Available online at http://www.journalijdr.com

ISSN: 2230-9926

International Journal of Development Research
Vol. 07, Issue, 10, pp.15801-15804, October, 2017

ORIGINAL RESEARCH ARTICLE OPEN ACCESS

COMPARISON OF RELATIVE AGE AVERAGES WITH CHOSEN BASIC MOTORIC CHARACTERISTICS

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ARTICLE INFO

Article History:
Received 06th July, 2017
Received in revised form
15th August, 2017
Accepted 07th September, 2017
Published online 10th October, 2017

Keywords:
Relative Age,
Child, Basic Motoric Characteristics,
Chronologic Age.

ABSTRACT

The purpose of this study is to compare the age averages to the chosen motoric characteristics. The universe of the study consists of 59 volunteer students training in the sports camp of Istanbul Yakuplu Sports Club. The height, weight measurement, body mass index, felxibility, right hand grip strength, left hand grip strength, balance, agility and standing long jump measurements of the volunteers participating in the study were taken. The data was recorded with the package program SPSS. Anova and t test were used in the comparison of the data. P<0.05 value was considered meaningful. Descriptive statistics of age, height, weight and body mass index of volunteers participating in the study were taken and significant differences between the volunteers' relative age and right hand grip strength, left hand grip strength, flexibility, balance, agility and standing long jump parameters were found. (p<0.05). In conclusion, we think that the significant difference that occurred between age and selected motoric characteristics is due to age-related physiological conditions.

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Citation: Özdemir Atar. 2017. "Comparıson of relatıve age averages wıth chosen basıc motorıc characterıstıcs", *International Journal of Development Research*, 7, (10), 15801-15804.

INTRODUCTION

It is difficult to organize classifications based on biological age systems in different sports branches. Chronological systems that address the date of birth can also be used as additional criteria in the classification of children for the competition (Musch and Grondin 2001). Age based on chronological age is divided into biological and chronological (calendar age). Chronological age refers to the time that has passed since the date of birth and left behind. Biological age is shown as the time unit of the current biological step (Güzel and Okur). When physical and biological changes and developments in children and adolescents are examined, there are significant physical, cognitive and motoric differences even in the same chronological ages. As a result of the categorization made in this way, the physical, cognitive and motoric development levels of children born in the first month of a year and who haven't completed their development process are found to be more developed than children born in the last months of the year. The positive effects of the advantages this development brought is called Relative Age Effect (Barnsley and others 1992). In parallel with this change, the differences in the basic motor characteristics also change in parallel with growth. Strength, one of the basic motoric characteristics, is to overcome or withstand resistance by muscle activity (Çetin and Flock 2000). Speed can be defined as the ability of the athlete to move himself or herself from one place to another at the highest speed, or the ability to apply movements as fast as possible (Günay and Yüce 2008). Flexibility, is the ability to exercise the athlete's movements in a wide angle and in different directions allowed by joints (Sevim 2002).

Durability is the ability of the organism to resist fatigue in long-term loads; Or in other words, the athlete's ability to resist psycho-physical fatigue (Mülazımoğlu and others 2002). Coordination (skill) is defined as the ability to learn difficult movements in a short period of time and to react appropriately and quickly in different situations (Günay and Yüce 2000). The development of basic motoric characteristics such as strength, speed, durability, flexibility, etc. with well-planned training methods to increase the efficiency in body capacity with relative age is the most important factor in success. In this study, it was investigated whether the relative mean ages have anything to do with the selected basic motor characteristics or not.

MATERIALS AND METHODS

The universe of the study consists of 59 volunteer students training in the sports camp of Istanbul Yakuplu Sports Club. The height, weight measurement, body mass index, felxibility, right hand grip strength, left hand grip strength, balance, agility and standing long jump measurements of the volunteers participating in the study were taken. The height measurement of the volunteers participating in the study; taken barefoot, head straight, head in frankfort plane, measuring table at the vertex of the head, after a deep inspiration the distance between the vertex of the head and the sole was measured with Rodi Super Quality brand meter with a precision of 1 mm and recorded in cm (Tutkun 2002). Body weight measurement; The athletes were recorded with standard sportswear (T-shirt and shorts) and measured with a premier brand electronic scale with a 100 g error margin in kg (Tutkun 2002). Flexibility measurements were taken in a sitting position on a test bench 35 cm long, 45 cm wide and 32 cm high. Hand grip strengths were measured with a Takkei brand hand dynamometer. After warming up for five minutes, the measurement was made while the subject was standing and bending the arm and without making contact with the body, while at a 45° angle to the arm (Tamer 2000). Agility measurement of the volunteers was done with the Pro-Agility test. Steel meter is used for standing long jump measurement. A jump is done from the back of the line and the point at which the sole contacts is marked and recorded in cm (Gül and Demirel 2003). Balance measurements of the volunteers participating in our study were made with the flamingo balance test. In order to mantain the balance on the beam in 1 min, the number of trials is calculated. Number of trials, except the falls, requires to stand on the beam within 1 minute. For example; somebody who attemps 5 times in 1 minute to stay in balance gets 5 points and this score is recorded.

Findings

Table 1. Distribution of Physical Characteristics of Participants

	N	Min	Max	X± Ss
Height	59	138	175	159,80±10,020
Weight	59	35	85	56,68±11,040
Bmi	59	17	30	21,78±2,786
Birthdate	59	12	16	13,97±1,575

When the distribution of the physical characteristics of the students participating in the study were examined, the mean height was found as 159.80 ± 10.020, the weight average was 56.68 ± 11.040, the mean of BMI was 21.78 ± 2.786 and the mean of birth was 13.97 ± 1.575.

Table 2. Assessment of Age and Balance Parameters of the Students Participated in the Study

	Age	n	X ± Ss	p	Tukey
Balance	12^1	17	14,41±3,726	*,001*	1-4 1-5
	13^2	8	13,00±4,690		
	14^3	8	13,38±3,378		
	15^4	12	9,17±3,786		
	16^5	14	8,43±5,003		

When Table 2 is examined; it was found out that the balance average of students with relative age 12 was 14,41 ± 3,726 units/min, the balance average of students who are 13 years old was 13,00 ± 4,690 units/min, the balance average of those who are 14 years old was 13,38 ± 3,378 units/min, the balance average of the 15 years old was of 9,17 ± 3,786 units/min, and the balance average of the 16 years old was 8,43 ± 5,003 units/min. Statistical analysis showed that there was a significant difference between relative age and balance parameters ($p<0.05$). It is seen that this difference is between 12 and 15 years of age and between 12 and 16 years of age, and this difference is due to the highness of the balance average of the 15 years and 16 years old.

Table 3. Assessment of the Age and Right Hand Grip Strength Parameters of the Students Participating in the Study

	Age	n	X ± Ss	p	Tukey
Right Hand Grip Strength	12^1	17	22,29±2,469	,000	1-3 / 2-5 1-4 / 3-1 1-5
	13^2	8	26,25±1,581		
	14^3	8	29,75±3,370		
	15^4	12	31,08±3,5,485		
	16^5	14	34,29±5,6,592		

When Table 3 is examined, right hand grip strength average is 22.29 ± 2.469 for students with relative age 12, right hand grip strength average is 26.25 ± 1.581 for children 13 years old, right hand grip strength average is 29.75 ± 3,370 for children 14 years old, the average grip strength of the right hand is 31,08 ± 3,5,485 for 15-year-olds and the right-hand grip strength of children age 16 is 34,29 ± 5,6,592. As a result of the statistical analysis, a significant difference was found between the relative age and the right-hand grip strength parameter ($p<0.01$). This difference was between 12 and 14 years, 12 and 15 years, 12 and 16 years, 13 and 16 years, 14 and 12 years and 15 and 12 years and this difference was due to the 12-year-olds right hand grip strength averages being low.

Table 4. Assessment of the Age and Left Hand Grip Strength Parameters of the Students Participating in the Study

	Age	n	X ± Ss	p	Tukey
Left Hand Grip Strength	12^1	17	22,82±2,60	,000	1-3 / 2-5 1-4 / 3-1 1-5
	13^2	8	26,75±2,37		
	14^3	8	30,12±3,35		
	15^4	12	30,83±5,04		
	16^5	14	34,07±7,43		

When Table 4 is examined; left hand grip strength average of students with relative age of 12 was found to be 22.82 ± 2.60, of 13 years old children 26.75 ± 2.37, of 14 years old children 30,12 ± 3,35, of 15 years old children 30,83 ± 5,04 and of 16 years old children 34,07 ± 7,43. As a result of the statistical analysis, a significant difference was found between the relative age and the left-hand grip strength parameter ($p<0.01$). This difference was between 12 and 14 years, 12 and 15 years, 12 and 16 years, 13 and 16 years, 14 and 12 years and 15 and 12 years old and this difference was due to the 12-year-olds left hand grip strength averages being high.

Table 5. Assessment of the Age and Standing Long Jump Parameter of the Students Participating in the Study

	Age	n	X ± Ss	p	Tukey
Standing Long Jump	12^1	17	137,06±13,85	,000	1-2/ 1-4 1-3 / 1-5
	13^2	8	157,50±9,73		
	14^3	8	160,75±12,03		
	15^4	12	173,75±11,39		
	16^5	14	174,14±16,27		

When Table 5 is examined; standing long jump average of students with relative age of 12 was found to be 137,06±13,85, average of children of age 13 was 157,50±9,73, average of children of age 14 was 160,75±12,033, average of children of age 15 was 173,75±11,39 and average of children of age 16 was 174,14±16,27. As a result of the statistical analysis, a significant difference was found between the relative age and standing long jump parameter ($p<0.01$). This difference was between 12 and 13 years, 12 and 14 years, 12 and 15 years, 12 and 16 years old and this difference was due to the standing long jump averages of 13 years, 14 years, 15 years and 16 years old children being high.

Table 6. Assessment of the Age and Flexibility Parameter of the Students Participating in the Study

	Age	n	X ± Ss	p	Tukey
Flexibility	12^1	17	22,21±7,36	,001	1-4 1-5
	13^2	8	20,58±7,31		
	14^3	8	16,75±3,19		
	15^4	12	16,50±5,90		
	16^5	14	13,45±4,15		

When Table 6 is examined; flexibility average of students with relative age of 12 was found to be 22,21±7,36, average of children of age 13 was 20,58±7,31, average of children of age 14 was 16,75±3,19, average of children of age 15 was 16,50±5,90 and average of children of age 16 was 13,45±4,15. As a result of the statistical analysis, a significant difference was found between the relative age and flexibility parameter ($p<0.01$). This difference was between 12 and 15 years and 12 and 16 years old children and the difference was due to the flexibility averages of 15 and 16 years old children being low.

Table 7. Assessment of the Age and Agility Parameter of the Students Participating in the Study

	Age	n	X ± Ss	p	Tukey
Agility	12^1	17	7,43±0,35	,000	1-2 / 1-5 1-3 / 1-4 2-3 / 2-4 2-5 / 2-6
	13^2	8	6,97±0,55		
	14^3	8	6,24±0,29		
	15^4	12	6,16±0,37		
	16^5	14	6,60±0,70		

When Table 7 is examined; agility average of students with relative age of 12 was found to be 7,43±0,35, average of 13 years old children was 6,97±0,55, average of children of age 14 was 6,24±0,29, average of children of age 15 was 6,16±0,37 and the average of children of age 16 was 6,60±0,70. As a result of the statistical analysis, a significant difference between the average age and agility parameter was found ($p<0.01$). This difference was between 12 and 13 years and 12 and 13 years , 12 and 14 years, 12 and 15 years, 12 and 16 years, 13 and 12 years, 13 and 14 years, 13 and 15 years, 13 and 16 years old and this difference was due to the agility averages of 15 and 16 years old children being high.

DISCUSSION AND CONCLUSION

At the end of this study, which aim was to compare relative age averages with chosen basic motoric characteristics, differences between relative age and chosen basic motoric characteristics were seen. When the findings obtained at the end of this study were compared with other studies performed in this area, studies on relative age were found but no studies were done to compare relative age and basic motoric characteristics. In the anthropometric characteristics of the children participating in the study, the average age, height, body mass index and body weight were found to be 13.97 ± 1,575 years, 159,80 ± 10,020 cm, 21,78 ± 2,786 kg / m2 and 56,68 ± 11,040 body weight respectively (Diker 2013). In the study conducted with 44 persons, the age, height, body weight and body mass index averages were found to be 13,06±0,25 years, 154,97±7,32 cm, 45,11±7,75 kg and 18,69±2,36 kg/m^2. It is thought that the reason for not having statistically significant difference in age in these parameters is due to the fact that the volunteers are from children in the same age group. Aydos and Kürkçü studied the physical and physiological characteristics of middle school students aged 13 to 18 who did and didn't do sports and found that the average age of children who did not exercise regularly (n = 30) was 13,9 ± 0.60 years and their height average was 157 ± 7.70 cm and the weight average was 57.07 ± 6.57 kg. In the study conducted, the reason for no significant difference in the parameters of the physical characteristics is because of the volunteers being in the same age group and again the reason for no statistically significant difference in the height and weight averages is becauese of the volunteers being in the same school age, not doing sports regularly and thus we think that this state brings up the similarities in the physical profiles. When the balance parameters of 12-16 year old students participating in the study were examined, significant differences between 12 and 15-16 years old were found ($P<0.05$), but no significant differences between 12 and 13-14 years old were present ($P> 0.05$). No studies on relative age and balance were found after a conducted literatüre review. It is thought that the result between these ages is due to age-related physiological conditions. When we look at the definitions and explanations made, it is described as balance for the human body, gravity of the torso, protection of the sequence under the influence of internal and external forces, and resetting the sum of the forces acting on the body (Sucan and others 2005).

Preservation of the balance, which is the base of all movements and influenced by various factors, is effected by visual, kinesthetic and vestibular stimuli (Günay and Cicioğlu 2001). These effects have three main systems that help balance human body with age. These are the visual system, the vestibular system and the proprioceptive system. With the progress of age, the visual system conveys to our brain the picture of where the objects around us are and with this the knowledge of where we will be located relative to the environment we are in. The vestibular system is in close contact with the visual system to ensure the coordination of head and eye movements (Rosengren and others 2010). The proprioceptive system sends information to the brain about the amount of pressure and force on a muscle or joint. Proprioceptive, vestibular and touch senses of children support the development of motor coordination. Especially because the hands and feet reach the maximum growth at the end of age 14 (Fisher and Murray 1991), the results in the study we have done with the significant difference between 12 and 15 years and 16 years and the reason for not being able to find a significant difference in the parameters of 12 and 13 years is because of this fact. Nevertheless, we think that there's need for multi-subject and multi-tasked studies between relative age and basic motoric characteristics. As a result of statistical analysis, significant difference was found between relative age and the right hand grip strength and left hand grip strength parameter ($p<0.01$). It can be seen that this difference is

between 12 and 14 years, 12 and 15 years, 12 and 16 yaş, 13 and 16 years, 14 and 12 years and 15 and 12 years and the difference is due to the left hand grip averages of 12-year-olds being high. When the studies are examined, different studies about hand grip strength are found, but studies done for the purpose of comparing relative age and hand grip strength are not found. A significant difference was found between relative age and hand grip strength as a result of the work we did. (Fisher, A. G. and Murray) found in their study that especially the hands and feet reach the maximum size they can be at the end of age 14. Another study (Yilmaz 2001) found that muscle strength increased with age in children and siginificant increases in muscle strength happened during adolescence. It is thought that the difference in the study we have done is due to the fact that the changes in the physiological conditions determined in different studies will increase with age and that especially the strength of the extensor digitorum, flexor digitorum profundus, lumbricales, dorsal, plantar muscles affecting the finger area will increase with age. Still, we think that there's need for multi-subject and multi-tasked studies between relative age and hand grip strength.

As a result of statistical analysis, significant difference between relative age and the standing long jump parameter was found ($p<0.01$). When other studies are examined, different studies about the standing long jump parameter can be found, but studies done for the purpose of comparing age to standing long jump parameters can't be found. The significant difference between the relative age and the standing long jump parameter in the study results is due to an important increase in weight and muscle mass from birth to adolescence and the significant increase of muscular force with age in children and teenagers and the especially fast growth that starts at age 12 and at 15 the taking up to 32% of body weight of the muscles is thought to be the reason for the difference in the study we conducted (Sevim 2002). As a result of statistical analysis, a significant difference between relative age and the flexibility parameter was found ($p<0.01$). It can be seen that this difference is between 12 and 15 years and 12 and 16 years old and the difference is due to the flexibilitiy averages of 15 and 16 years old children being low. When other studies in this field are examined, we can see a lot of studies about the flexibility parameter but studies done for the purpose of comparing relative age to the flexibility parameter can not be found. When we examined our findings the reason of the significant difference between relative age and flexibility values is the decrease of flexibility with aging, the decrease of joint movement, the ability of the muscles to stretch and softness, decreasing joint movement pain with age and the lesser transfer of high-blood-value hemoglobin to the muscle groups concerned and change in muscle tone. As a result of statistical analysis, a significant difference between relative age and the agility parameter was found ($p<0.01$). When other studies are examined, we can see a lot of studies about the agility parameter but studies done for the purpose of comparing relative age and the agility parameter can't be found. Agility is described as the ability to change directions quickly and accurately (Chelladurai and Yuhasz 1977). The significant difference between the relative age and agility in the study we have done is due to the fact that the physical and physiological developmental process of the musculoskeletal system and cardiovascular system progresses with age and that the motor skills of the 15 and 16 age period is the fastest development period and that this situation can be exhibited more efficiently in parallel with agility. In conclusion, we think that the significant difference between the relative age and the chosen motoric characteristics is due to age-related physiological conditions.

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