea increased significantly and is followed by the subsequent decrease in the athletes' fertility [27]. This prevalence varies among the sporting groups. In agreement with Wolman and Harries, that studied 226 women elite athletes, they concluded that the gymnasts presented the highest amenorrhea incidence (71%), followed by the rowers of lightweight (46%) and the runners (45%). In study accomplished by Benson and collaborators, with ballet dancers, the incidence of amenorrhea is approximately 27 to 50%.

Physiopathology

The menstrual cycle is characterized by the interval between a menstrual flow and the beginning of the subsequent flow [19]. The amenorrhea can be caused by several reasons, being the more common to the physiologic, due to the pregnancy. The pathological causes can include anatomical abnormalities, a failure of the gonads and disorders of the axis hypothalamic-hypophysis-ovaries. However, she can also be unchained by stress physical and/or psychological [20].

The cycle eumenorrheic (regular cycle) it varies from 23 to 35 days, with 10 to 13 cycles a year. Oligomenorrhea is related to the presence from 3 to 6 cycles a year with intervals larger than 36 days. Amenorrhea is defined as the lack or interruption of the menstrual flow, with less than 2 menstrual cycles a year [26].

The amenorrhea caused by the sport (ACS) it is defined as a menstrual dysfunction that it happens in athletes, including the primary amenorrhea (it corresponds to the lack of menstrual periods in girls of up to 16 years of age), the secondary amenorrhea (it is related to the interruption from 3 to 12 consecutive menstrual periods in youths that presented a normal first menstrual flow) or even changes in the menstrual cycle [21, 24, 26]. In agreement with some authors, the delay of the first menstrual flow links with intense physical activity before the puberty; consequently, there is a reduction in the accumulation of bone mass, resulting in a decrease of the potential growth [22].

In spite of many authors to consider the amenorrhea presence as a normal adaptation of the organism to periods of alimentary restriction and intense physical training, several studies shows that it is treated of an indicative symptom of a serious clinical problem. The most harmful clinic consequence of the athletic amenorrhea is its impact on the bone mass [13, 14].

Amenorrhea and bone health

According to Beck & Schoemaker (2000), the bone is an alive fabric, in which is in constant mineralization and reabsorption cycles, and any change in that swinging can cause losses or gains of bone mass. The human skeleton is formed by two types of bones, one with dense components (cortical) and other with spongy (trabecular), usually more vulnerable to diseases. Some factors that predispose to the development of the osteoporosis are: the sedentary life, the smoking, the lack of estrogen and the alimentary ingestion and the consumption of inadequate calcium. Like this, the physical activity and the rich diet in calcium can be associated positively to the increase of the bone mass [35].

The ingestion of calcium in athletes should be monitored; therefore the appropriate consumption of that nutrient is of extreme importance for athletes in growth, because it reduces the stress fractures and the risk of osteoporosis development. That factor is important among female athletes that present primary amenorrhea, which is associated to a smaller bone density. It is also believed that the amenorrhea is the main risk factor for the reduction of the bone mass. They are found frequent in athletes with amenorrhea: their incapacity of reaching the top of bone mass, premature loss of this mass and osteoporosis. The rhythmic gymnasts are among the athletes that present larger frequency of bone damage [10, 15, 16].

The reduction of bone mass is intimately linked to the tendency of sedentary behavior along the years, because it has been accentuating decrease in the mechanical stimulation of the osteoblasts, however the protecting effect of the exercise on the skeleton is lost in those athletes with late first menstrual flow or amenorrhea. The prevalence of the low amount of bone mass in athletes contributes with that their ACS is inferior in relation to those with regular menstrual cycles [33, 34].

Nutritional factors associated to the amenorrhea

The athletes are more susceptible to the opinions of the society and pressures in relation to the acting, becoming highly influenced and with great possibilities to develop alimentary disorders [17, 18]. Many factors are associates to the athletic amenorrhea, the more frequently are: disturbances in the alimentary behavior, dietary restriction, intensity of the trainings, psychological and physiologic stress, physical training before the first menstrual flow, retard of the beginning of the menstrual function, low corporal and low weight percentile of corporal fat [25].

The outstanding increase of the feminine participation in competitive sporting activities in the last decades brought many benefits; however, unfortunately, besides the positive aspects there are some related problems in evidence. Such situations and problems can happen with those athletes that are devoted in a compulsive way, getting the sport and the search for the perfection of the body to assume an unhealthy aspect due to the decrease of the athlete's social life [30].

The alimentary disturbances can be classified as abnormal behaviors related to foods and the nutrition; they can include denial of the ingestion of foods, drunk in excess, vomits, use of laxative or even excessive exercises. The alimentary upset among the sportspeople also seems close to the other types of upset. The trainers usually express concerns on some of their athletes, mainly the ones that worry more in maintaining the corporal weight as runners, gymnasts, fighters and athletes of the lightweight [31, 26].

The adoption of a vegetarian diet can contribute for alterations in the hormonal state, due to the high consumption of fibers, contributing to a great production of feces, and then a loss occurs from 2 to 3 times more fecal estrogen than the women that consume omnivorous diets. Additionally, the low consumption of fats, the low corporal fat, the low dietary protein, the low triptophane consumption and the high consumption of fibers associate to a reduction of the prolactic levels and they can alter the menstrual cycle, influencing directly in the development of the amenorrhoea [28, 29].

The inadequate amount of corporal fat can be the cause of the menstrual dysfunction and, therefore, the inadequate corporal composition is related to ACS. The outlying fat has an important role in the conversion of the androgenic hormones in estrogens. When there is a decrease of that fat, the existing amount of estrogen decreases and the androgenic ones increase, causing the stop of the menstrual cycles. The depletion of those stocks in sportsmen can be a possible explanation for the menstrual dysfunctions, signaling that the body cannot sustain the fertility. It is known that the body would try to maintain that fat, mainly the related to the reproduction, modifying the basal metabolism or the efficiency of the use of the ingested nutrients [21].

In an accomplished study by Carlberget and collaborators analyzed 42 practicing athletes of different sporting modalities and they verified that those with amenorrhea have an inferior amount of corporal fat in relation to those without amenorrhea, being 13% and 16%, respectively. In addition the athletes with amenorrhea have the total corporal weight very inferior in relation to those without the symptoms.

The low consumption of proteins can also contribute to the appearance of the amenorrhea. However, athletes with low consumption of energy have inferior proteic ingestion in opposition to the one of those with normal energy consumption. Like this, studies showed that the proteic ingestion itself does not have any relationship with the menstrual irregularities [33].

FINAL CONSIDERATIONS

A lot of speculations were made in order to discover the causes of the amenorrhea in the athletes; however, the more precocious is the diagnosis probably the less will be the chances of bone damage. In spite of the causes being ignored, there are treatments that should be used soon after the determination of diagnosis, as the supply of the nutritional contribution adapted together with the restructuring of those athletes' training.

The nutrition develops a fundamental paper in the treatment and in the prevention of the athletic amenorrhea, returning the nutritional state and presenting an appropriate vitamin-mineral contribution, so the maintenance of the athlete's health can take place. However, if there is not assistance since the appearance of this pathology, it becomes necessary to reduce the training, in a way not to commit the bone health.

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NUTRITIONAL INTERVENTIONS IN THE TREATMENT AND IN THE PREVENTION OF THE ATHLETIC AMENORRHEA

ABSTRACT

With the increase of the feminine participation in the practice of sports, they noticed their benefits, such as physiologic, psychological and social effects. The practice of sports of high intensity results in health problems, as evidenced in competition athletes that present high incidence of menstrual irregularities, as athletic amenorrhea, this is the absence of menstrual cycles characterized by low levels of estrogen in circulation. It was aimed to approach the physiopathological aspects, etiological and nutritional of the treatment of the athletic amenorrhea, likewise providing a better income of the training. Several factors are associated to the athletic amenorrhea and the most frequent are: the low caloric consumption, the intensity of the training, the retard of the beginning of the menstrual function, the disturbances of the ingestion, the stress, the low corporal weight and the low percentile of corporal fat. The prevalence of this menstrual dysfunction is larger among the women athletes' group when compared to the general population. The psychological and physiologic stress induced by the competition and the intense physical training can increase the production of androgenic adrenals and to modify the metabolic clearance of estrogens, exercising an important paper in the etiology of the amenorrhea. The ingestion of calcium must be monitored once the appropriate consumption is extremely important for athletes in growth, because it reduces the stress fractures and the risk of osteoporosis development, being important for female athletes that present primary amenorrhea, which is associated to a smaller

bone density. The alimentary disturbances among the sportspeople also appear close to the other types of alimentary problems, related to the maintenance of the corporal weight. It is necessary to maintain the appropriate corporal level, because it influences directly to this menstrual dysfunction. It is of extreme importance the attendance at the dietary nutritional planning in the treatment and in the prevention of the athletic amenorrhea, with the purpose of providing an improvement in the female athletes' income.

Keywords: athletic amenorrhea, nutritional state, dietary consumption.

L'INTERVENTION NUTRITIONNEL DANS LE TRAITEMENT ET PREVENTION DE L'AMENORRHEA ATHLETIQUE

RESUMEE

Avec la croissance de la participation des femmes aux sports, on a remarqué les améliorations, tels que les effets phisiologiques et sociaux. La pratique des sports d'haute intensité résulte des problèmes de santé, comme constaté chez les athlètes de competitions qui présentent une grande incidance d'irrégularités menstruelles, comme l'amenorrhea athlètique, est l'absence du cycle menstruel caractérisé par les bas niveaux d'estrogène circulant. On a eu comme cible vérifier les aspects phisiologiques, étiologiques et nutritionnels du traitement de l'amenorrhea athlétique, en favorisant ainsi une meilleure performance à l'entraînement sportif. Beaucoup de facteurs sont liés à l'amenorrhea athlètique, et le plus fréquentes sont: La basse consommation des calories, l'inténsité du traitement, le cycle menstruel retardé, les problèmes d'indigestion, le stress, le bas poid corporel et aussi le bas percenctuel de grasse corporal. La predominance de cette fonction menstruelle est plus grande parmis les femmes athlétes quand on les compare avec la population en géneral. Le stress psychologique et phisiologique produit par la compétition et par l'entraînement physique intense peut augmenter la production d'androgène adrénales et modifier le clearance méthabolique des estrogènes, en ayant un rôle important dans l'étiologie de l'amenorrhea. L'ingestion du Calcium doit être monitorée, car sa consommation correcte est très importante pour les athlètes qui grandissent, parce que ça fait diminuer les fractures de stress et le risque de développement d'osthéoporose. Importante aussi pour les femmes athlètes qui présentent amenprrhea primaire, qui est toujour associée à une densité d 'os plus petitte. Les troubles de l'alimentationchez les sportistes apparaît aussi avec les autres genre de trouble de l'alimentation liés à la préoccupation de mantenir le poid du corps. Il faut mantenir le niveau corporel adéquat, car ça fair d'intérference directe au trouble menstruel. Il est très importante l'observation et la planification nutritionnelle dans le traitement et dans la prévention de l'amenorrhea athlétique à fin de favoriser une amélioration à la bonne performance des femmes athlétes.

Mots Clés: amenorrhea athlétique, état nutritionnel, consommation dietetique

INTERVENCIONES NUTRICIONAIS EN EL TRATAMIENTO Y LA PREVENCIÓN DEL AMENORRHEA ATLÉTICO

RESUMEN

Con el aumento de la participación femenina en el deporte, sus ventajas, tales habían sido notadas como efecto fisiológico, psicologico y social. El práctico de deportes de los problemas de salud de intensidad alta de las causas, según lo evidenciado en los atletas de la competición que presentan la alta incidencia de irregularidades menstruales, como amenorrhea atlético, de ésta es la ausencia de los ciclos menstruales son por los niveles bajos del estrogeno que circula. Era objectified para acercar a los fisiopatológicos, a los etiológicos y a los aspectos de los nutricionais del tratamiento del amenorrhea atlético, así proporcionando una renta mejor de los entrenamientos. Los factores diversos lo asocian el amenorrhea atlético, siendo que están con frecuencia: la consumición baja calórica, la intensidad del entrenamiento, el retraso del principio de la función menstrual, los alborotos de la ingestión, estresse él, el peso corpóreo bajo y el porcentaje bajo de la grasa corporal. El predominio de este disfunção menstrual, es más grande inscribe a grupo del atleta de las mujeres en comparación con la población en general. Estresse él psicologico y fisiológico inducido para la competición e intenso el entrenamiento físico él puede aumentar la producción de los andrógenos de los adrenais y modificar la separación metabólica de estrógenos, ejerciendo un papel importante en la etiología del amenorrhea. La ingestión del calcio que se supervisará, por lo tanto su consumición adecuada es extremadamente importante para el atleta en crecimiento, por lo tanto disminuye los breakings del estresse y el riesgo del desarrollo del osteoporose, siendo importante para los atletas del sexo femenino que presentan el amenorrhea primario, que se asocia a una poca densidad del óssea. Las agitaciones alimenticias entre los sportsmen también aparecen al lado del demasiado mecanografían de agitaciones alimenticias, relacionado con la preocupación del mantenimiento del peso corpóreo. È necesarios para guardar adecuado el nivel corporal, por lo tanto influencian directamente de este disfunção menstrual. È de la importancia extrema el acompañamiento y el planeamiento dietético del nutricional en el tratamiento y la prevención del amenorrhea atlético, con el propósito de proporcionar una mejora en la renta del atleta del sexo femenino.

Palabras-Llave: amenorrhea atlético, estado del nutricional, consumición dietética.

INTERVENÇÕES NUTRICIONAIS NO TRATAMENTO E NA PREVENÇÃO DA AMENORRÉIA ATLÉTICA

RESUMO

Com o aumento da participação feminina no esporte, notaram-se os seus benefícios, tais como efeitos fisiológicos, psicológicos e sociais. A prática de esportes de alta intensidade acarreta problemas de saúde, como evidenciado em atletas de competição que apresentam elevada incidência de irregularidades menstruais, como amenorréia atlética, esta é a ausência de ciclos menstruais caracterizada por baixos níveis de estrógeno circulante. Objetivou-se abordar os aspectos fisiopatológicos, etiológicos e nutricionais do tratamento da amenorréia atlética, proporcionando assim um melhor rendimento do treino. Diversos fatores associam-se à amenorréia atlética, sendo que os freqüentemente são: o baixo consumo calórico, a intensidade do treinamento, o retardo do início da função menstrual, os distúrbios da ingestão, o estresse, o baixo peso corpóreo e o baixo percentual de gordura corpórea. A prevalência desta disfunção menstrual, é maior entre o grupo de mulheres atletas quando comparado à população geral. O estresse psicológico e fisiológico induzido pela competição e pelo treinamento físico intenso pode aumentar a produção de andrógenos adrenais e modificar o *clearance* metabólico de estrógenos, exercendo um papel importante na etiologia da amenorréia. A ingestão de cálcio deve ser monitorada, pois seu consumo adequado é extremamente importante para atletas em crescimento, pois diminui as fraturas de estresse e o risco de desenvolvimento de osteoporose, sendo importante para atletas do sexo feminino que apresentam amenorréia primária, a qual está associada a uma densidade óssea menor. Os transtornos alimentares entre os desportistas também aparecem junto aos demais tipos de transtornos alimentares, relacionados com a preocupação da manutenção do peso corpóreo. È necessário manter o nível corporal adequado, pois influencia diretamente nesta disfunção menstrual. È de extrema importância o acompanhamento e o planejamento nutricional dietético no tratamento e na prevenção da amenorréia atlética, com a finalidade de proporcionar uma melhora no rendimento de atletas do sexo feminino.

PALAVRAS-CHAVE: amenorréia atlética, estado nutricional, consumo dietético.