

35 - BIOTYPE, ANAEROBIC POWER AND CAPACITY OF THE ATHLETE MOUNTAIN BIKE

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INTRODUCTION

The mountain biking is a sport that grows in Brazil and develop elite athletes who are preparing hard for international competitions, requiring scientific information to guide their training optimally, thus reducing the loss of time, money, material and most importantly; the health of the athlete.

The city of São Bento do Sul, Santa Catarina in the northern highlands has a relevant national prominence. The topography of the city seems to influence the development of athletes in the mountain bike. So open up research to identify some valances that will prove to be better than the other fellows in the state of Santa Catarina (BRASILINO et al 2008). Information about your trait and some relevant physical qualities, such as power and anaerobic capacity must be part of developing your training program.

The ability to generate peak power during part of the event (short) plays an important role in athletic performance, for example, in starts, hills, trails, especially in the sprints and the arrival of a competition (Baron, 2001 in COSTA, 2006).

The aim of this study was to evaluate the Somatotype, capacity and anaerobic power of the athletes of the sport of mountain biking OF city of São Bento do Sul-SC. The anaerobic power and capacity are important variables for sports performance and daily activities, but the evaluation of these variables presents problems of theoretical validation (FRANCHINI, 2002). In addition to the identification of the Somatotype of Heath & Carter comes from enabling a more precise study of the physical form ideal for sport specific (MARINS; GIANNICH, 1998).

METHODS

The group was composed of athletes practicing Mountain Bike, aged (15 and 30 years), all male, resident and domiciled in São Bento do Sul located in Santa Catarina-Brazil. The particularity of this study can be understood as a case study.

The determination of Somatotype was performed according to the anthropometric technique by Heath & Carter (1990). According to Carter & Heath, Duquet and Carter (in FERNANDES FILHO, 2003) is the fact that the Somatotype ideal for athletes diversify depending on the type and position you play. Although the size and shape of the body are not the only elements necessary for the success of an athlete can represent important prerequisites for a high yield in a particular sport.

For the prediction of body fat was used the equation proposed by Faulkner (1968 in FERNANDES FILHO, 2003). Introduced by LABOFISE in the early 70's, was the use of Yuhasz equation, modified by Faulkner, which determines the percentage of fat determined by the equation taking into account the following folds body: triceps skinfold, subscapular, supra iliac and umbilical (PIRES; NETO; GLANER, 2007).

We used the following equipment to collect anthropometric: skinfold caliper CESCORF mark, anthropometric tape metal caliper blunt WCS, SANNY CARDIOMED wall mounted and FILIZOLA balance medical.

To assess the capacity and anaerobic power, we used a bicycle ergometer with mechanical braking MONARK model, equipped with pedals and feet fixed by tape. Was performed the Wingate test, protocol used follows the standardization and information described in Pompeu (2004).

The subjects were instructed to remain seated and pedal as fast as possible during every 30 seconds test. The subject had to 2-3 seconds to win the inertia of the wheel before any resistance was applied, and the timer started from this moment. Once the total resistance has been applied, the power was determined by averaging rotations every 5 seconds.

The peak power (PP) was defined as the highest value of power measured in 5 seconds. The mean power (MP) was determined by averaging the values presented every 5 seconds throughout the test (30 sec.). And these values were converted to absolute (watts) to relative (watts/kg) and the fatigue index (IF), as the percentage of decline between the highest and lowest value displayed. Kirkendall and Garrett Jr. (2003, pp. 62) emphasize that "the objectives of the Wingate test 30seconds are to determine the anaerobic power and anaerobic capacity".

For the collection and organization of data was created a specific worksheet in Excel for Windows 2007. Data were collected in an environment own for such activity on the premises of the University of the Region of Joinville - UNIVILLE situation in São Bento do Sul, Santa Catarina in the northern highlands during the diagnostic evaluations performed annually in the research group on Movement of the institution. Data ready after the Excel spreadsheet were analyzed using descriptive statistics, getting the appropriate treatment needs through the statistical program SPSS 15 for Windows.

RESULTS ANALYSIS

The group analysis showed a mean of 22.9±5.4 years and their average height was at 176.2±4.2cm and their body mass 66.7±6.8kg. Analysis of anaerobic valences was obtained from the data plotted on the worksheet designed especially for this purpose and which provided the data for discussion. The sample was characterized with the body fat percentage average of 11.7±2.2% and the values of the Somatotype showed the following averages: 2.0±06 endomorphic, 4.1±1.1 mesomorphic and 3.1±1.3 ectomorphic (table 1).

Through the Pearson correlation could be found correlation between power and mesomorphic significant $p < 0.05$ by $r = 0.639$ and between power and endomorphy $p < 0.05$ by $r = 0.565$ in both cases positive, however Could not find a correlation between power and ectomorphy ($p < 0.05$) but negative for $r = -0.570$.

For the correlation between capacity and mesomorphism was obtained significance ($p < 0.01$) with $r = 0.705$, ectomorphism ($p < 0.01$) but negative for $r = -0.733$ and no correlation between capacity and endomorphy.

Table 1 - Age chronotropic and anthropometric measurements.

Variables	Sample (n=15)
Age (years)	22.9±5.4
Body Weight (Kg)	66.7±6.8
Height(cm)	176.2±4.2
Percent Fat (%)	11.7±2.2
Mean Somatotype	
Endomorphic ^{1,2}	2.0±0.6
Mesomorphic ^{1,2}	4.1±1.1
Ectomorphic ¹	3.1±1.3

¹ p<0,05 for power² p<0,01 for capacity

The samples (n=15) was ranked as the average of its Somatotype as meso-ectomorphic. Since its variables means (power, capacity and fatigue index) found in the Wingate test shown in table 2.

Table 2 - Analysis of anaerobic valences.

Variables	Sample (n=15)
Power*	8.1±1.1
Capacity*	6.9±0.9
Fatigue Index**	29.2±1.0

* Watts per body mass (kg)

** Measured in percentage (%)

The sample was divided into specific subgroups according to their Somatotype, and found 05(33.3%) individuals meso-ectomorphic, 04(26.7%) ecto-mesomorphic, 03(20.0%) ectomorphic endomorphic, 02(13.3%) meso-endomorphic, and only 01(6.7%) individual being classified as balanced mesomorphic.

Each subgroup investigated according to their biotype showed differences between the averages when compared with their specific variables. Demonstrating a relationship exists with the ethos of the athletes according to their performance.

In subgroup meso-ectomorphic (n=5) your power (7.9±0.8) and capacity (7.0±0.9) did not exceed the subgroup meso-endomorphic (n=2) with variables of power (9.0±1.3) and capacity (8.5±0.2), but obtained the fatigue index (FI%) inferior to all groups (25.1±10.2), this index represents the drop in maximum power occurred at the beginning of the test until the final 30 seconds (table 3).

In the same table, to look at subgroups is possible to find a significant correlation (p<0.01) between the power* and subgroup Meso-endomorph (r=1.000) and a significant correlation (p<0.05) between the capacity** and subgroup Ecto-mesomorph (r=0.990).

Table 3 - Comparison of the subgroups and their variables.

Variables	Somatotypes				
	Meso-Ectomorphic	Ecto-Mesomorphic	Ectomorphic-Mesomorphic	Meso-Endomorphic	Mesomorphic Balanced
(n)	5	4	3	2	1
Power*	7,9±0,8	7,9±1,4	7,5±0,5	9,9±1,3	9
Capacity*	7,0±0,9	6,4±0,6	6,5±0,4	8,5±0,2	7,1
I.F. ⁶	25,1±10,2	36,5±5,4	28±8,1	35±21,2	30

* Expressed in watts/kg - I.F.% Fatigue Index in percentage.

CONCLUSIONS

Using data obtained from the group studied was possible to detect the relationship between the Somatotype of an athlete with the characteristics of power and capacity needed when these physical valences are prevalent.

The mean Somatotype found (Meso-endomorph) showed significant correlation at p<0.05 with power, while capacity showed significant correlation at p<0.01.

When we pay attention to the subgroups that stands out in the balance of power is just the Meso-endomorph as the capacity that the Ecto-mesomorph.

This information is important in order to develop a more specific mode, considering that during the competition, practitioners are required in every way, in this case power and capacity can be said to correlate this with haste as the biotype ideal for yield.

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BIOTYPE, ANAEROBIC POWER AND CAPACITY OF THE ATHLETE MOUNTAIN BIKE SUMMARY:

The mountain biking is a sport that grows in Brazil and develop elite athletes who are preparing hard for international competitions, requiring scientific information to guide their training optimally, thus reducing the loss of time, money, material and most importantly; the health of the athlete. The city of São Bento do Sul, Santa Catarina in the northern highlands has a relevant national prominence. The topography of the city seems to influence the development of athletes in the sport. The aim of this study was to evaluate the Somatotype, capacity and anaerobic power athletes and the sport of mountain bike from the city of São Bento

do Sul-SC. The group was composed of athletes practicing in Mountain Bike, aged (15 and 30 years), all male, resident and domiciled in São Bento do Sul located in Santa Catarina-Brazil. Because of its peculiarities, was taken as a case study. For the Somatotype was used the technique of Heath & Carter (1990); for body fat was used the equation proposed by Faulkner (1968 in Fernandes Filho 2003), to assess the capacity and anaerobic power, the second Wingate test Pompeu (2004) and the following equipment: skinfold caliper CESCORF mark, metal anthropometric tape SANNY, caliper blunt WCS, Cardiomed wall mounted, medical Filizola balance and a cycle ergometer with mechanical braking model MONARK. The study group had a mean age of 22.9 ± 5.4 years, with mean weight of 66.7 ± 6.8 kg, while its height was the average of 176.2 ± 4.2 cm. and with an average percentage of body fat of $11.7 \pm 2.2\%$. How mean Somatotype find: Endomorphic (2.0 ± 0.6); Mesomorphic (4.1 ± 1.1) and Ectomorphic (3.1 ± 1.3). We conclude that the biotype ideal for mountain bike, based on the findings of the group investigated for better performance generator power and anaerobic capacity is the meso-endomorphic. **KEY WORDS:** Mountain Bike, Wingate, Somatotype.

BIOTIPO, ANAEROBIE DE PUISSANCE ET RENFORCEMENT DES ATHLÈTES DE MOUNTAIN BIKE

RÉSUMÉ:

Le mountain bike est un sport qui se développe au Brésil et à développer des athlètes qui se préparent dur pour les compétitions internationales, exigeant des informations scientifiques pour guider leur formation de façon optimale, réduisant ainsi la perte de temps, d'argent, de matériel et plus important, la santé de l'athlète. La ville de São Bento do Sul, Santa Catarina, dans les montagnes du nord a une importance nationale. La topographie de la ville semble influencer le développement des athlètes dans le mountain bike sport. L'objectif de cette étude était d'évaluer le somatotype, la capacité et puissance anaérobie des athlètes et du sport du vélo de montagne dans la ville de São Bento do Sul-SC. Le groupe était composé d'athlètes pratiquant de mountain bike, âgés (15 et 30 ans), tous de sexe masculin, résidant et domicilié à São Bento do Sul, de Santa Catarina, Brésil. A été pris comme une étude de cas en raison de ses particularités. Pour la somatotype a utilisé la technique de Heath et Carter (1990), pour la masse grasse corporelle a été utilisé l'équation proposée par Faulkner (1968 apud Fernandes Filho, 2003); d'évaluer la capacité et la puissance anaérobie, le second test Wingate Pompeu (2004) et les équipements suivants: pli cutané étrieur scientifique CESCORF, anthropométriques stadiomètre acier bande mur SANNY, Blunt-WCS étrier pointe, Cardiomed montées échelle médicaux FILIZOLA et un vélo stationnaire avec freinage mécanique modèle MONARK. Le groupe d'étude avaient un âge moyen de $22,9 \pm 5,4$ ans, poids moyen de $66,7 \pm 6,8$ kg, tandis que sa hauteur était la moyenne de $176,2 \pm 4,2$ cm. et avec un pourcentage moyen de graisse corporelle de $11,7 \pm 2,2\%$. Comment somatotype moyenne a été trouvé: Endomorphy (2.0 ± 0.6); Mesomorphy (4.1 ± 1.1) et Ectomorphy (3.1 ± 1.3). Nous concluons que le biotope idéal pour le vélo de montagne, sur la base des conclusions du groupe d'enquête pour mieux pouvoir générateur de performance et de capacité anaérobie est le méso-Endomorph.

MOTS-CLÉS: Mountain bike, Wingate, Somatotipo.

BIOTIPO, POTENCIAANAERÓBIA Y LA CAPACIDAD DE LOS ATLETAS DE MOUNTAIN BIKE

RESUMEN:

El mountain bike es un deporte que crece en Brasil y desarrolla deportistas de élite que se preparan duro para las competiciones internacionales, lo que requiere información científica para guiar su formación de manera óptima, reduciendo así la pérdida de tiempo, dinero, material y más importante, la salud del atleta. La ciudad de São Bento do Sul, Santa Catarina, en las montañas del norte tiene una prominencia nacional pertinente. La topografía de la ciudad parece influir en el desarrollo de los atletas en la bicicleta de montaña. El objetivo de este estudio fue evaluar el somatotipo, la capacidad y potencia anaerobia de los atletas del deporte de mountain bike en la ciudad de São Bento do Sul-SC. El grupo estaba compuesto por los atletas que practican en bicicletas de montaña, con la edad (15 y 30 años), todos varones, con residencia y domicilio en São Bento do Sul, ubicada en Santa Catarina-Brasil. Se tomó como caso de estudio debido a sus peculiaridades. Para el somatotipo se utilizó la técnica de Heath & Carter (1990), de grasa corporal se utilizó la ecuación propuesta por Faulkner (1968 in Fernandes Filho, 2003), para evaluar la capacidad y la potencia anaerobia, el test de Wingate segundo Pompeu (2004) y el siguiente equipo: de la zapata del pliegue cutáneo CESCORF, cinta antropométrica de metal Sanny, pinza metálica WCS, estadiómetro de pared Cardiomed montado de equilibrio Filizola y una bicicleta ergométrica con freno mecánico modelo Monark. El grupo de estudio tenían una edad media de $22,9 \pm 5,4$ años, con peso medio de $66,7 \pm 6,8$ kg, mientras que su altura era el promedio de $176,2 \pm 4,2$ cm. y con un porcentaje medio de grasa corporal de $11,7 \pm 2,2\%$. ¿Cómo somatotipo medio fue encontrado: endomorfia ($2,0 \pm 0,6$); Mesomorfia ($4,1 \pm 1,1$) y ectomorfia ($3,1 \pm 1,3$). Llegamos a la conclusión de que el biotipo ideal para el mountain bike, basado en las conclusiones del grupo de investigación para un mejor funcionamiento del generador de energía y la capacidad anaeróbica es el meso-endomorfo.

PALABRAS CLAVE: Mountain Bike, Wingate, Somatotipo.

BIOTIPO, CAPACIDADE E POTENCIAANAERÓBIA DO ATLETA DE MOUNTAIN BIKE

RESUMO:

O mountain bike é uma modalidade esportiva que cresce no Brasil e desenvolve atletas de elite que se preparam arduamente para competições internacionais, necessitando de informações científicas para direcionar seus treinamentos de forma otimizada, diminuindo assim a perda de tempo, dinheiro, material e o mais importante; a saúde do atleta. A cidade de São Bento do Sul, no planalto norte catarinense tem relevante destaque nacional. A topografia da cidade parece influenciar para o desenvolvimento de atletas na modalidade mountain bike. O objetivo deste estudo foi avaliar o somatotipo, a capacidade e potência anaeróbica e dos atletas da modalidade mountain bike da cidade de São Bento do Sul-SC. O grupo amostral foi composto de atletas praticantes da modalidade de Mountain in Bike, com idades entre (15 e 30 anos) sendo todos do sexo masculino, residentes e domiciliados na cidade de São Bento do Sul situada em Santa Catarina-Brasil. Tomou-se como um estudo de caso em razão das suas particularidades. Para o somatotipo foi utilizado a técnica de Heath & Carter (1990); para a gordura corporal foi utilizada a equação de proposta por Faulkner (1968 apud Fernandes Filho 2003); para a avaliação da capacidade e potência anaeróbica, o teste de Wingate segundo Pompeu (2004) e os seguintes equipamentos: compasso de dobras cutâneas científico cescorf, fita antropométrica metálica SANNY, paquímetro de pontas rombas WCS, estadiômetro marca Cardiomed fixado na parede, balança médica Filizola e uma bicicleta ergométrica com frenagem mecânica do modelo MONARK. O grupo estudado apresentou média de idade de $22,9 \pm 5,4$ anos, com massa corporal média de $66,7 \pm 6,8$ kg, sendo que a sua estatura ficou com a média de $176,2 \pm 4,2$ cm. e com um percentual médio de gordura corporal de $11,7 \pm 2,2\%$. Como somatotipo médio foi encontrado: Endomorfia ($2,0 \pm 0,6$); Mesomorfia ($4,1 \pm 1,1$) e Ectomorfia ($3,1 \pm 1,3$). Concluímos que o biótipo ideal para o mountain bike, baseados nos resultados encontrados no grupo investigado para melhor desempenho gerador de potência e capacidade anaeróbica é o meso-endomorfo.

PALAVRAS-CHAVE: Mountain Bike, Wingate, Somatotipo.

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