Orientation run: dermatoglyphical and somatotypical characterization of high performance athletes in the south region of Brazil

ABSTRACT: Though frequently scattered on European countries, the orienteering is a brand new practice in Brazil. The number of practiser comes growing up anually in Brazil and orienteering clubs have been stabilished on a lot of cities, outstanding importantly in souther zone states. This sport, meanwhile, comes developmentg detached technically, what, consequently becomes very hard to achieve and later support the high performance. This level demands special and privates characteristics from persons that wish reach expressives and proeminence results. The study aims to determine the dermatoglytical and somatotypical profile in orienteering elite athletes in brazilian south zone. The sample used was based on 08 male athletes participants of the Orienteering south championship in elite categories (age 30.38 ± 3.38 years, body mass 71.00 ± 4.50 kg and height 178.63 ± 3.07 cm). To obtain the somatotype was used the method of Heath & Carter (1990) and to Dermatoglyphics characteristics was used protocol by Cummins & Midlo (1942 apud FERNANDES FILHO, 1997). In conclusion, somatotype is the Meso-Ectomorfi c and the SQTL and D10 (Delta index) meeting includ in Class IV of the Dermatoglyphics and somatic-functional index Classification (ABRAMOVA et al., 1995) and what make reference to high levels of resistence and cordination, essentials physical qualities to an orienteering athlete.

Keywords: Orienteering, Orientation, Elite, Somatotype, Dermatoglyphics.

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RESUMEN

Carrera de orientación: caracterización dermatoglífica y somatotípica de atletas de alto rendimiento de la región sur de Brasil

A pesar de bastante difundida en los países del Continente europeo, carrera De Orientación es una modalidad de práctica reciente en Brasil. El número de practicantes de Carrera de Orientación viene creciendo anualmente y Clubes de Orientación están siendo fundados en diversas ciudades con destaque importante para los estados de la región sur. Este deporte, sin embargo, viene evolucionando técnicamente de forma destacada lo que, de modo que, vuelve extremadamente difícil la consecución y posterior manutención del alto rendimiento. Este nivel exige características especiales y particulares de los individuos que desean alcanzar resultados expresivos y de destaque. El objetivo de este estudio es determinar el perfil somatotípico y dermatoglífico de atletas de carrera de orientación de alto rendimiento de la región sur de Brasil. La muestra utilizada se constituye de 08 individuos del sexo masculino participantes del Campeonato Gaúcho de Orientación en la Categoría Elite (edad 30,38 ± 3,38 años, masa corporal 71,00 ± 4,50 kg y estatura 178,63 ± 3,07 cm). Para la obtención de la somatotipia fue utilizado el método de Heath & Carter (1990) y para la verificación de las características dermatoglíficas se utilizó el protocolo de Cummins & Midlo (1942 citado por FERNANDES FILHO, 1997). A partir de los datos podemos concluir que el somatotipo verificado es del tipo Meso-Ectomórfico y que el SQTL (Somatório de la Cantidad Total de Líneas) y el D10 (Índice Delta) encontrados enquadran-se en la Clase IV de la Clasificación de Índices Dermatoglíficos y Somato-Funcionales (ABRAMOVA et al., 1995) y que hace referencia a altos niveles de Resistencia y Coordinación, cualidades físicas esenciales al Atleta de Carrera de Orientación.

Palabras clave: Carrera de Orientación, Orientación, Elite, Somatotipia, Dermatoglífica.

INTRODUCTION

The orientation came up from the man’s necessity of hunting and foraging for food far away from their homes. Those necessities propitiated the development of strategies that would allow a precise and safe dislocation.

Through strong details’ verification of the ground and also through soil and stars observation, men can determine the cardinal points (north, south, east and west) and, in this way, orientate themselves in more and more distant areas.

As a sport, the Orientation appeared around 1850, in Scandinavia. Those which were activities of essential training for displacement in war has been transformed in a way of entertainment to the troops and tried to ally the contact with nature with intensive physical and mental activity. Right after, the “game” had already been dispersed and clubs were created. Competitions were organized and, in 1912, the major Ernst Killander introduced the Orientation at the Swedish Athletism Federation (CBO, 2000) program.

The Orientation is a sport which represents a new way of expression in Physical Education. Not widely broadcast in Brazil, it is preferably developed near nature. The trainee receives a very detailed map of a region where there is an outlined way that joins many control points and that, with the help of a compass, must do the course passing through all these points in the shortest time as possible (CBO, 2000).

The number of participants of the Orientation Run has been yearly growing in Brazil. Orientation clubs have been created in many cities of our countries, with an important focus to the south states, maybe due to the fact that they have a bigger and more representative European cologne. Universities (like UFRJ and UFRGS) and Brazilian schools have adopted the Orientation run in their school curriculums, expanding, this way, the divulgation and practice of this sport in the academic environment. The OBC (Brazilian Orientation Confederation) regulates sports’ practice in Brazil and is an organ linked to the BOC (Brazilian Olympics Committee) and to the IOF (International Orientation Federation). The Federation has 6.400 affiliate athletes in Brazilian Orientation clubs. All around the world there are 400.000 Orientation trainees (IOF, 2000).


Lorenzo (2000), mentioned by Cortes et. al (2002), comments that the deport talent is a “conjunto de aptitudes inherentes al sujeto, que determinan el rendimiento del deportista”. According to Dantas (1998), it’s very important that the considered high...
performance athlete presents psycho-motor characteristics different in such a way to be better than others also highly qualified morphologically, physiologically and psychologically.

In Fernandes Filho (1997) and Weineck’s (1991) opinion, it is necessary to create models based on science and which work as a support to the selection and detection of sportive talents.

According to the IOF (1990), the special characteristics of the instructors [a combination of mental and physical effort] make the sport become a particular interest to medical and scientific analysis.

When we determinate ideal indexes to a modality, we don’t desire the creation of exclusion mechanisms through a common characteristics’ profile; this attitude is due to the basic necessity in responding to the each sport’s exigencies, with their own characteristics. This is due to the fact that each athlete belongs to some minorities that must be determined and that need opportunity to be discovered and developed.

The correct application of previous knowledge of the possibilities and genetic tendencies added to the appropriate environment’s contribution, the training can contribute, although not in an unique way, to the talent’s determination and also to its development (SKINNER, 2002).

Fernandes Filho (1997) also says that the model of Digital Impressions allows the choice with a bigger optimization of the specialization in the sport in relation to the individual talent. This presupposed is an efficient instrument that teams can count on to know its performance in advance. Through this procedure it would be possible to obtain not only the maximization of sportive productivity, but also the correct direction of efforts, time and money. In this way and with the intuit to foresee the athletes’ adequate future performance, we have verified that the initial level must have dermatoglyphia’s contribution through the obtainance of the Digital Impressions necessary to study.

Still according to Fernandes Filho (1997), scientific researches of the VNIIFK – Moscow, accomplished principally during the last two decades, showed the application of Digital Impressions (DI) in the sportive selection.

Norton & Olds (2000, p. 265), say that if there is an ideal corporal type to a particular sport, only the sportsmen with this ideal shape will remain in competitive level.

Studies related to somatotipia with high performance sports’ practice have been reinforcing its importance, not only to athletes’ physical development accomplishment, but also as a powerful help in the selection of sport’s talents (HAWES & SOVAK, 1994; RIENTZI et al, 2000).

Nowadays, it is obvious the integration between the Somatotipology, the sport and the physical performance, propitiating the obtention of positive indexes in the sportive evolution (CLAESSSENS et al, 1999) and (NORTON & OLDS, 2001). Today the method of Heath-Carter is the most used aiming to obtain the somatotype. (FERNANDES FILHO, 2003, p. 119).

### METHODOLOGY

The kind of study used is the Profile one (FLEGNER & DIAS, 1995, p.56) and its delineation is almost experimental, as Thomas & Nelson (2002, p.314) classify. According to that it aims to “adjust the delineation for environments more similar to the reality and, even so, control as many threats to the internal validity as possible”.

The sample was limited to 08 (eight) Orienteering Run athletes in the male’s Elite category of the Orientation Brazilian Confederation (OBC), that hold at least 04 (four) years of experience as region level athletes and who are participants of the Gaucho Championship of Orientation (GCO). This study respond to the Norms for Realization of Research in Human beings– Resolution 196/96 of the National Health’s Council. 10/10/1996.

### PROTOCOLS

Age, corporal mass and high have been verified in order to characterize the considered sample in a very definite way.

The protocol chosen for the determination of the genetic characteristics was the Cummins and Midlo (1942 quoted by FERNANDES FILHO, 1997) digital dermatoglyphia and updated by the use of new materials.

The reading of digital impressions was accomplished according to the method described bellow:

1) Types of drawings in the hands fingers’ distal phalanges: Arch “A” (drawing without deltas) – It’s characterized by the absence of tiriádios or deltas and it’s composed by edges that cross the digital pad transversely; Braid “L” (drawing of a delta) – has one delta. It’s a drawing partially closed where the skin crests start in a finger extremity and round itself distally in comparison to the other, without getting near the one where they are originated.; Verticilo “W” (two deltas drawing) – has two deltas. It’s a closed figure in which the center lines are around the drawing’s center;

2) Lines quantity (LQ): It’s counted according to the line that connect the delta to draw center discorsidiering the first and the last crests line, as the Vucetich method.

With these values, we can calculate the gage and fundamentals indexes of the digital impressions:

- a) The quantity of drawings of different kinds for the 10 (ten) hands fingers;
- b) The quantity of the lines (QL) in each finger of the hand;
- c) The complexity of the drawings or delta index (D10) in the 10 (ten) fingers of the hands which is obtained realizing the sum of deltas of all the fingers, so that the Arch value score (A) is 0 (delta’s absence); the Braid’s (L) is 1 (one delta); the verticil’s (W) or of the S-drawing is 2 (two deltas) which is equal to the formula $S L + 2 S W = \Delta 10$;
- d) The total lines’ quantity (STLQ), which is the sum of the lines’ quantity referring to the 10 (ten) hands fingers;
- e) The types of the digital formulas that indicate the representation of the different drawing types in the individuals. There are 5 (five) types of digital formulas:
  - AL – the presence of arch and braid in any combination;
  - ALW – the presence of arch, braid and verticil in any combination;
• **10L** – ten braids;
• **LW** – the braid and the verticil in which the number of braids is superior or equal to 05 (five);
• **WL** – the verticil and the braid in which the number of verticils is superior to 05 (five).

The somatotype values was obtained by the somatotypologic method of Carter & Heath (1990, p. 368). This method enables the exact determination of the ideal physical structure of each sport, besides being an effective tool to be used in talents’ discovery and to propitiate the body’s alteration accompaniment during a competition season (ISAK, 2000). According to Carter & Heath (1990, p. 371), this method has a 0.98 “r” for weight and height, between 0.92 and 0.98 for circumferences and diameters and between 0.90 and 0.98 for cutaneous folding.

**STATISTICAL TREATMENT**

A descriptive analysis has been done aiming to verify its profile through its basic statistical parameters, such as population size, average, standard deviation, maximum and minimum. To quantify the homogeneity degree of the considered population, we used the dispersion’s analysis combined to curtosis and asymmetry test.

To keep the research’s scientific rigidity, we considered the level of significance of p < 0.05, this is to say, 95% of probability to affirmative and/or negative verified during the investigations.

**RESULTS’ PRESENTATION AND DISCUSSION**

The variables age, corporal mass and stature’s results are demonstrated in CHART 1:

Comparing to others countries masterminds’ samples, the athletes’ ages in the present study is superior to the French one (CHALOPIN, 1994) and similar to the Portuguese one (SANTOS, 2001) as it can be seen in CHART 2.

Regarding the athletes’ corporal mass and stature, the presented studies indicate to the same sense according to the showed at the SCHEDULE 3.

The dermatoglyphical profile verified in orientation runners is put in 4th Class of the Dermatoglifical and Somato-Functional classification index (ABRAMOVA et al., 1995). This class is characterized by the SQTL and D10 elevation and symptomatic in complex proprioception sports and with a bigger motor complexity. The average values and its derivatives are presented in CHART 4 and certify the homogeneity for the two considered variables.

In relation to the qualitative aspect the following results were obtained: Arch (A)=0.00+/-0.00; Braid (B)=5.00+/-2.78 and whorl (W)=5.00+/-2.78. It was also verified the existence of the following digital formulas (in percentage): W>L=62.5%; L>W=25% and 10L=12.5%. We can notice the absence of Arch (A) which is an outstanding characteristic of high sportive productivity in modalities that don’t need high levels of Resistance

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**Chart 1 – Age, Mass and Stature’s values presentation**

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>30.38</td>
<td>3.38</td>
<td>23.00</td>
<td>35.00</td>
</tr>
<tr>
<td>Mass</td>
<td>71.00</td>
<td>4.50</td>
<td>64.00</td>
<td>78.40</td>
</tr>
<tr>
<td>Stature</td>
<td>178.63</td>
<td>3.07</td>
<td>174.00</td>
<td>183.00</td>
</tr>
</tbody>
</table>

**Chart 2 – Presentation of the age values**

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chalopin (1994)</td>
<td>n=10</td>
<td>23.7 +/- 0.6</td>
</tr>
<tr>
<td>Santos (2001)</td>
<td>n=10</td>
<td>30.0 +/- 4.97</td>
</tr>
<tr>
<td>Current Study</td>
<td>n=08</td>
<td>30.38 +/- 3.38</td>
</tr>
</tbody>
</table>

**Chart 3 – Presentation the Height and Body Mass values**

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Stature</th>
<th>Corporal Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowlton et al (1980)</td>
<td>n=13</td>
<td>n.d.</td>
<td>72.2 +/- 6.5</td>
</tr>
<tr>
<td>Stepinck (1986)</td>
<td>n=18</td>
<td>179.4 +/- 5.2</td>
<td>70.4 +/- 1.8</td>
</tr>
<tr>
<td>Withers et al (1986)</td>
<td>n=100</td>
<td>176.2 +/- 6.8</td>
<td>64.7 +/- 5.0</td>
</tr>
<tr>
<td>Santos (2001)</td>
<td>n=10</td>
<td>175.60 +/- 5.7</td>
<td>68.5 +/- 4.58</td>
</tr>
<tr>
<td>Current Study</td>
<td>n=08</td>
<td>178.63 +/- 3.07</td>
<td>71.00 +/- 4.50</td>
</tr>
</tbody>
</table>

**Chart 4 – Presentation of Dermatoglyphical characteristics**

<table>
<thead>
<tr>
<th></th>
<th>SQTL</th>
<th>D10</th>
<th>A</th>
<th>L</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Average</td>
<td>143.25</td>
<td>15.00</td>
<td>0.00</td>
<td>5.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Standard Error</td>
<td>7.19</td>
<td>0.98</td>
<td>0.00</td>
<td>0.98</td>
<td>0.98</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>20.32</td>
<td>2.78</td>
<td>0.00</td>
<td>2.78</td>
<td>2.78</td>
</tr>
<tr>
<td>Minimum</td>
<td>108.00</td>
<td>10.00</td>
<td>0.00</td>
<td>2.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>171.00</td>
<td>18.00</td>
<td>0.00</td>
<td>10.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Asymmetry</td>
<td>-0.21</td>
<td>-0.96</td>
<td>.</td>
<td>0.96</td>
<td>-0.96</td>
</tr>
<tr>
<td>Curtose</td>
<td>0.20</td>
<td>-0.16</td>
<td>.</td>
<td>-0.16</td>
<td>-0.16</td>
</tr>
</tbody>
</table>
and Coordination, which are essential physical qualities for the Orientation Run Athlete.

About the somatotypical characteristics, it was verified Endomorph = 2.41±0.57; Mesomorphy = 4.24±0.64 and Ectomorphy = 3.00±0.46 which characterizes the sample as Meso-ectomorph, as exposed in the CHART 5.

In relation to other studies, the result gotten for this sample is similar as for the Endomorphy. However, it has inferior values of Mesomorphy and Ectomorphy, as shown in the CHART 6. It is important to point out the proximity of values between the study carried through more recently (SAINTS, 2001) and the present research.

CONCLUSIONS AND RECOMMENDATIONS

The Orientation Run sport is unique in its characteristics of uniting the physical activity with the use of the cognitive faculties in constant way. This natural specificity takes in to believe them in the pressing necessity of definition of its basic characteristics of orientation and allied porting election to the way training such to maximize the evolution of the sport related to the high income in Brazil.

With the purpose of determining the profile of the mentioned Elite’s athletes we investigated the dermatoglyphical and somatotypical characteristics of Orientation runners from the South region of Brazil, aiming to determine a safe and trustworthy basis for future comparisons and the determination of the high income national level Athlete’s Profile. In this way and through the obtained results, we verified the occurrence of homogeneous factors in 10 of the 11 analyzed variables (90.91%), what allows us to affirm the existence of one high degree of homogeneity for the considered sample.

For the relatively recent expansion of the Orientation Run in Brazil, it is yet not possible to count on information and subsidies that can serve as comparative parameters for our research. This study comes, in such a way, to initiate a new investigation field inside Sport’s Sciences significantly regarding the Orientation Run.

REFERENCES


