

# The Urinary Catheters Used in Ancient Times Discovered in Anatolia

## Anadolu'da Keşfedilmiş Antikçağ Dönemine Ait Üriner Kateterler

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**ABSTRACT Objective:** Urinary catheterization using urethral catheters is a frequently performed procedure in daily urology practice. Especially in cases of urinary retention, it removes the troubles caused by the inability to urinate. The beginning of the process of drainage of full, distended and painful bladder due to inability to urinate extends to the antique age. During the Ancient Greek and Roman periods, various urinary catheters were developed for this purpose and used for urinary retention. Similar processes took place in Ancient Anatolia where ancient Greek and Roman civilizations were lived. **Material and Methods:** Including the site reports of the archaeological explorations and the writings of antic age physicians and writers, related literature was surveyed and also sample urinary catheters of private collections and the ones in the archaeological museums of Turkey were viewed. **Results:** During Anatolian archaeological excavations in ancient cities such as Allianoi, Ephesos and Kolophon, various types of surgical tools and urinary catheters belonging to the Roman period were discovered. Many ancient Anatolian physicians of Anatolia like Soranus of Ephesus and Galen of Pergamon used these catheters and described their own experiences in their daily works. **Conclusions:** In ancient times, it was known that urethral anatomies were different in male and female gender, and for this reason it was seen that catheters were used in different shapes and sizes for men and women.

**Keywords:** Ancient medicine; history of urology; urinary catheters; urinary retention; bladder stone

**ÖZET Amaç:** Üretral kateterler kullanılarak yapılan üriner kateterizasyon günlük üroloji pratiğinde çok sık uygulanan bir işlemdir. Özellikle üriner retansiyon durumlarında idrar yapamamanın verdiği sıkıntıları ortadan kaldıran. İdrar yapamamaya bağlı dolu, distandü ve ağrılı mesanenin boşaltılması işleminin başlangıcı antik çağa kadar uzanır. Antik Yunan ve Roma dönemlerinde bu amaç için çeşitli üriner kateterler geliştirilmiş ve idrar çıkaramama durumlarında kullanılmıştır. Antik Yunan ve Roma uygarlıklarının yaşandığı Antik Anadolu'da da benzer süreçler gerçekleşmiştir. **Gereç ve Yöntemler:** Arkeolojik keşiflerin saha raporları ile antik çağın hekim ve yazarlarının yazıları da dâhil olmak üzere ilgili literatür gözden geçirilmiş, Türkiye'deki arkeoloji müzelerinde ve özel koleksiyonlarda bulunan üriner kateter örnekleri incelenmiştir. **Bulgular:** Anadolu'da, Allianoi, Ephesos ve Kolophon gibi antik şehirlerde yapılan arkeolojik kazılarda özellikle Roma dönemine ait çeşitli cerrahi aletler ile birlikte üriner kateter örnekleri keşfedilmiştir. Efesli Soranus ve Bergamalı Galen gibi Anadolu'nun birçok yerli antikçağ doktoru bu kateterleri kullanmış ve kendi deneyimlerini günümüze ulaşan eserlerinde anlatmıştır. **Sonuç:** Antik çağda üretra anatomilerinin kadın ve erkek cinsiyette farklı olduğunun bilindiği ve bu nedenle idrarı boşaltmada erkekler ve kadınlar için farklı şekil ve boyutlarda kateterlerin kullanıldığı görülmüştür.

**Anahtar Kelimeler:** Antik tıp; üroloji tarihi; üriner kateterler; idrar retansiyonu; mesane taşları

**D**iseases and the maladies spread with the beginning of mankind, for which the man has looked for remedy persistently. Undoubtedly, there had been maladies related with urinary system among the ones sought for a remedy. Distended bladder due to unable to urinate which causing serious urinary problems has been one of the widely-known urological diseases.<sup>1</sup>

Several bronze urinary catheters were discovered in archaeological excavations at sites where Roman Civilizations took place (Figure 1). It is mentioned in the archaic literature that aforesaid catheters had been used in ancient times especially during Roman reign.<sup>2,3</sup>

The objective of this paper is to reveal the functionality and the usability of the urinary catheters for which sex and for what kind of urinary retentions by analysing the shapes, size and which material they were made of.

## MATERIAL AND METHODS

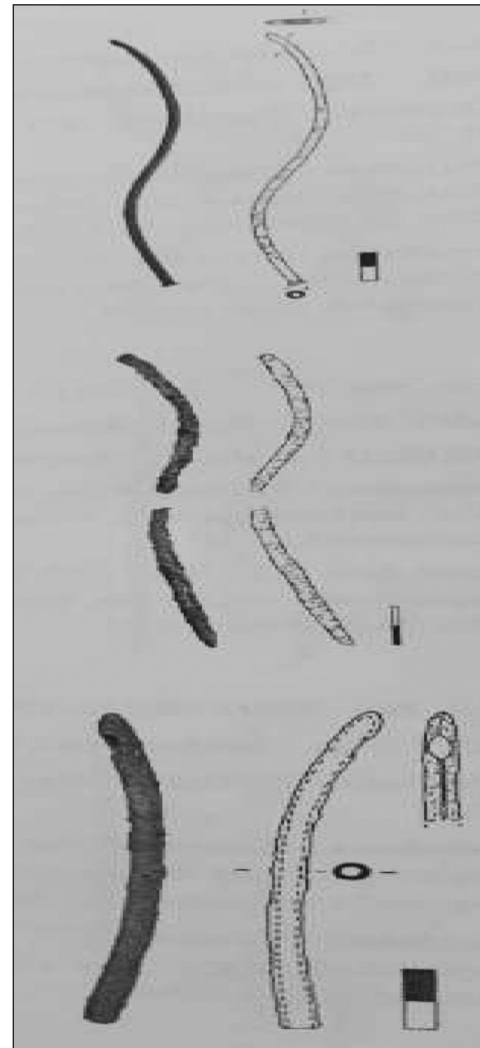
Including the site reports of the archaeological excavations (Allianoi ancient city site reports) and the writings of antic age physicians and writers, related literature was surveyed and also sample urinary catheters of individual collectors (Haluk Perk Private Collection) and the ones in the archaeological museums of Turkey (Bergama Archaeology Museum) and the books about ancient medical instruments (Allianoi Tıp Aletleri, Anadolu'da Bulunan Antik Tıp Aletleri, Anatolia Ancient Period Medicine Instruments, Milestones in Urology) were viewed.

## RESULTS

When the Bergama Archeology Museum and the book named Allianoi Medical Instruments were examined, three bronze samples, among the very rare catheters belong to Roman Period, found in Allianoi antique city excavations.<sup>4</sup> Two of them are long and curled like "S", while the third one is shorter and straighter (Figure 2).<sup>4</sup>



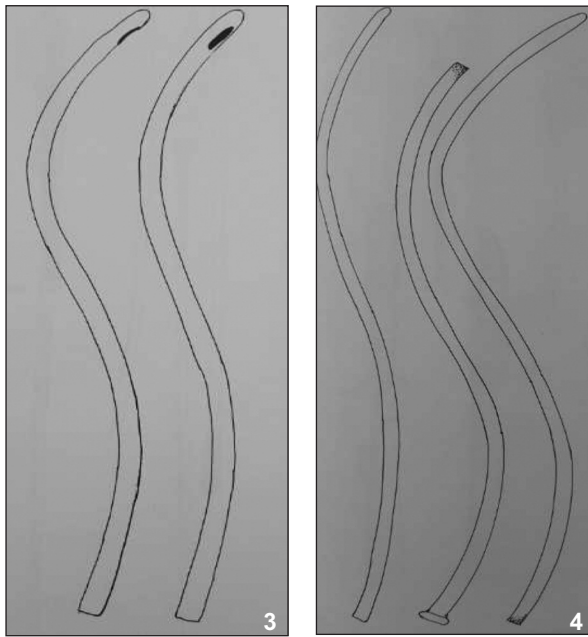
**FIGURE 1:** Ancient roman bronze catheters, 1<sup>st</sup> century CE, British Museum, London, UK.



**FIGURE 2:** Drawings of three different bronze urinary catheters found in Allianoi Antic City. Bergama Archaeology Museum, Izmir, Turkey.

When the Uzel's book *Anatolia Ancient Period Medicine Instruments* examined, we found that a medical historian Dr. Theodor Meyer-Steineg found a surgery tool set including a bladder catheter belonging to an antique age physician in 1905 at the site of Ephesus. Currently exhibited at the medical history museum of Friedrich Schiller University in Jena, Germany, a drawing from its original, it is shown that the catheter has a long "S" shape and closed tip and holes on the sides just like its contemporaries (Figure 3).<sup>5-7</sup>

There are also curled and "S" shaped urethral catheters found in Colophon antique city as a part of 36-piece surgery set which was in the hands of



**FIGURE 3:** Drawing of “S” shaped bronze urinary catheter found in Ephesos Antic City. Medical history museum of Friedrich Schiller University, Jena, Germany.

**FIGURE 4:** Drawing of “S” shaped bronze urinary catheters found in Colophon Antic City. Medical History Museum of Johns Hopkins University, Baltimore, USA.

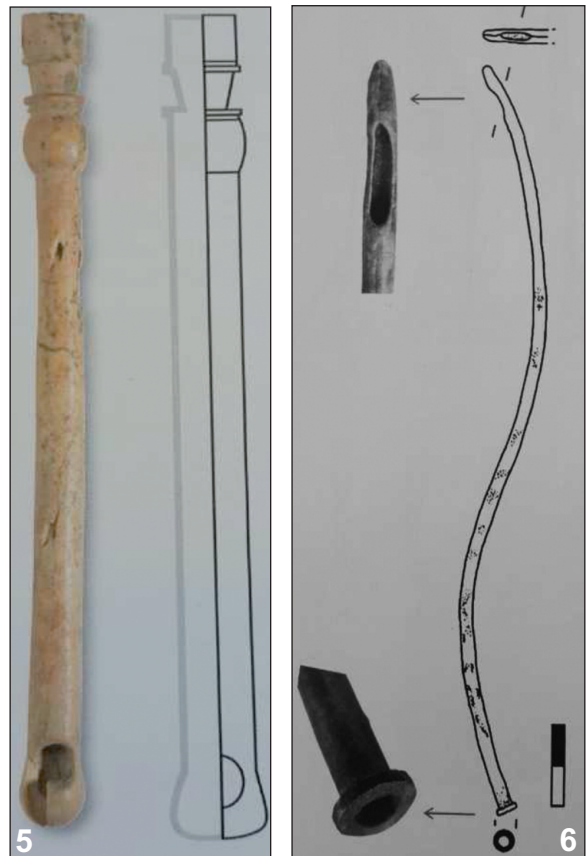
Dutch Consulate in Izmir now being exhibited at the medical history museum of Johns Hopkins University (Figure 4).<sup>8</sup> In addition, drawings of the catheters, which are revealed as they were found from the grave of an antic age physician are made according to pictures of Caton’s publication.<sup>8</sup> Furthermore, a highly rare urethral catheter, originating from Roman age, made up of bone and straight shape belonging to Haluk Perk’s private collection in Turkey was discovered in Anatolia (Figure 5).<sup>9</sup> The catheters, dated to Roman age between the 1<sup>st</sup> and 3<sup>rd</sup> centuries A.C., resemble the ones used today in terms of shape and functionality as they have closed tips and holes on the sides (Figures 6-8).

## DISCUSSION

Bronze urinary catheters have been reported for the first time in the third century BC by Erasistratus (304-250 BC), the successful surgeon of antiquity, and it has been reported to be used for urination difficulties.<sup>10,11</sup> Because of that urinary catheterization has been described as one of the

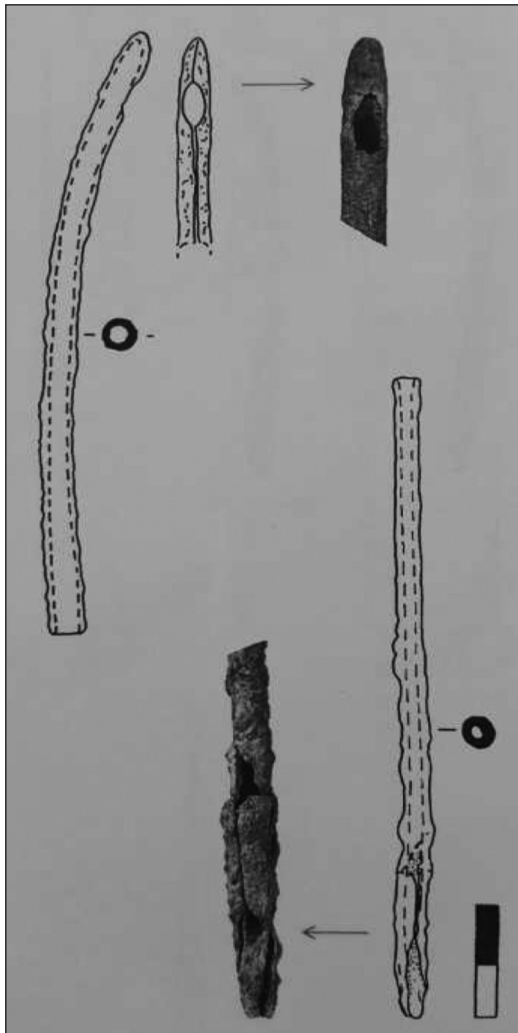
first form of catheterization in the body and one of the first treatment interventions based on drainage. In other words, urinary catheterization is accepted as a milestone in urological history.<sup>2</sup>

There are numerous causes for inability to urinate. Celsus of Rome (25 BC-50 AD) asserted that trouble in urinating might develop due to senectitude and keeping urine as a bad habit, and also this case was valid for both sex, for which the bronze tubes were used to discharge the urine<sup>4</sup>. He not only described the urinary catheters exceedingly well, but also explained the length of the male and female bladder catheters by utilising the rule of thumb. He defined that the catheters should have been of different and ergonomic size, and of different length for males and females while curved and longer for just males, and also chosen with ut-



**FIGURE 5:** Straight urinary catheter made of bone, found at unknown place. Haluk Perk Private Museum, Istanbul, Turkey.

**FIGURE 6:** Drawing and tips of “S” shaped bronze urinary catheter found in Allianoi Antic City. Bergama Archaeology Museum, Izmir, Turkey.



**FIGURE 7:** Drawing and tips of slightly curved bronze urinary catheter found in Allianoi Antic City. Bergama Archaeology Museum, Izmir, Turkey.



**FIGURE 8:** Contemporary urinary catheters with closed tips and side holes.

most care for the patient.<sup>12,13</sup> Celsus has recommended a urethral catheter for three men and two women in a urological set.<sup>10,12</sup>

Another antic age physican, Galen of Pergamon (129-216 AD), explained that they drained the bladder by the help of a catheter by inserting this “S” shape appliance thorough urethra.<sup>14</sup>

On the other hand, Paul of Aegina (625-690 AD), explained the usage of catheter and draining bladder with all the specifics. He further detailed how to choose a catheter according to height, weight and sex of the patient, and also why a piece of wool tied with thread compressed into the tip of the catheter and exposed to oil for a while. He also described how the catheter pushed into the bladder while the patient had a proper sitting position and then how the urine was discharged through the catheter when the thread was pulled back.<sup>15</sup>

Soranus of Ephesus (98-138 AD) pointed out that catheters can be used for obstructive urethra or bladder calculus by describing how to push the stone through bladder with a proper catheter.<sup>16</sup>

Because of fragile structure, bronze catheters were rarely discovered in archeological sites and were found Pompeii, Baden, and Novaesium excavations (Figure 1).<sup>3,17,18</sup> These catheters were also discovered in Allianoi antique city excavations, and also in Ephesus and Colophon antic city physican graves in West Anatolia where the Antic Roman and Greek civilizations lived.<sup>5,8,11,19</sup>

## CONCLUSION

Two different type catheters were used for man and woman in order to drain the bladder and to treat urinary retention. The compliance of long “S”-shaped and curled bronze catheters with male urethra anatomy supports that these type of catheters had been used for male patients. Short and slightly curved bronze catheters as well as short and straight catheters made up of bone seem compliant with female urethra anatomy. These ancient catheters have been used in obstructive bladder stones except in cases of urinary retention and inability to urinate.

### **Conflict of Interest**

*Authors declared no conflict of interest or financial support.*

### Authorship Contributions

**Idea/Concept:** Ekrem Güner, Şebnem İzmir Güner, Osman Özdemir; **Design:** Ekrem Güner, Volkan Tuğcu, Mehmet Emin Güneş; **Control/Supervision:** Şebnem İzmir Güner, Volkan Tuğcu; **Data Collection:** Ekrem Güner, Osman Özdemir, Şebnem İzmir Güner; **Analysis and/or Interpretation:** Osman Öz-

demir, Volkan Tuğcu; **Literature Review:** Ekrem Güner, Şebnem İzmir Güner; **Writing the Article:** Mehmet Emin Güneş, Volkan Tuğcu; **Critical Review:** Ekrem Güner, Osman Özdemir, Şebnem İzmir Güner; **References and Findings:** Ekrem Güner, Şebnem İzmir Güner, Volkan Tuğcu.

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