

SEXUAL MATURATION OF TURKISH BOYS IN ANKARA*

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Although there are reports of many studies dealing with puberty in boys in different countries¹⁻⁷, studies of this type are very limited in number in Turkey^{8,9}. Daniel et al¹⁰ have stated that they had no idea about the testicular volumes of Asian adolescent boys. The present study evaluates sexual maturation in Turkish boys.

Material and Methods

Four hundred and thirty-five healthy, well-developed school boys, ranging in age from 9 to 16 years were selected among the different regional primary and high schools in Ankara for this study. Each student was given a complete physical examination. Measurements of the testis and penis were taken under normal room temperatures with a plastic ruler while the subject was in standing position. Each testis was held by the fingers of the left hand with the scrotal skin smooth but not compressing the testis. The length and width of each testis were measured and the measurements were recorded in centimeters. For the penile length, the measurement was taken from the symphysis pubis to the tip of the penis. In order to determine the testicular volume, the measured testicular length and width were used¹¹. Genital development and pubic hair growth were classified into five different stages as described by Marshall and Tanner⁶, and Winter¹². Testicular length was determined in centimeters for genital stages as G1: prepubertal (testicular length less than 2.4 cm); G2: onset of puberty (testicular length 2.4-3.2 cm); G3: testicular length 3.3-4 cm; G4: testicular length 4.1-4.5 cm; G5: testicular length greater than 4.5 cm¹².

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Results

The genitalia began to develop in our subjects between the ages of 9 1/4 and 13 1/2 years (mean = 11.1 ± 0.10) and reached maturity at ages varying between 13 1/4 and 16 (mean = 14.8 ± 0.14) years. Genital Stages 3 and 4 were reached at the mean ages of 12.6 ± 0.15 and 13.8 ± 0.17 , respectively. Pubic hair growth began at the mean age of 12.9 ± 0.17 and was completed at the mean age of 15.5 ± 0.17 (Table I).

The mean values of testicular length, testicular volume, penile length and penile circumference that were determined for the samples varying from 9 to 16 years of age are shown in Table II.

TABLE I: The Mean Ages (yrs) at which Different Stages of Genital Development and Pubic Hair Growth Are Reached According to Various Authors

	G2	G3	G4	G5	PH2	PH3	PH4	PH5
Reynolds and Wines North America, 1951	11.5	12.7	13.4	17.3	12.2	13.3	13.9	16.1
Nicolson and Hanley North America, 1953	11.8	13.1	13.8	15.2				
Barton and Hunt North America, 1962	11.9			14.6	13.4			14.6
Chang, Ng, Lee and Chan China, 1966	12.9			16.0	12.2			14.2
Van Vieringen et al. Holland, 1968	13.4			16.8	13.0			16.0
Marshall and Tanner England, 1970	11.0	13.2	14.1	15.8	13.5			16.7
Lichtenstein Sweden, 1972	11.8				11.8	13.4	14.4	16.0
Neyzi and Alp Istanbul, Turkey, 1975	11.6	12.9	13.8	14.9	13.4	13.9	14.4	15.1
Kinik Ankara, Turkey, 1977	11.8				12.5			
The paper presented, Ankara, Turkey	11				11.8			
Mean	11.1	12.6	13.8	14.8	12.2			
SE	0.10	0.15	0.17	0.14	0.17			
SD	1.17	1.20	1.13	1.25	1.49			

Abbreviations used G : Genital development.

PH : Pubic hair growth

TABLE II: Testicular Length, Testicular Volume, Penile Length and Penile Circumference For the Subjects Aged Between 9-16 Years

Age (yrs)	Testicular Length (cm)		Testicular Volume (cm ³)		Penile Length (cm)		Penile Circumference (cm)	
9	2.15 ± 0.04	(0.28)*	2.55 ± 0.14	(1.03)	5.20 ± 0.10	(0.76)	5.18 ± 0.06	(0.49)
10	2.23 ± 0.04	(0.38)	2.84 ± 0.15	(1.40)	5.20 ± 0.08	(0.73)	5.38 ± 0.06	(0.59)
11	2.63 ± 0.08	(0.67)	4.79 ± 0.43	(3.66)	5.26 ± 0.11	(0.02)	5.44 ± 0.10	(0.80)
12	3.26 ± 0.12	(0.94)	8.92 ± 0.85	(6.80)	5.88 ± 0.15	(1.23)	6.02 ± 0.15	(1.23)
13	3.87 ± 0.11	(0.88)	13.36 ± 0.94	(7.52)	6.94 ± 0.20	(1.59)	7.24 ± 0.20	(1.56)
14	4.37 ± 0.11	(0.70)	17.80 ± 1.08	(7.14)	7.82 ± 0.15	(1.36)	8.35 ± 0.19	(1.27)
15	4.61 ± 0.15	(0.74)	20.17 ± 1.43	(6.84)	8.16 ± 0.27	(1.26)	8.70 ± 0.23	(1.10)
16	4.63 ± 0.09	(0.42)	21.00 ± 1.09	(5.12)	8.41 ± 0.21	(0.98)	9.09 ± 0.20	(0.93)

* Mean ± SEM (SD)

Discussion

A normal onset, duration and completion of puberty, which is a transition from childhood to adulthood is very important. In order to interpret sexual precocity and/or delayed puberty-hypogonadism, the average and standard variations of a population are necessary.

Due to the limited number of such studies^{8,9} in Turkish boys, this research was carried out and the age of onset of puberty was determined as 11.1 years. Table I illustrates data from this study and other investigations¹⁻⁷. When Genital Stage 2 was compared with previous studies¹⁻⁷, the closest results were found in Holland⁵ (11.0 years) and in Istanbul, Turkey⁸ (11.0 years). As illustrated in Table I there is remarkable agreement between authors as to the ages at which these stages are reached despite the widely different samples studied. However, the estimates of Reynolds and Wines¹ which record the age at which Genital Stage 5 is reached and of Chang et al⁴ at which Genital Stages 2 and 5 are reached do not coincide with the general pattern.

The mean age at which Pubic Hair Stage 2 is reached as estimated in Holland by Van Wieringen et al⁵ and in Istanbul by Neyzi et al⁸ is considerably earlier than our results and the ratings of the other investigators. The differences between various authors in their estimates of the mean age at which Pubic Hair Stage 5 is reached are probably due widely to variations in the exact criteria used to define the stage⁶.

The results of our study are quite similar to those reported by other authors. The data provide a basis for normal puberty in Turkish boys. Puberty cannot be regarded as abnormally early if it begins after the age of nine or as unduly late so long as it begins before 14 years of age. Pubic hair growth in the absence of genital development is quite unusual in boys.

Summary

Four hundred thirty-five healthy, well developed male students, ranging in age from 9 to 16 years were given physical and sexual examinations. The dimensions of the testis and penis were measured. Genital development and pubic hair growth were classified as described by Marshall and Tanner and Winter. The onset of puberty (genital development) and pubic hair growth was reported at the mean ages of 11.1 ± 0.10 and 12.9 ± 0.17 , respectively. The results of our study were compared with those reported by various authors.

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