

From Mummification to Plastination

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The authors analyze and systematize the principals and the methods of embalmmnt and some factors that were used for conservation of the of corpses through the ages and now.

Key words: Mummy, Mummificatin, Plastination, Biodur.

Introduction

For many centuries scientists have tried to create effective and safe for human health method of conservation and long-lasting preservation of corpses. Mummies and anatomic preparations created in the past have had many disadvantages, which is the reason for the continuation of research in this area. There is a succession between mummification and plastination as a modern scientific method for conservation of organic matter.

Basic information

The Mummies of Chinchoros. A u f d e r h e i d e et al. [3] inform about seven mummies from the northern Chilean coast. One of the bodies is the oldest naturally preserved mummy aged 9000 years. A l l i s o n [1] and S t a n d e n [12] describe in detail the funeral techniques used by Chinchoros in 149 well preserved mummies. Embalmers took out the internal organs, remove soft tissues and replace them with texture. There are two styles of mummification [2]: 1) “**Black style**”(manganese mask). The earliest well preserved mummy of this style “The child of valley Camarone”, situated 70 kilometers south of city Arica in Chile, is from 5050 BC; 2) “**Red style**” (red ochre cover). The child from El Morro near Arica is in this style.

Pacific mummies. A u f d e r h e i d e [4] describes 14 of the well-preserved pacific mummies from Melanesia, Papua New Guinea, Australia and the islands of Torres.

Embalmers take out fats and internal organs, smoke the body and rub into the skin its own fats and red ochre. Few times a day the body is massaged until it has

dried out. Big part of the preserved Pacific mummies is kept in Maclean Museum in Australia or in American collections [11].

The Siberian Ice princess. Russian scientists discovered in 1993 a richly dressed mummy [7] in pazaryk tomb in Altai. Ossification of the skull on X-ray pictures proves that the mummy is one of a 25 years old woman, and examination with radioactive carbon that it is buried 500 BC.

Internal organs, brain and all other parts that rotten quickly are removed after the death, during the process and replaced with natural conservatives: tree barks containing tannin, and peat, which acid has anti-bacterial and mummification working [5].

The mummies of Chachapoyas. They are discovered in the jungle of Northern Peru in November 1996 in the area named "The Cloudy Forest" at 3658 m above the sea level.

There was more than 200 mummies in six tombs, hewn into the cliff coast of the Laguna de Los Condores. Every tomb is 3.5 meters tall, has a wooden platform, where the mummies are placed. The tombs are dry and well protected against the bad weather.

X-ray study in the improvised laboratory in Leimembamba, where they are still kept, shows that organs of the dead ones have been removed. The skin and the internal cavities are treated with few different balsams, but their type has not been discovered yet [4].

Egyptian mummies. The ritual of embalmment lasted 70 days. The body is placed on a straight cloth, called "ibu" and washed with "water from Nile" and "aromatic palm wine".

Embalmer scooped out the brain through the nose and take out the internal organs with the exception of the heart. After 40-days drying with natron (carbonates, bicarbonates, and chloride salts of sodium) they are placed in special containers and 17 cuts were made on different parts of the skin to compensate the shrinking when drying [6, 8].

Embalmer would fill the inside of the mummies with linen cloth soaked with aromatic resins, the skin is treated with oils and impregnated with wax. This process lasted 10-15 days, and after that "the corpse is dressed". Embalmers used linen bandages soaked in conservative solutions [9, 10].

Plastination technologies. Plastination method of von Hagens, besides the 3 typical processes of *fixation*, *dehydration* and *impregnation* includes a stage of drying. The most commonly used dehydrator is acetone and impregnators are different modifications of Biodur depending on the organ.

Discussion and Conclusions

In more of ancient mummies the internal organs, the brain and the fats have been removed. The methods used in ancient times such as fixation, dehydration and impregnation are base of newest preserving methods of the modern science for preparation, keeping and long-time preservation of anatomical preparations for the requirements of education.

The ancient principles of embalmment use also in modern plastination technologies — plastination with the products of type "Biodur Sn" executed for first time in anatomical practice by Gunther von Hagens in 1979.

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