

## Medical advancements of Iranians in pre-Islamic Era

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**Abstract:** The advancement in medicine, in ancient Iran has been explained in ancient Iranian literature, such as Avestan and Pahlavi text; however, evidences has been found by archeologists may help in providing scientific proofs to this claim. Variety of evidences supports medical background in the history of ancient Persia. However, although any kind of treatment, in particular surgery, requires special means and preparations, but medical tools, including those used in pharmacy and surgery, have usually been ignored in studies and only some of them, like small forceps and scalpels, have been doubtfully recognized as medical tools. In addition, only small number of archeological reports, like those prepared on a trepanned skull found in Shahr i Sokhta, have addressed ancient Persian advancements in medicine and surgery.

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### 1. Introduction

It seems that the interdisciplinary studies are missed in archeological studies and reports, some of which partially addressed this topic are incomplete discussions and left the detailed investigations to future seasons or studies; and this is why in spite of many written documents, such as Avesta, the oldest Iranian book, which mentions the name of Iranian pioneers of medicine as well as different branches of medicine such as herbal medicine, surgery and manthera- therapy; Pahlavi texts ( e.g. dinkart) with numerous instances of medical science and ethics which should be followed by those who want to become physicians and further, books in other ancient languages, like Soghdian, we have nothing but conjectures to rely on when we want to learn about how much our ancestors knew about medicine and medical tools.

### 2. Archeological findings

Archeological studies are carried out on archaeological sites for achieving different goals by seeking assistance from other fields of study such as animal archeology, geology and mineralogy. The studies also pursue some side-goals such as refurbishment of vegetation, study of plants, fruits, seed and wood and their role in local economy. Information and data required for such studies may be obtained by examining charcoal and coaled seed or other relics of plants found at different layers. A method called "inundation" or "flooding" is used to separate light organic substances from the heavier mud excesses, with water (Tenburg, 2003)

It seems that researchers usually ignore side applications (e.g. applications in herbal medicine) of plants and seeds found in excavations\*. This is not only true for herbs, but also for other artifacts found by archeologists.

However, there are some certain examples which made one sure, about medical progress in ancient Iran such as spicial tiny tools and samples from Sialk and Shahr i Sokhta, which will be discussed below:

#### a. Instruments

Among gunmetal, bone, stone and copper tools found in excavations, there are examples with specific applications or with functions which cannot be precisely determined. Given the evidence found on medical advancements in ancient Persia, it is surprising that the applications of these tools have not been identified. The tools include different types of forceps, drills, small hones and awls. The samples are as follow:

#### I: Bronze pipe

This object belongs to 700-600 BC. and was discovered in luristan: a reed pipe which has a little curvature in the middle, its ending part is conic and it has an ibex on the other part. Regarding to design of the ibex one can imagine a ritual application for it, but its appearance can be assigned for its usage as a medical tool. (Figure 1-2)

\* Sialk revision plan contains several discussions on herbs and their properties. See Kimiayi Masumeh, 2006



Figure1: bronze pipe, first millennium, Luristan

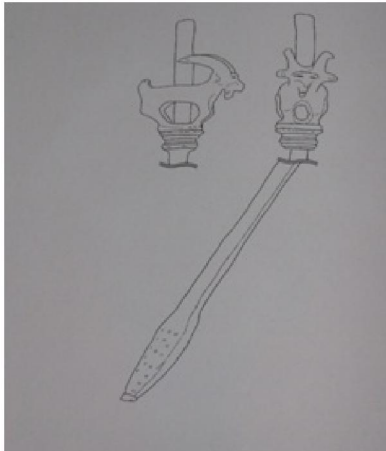


Figure 2: design of bronze pipe  
II: Forceps

The other example of these tools are bronze forceps in the shape of crescent long slender horn, regarding its appearance, one can consider that they might have a function such as today in medical science (Figure3).



Figure 3: bronze forceps, first millennium, Luristan  
III: Tiny knives

The usage of most of the founded tools from archaeological sites is clear and evident, but there are some cases which in spite of their ritual, industrial or domestic functions their usage in the other fields are not improbable (Figure 5). This characteristic specially can be seen in tiny tools such as those which are defined as cosmetics and often they could have been used in medicine, whether in the production of herbal drugs or their usage. Among these tools are four little objects which are marked as cosmetic tools in the museum of medical science history in Tehran (Figure 4).



Figure 4: a set of bronze tools, medical science history museum, Tehran



Figure 5: a set of bronze tools with medical application, Luristan

### B: a sample from Sialk

Prehistoric site of Sialk is located at northern hillsides of Karkas mountain on a conical region bordered by Kashan plain on north. The site is 950m. above the sea level and its area is around 480,000m<sup>2</sup> (48 hectares) of which 8.4 hectare is covered by the main part of northern tappa and 8 hectare is occupied by the main part of southern tappa. (Malek Shahmirzadi,2006) around 70 years ago Girshman identified six separate cultural periods in Sialk:

1. Sialk I and sialk II which contain evidences of initial habitation and food production;
2. Sialk III and sialk IV which reflect the beginning of urbanization and emergence of writing;
3. Sialk V (Iron Age ) whose relics are found in cemetery A;
4. Sialk VI (Iron Age Cntd.) whose relics are found in cemetery B; about 7000 years ago, the first inhabitants of Sialk settled at the northern hills. The last outsiders entered Sialk around 3000 years ago and buried the dead in cemetery B (Malek Shahmirzadi, 2006:19)

First medical specimen, was discovered by Shahmirzadi in Sialk. In the first phase of "Sialk revision plan", a preliminary survey was conducted on the northern tappa, in the third phase, in 2003, the southeast corner of Grishman's Trench I was selected for stratigraphy (Figure 6). At the depth of 1.60 m. from the datum point (948.14 below the sea level), two skulls were found, which were later examined by anthropologists. In the jaw of one of these skulls, which belonged to a middle-aged man, between the molars and foreteeth, there were two copper nuts resembling chess pawns (Figures 7-8) (Malek, 2006). The nuts had rounded base, solenoid stalk and ball shape head. They were 1 cm high and 7 mm in diameter, with the largest ball diameter being 3 mm (Figure 9). The nuts were acetated and the green effect of it can still be seen on the teeth (Malek, 2006). Appearance, location and attrition of the teeth confirm that they were nothing but dentures; probably the oldest and the most ancient dentures ever found (Malek, 2004).

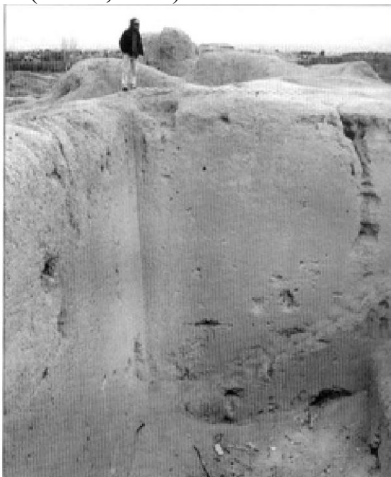


Figure 6. A view of north east corner of Giresman's Trench (Malek, 2006)

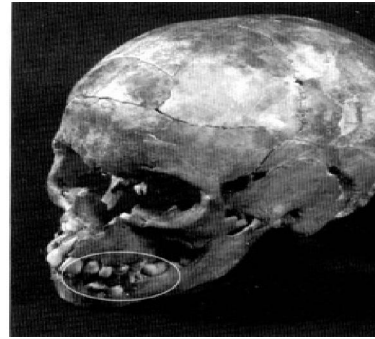


Figure 7: two copper nuts, in the jaw of skull (Malek, 2006)

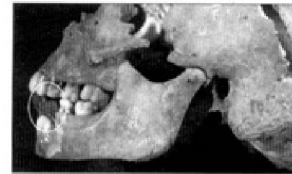


Figure 8: place of two nuts in the middle of the teeth (Malek, 2006)



Figure 9: two small chess pawn like nut (Malek, 2006)

### C: specimen of Shahr i sokhta

Shahr i Sokhta, is the name of chain of great natural hills with the height of 18-12 m. from the earth its located 56 km south of Zabol in the Sistan/Baluchistan province. Its existence was owed to the Hilmand and its delta, 120 hectare of its extend have ancient remains and the largest period belongs to the seventh to fifth layer, years between 2800-2500 BC that accede to 80 hectare. (Sajjadi, 2008)

Without doubt Shahr i Sokhta, is one of the most developed cities during the Bronze Age. The remains of this city shows that during the third millennium BC had an organized system of water supply and sewage discharge and medicine was progressed so that the doctors were not only aware of sciences such as bone-setting but also they could done wonderful surgeries, and so the people of this urban center had gain to such welfare that women had pay attention to their beauty.

Other elated findings are from graves of Shahr i Sokhta, the first one is a sample of skull surgery and the other one is an artificial eye.

### I: Artificial eye

One of the most distinctive features, found during the excavations in 2006, in grave 6705 is a half-sphere artifact which is inserted in the left eye of the buried woman of this grave.

Preliminary analysis, suggested that under her eyebrow and on her eyelid there is sign of abscess and some probable organic remains can be seen because of long term contact with the artificial eye-ball. (Sajjadi, 2008)

In general, it seems that the main material of this eye is bitumen mixed by unknown animal fat, its weight is 6.9 grams and it is convex from one side and the other side is almost circular and smooth. On this artificial eye the tiniest capillaries of the eye ball are designed with golden wires less than 0/5 mm diameter, the capillary was engraved at its center and there are very tiny traces of white spots on the iris of the eye which shows that it was completely white and its color was probably lost by the time. Two holes had been drilled on its sides were used for keeping the artifact in place (Sajjadi, 2008).

Chronologically, this grave dates beyond 2800-2900 BC and as the other founded samples of artificial eyes in ancient middle east and Egypt, have been dated back to the late third millennium BC. ,so the artificial eye of Shahri Sokhta is the oldest known sample in the world (Figure 10).



Figure 10: artificial eye, Shahri Sokhta, Iran (sajjadi, 2008:1)

## II:Skull surgery

Early physicians, who may be appropriately called wizard-therapist, believed that many diseases stem from captivation by devil or demons. They regarded serious headaches and faints and unconsciousness, as symptoms of such captivation. Primitive men thought that head is a channel through which these super natural forces influence human. Therefore, they believed in trepanation\* as the only way of getting rid of the demons. Many trepanations discovered by archaeological excavations around the

world, were of no medical use and largely based on superstitions or particular ethnic or religious beliefs.

Archeological evidences confirm several thousand years of trepanation background which was discovered in different regions of North America, Africa and south and East Asia. The largest number of trepanned skulls was found in Peru. Studies revealed that Peruvians used trephine, levatore and stone or metal tools to make rounded or square holes in skulls (figure.11). In some skulls, archeologists have discovered more than one hole which was possibly used to reduce the pressure inside the skull as a result of blows. Through large number of studies, scientists now believe that aboriginal inhabitants of Peru used to beat each other, continuously, on head by clubs or slingers to get rid of migraines, epilepsy and other brain damages (Sarmadi, 1999).



Figure 11: trepanned skull found in Peru

A perfect example of trepanned skull was found in excavations of Shahr i Sokhta, Iran. The skull presents a medical attempt to treat hydrocephalus:

Hydrocephalus, identified by Socrates for the first time, is a term of a Greek origin (made of two words: hudor (water)+ kephale (head) literally meaning" the water inside the skull".

The cerebrospinal fluid flows from the brain ventricles to the stalk and then to the spinal cord. Hydrocephalus is the result of misbalance between the secretion of cerebrospinal fluid and the re-absorption of the fluid.†

The level of cerebrospinal fluid may increase as a result of genetic and congenital disorders, as well as damages to head, apoplexy, infections (meningitis), or tumors. However, the most common reason for hydrocephalus is congenital

\* Of Greek origin: Trypanon meaning pierce or bore

† Rafei, Parasto, 2008:16

disorders which root in genetic conditions. CT scan and MRI may be used to diagnose the problem before it changes the skull.

In the case of The skull found in Shahri Sokhta (Figure 12) one can suggest that skull enlargement in addition to other symptoms such as convulsion, unsteady movements or even more serious chronic disorders e.g. loss of memory or changes in personality (which are still known as symptoms of hydrocephalus) led the physicians- although called the disease by other names and attributed it to supernatural powers- to trepan the woman's skull.

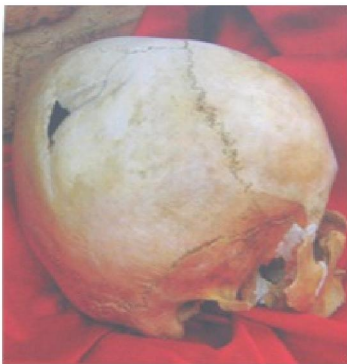


Figure12: the trepanned skull found in Shahri Sokhta (courtesy of medical science museum).

Along with long lasting headaches and gastrointestinal problems, the main post-surgery complication was infection. Today, patients are treated by antibiotics prior to operation in order to prevent infections. The young woman of Shahri Sokhta had a successful surgery after which she had a long life, but eventually she might have died of complications such as infections.

Archeological excavations of a mass grave in Shahri Sokhta in 1977 led to discovery of a young girl among relics of 13 skeletons. At the right parietal of her skull, there was a triangle loss, measuring 9.12 mm<sup>2</sup> showing bone complications. Cephalometric studies revealed abnormal indices as a sign of unusual skull size. Radiographic examinations showed a triangular complication and disordered bony tissues with rough cross-section and thin edges which confirm that the tissues have been treated by trepanation for removal of hydrocephalus around 4800 years ago in Iran. The evidences suggested that the girl lived for 8 to 12 months after the surgery; a fact that signifies great medical advancements in ancient eras.\*

\* Another example of trepanned skull was found in recent excavations in Rudan, Hormozgan.

### 3. Conclusion

Along with many written indisputable evidences which are found in avesta, the oldest Iranian book, Pahlavi texts and books in other ancient languages, there are many archeological proofs, which are founded in excavations around Iran, which confirm and support the ancient medical advancements in Ancient Persia. Skulls with trepanned remains, such as the trepanned skull found in Shahr i Sokhta, are the most important and outstanding example of them.

The question is that, given our current knowledge on the degree of medical progress in Iran and presence of skull surgeries in the past, why do we tend to regard knives trephines and similar tools as non- surgical tools? Why do we not think of small hones and other similar devices as something used for making herbal drugs? And why are so sure in calling small glass and stone containers perfume containers?

Finally, although anthropological studies have recently been carried out on skeletons found in excavations and in some cases even tooth and bone diseases have been examined, however archeological studies are yet to address probable treatments used by our ancestors in order to discover larger body of evidences of long- standing medical advancements made by our great nation.

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### References

1. Rafei, Parastoo, 2008, "hydrocephalus", Iran newspaper, may 11.
2. Sarmadi, Mohammad taghi, 1999, history of medicine and cure in the world, Sarmadi, Tehran.
3. Sajjadi, s m s, 2008, Shahri Sokhta's artificial eye, cultural heritage of Sistan & Baluchistan. 1<sup>st</sup> edit.
4. Frozanfar, Farzad, 2003, "Sialk man in the Neolithic", Sialk, by Malek Shahrmirzadi, Tehran. 1<sup>st</sup> edit
5. Kimiayi, Ma'sumeh, 2006, " study of herbs in the third phase of Sialk revision plan", by Malek Shahrmirzadi, Tehran.
6. Malek Sharhmirzadi, Sadegh, 2006, Sialk the oldest fenced village of Iran, Tehran. 1<sup>st</sup> edit.

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