

## STANDARD PENILE SIZE FOR NORMAL FULL TERM SAUDI NEWBORNS

By:

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Running Title: **Penile size in Saudi newborns**

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## معايير قياسات طول ومحيط والقضيب عند المواليد السعوديين كاملي الحمل

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ملخص :

الهدف: إثبات المعايير الطبيعية لطول ومحيط القضيب عند المواليد السعوديين كاملي الحمل.

طريقة الدراسة: تم مقياس طول القضيب لدى ٣٧٩ مولودا سعوديا كاملي الحمل حيث وضع طرف الملقوق على العظم العاني وطرف الحشفة ، كما تم قياس محيط القضيب باستخدام أنبوبة بلاستيكية غير قابلة للتمدد قيس بها محيط القضيب عند منتصف طوله.

النتائج: كان معدل طول القضيب ٣.٥٥ سم ( الانحراف المعياري: ٠.٥٧ ) وكان محيط منتصف القضيب ٣.٩٦ سم ( الانحراف المعياري ٠.٤٤ ).

خاتمة: إن معدل طول القضيب لدى المواليد في هذه الدراسة ٣.٥٥ سم لم يكن مختلفا اختلافا كبيرا عن ما حقق في دراسات عالمية سابقة ، وبهذا تكون نقطة الحد الأدنى (-٢.٥ انحراف معياري) ٢.١٣ سم ونقطة الحد الأعلى (+ ٢.٥ انحراف معياري) ٤.٩٨ سم . هذا وكان محيط منتصف القضيب ٣.٩٦ سم (انحراف معياري ٠.٤٤).

مفتاح الكلمات: القضيب - المواليد - كاملي الحمل - السعوديين

**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 the a non stretchable plastic tube placed around the midshaft of the uncircumcised penis.

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

**Conclusion:** The mean penile length of 3.55 cm in this study was not very much different from the previously reported international data. The cut-off lower limit (-2.5 SD) is calculated to be 2.13 cm. The cut-off upper limit (+2.5 SD) is 4.98 cm. The mean penile circumference was 3.96 cm (SD 0.44).

**Keywords:** penile size; Saudi newborns

## **INTRODUCTION:**

The human body and various body organs have variable sizes. Various normal standards and charts defining the mean and the range have been developed for various organs. Normal penile length and circumference is important from both the cosmetic and the functional (urinary and sexual) points of view. Normal standard of penile size at birth was established by Feldman et al in 1978 to be  $3.5 \text{ cm} \pm 0.7 \text{ cm}$  and the diameter was  $1.1 \text{ cm} \pm 0.2 \text{ cm}$ .<sup>(1)</sup> This study set forth normal penile length and midshaft circumference among Saudi full term newborns.

## **MATERIALS AND METHODS:**

Prior to circumcision, penile length and circumference in 379 normal full term Saudi newborns was measured during the first two 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).<sup>(2-7)</sup> The midshaft penile circumference was estimated by measuring the length of a plastic tube put around the middle part of the penile shafts.

The interobserver and intraobserver variation was tested by repeating the measurements on the same babies by the same examinee and by the two examiners in 10% of the babies. The mean and standard deviation of the results was then calculated and expressed in percentile charts. The student-t-test was used to compare the results with other studies.

## RESULTS:

379 normal full term infants were examined within the first two 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 standard deviation 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, respectively. The cut-off lower limit normal penile length (-2 SD) is therefore 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 standard deviation was calculated to be 0.44 cm. The 95 and the 99 percent confidence interval around the mean were 3.913 – 4.003, and 3.900 – 4.017 cm, respectively. 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 is shown in Figures 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 have been put forward. The mean phallus length at birth was about 4 cm in Schonfeld and Beebe study in 1942.<sup>(2)</sup> Since then many studies in different populations were conducted. The majority however was on Caucasian babies. Comparing the results of this study to similar studies done on different communities showed no significant difference among the majority of studies (Table1).<sup>(1-7)</sup> The significant difference found compared to Ozbey's study may reflect the difference in technique used (CPLM vs

Syringe). 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.<sup>(2)</sup> 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 with 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 Selonfeld demonstrated significant correlation between the stretched and erect penile length (Erect penile length = 0.985 (stretched length of -0.0095 ;  $r=0.983$ ).<sup>(2,3)</sup> Other methods have been introduced which although called simple and accurate, it may be disturbing to the baby and his parents as the piston introduced to the cut end of the 10 ml syringe, is partially withdrawn causing suction to draw the penis into the injector to read the penile length from the attached scale.<sup>(4)</sup>

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 and/or microphallus. 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.<sup>(4)</sup>

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 Flatau, Schonfeld and Troshev studies may reflect the difference in techniques

and definitions. In this study the maximum measured (not calculated) circumference was taken.<sup>(2,5,7)</sup>

Interestingly, in this study the circumference and the length figure almost overlapped (Fig 1). This may be taken as a rough method to ascertain proportional length and circumference figures.

It is concluded from this study that the SPL in normal full term Saudi boys is not very much different from the previously reported international data. The Mean is 3.55 cm and the standard deviation 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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**Table 1. The data of this study in comparison to other studies.**

Study	Number of Babies	Ethnic background	Age	Penile Length in cm ( $\pm$ SD)	P Value compared to this study	Penile circumference in cm ( $\pm$ SD)	P Value compared to this study	Technique
Flatau (Ref 5)	100	Jewish	Newborns	3.5 (0.4)	0.4098 (NS) <sup>††</sup>	3.3 (0.3)	<0.001	CPLM*
Lian (Ref 3)	228	Singapore (Asian)	Newborns	3.6 (0.4)	0.2452 (NS) <sup>††</sup>	ND <sup>†</sup>	-	CPLM*
Va Sudavan (Ref 6)	135	Indian (Asian)	Newborns	3.57 (0.46)	0.7136 (NS) <sup>††</sup>	ND <sup>†</sup>	-	CPLM*
Oakey (Ref 4)	30	Turkish (Asian)	Newborns and infants	3.53 (0.53) 3.26 (0.56)	0.8526 (NS) <sup>††</sup> 0.0075 (S) <sup>§</sup>	ND <sup>†</sup>	-	CPLM, <sup>††</sup> CPLM, <sup>††</sup>
				3.32 (0.47) 3.28 (0.55)	0.0127 (S) <sup>§</sup> 0.0320 (S) <sup>§</sup>			Syringe, <sup>††</sup> Syringe, <sup>††</sup>
Schonfeld (Ref 2)	125	American (Caucasian)	Newborns and infants	3.75	-	3.6 (0.3)	<0.001	CPLM*
Troschev (Ref 7)	50	Bulgaria (Caucasian)	Newborns and infants	3.11	-	3.28 (1.5)	<0.001	Not described
Feldman (Ref 1)	37	American (Caucasian)	Newborns	3.5 (0.7)	0.6185 (NS) <sup>††</sup>	-	-	-
Al Herbish <sup>†</sup>	379	Saudi Arabian	Newborns	3.55 (0.57)	-	3.96 (0.44)	-	CPLM*

\*CPLM = Conventional Stretched Penile Length Measurement

<sup>††</sup>No. 1 & 2 in Ozbey study indicated 1<sup>st</sup> and 2<sup>nd</sup> observe

<sup>†</sup>ND = Not Done.

<sup>††</sup>NS = Not Significant

<sup>§</sup> = Significant

<sup>†</sup> = The present study



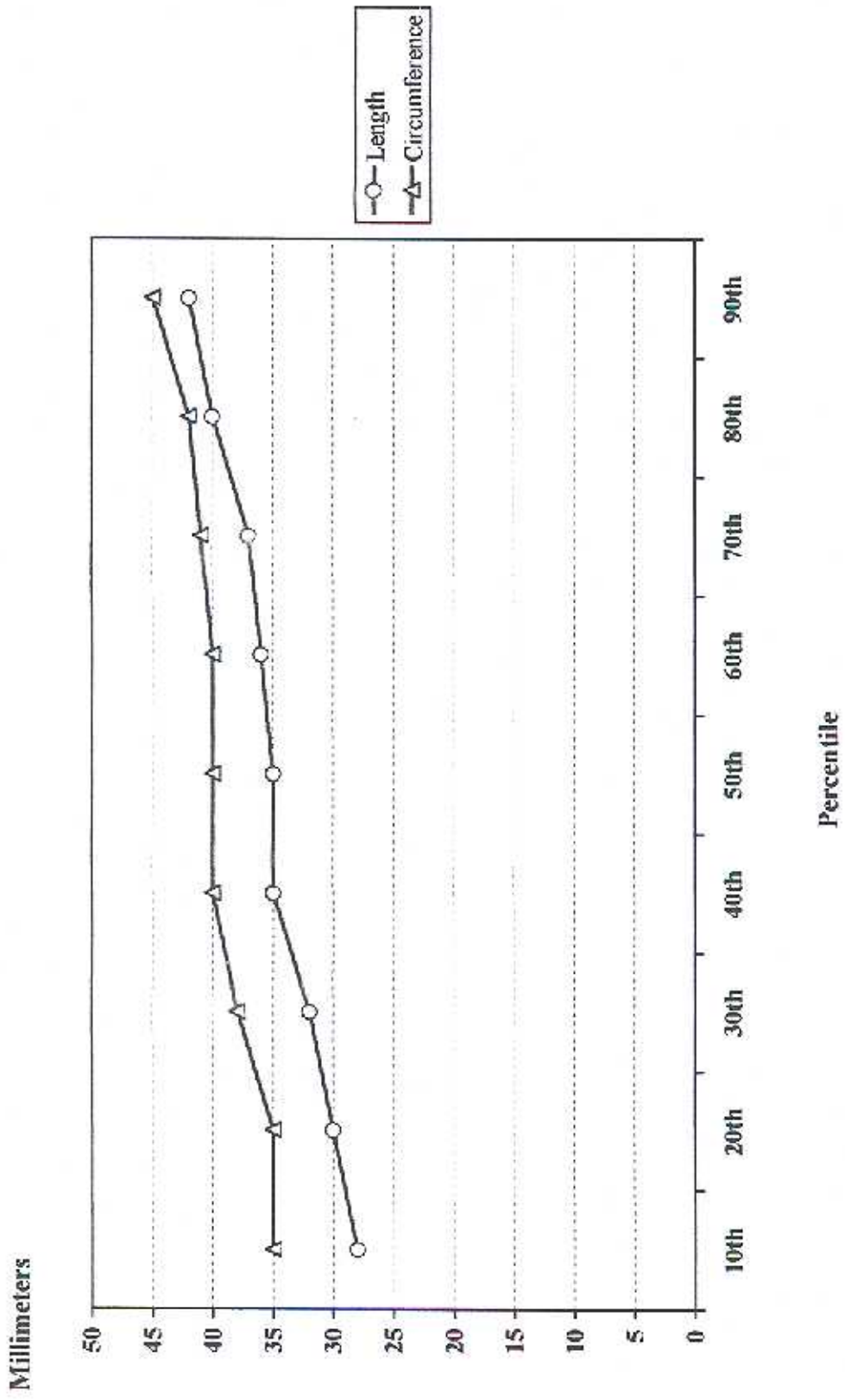


Figure 1. Percentile Chart of Penile Length and Circumference

**Figure 1. Percentile Chart of Penile Length and Circumference**

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