

Standard penile size for normal full term newborns in the Saudi population

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ABSTRACT

Objective: To establish norms for penile size for normal full term Saudi newborns.

Methods: The length between the pubic ramus and the tip of the glans was measured in 379 normal full term Saudi newborns. An unmarked spatula was used where its edge was placed against the pubic ramus and the shaft of the penis was stretched to the point of increased resistance. The penile circumference was measured using a non-stretchable plastic tube placed around the midshaft of the uncircumcised penis. The study was carried out in King Khalid University Hospital and King Fahad National Guard Hospital, Riyadh, Kingdom of Saudi Arabia for the period September 1998 to February 1999.

Results: The mean penile length was 3.55 cm (standard deviation 0.57) and the mean penile midshaft circumference was 3.96 cm (standard deviation 0.44 cm).

Conclusion: The mean penile length of 3.55 cm in this study was similar to previously reported international data. The cut-off lower limit (-2.5 standard deviation) is calculated to be 2.13 cm. The cut-off upper limit (+2.5 standard deviation) is 4.98 cm. The mean penile circumference was 3.96 cm (standard deviation 0.44).

Keywords: Penile size, newborns.

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The human body and various body organs have variable sizes. Various normal standards and charts defining the mean and the range had been developed for various organs. Normal penile length and circumference are important from both cosmetic and functional (urinary and sexual) points of view. The normal standard penile size at birth was established by Feldman et al to be 3.5 cm \pm 0.7 cm and the diameter was 1.1 cm \pm 0.2 cm.¹ This study was set forth for normal penile length and midshaft circumference among Saudi full term newborns.

Methods. Prior to circumcision, penile length and circumference in 379 normal full term Saudi newborns was measured during the first 2 days of life. The rounded end of an unmarked wooden spatula was placed against the pubic ramus and the penis was held at a right angle to the pubic ramus on the spatula. While the shaft of the penis was

stretched to the point of increased resistance, the length between the pubic ramus and the tip of the glans (determined by palpation) was marked on the spatula by a pencil. The distance between the tip of the spatula and the marked point was measured using a disposable paper measuring tape. This method has been described in the literature as the conventional penile length measurement (CPLM).²⁻⁷ The midshaft penile circumference was estimated by measuring the length of a plastic tube placed around the middle part of the penile shaft. The interobserver and intraobserver variation were tested by repeating the measurements on the same babies by the same examiner and by the 2 examiners in 10% of the babies. The mean and standard deviation (SD) of the results were calculated and expressed in percentile charts. The student t-test was used to compare the results with other studies.

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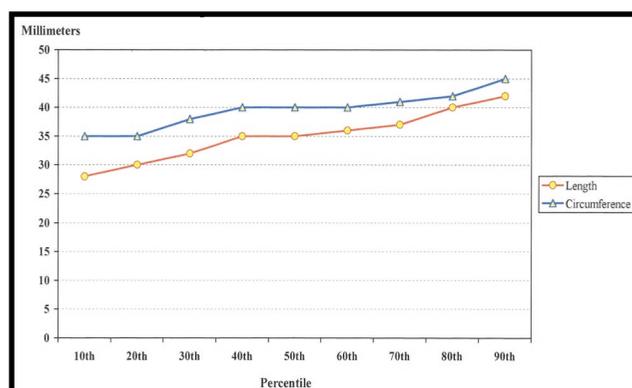


Figure 1 - Percentile chart of penile length and circumference.

Results. Three hundred and seventy-nine normal full term infants were examined within the first 2 days of life. The mean birth weight was 3.3 kg (range 2.01-4.63) and the mean length was 49.1 cm (range 41.5 – 55.0 cm). The mean stretched penile length (SPL) was 3.55 cm (range 2.2 – 5.4 cm). The SD was calculated to be 0.57. The 95 and the 99 percent confidence interval around the mean were 3.488 - 3.603, and 3.470 - 3.621 cm. Therefore, the cut-off lower limit normal penile length (-2 SD) is calculated to be 2.13 cm and the cut-off upper limit normal penile length (+2 SD) is calculated to be 4.98 cm. The mean midshaft penile circumference was 3.96 cm (range 2.7 – 5.8). The SD was calculated to be 0.44 cm. The 95 and the 99 percent confidence

Table 1 - The data of this study in comparison to other studies.

Study	N of babies	Ethnic background	Age	Penile Length in cm (± SD)	P Value compared to this study	Penile circumference in cm (± SD)	P Value compared to this study	Technique
Flatau ⁵	100	Jewish	Newborns	3.5 (0.4)	0.4098 (NS) [§]	3.30 (0.3)	<0.001	CPLM*
Lian ³	228	Singapore (Asian)	Newborns	3.6 (0.4)	0.2452 (NS) [§]	ND [‡]	-	CPLM*
Vasudevan ⁶	135	Indian (Asian)	Newborns	3.57 (0.46)	0.7136 (NS) [§]	ND [‡]	-	CPLM*
Ozbey ⁴	30	Turkish (Asian)	Newborns and infants	3.53 (0.53)	0.8526 (NS) [§]	ND [‡]	-	CPLM ₁ [†]
				3.26 (0.56)	0.0075 (S)**			CPLM ₂ [†]
				3.32 (0.47)	0.0127 (S)**			Syringe ₁ [†]
				3.28 (0.55)	0.0320 (S)**			Syringe ₂ [†]
Schonfeld ²	125	American (Caucasian)	Newborns and infants	3.75 (0)	-	3.60 (0.3)	<0.001	CPLM*
Troschev ⁷	50	Bulgaria (Caucasian)	Newborns and infants	3.11 (0)	-	3.28 (1.5)	<0.001	Not described
Feldman ¹	37	American (Caucasian)	Newborns	3.5 (0.7)	0.6185 (NS) [§]	- (-)	-	-
Al Herbish ⁺⁺	379	Saudi Arabian	Newborns	3.55 (0.57)	-	3.96 (0.44)	-	CPLM*

N - number
 SD - standard deviation, *CPLM- conventional stretched penile length measurement, [†]No. 1 & 2 in Ozbey study indicated 1st and 2nd observe, [‡]ND - not done, [§]NS - not significant, ** - significant, ++ - the present study,

interval around the mean were 3.913 – 4.003, and 3.900 – 4.017 cm. The cut-off lower limit normal penile circumference (-2.5 SD) is 2.86 cm and the cut-off upper limit normal penile circumference (+2.5 SD) is 5.06 cm. The percentile charts of this data are shown in **Figure 1**.

Discussion. Establishing normal standards for genital size at different ages is very important to define abnormalities to hint towards pathology. As early as 1942, establishment of normal penile length for different ages had been put forward. The mean phallus length at birth was about 4 cm in the Schonfeld and Beebe study.² Since then, many studies in different populations have been conducted. The majority however were on Caucasian babies. Comparing the results of this study to similar studies carried out on different communities showed no significant difference among the majority of studies, **Table 1**.¹⁻⁷ The significant difference found when compared to Ozbey's study may reflect the difference in technique used (CPLM versus Syringe).⁴ The studies conducted for the Asian population by Lian et al showed no major difference to warrant difference for the lower limit cut-off point of almost 2.5 cm reported in these studies.³ The data presented showed the mean penile length of 3.55 cm and 2.5 SD below the mean of 2.13 cm. This may be taken as the cut-off point for lower limit of normal when a child with small or micropenis is assessed or investigated in this community. The methodology followed in this study was the most commonly used one in the majority of the studies performed to define penile length among neonates. This conventional stretched penile length measurement method was based on the fact that Schonfeld demonstrated significant correlation between the stretched and erect penile length (erect penile length = 0.985, stretched length of -0.0095; $r=0.983$).²⁻³ Other methods had been introduced which although are called simple and accurate, it may be disturbing to the baby and his parents as the piston introduced to the cut end of the 10ml syringe, is partially withdrawn causing suction to draw the penis into the injector to read the penile length from the attached scale.⁴ The measurement technique described in this study is not only the most commonly utilized technique, but perhaps the most convenient and very accurate to rule out commonly normal variants mistaken for micropenis or microphallus, or both. These variants include buried penis (intraped normal penis within the subcutaneous tissue surrounding it)

and the webbed scrotum which means extension of the scrotal sac into the ventral aspect of the shaft of the penis.⁴ The bulk of the penile shaft is also important. This is presented in this study by the actual measurement of the midshaft circumference, which was not converted to width or diameter for simplification reasons. The significant difference found comparing the results of this study to Schonfeld, Flatau and Troschevs' studies may reflect the difference in techniques and definitions. In this study the maximum measured (not calculated) circumference was taken.^{2,5,7} Interestingly in this study the circumference and the length figure almost overlapped, **Figure 1**. This may be taken as a rough method to ascertain proportional length and circumference figures.

It is concluded from this study that the standard penile size in normal full term Saudi boys is similar to that previously reported in international data. The mean is 3.55 cm and the SD is 0.57 giving a cut-off upper limit of 4.98 cm and lower limit of normal 2.13 cm .

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