

# The Size of External Urethral Meatus on Maximum Stretch in Indian Adult Males

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**Abstract** Size of the external urethral meatus in adult Indian males is not yet documented. However, for choosing optimum size of an instrument, it is important to know the maximum stretchable external urethral meatal size in a particular patient. Hence, a prospective study was conducted at our institution to document the maximum stretchable adult male external urethral meatus size. After obtaining consent, 340 adult males who were undergoing urethral instrumentation for reasons other than the diseases of the urethra underwent urethral calibration using a “urethral calibrator” during February 2009 to April 2010. Data were analyzed using the SPSS 17. The average maximum stretchable external urethral meatal size in an Indian adult male was 28.49 Fr. Ours is the only study to document the maximum stretchable adult external urethral meatal size in Indian males which helps us for better instrumentation.

**Keywords** Males · External urethral meatus · Instrumentation · Urethral calibration

## Introduction and Study Objective

Although the organic anatomy is grossly similar in all individuals, there exists interracial and interindividual variations

with respect to various aspects of human anatomy. It is important to note that these dissimilarities need to be taken into account while dealing with these anatomical structures especially by instrumentation.

The basis of interventional instrumentation in India, be it the GIT or the GUT, has been according to the western standards making these instruments a poor fit to our anatomical dimensions.

Although we as a urologists deal with the external urethral meatus day in and day out, we do not have any data as far as external urethral meatal size in Indian adult males. Hence, this study to document the maximum stretchable external urethral meatal size among the Indian male population was conducted so as to enable trauma-free instrumentation.

## Materials and Methods

A prospective study was conducted in our institute between February 2009 and April 2010. After obtaining clearance from the ethical committee, the male patients undergoing urethral instrumentation for reasons other than diseases of the urethra were offered estimation of their maximum stretchable external urethral meatal size. After obtaining the consent, the size of the maximum stretchable external urethral meatus of these patients was measured using a meatal calibrator (Fig. 1).

The meatal calibrator is a tapering rod made of stainless steel, manufactured by Kalelkar Surgicals, Mumbai, India, and has graduation marks on it. The calibrator was inserted into the adult male’s external urethral meatus with appropriate lubrication and under all aseptic precautions, as shown in Fig. 2. The calibration mark at the level of external urethral

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**Fig. 1** A meatal calibrator (Kalelkar Surgical, Mumbai, India)

meatus was taken as meatus size and hence recorded. This calibrator was introduced into the various sized fenestrations in the French measurement scale provided by Cook Urologicals (Fig. 3). The maximally stretchable size of the external urethral meatus was recorded in French by noting the size of fenestration in which the calibrator matches at the level of the measured graduation mark.

#### Inclusion Criteria

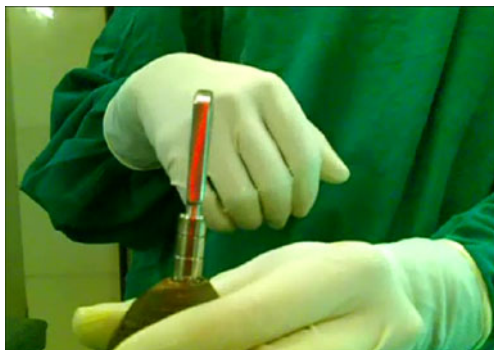
- Adult patients undergoing urethral instrumentation who consent to the measurement of maximum stretchable external urethral meatus size

#### Exclusion Criteria

- Patients who have history of
  - Penile surgeries
  - Per urethral instrumentation
  - Per urethral intervention

The data of 340 adult males in the age group of 18–92 years were evaluated. The mean age was 47.61 years (Fig. 4).

Statistical analysis was performed using SPSS version 17 software.



**Fig. 2** Method used for measuring external urethral meatus size

## Results

The mean external urethral meatal size was 28.49 Fr with a standard deviation of 3.063. The male external urethral meatus size in different age groups is shown in Table 1.

The association of the age with the external urethral meatal size was assessed with the linear regression model to find that there was no linear association of age with the meatal size as shown in Fig. 5.

In our study, we found that majority of the external urethral meatus was of 28 Fr and men with 22 Fr urethral meatus were the least in number (Fig. 6).

## Discussion

It was surprising for us to know that the adult male urethral meatal size was a matter of accepted concept rather than literature-supported data. The extensive literature search in this regard yielded a very few results which are mentioned below.

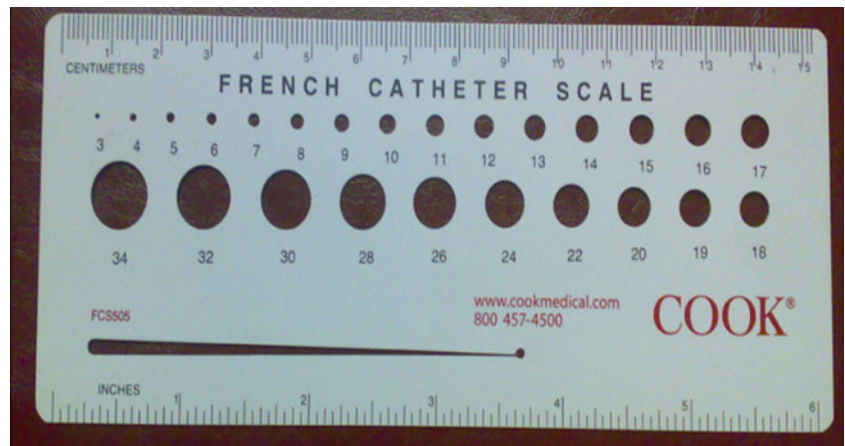
Thomson [1] from Guy's Hospital, London, was the first to document the external urethral meatus size. According to him, the adult male external urethral meatal size on an average is 0.35 inches. as a vertical slit, if converted into the French scale, becomes 29.6 Fr. In our study, the maximum stretchable male external urethral meatus size on an average is 28.49 Fr. Table 2 shows the comparison between Ralph Thomson's data and our data. It clearly shows that the maximum stretchable size of external urethral meatus in adult Indian males on an average is about 1.5 Fr smaller than the Western population. This is important and significant difference which needs to be considered as far as the instrumentation is considered.

Berry and Cross [2, 3] in 1955 compared the meatal size in circumcised and uncircumcised Americans and published their data. According to them, meatal size in uncircumcised adult males on an average was 22.7 Fr and the same in circumcised males was 19.9 Fr (average). There is no mention in the article as to how they had measured the external urethral meatus size.

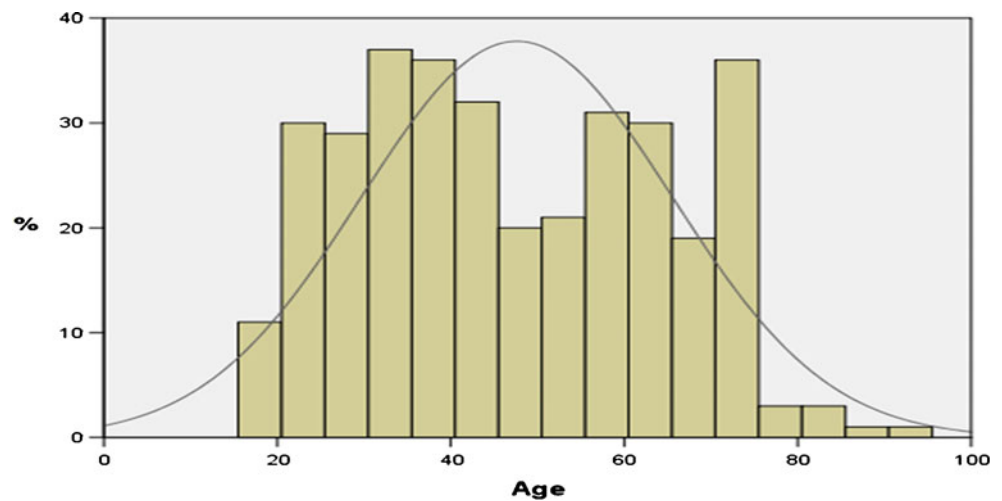
Our study did not contain any circumcised males as they were excluded from the study for having undergone surgery on the penis. The average maximum stretchable meatal size in our study was 28.49 Fr, which is much higher to that found out by Berry and Cross, though the way they measured may not be similar to us.

Other than Berry and Cross only other authenticated data available about the external urethral meatus in adult males is in Gray's anatomy [4], where the adult male external

**Fig. 3** The French measurement scale used for measuring external urethral meatus size



**Fig. 4** Age distribution of the study group (mean being the summit of the sigmoid curve)



urethral meatus is stated as a vertical slit of about 6 mm size which if converted into a hollow orificial opening results in 18 Fr size. Our study has proved beyond doubt that the Indian adult urethral meatal size on maximal stretch is much more than what is quoted in Gray’s anatomy.

But it is important to note that any anatomical study about the external urethral meatus does not give the information regarding the distensibility and elasticity of the meatus which is very important from the instrumentation point of view. Hence, we have used a novel method to measure external urethral meatus size using the meatal calibrator, which measures not only the size but also the exact distensible size, by which we can very well know which sized instrument can be used in a given urethra without damaging the urethral meatus per se.

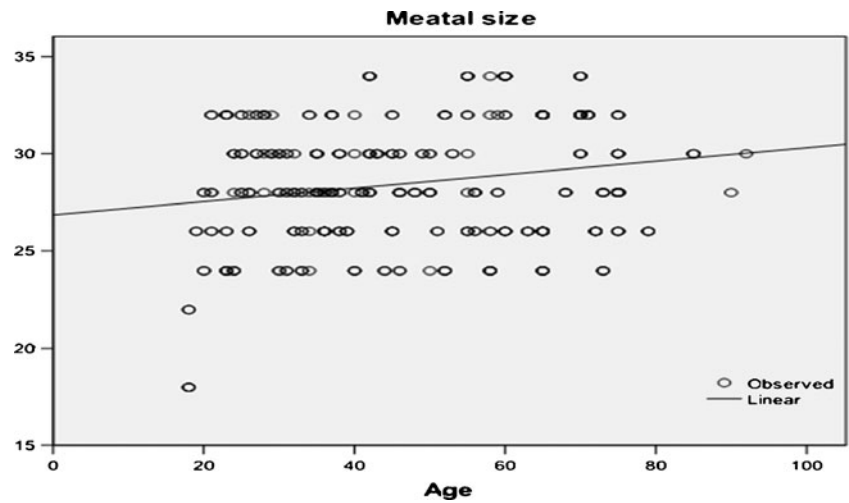
Although Mundy [5] has quoted adult male meatal size as 24–26 Fr, this is not supported by any literature. Similarly, Noel [6] states adult male urethral meatus size as 24 Fr without any literature support.

It is important to note that there is no Indian data available as per our knowledge and ours is the only study which deals with this subject in an Indian population.

**Table 1** External urethral meatus size in various age groups

S. No.	Age group (years)	Number of patients	Mean maximum stretchable external urethral meatal size (Fr)
1	Up to 20	10	23.09
2	21–30	59	28.75
3	31–40	73	27.67
4	41–50	52	28.73
5	51–60	52	29.23
6	61–70	49	29.76
7	71–80	39	28.15
8	81–90	5	29.5
9	>90	1	30

**Fig. 5** Association of the age with external urethral meatal size

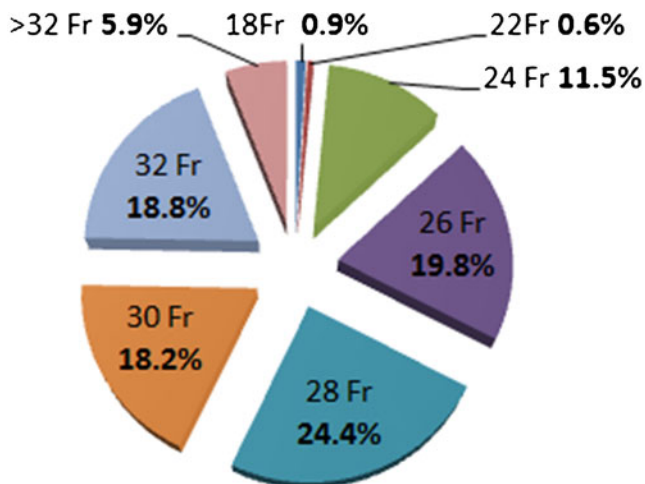


The relationship of the age with the external urethral meatus size among boys aged between 0 and 14 years has been established by Wozniak [7]. But the same is not proved in any adult population till today and the same is confirmed in our study as well. However, one thing to be kept in mind is that the sample size in each age subgroup in our study may not be statistically big enough to prove any association between the age and the maximum stretchable external urethral meatus size. Our study has clearly showed that the maximum stretchable size of the urethral meatus is more of an individualistic phenomenon in Indian males rather than being associated with age.

**Conclusion**

The absence of data with regard to external urethral meatal size in males is surprising, but it is the truth, especially in an Indian context. The fact becomes much more important when

one deals with the external urethral meatus day in and day out without knowing exact size. Our study is the first study to document the maximum stretchable external urethral meatus size in an Indian male as 28.49 Fr (average) and probably the first such data among Asian population according to our knowledge. These data clearly help us as a baseline for urethral instrumentation as we have used the meatal calibrator, which has helped us to get the data regarding properly calibrated urethral meatal size unlike in anatomical study, where meatus is measured as a mere vertical slit. It is important to note that none of the prior studies considered meatus measurement using the meatal calibrator, which can provide definite information regarding the distensibility and elasticity of the urethral meatus as well and hence help us to know the appropriate size of the instrument that can be used in adult Indian male urethra without harming external urethral meatus, thus preventing any further complications due to inappropriate instrument use.



**Fig. 6** The frequency distribution of external urethral meatus size in our study

**Table 2** Comparison between Thompson’s data and our data

Sl. No.	Age group in years	Meatus size in Fr (Thompson’s study)	Meatus size in Fr (our study)
1	1–10	11.95	NA
2	11–20	19.14	23.09 (up to 20 years)
3	21–30	30.24	28.75
4	31–40	27.81	27.67
5	41–50	28.65	28.73
6	51–60	30.45	29.23
7	61–70	30.77	29.76
8	71–80	30.77	28.15
9	81–90	NA	29.5
10	>90	NA	30

Conversion equation used:  $25.4 \times \text{meatus diameter in inches} / 0.33 = \text{meatus size in Fr}$

**Conflict of interest** No funding source to declare

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