SOMATIC EVALUATION OF JUNIOR HANDBALL PLAYERS

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Abstract. The issue related to the importance of training young athletes is well known, because they are the basis of player selection in clubs and national teams at senior level, and maintaining a high standard of practice in this sport depends on the involvement of coaches and the appropriate training of young talents. The game of handball is constantly experiencing an exponential increase in the level of play, dynamics, training methods, technical structures, physical involvement and personal touch on specific technical elements, aspects that need to be treated with interest so that players can maintain their performance at a high level. Handball is a game that requires the regular assessment of players’ indices in order to have a proper perspective on their progress. As regards junior handball players, we can state that it is very important to thoroughly observe their development, especially from a somatic point of view, because they are in a constant process of growth that has implications on their way of sustaining the specific effort demanded by this team sport. We assume that the choice of the most important areas of interest throughout this process will enable us to find the suitable means and methods as well as tests and measurements for these young athletes.

Keywords: handball, somatic evaluation, process.

Introduction

There are noticeable individual differences in anthropometric and physiological characteristics between elite players. Anthropometric measurements include height, weight, body fat percentage as well as waist and hip circumferences. Anthropometric measurement was the first type of test used in physical education worldwide, the American Association for the Advancement of Physical Education recommending fifty measurements to be performed.

In terms of physical performance, handball is considered to be a complex and intermittent sport that requires players to provide, in some moments of the game, efforts of maximum intensity in a short period of time during actions such as jumping, running and throwing the ball at high velocities, followed by short periods of low-intensity effort. Some studies (Gorostiaga et al., 2006; Gorostiaga et al., 2005) report that in this team sport, along with technique and tactics, anthropometric values and high levels of strength under different forms of manifestation are crucial factors for achieving success in competitions.

Handball is a physically demanding team sport with professional leagues in a large number of countries, and major international championships take place on a regular basis, meaning that the importance of this sport is growing and hence the need for further studies on all its aspects (Michalsik et al., 2015a; Michalsik et al., 2015b).

Currently, the game of handball is characterised by three main motor skills – throwing, running and jumping, and in anthropometric terms, by aspects such as body height, arm span and hand length. Most players, regardless of level and age, try to progress and improve as much as possible their overall performance both physically and mentally in conditions of
constant development and changing factors that tend to exist in this sport. Some top athletes have as the main goal to overcome their limits and all obstacles to reach performance.

Competitions in sports games take place in environments that differ in space and time, aspects that condition the wave of information provided by opponents, and a good decision-making ability allows athletes to move on the playing field in the best circumstances and finally achieve their main goal, namely winning the game.

Handball players need to have a certain level of tactical, technical and social skills (Wagner et al., 2014). There is a strong connection between these factors, and we believe that their good manifestation can be correlated with players’ somatic characteristics.

According to Jaric (2003), body height can influence the results of field tests. Some anthropometric characteristics need to be taken into account when assessing the level of players. Other studies (Skoufas et al., 2004; Van den Tillaar & Ettema, 2004) showed a positive correlation between handball-specific movements and anthropometric variables such as body mass, lean body mass, body height and body mass index (BMI). Zaptiditis et al. (2009) highlighted other anthropometric parameters such as hand length and arm span and correlated them with movements specific to this team sport. At a higher or lower level, these somatic and anthropometric variables tend to be able to predict performance.

Some authors (Milanese et al., 2012; Hermassi et al., 2015; Mohamed et al., 2009) state that information on variations in handball players’ anthropometry during the competition season is quite limited. Monitoring the body composition of players throughout a competition cycle can provide valuable information to create an anthropometric profile of each player in order to have an overview of their development level and the areas that need to be improved.

According to Schwesig et al. (2016), “substantial differences of body build and physical performance between playing positions underline the importance of a careful assignment of such positions and the development of position-specific training for professional handball players by modifying both intermittent aerobic and anaerobic endurance components of training sessions” (p. 1471); at some point, they are able to relate to some somatic and anthropometric features of each individual.

The game of handball has quickly developed, and the performance levels achieved today are increased and can be reached by athletes who are constantly improving their training.

In modern handball, the somatic area is large from the perspective of different playing zones that impose different physical and mental demands on players.

Handball is a well-known sport around the world, which is played at different levels, and for each of them, there are some basic skills (such as strength, power, speed and endurance) that matter most when playing this complex team sport. The presence of direct opponents requires a great level of creativity to find the best solution when facing them. The positive influence of fast starts after receiving a goal (which are currently used in a high percentage in any handball game) and the increased time spent in attack show that this team sport has reached another level of performance through its dynamics.

All these demonstrate that the regular assessment of handball players, especially at junior level, can help coaches and players to design specific training plans to improve the areas that do not have the desired level of performance.

The game of handball, due to its complexity, requires the constant improvement of motor manifestations during matches from the perspective of two components.
A first component concerns the whole group, its level of cohesion but also the efficiency with which it performs the elements of collective tactics in attack and defence (closing the corridors, blocking the balls thrown to the goal, etc.). Being a team sport, it is imperative for all the collective mechanisms and systems to function properly for an increased level of efficiency and implicitly the achievement of positive results.

The second component is closely related to each player’s characteristics viewed in relation to the team. Thus, it should be recalled that each player’s position requires specific training for particular motor tasks aimed at improving the elements of individual technique, with the ultimate goal of making a positive contribution to achieving the highest level of performance.

Players must be mentally prepared to cope with the psychological discomfort induced by the stressful effects of competitions, the periods of training in isolated areas, the monotony of training, the affected interpersonal relationships or even conflict situations.

Sport psychology has as an object of study the psychological adaptation of athletes to the needs of competitive activity and training periods. As a precisely directed science, it addresses and studies the educational and intellectual processes of athletes engaged in sports activities, their behaviours and motor reactions being exactly the goals pursued. All the stages of sports training, especially in the current period, contain an increased level of difficulty in the context of interdisciplinary and psychological contribution.

Individual or collective psychological investigation can establish to what extent an athlete is able to fulfil or demonstrate as effectively as possible their skills, knowledge and level of training, all these related to the level of competition.

To achieve the best possible performance, the motor activity of elite players must involve specific physical and mental demands, and their maximum effort must alternate between these two spectrums. Top-level handball players need to provide intense effort due to the extremely high training and competition loads that require maximum concentration in addition to physical, volitional and mental abilities.

Sports performance, like human performance in general, is determined by the logical, emotional and creative activities of the athletes’ spirit and plays a key role in obtaining the best indices of motor manifestation. The main goal of elite sport is considered to be a borderline activity of both human capabilities and multilateral mental and physical processes that develop simultaneously with the athlete.

In recent years, the study of sports performance and anthropometry has shown: “1. how morphological prototypes are important for success, within and among sports; 2. a higher morphological variability in some sports than others; 3. that athletes who have or have acquired an optimal anthropometric profile for a specific event are more likely to succeed; and 4. that morphological optimization is useful to evaluate the training status, and the talent selection in both male and female athletes” (Massuća & Fragoso, 2015, p. 109).

Intensities in handball range from walking, moderate running and short sprints to side or forward/backward movements, so an increase in specific endurance is needed to maintain an optimal level of play during the game (Michalsik et al., 2013; Povoas et al., 2012).

Moreover, the game of handball is also influenced by tactical concepts, social factors and cognitive aspects. Other factors such as trauma, nutrition and external influences on material and environmental conditions can also influence performance.
It can be said that, along with body mass, other anthropometric characteristics have been shown to be crucial for sports activities and implicitly performance achievement in the game of handball (Manchado et al., 2013) but also in other team sports such as volleyball, football and rugby (Campa et al., 2020). For example, throwing can be seen as the most important technical action performed by players (Van den Tillaar, 2016), which depends on the ability of the arm to reach a sufficient degree of acceleration so that the ball leaves the hand at the maximum possible speed. The duration of the throwing motion can lead to a reduction in the visual information available to the goalkeeper, and the velocity of the ball is correlated with the goalkeeper’s reaction time in an attempt to stop it.

Apart from this anthropometric knowledge, other body measurements are imperative to be performed to identify players’ strengths (Van den Tillaar, 2016).

Based on the anthropometric measurements of handball players of different levels, it has been concluded that the tallest athletes, with the largest arm span and an optimal body mass show a higher level of performance. A comparison of body structure between elite and amateur players also highlights that players who regularly practise this sport have higher values of muscle mass in relation to the whole body (Gorostiaga et al., 2005).

**Methodology**

The study was conducted on 43 junior handball players from different teams in the Moldova area, and its main purpose was to assess some somatic characteristics along with nutrition and strength indices. In order to assess handball players from a relevant point of view, we measured their height, body mass, BMI, body fat, arm span, lower limb length, hand length, spine mobility and palmar flexor strength.

*Height.* For the correct measurement of height, the athlete will stand barefoot and touch a vertical wall with their back, head and heels while facing forward. A stadiometer or a tape measure (a ribbon with linear markings in cm and subdivisions of at least 0.5 cm can be glued to the wall) is used to measure the distance from vertex (the highest point of the skull) to floor. Height is recorded in centimetres to the nearest 0.5 cm. A Bosch GLM 80 laser rangefinder was used in field tests to outline this profile.

*Body composition.* All parameters were measured using Omron HBF-511B-E body composition scales, which reproduce these parameters using BIA (bioelectric impedance analysis) technology based on 8 accurate sensors. In the first part of the protocol, data on the age, height and gender of the athlete are entered; then, the athlete will stand barefoot with both feet on the two sensors and will hold this position until the analyser evaluates all the data.

*Arm span.* It is measured with a centimetre ribbon or a flexible roulette. The athlete will stand on a flat surface facing a vertical wall, with arms outstretched and raised sideways in a horizontal position while touching the wall with both palms. It is recommended to stick on the wall a horizontal grid graduated in centimetres and subdivisions of 0.5 cm (grid length: 2 m and grid width: 40-50 cm to measure students with different heights). The distance between distal points of the middle fingers of both hands is measured in centimetres and subdivisions of 0.5 cm. It can be related to body height.

Materials needed: centimetre ribbon or flexible roulette
Lower limb length. The measurement is performed between the iliopspinal point and the tibial sphincter. The athlete will sit or lie supine with the lower limbs in extension.

Materials needed: digital calliper, centimetre ribbon

Hand length. The measurement is performed between the fold of the wrist below the palm to the tip of the middle finger when the hand is flat. The athlete will be seated with both feet resting on the outer edge of the flexometer, will bring the outstretched arms forward by bending the spine and will slide the rangefinder placed on the flexometer support to the maximum point of their muscular and articular capabilities. The device measures (in centimetres) the distance that the athlete covers through the movements described above.

Palmar flexor strength. Standing with legs apart at shoulder level and hands in supination, the athlete will hold a dynamometer in each hand, being required to make a muscular effort for a few seconds on the handles of the dynamometers. These devices will record the athlete’s muscle strength of the upper limbs at the moment.

Materials needed: Camry EH101 digital dynamometer

Results

Table 1. Descriptive statistics for the analysed group

|                         | N  | Minimum | Maximum | Mean  | Std. Deviation |
|-------------------------|----|---------|---------|-------|---------------|
| Height (cm)             | 43 | 157     | 195     | 174.70| 8.529         |
| Body mass (kg)          | 43 | 43      | 100     | 67.72 | 12.868        |
| BMI (kg/m²)             | 43 | 15      | 33      | 22.16 | 3.817         |
| Body fat (%)            | 43 | 7       | 34      | 17.60 | 7.604         |
| Arm span (cm)           | 43 | 153     | 197     | 176.49| 9.468         |
| Lower limb length (cm)  | 43 | 78      | 107     | 89.67 | 6.661         |
| Hand length (cm)        | 43 | 17      | 22      | 18.88 | 1.159         |
| Palmar flexor strength (kgF) | 43 | 17      | 58      | 33.44 | 8.209         |
| Valid N (listwise)      | 43 |         |         |       |               |

The calculation of minimum, maximum, mean and standard deviation was performed using the SPSS 20.0 program (Table 1).

The descriptive analysis has revealed the following results for the 43 analysed athletes:

Minimum height is 157 cm and maximum height is 195 cm, with a mean of 174.7 and a standard deviation of 8.529. Concerning body mass, the lowest value is 43 kg and the highest value is 100 kg, with a mean of 67.72 and a standard deviation of 12.86. BMI has a minimum value of 15 kg/m² and a maximum value of 33 kg/m², with a mean of 22.16 and a standard deviation of 3.817. Body fat has a minimum value of 7% and a maximum value of 34%, with a mean of 17.60 and a standard deviation of 7.604. Arm span has minimum and maximum values of 153 cm and 197 cm, respectively, with a mean of 176.6 and a standard deviation of 9.46. Lower limb length has minimum and maximum values of 78 cm and 107 cm, respectively, with a mean of 89.67 and a standard deviation of 6.661. Hand length has minimum and maximum values of 17 cm and 22 cm, with a mean of 18.88 and a standard deviation of 1.159. Palmar flexor strength has minimum and maximum values of 17 kgF and 58 kgF, respectively, with a mean of 33.44 and a standard deviation of 8.209.
Table 2. Descriptive statistics for players’ somatic and anthropometric characteristics

| Position      | V1 | Height (cm) | Body mass (kg) | BMI (kg/m²) | Body fat (%) | Span (cm) |
|---------------|----|-------------|----------------|-------------|--------------|-----------|
| Right wing    | Mean | 173.80     | 63.70          | 21.00       | 16.50        | 173.70    |
|               | N   | 10.00       | 10.00          | 10.00       | 10.00        | 10.00     |
|               | Std. Deviation | 9.47       | 11.85          | 3.20        | 7.26         | 10.03     |
| Right back    | Mean | 173.00     | 79.75          | 26.25       | 24.50        | 175.50    |
|               | N   | 4.00        | 4.00           | 4.00        | 4.00         | 4.00      |
|               | Std. Deviation | 11.20     | 24.14          | 5.85        | 6.24         | 5.51      |
| Centre back   | Mean | 177.67     | 66.00          | 21.00       | 12.67        | 180.00    |
|               | N   | 3.00        | 3.00           | 3.00        | 3.00         | 3.00      |
|               | Std. Deviation | 15.14     | 12.12          | 1.00        | 2.52         | 13.89     |
| Left back     | Mean | 172.63     | 63.63          | 21.38       | 15.25        | 178.13    |
|               | N   | 8.00        | 8.00           | 8.00        | 8.00         | 8.00      |
|               | Std. Deviation | 8.42       | 9.26           | 3.62        | 8.26         | 7.26      |
| Left wing     | Mean | 175.83     | 67.83          | 21.83       | 15.00        | 174.33    |
|               | N   | 6.00        | 6.00           | 6.00        | 6.00         | 6.00      |
|               | Std. Deviation | 6.65       | 12.86          | 3.31        | 4.98         | 7.66      |
| Pivot         | Mean | 174.75     | 70.75          | 23.25       | 20.00        | 182.25    |
|               | N   | 4.00        | 4.00           | 4.00        | 4.00         | 4.00      |
|               | Std. Deviation | 4.19       | 14.45          | 5.56        | 11.83        | 10.08     |
| Goalkeeper    | Mean | 176.75     | 69.88          | 22.50       | 20.50        | 176.25    |
|               | N   | 8.00        | 8.00           | 8.00        | 8.00         | 8.00      |
|               | Std. Deviation | 8.63       | 9.54           | 3.38        | 7.09         | 12.61     |

Moreover, the group was divided into specific field zones according to the playing positions, and thus we could observe each group in terms of descriptive statistics (Table 2).

Values for right wings:
- Height – mean 173.80 and standard deviation 9.47;
- Body mass – mean 63.7 and standard deviation 11.85;
- BMI – mean 21 and standard deviation 3.20;
- Body fat – mean 16.70 and standard deviation 7.26;
- Span – mean 173 and standard deviation 10.03.

Values for right backs:
- Height – mean 173 and standard deviation 11.20;
- Body mass – mean 79.75 and standard deviation 24.14;
- BMI – mean 26.25 and standard deviation 5.85;
- Body fat – mean 24.50 and standard deviation 6.24;
- Span – mean 175.50 and standard deviation 5.51.

Values for centre backs:
- Height – mean 177.67 and standard deviation 15.14;
- Body mass – mean 66 and standard deviation 12.12;
- BMI – mean 21 and standard deviation 1;
- Body fat – mean 12.67 and standard deviation 2.52;
- Span – mean 180 and standard deviation 13.89.

Values for left backs:
- Height – mean 172.63 and standard deviation of 8.43;
- Body mass – mean 63.63 and standard deviation 9.26;
- BMI – mean 21.38 and standard deviation 3.62;
- Body fat – mean 15.25 and standard deviation 8.26;
- Span – mean 178.13 and standard deviation 7.26.

Values for left wings:
- Height – mean 175.83 and standard deviation 6.65;
- Body mass – mean 67.83 and standard deviation 12.86;
- BMI – mean 21.83 and standard deviation 3.31;
- Body fat – mean 15 and standard deviation 4.98;
- Span – mean 174.33 and standard deviation 7.66.

Values for pivots:
- Height – mean 174.75 and standard deviation 4.19;
- Body mass – 70.75 and standard deviation 14.45;
- BMI – mean 23.25 and standard deviation 5.56;
- Body fat – mean 20 and standard deviation 11.83;
- Span – 182.25 and standard deviation 10.08.

Values for goalkeepers:
- Height – mean 176.75 and standard deviation 8.63;
- Body mass – mean 69.88 and standard deviation 9.54;
- BMI – mean 22.50 and standard deviation 3.38;
- Body fat – mean 20.50 and standard deviation 7.09;
- Span – mean 176.25 and standard deviation 12.61.

Table 3. Descriptive statistics for players’ anthropometric and strength characteristics

| Position      | V1 | Lower limb length (cm) | Hand length (cm) | Spine mobility (cm) | Palmar flexor strength R (kgF) | Palmar flexor strength L (kgF) |
|---------------|----|------------------------|------------------|---------------------|-------------------------------|--------------------------------|
| Right wing    | Mean | 88.90                  | 18.70            | 45.90               | 30.70                         | 29.10                          |
|               | N | 10.00                   | 10.00            | 10.00               | 10.00                         | 10.00                          |
|               | Std. Deviation | 6.72                  | 1.06             | 4.12                | 7.76                          | 7.62                           |
| Right back    | Mean | 89.25                  | 19.00            | 48.25               | 41.00                         | 38.25                          |
|               | N | 4.00                    | 4.00             | 4.00                | 4.00                          | 4.00                           |
|               | Std. Deviation | 2.63                  | 0.82             | 6.24                | 16.43                         | 16.38                          |
| Centre        | Mean | 96.00                  | 19.33            | 49.67               | 37.67                         | 33.50                          |
| Centre back   | N | 3.00                    | 3.00             | 3.00                | 3.00                          | 2.00                           |
|               | Std. Deviation | 11.00                 | 1.53             | 10.21               | 7.09                          | 6.36                           |
| Left back     | Mean | 90.63                  | 18.50            | 49.38               | 30.25                         | 29.13                          |
|               | N | 8.00                    | 8.00             | 8.00                | 8.00                          | 8.00                           |
|               | Std. Deviation | 6.25                  | 0.93             | 7.73                | 7.11                          | 6.15                           |
| Left wing     | Mean | 88.83                  | 19.00            | 46.67               | 37.33                         | 34.17                          |
|               | N | 6.00                    | 6.00             | 6.00                | 6.00                          | 6.00                           |
|               | Std. Deviation | 5.71                  | 0.89             | 8.80                | 4.93                          | 3.66                           |
| Pivot         | Mean | 91.25                  | 18.75            | 47.00               | 34.25                         | 30.50                          |
|               | N | 4.00                    | 4.00             | 4.00                | 4.00                          | 4.00                           |
|               | Std. Deviation | 9.00                  | 1.50             | 2.58                | 5.85                          | 2.38                           |
| Goalkeeper    | Mean | 87.38                  | 19.25            | 44.13               | 31.38                         | 30.25                          |
|               | N | 8.00                    | 8.00             | 8.00                | 8.00                          | 8.00                           |
|               | Std. Deviation | 8.80                  | 1.67             | 4.64                | 5.78                          | 5.52                           |

Table 3 shows the descriptive statistics of the analysed group, providing basic information about the values of lower limb length, hand length, spine mobility and palmar flexor strength.
Table 4. Pearson correlation between measurements (1)

|                      | Height (cm) | Body mass (kg) | BMI (kg/m²) | Body fat (%) | Span (cm) |
|----------------------|-------------|----------------|-------------|--------------|-----------|
| **Height (cm)**      |             |                |             |              |           |
| Pearson Correlation  | 1           | .454**         | -.050       | -.310*       | .820*     |
| Sig. (2-tailed)      | .002        | .752           | .043        | .000         |           |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Body mass (kg)**   |             |                |             |              |           |
| Pearson Correlation  | .454**      | 1              | .862**      | .535**       | .251      |
| Sig. (2-tailed)      | .002        | .000           | .000        | .105         |           |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **BMI (kg/m²)**      |             |                |             |              |           |
| Pearson Correlation  | -.050       | .862**         | 1           | .769**       | -.178     |
| Sig. (2-tailed)      | .752        | .000           | .000        | .253         |           |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Body fat (%)**     |             |                |             |              |           |
| Pearson Correlation  | -.310*      | .535**         | .769**      | 1            | -.417**   |
| Sig. (2-tailed)      | .043        | .000           | .000        | .000         |           |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Span (cm)**        |             |                |             |              |           |
| Pearson Correlation  | .820*       | .251           | -.178       | -.417**      | 1         |
| Sig. (2-tailed)      | .000        | .105           | .253        | .005         |           |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Lower limb length (cm)** |             |                |             |              |           |
| Pearson Correlation  | .622**      | .189           | -.134       | -.399**      | .757**    |
| Sig. (2-tailed)      | .000        | .224           | .393        | .008         | .000      |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Hand length (cm)** |             |                |             |              |           |
| Pearson Correlation  | .709**      | .260           | -.092       | -.338*       | .676*     |
| Sig. (2-tailed)      | .000        | .093           | .555        | .027         | .000      |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Spine mobility (cm)** |             |                |             |              |           |
| Pearson Correlation  | -.054       | .269           | .345*       | .091         | .043      |
| Sig. (2-tailed)      | .732        | .081           | .024        | .562         | .784      |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Palmar flexor strength R (kgF)** |             |                |             |              |           |
| Pearson Correlation  | .577**      | .506*          | .242        | -.058        | .344*     |
| Sig. (2-tailed)      | .000        | .001           | .117        | .713         | .024      |
| N                    | 43          | 43             | 43          | 43           | 43        |
| **Palmar flexor strength L (kgF)** |             |                |             |              |           |
| Pearson Correlation  | .588*       | .579*          | .311*       | -.044        | .300      |
| Sig. (2-tailed)      | .000        | .000           | .045        | .784         | .053      |
| N                    | 42          | 42             | 42          | 42           | 42        |

With the help of SPSS 20.0, the correlations between the measurements performed on the targeted group of junior handball players were also calculated. Table 4 highlights the values that are statistically significant. There are positive correlations between height and body mass and (.454) and height and arm span (.820). Body mass has significant correlations with BMI (.862) and body fat (.535). BMI has a high correlation with body fat (.769). Arm span has a negative but significant correlation with body fat (-.417). Lower limbs have correlations with height (.622), body fat (-.399) and arm span (.757). Hand length is correlated with height (.709), body fat (-.338) and arm span (.676). Spine mobility has only one significant correlation with BMI (.345). In the case of palmar flexors, the right hand has correlations with height (.577), body mass (.506) and arm span (344), while the left hand has significant correlations with height (.588), body mass (.579) and BMI (.311).
Table 5. *Pearson correlation between measurements* (2)

|                  | Lower limb length (cm) | Hand length (cm) | Spine mobility (cm) | Palmar flexor strength R (kgF) | Palmar flexor strength L (kgF) |
|------------------|------------------------|------------------|---------------------|-------------------------------|-------------------------------|
| Height (cm)      | .622**                 | .709**           | -.054               | .577                          | .588                          |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .000                   | .000             | .732                | .000                          | .000                          |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Body mass (kg)   | .189                   | .260             | .269                | .506*                         | .579*                         |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .224                   | .093             | .081                | .001                          | .000                          |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| BMI (kg/m²)      | -.134                  | -.092            | .345*               | .242                          | .311*                         |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .393                   | .555             | .024                | .117                          | .045                          |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Body fat (%)     | -.399**                | -.338            | .091                | -.058                         | -.044                         |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .008                   | .027             | .562                | .713                          | .784                          |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Span (cm)        | .757**                 | .676**           | .043                | .344                          | .300                          |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .000                   | .000             | .784                | .024                          | .053                          |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Lower limb length (cm) | 1                   | .587**           | .199                | .257                          | .256                          |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .000                   | .200             | .097                | .101                          |                               |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Hand length (cm) | .587**                 | 1                | -.051               | .511*                         | .450*                         |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .000                   | .743             | .000                | .003                          |                               |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Spine mobility (cm) | .199                  | -.051            | 1                   | .057                          | .057                          |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .200                   | .743             | .718                |                               | .718                          |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Palmar flexor strength R (kgF) | .257                 | .511*            | .057                | 1                             | .875*                         |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .097                   | .000             | .718                | .000                          |                               |
|                  | N                      | 43               | 43                  | 43                            | 42                            |
| Palmar flexor strength L (kgF) | .256                 | .450*            | .057                | .875*                         | 1                             |
|                  | Correlation            |                  |                     |                               |                               |
|                  | Sig. (2-tailed)        |                  |                     |                               |                               |
|                  | .101                   | .003             | .718                | .000                          |                               |
|                  | N                      | 42               | 42                  | 42                            | 42                            |

Table 5 shows the rest of the measurements and highlights their correlations that can be statistically significant. Therefore, height has significant values for lower limb length (.622), hand length (.709) and palmar flexor strength of both hands (.577 / .588). Body mass has only two significant values, namely for palmar flexor strength (.506 / .579). Body fat has correlations with lower limb length and hand length (-.399 / -.338). Arm span has correlations with lower limb length (.757), hand length (.676), and the right palmar flexor strength (.344). Lower limb length has only one significant value, namely hand length (.587). Hand length is correlated with palmar flexor strength of both hands (.511 / .450).
Conclusion

We can state that a good assessment of players, even if they are at a young age, can provide important information about their development level within a certain period. In somatic terms, this aspect is important and will always be present in the game of handball, especially when correlated with the nutritional and strength indices of athletes. Through this research, we have tried to assess a group of junior handball players to see their level of development at a certain time and also to observe if other measurements can influence their motor skills and motor manifestations throughout the training process or during competitions.

Handball is a very complex game and, due to its dynamics and features, has constantly developed towards its modern stages. Considering the increase in the level of play, athletes’ characteristics need to be regularly assessed and improved in order to sustain the efforts of maintaining their competitive performance.

The anthropometric and body composition characteristics need to be found in any athlete, regardless of their level of practice, because they provide relevant information that can be used in choosing the best means and methods of training.

The field tests, which create a picture of players’ motor skills, are also elements that should not be missing from the assessment of juniors. All the information gathered reveal the areas that need more attention so that the progress of young athletes can be guided in line with the current requirements of the sport in question.

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