

Protective and Consolidating Interventions on the Mummy Collection of Venzone

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Introduction

We observed the seriousness of the lacerations on the cutis of the mummified bodies of the Collection of the Cathedral of Venzone (northern Italy) due to the necessity of the restoration interventions which ended in 2009.

The mummies of Venzone are known worldwide and are considered as an example of natural mummification. The Collection of the Mummies of Venzone is one of the most important Italian collections. These Mummies have been famous since the beginning of the nineteenth century, in the quaint little town of Venzone. There was such a strong curiosity regarding these Mummies and the phenomenon of their natural mummification, that even Napoleon I went to visit them in 1807, as well as Francis I of Austria in 1819, and Ferdinand I in 1848 examined by G. Baggieri (2002). The mummified corpses represented the idea of immortality, in XIX century. Venzone is a little town, with about 2.000 inhabitants, it lies in Northern Italy. It was destroyed by an earthquake in 1976. The cathedral of Venzone was destroyed as well, and the Mummies which were recovered inside the cathedral were severely damaged.

The town of Venzone, as well as the cathedral, have been completely restored, and at the moment we are also proceeding with the restoration of the mummies.

Materials and Methods

The Mummy Collection of Venzone is composed of 15 mummies (8 males, 6 females and 1 corpse of uncertain sex). Five of the fifteen mummies are now displayed inside the crypt of the chapel of Saint Michael, near the Cathedral of Venzone. The average age at death is about 70 years. Almost all of these corpses date back to the XVII-XVIII and XIX centuries, except for one mummy that dates back to the XIII century, examined by G. Baggieri *et al.* (2001a, 2002, 2003), and by Marcolin (1831).

As a whole, this Collection was in very bad condition up until 2009. In fact, all the interventions made in the preceding years had been confined to consolidation, assemblage and cleaning of the deteriorated anatomical

parts of the bodies, following the earthquake of 1976.

All these operations, even if imperfectly performed, were indispensable to ensure the integrity of the bodies. Only in 2008 we were able to introduce the necessary restoration plan inside the study program which was started in 2003. Moreover, we carried out the radiological exams on all of the mummies which allowed us to see the internal organs in the abdomen, thorax and skull, as studied by G. Baggieri *et al.* (2003), and by G. Baggieri (2007, 2009a).

From a preservative point of view, the mummies which underwent a natural mummification present more problems during the process of restoration than the embalmed corpses. In particular, we found difficulty in choosing the most appropriate conservative preparations to use for repairing the corpses, especially because we did not know the final result, as reported by R. Grilletto (1987).

Regarding the internal structures, it was sufficient to carry out disinfestation, while we paid particular attention to the choice of the cutaneous preservative treatments and to the selection of the consolidators to use on the cutis. We performed some skin repairs in order to close all the lacerations and holes provoked by infestations and humidity, and that had seriously damaged large portions of cutaneous tissue in all of the fifteen mummies (Fig. 1). The weight of a mummy is approximately 5-10% of the weight of the corpse at the moment of death, while the form of a mummy depends on its antiquity, on the lying position, on the sepulcher, on the climate changes at the moment of death, as examined by Cockburn *et al.* (1998), and by Aufderheide (2003) and on the possible use of *post-mortem* treatments (i.e. tying, sudaria, dresses, unguents, bandages, etc ...) as examined by AA.VV. (2001), and G. Baggieri (2009b).

The surfaces of the skin appear to be coriaceous, their color having changed as a consequence of the lying position of the single mummy and depending on the sepulcher. In general, the cutis is quite wrinkled to the touch, in every anatomical district. We did not observe any smooth surface, as we might have found after a treatment of the skin with resins, balsams, waxes, or ointments, as studied by Ascenzi *et al.* (1996), by Elliot (1912) and by Ruffer (1914).

The wider lesions and lacerations were located at the level of the basins and of the anterior side of the thighs. The lower limbs of some mummies presented large areas of lacerations with marked muscular disintegration (Fig. 2, 3).

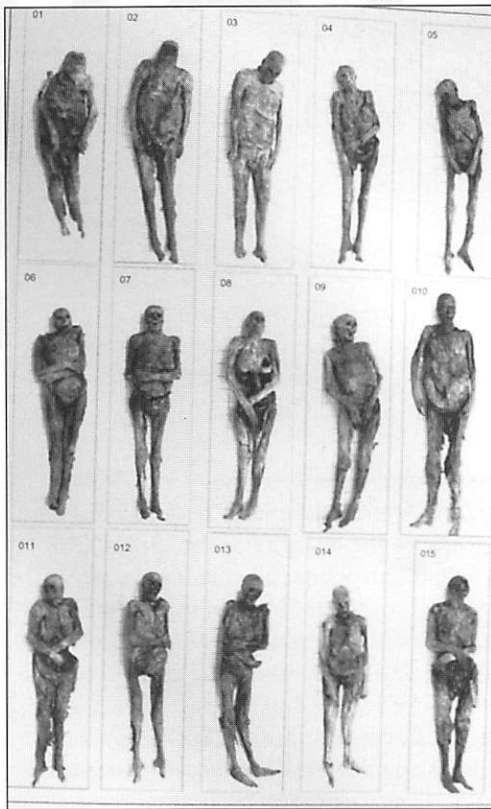


Fig. 1. The fifteen mummies.

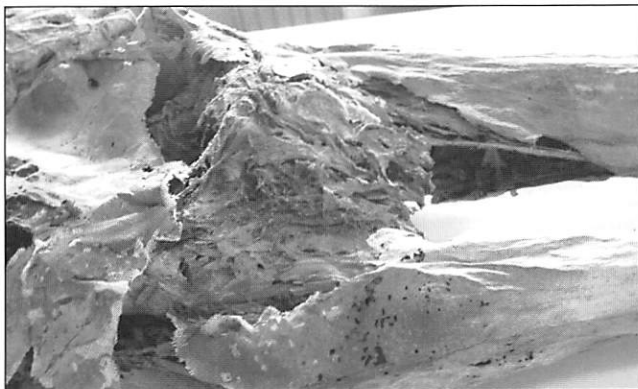


Fig. 2. Example of jagged margins in a lacerations of the limb.



Fig. 3. Definite lesions on the cutis of the arm.

A loss of cutaneous tissue was present on the surface of calvarium and on the back of some of the mummies. Regarding the lesions, they are present on all of the mummy surfaces, both on the anterior and posterior side

of the bodies. We placed their frequency and importance inside a score which goes from 0 to 3. The 27% of the lacerations have a score from 0 to 1 (lesions from 5 to 10 cm.); 36% of the lesions have a score from 1 to 2 (lesions from 10 to 15 cm.), and 37% of the lesions have a score from 2 to 3 (lesions larger than 15 cm.). Moreover, 50% of the lacerations was concentrated at the level of the lower limbs.

During the first phase of the process of natural mummification there is a sudden dehydration of the corpse; ventilation reduces the decomposition processes which, as a rule, begin with the cellular autolysis, as reported by Cockburn *et al.* (1998), and by G. Baggieri (2009b). Generally this phase happens in the first days after death, reducing the degenerative phenomena of liver, kidneys, glands, bone marrow, and blood which get destroyed both inside the parenchyma and the vascular-nervous structure, as reported by G. Baggieri (2009b).

The muscular disruption need a longer period of time; sometimes the heart and part of the arteries continue to be visible for a long period of time following death as examined by Tapp *et al.* (1984), probably due to a process of sclerotization. During the decomposition process, there is also the autolysis of the adipose tissue. As we have already observed, we have to keep in mind that climatic conditions and changes can deeply interfere with the degeneration of tissues, modifying both cutaneous and muscular structures. In fact, in the course of years and centuries sudden environmental variations (i.e. humidity and/or temperature) may have provoked small or large lacerations on the cutis, or fray of muscular fibers (Fig.4).

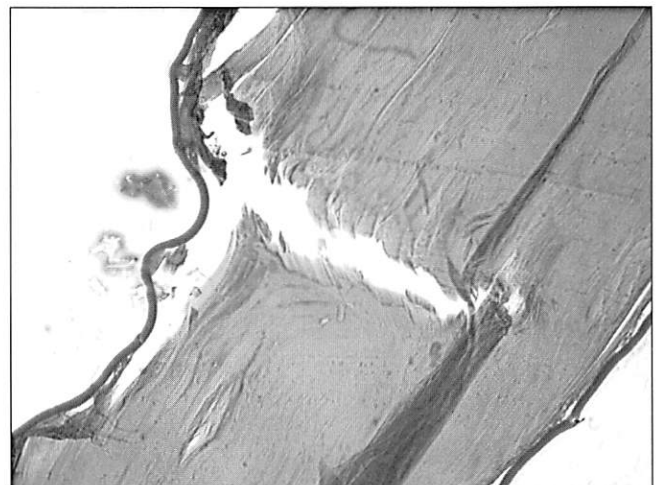


Fig.4. Damage of the muscular fiber.

Circular and oval lesions have a different genesis, in fact they are provoked by microorganisms, such as parasites, insects, and fungi, as examined by G. Baggieri (2009), reported by Ciferri (1959), and studied by Ruffer (1914) (Fig. 5). Before the restoration of the mummies, we per The samples that were examined mainly consist in endothelium of the aorta, quadriceps of the femur, cutis, etc... Every single fragment has been divided into three equal parts, each of which has been immersed in a different rehydrating solution. Our aim was to evaluate what was the most

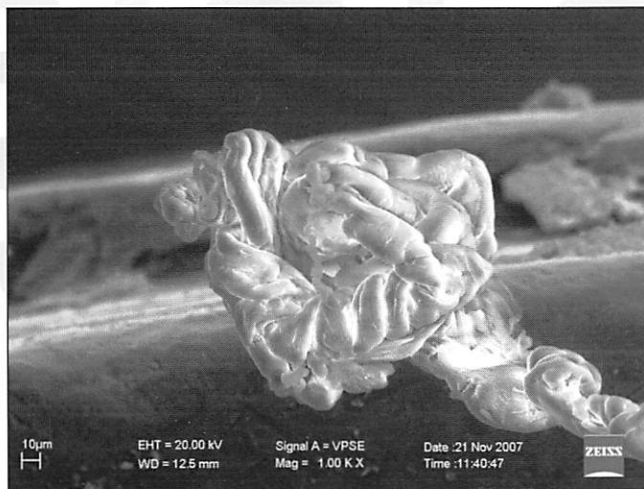


Fig. 5. Rolled up structure of mycelium (SEM 1.000X).

appropriate solution for the different histological typologies of fragments. formed some histological tests on a number of fragments collected from various anatomical districts. The histological study will give us more information on the state of preservation of the corrupted structures. The results obtained will suggest the kind of protection that must be used and the employment of prospective disinfection treatments. At the moment, we can hypothesize sterilization by using ethylene oxide.

Lacerations are due to climate changes. In fact, the skin absorbs little water particles which evaporate at elevated temperature provoking skin surface tension, and forming fissures with definite margins on the skin, or fissure with jagged edges. It is possible to confuse the fissure that has definite margins with intentional incisions. At present we are performing the exploration of the external surfaces of the bodies, in order to proceed with the preservation of the corpses. After having cleaned the surfaces of the body with extreme care by means of small brushes, and after having removed dust and concretions, we scrubbed the surfaces with denatured alcohol. After these treatments, we proceeded with the restoration of the body, essentially with three important applications:

- Impregnation of all the body surfaces with bi-distillate glycerin;
- Restoration by means of little cloths from Lione;
- Spreading of paraffin and beeswax in reduced percentage, with preservative aims.

The application of glycerin caused tissue rehydration which improved the body morphology, facilitating the following manipulation. Consequently, we were able to restore the surfaces of the body with micro-interventions in order to reprimatinate the outline of the body and protect the most lacerated areas. In the end, we spread paraffin mixed 25% with beeswax. On this occasion we would also like to mention that we still have doubts regarding the determination of the sex of Mummy number 13. The female sex was originally attributed to the corpse, but the cranial outlines show some elements which indicate the male sex. We also observed, at the microscopic examination, a bit of beard on the chin and on the lateral side of mouth.

These features are disguised by the presence of a strange genital morphology which presents a bilateral formation, similar to the labia majora or to the labia minora. The absence of penis allowed us to hypothesize that this formation was an hypertrophy of the labia majora. By applying glycerine, the formation swelled, allowing us to recognize a detachment of the left wing from the underlying cutis, while the right side of the formation still remains strongly attached. A sectioned structure appears on the central side, formed by two membranes which are wrapped up, allowing us to recognize the urethra. Considering the possibility of the male sex, we can hypothesize that the bilateral formation corresponds to the pressed testicular mass due to a traumatic lesion in the groin area.

The absence of penis could be attributed to amputation for apotropaic use. Regarding the hypothesis of the female sex, we have to consider the possible hormonal alterations which might provoke hirsutism, hypertrichosis, anomalies and hypertrophies of vulva and clitoris, ovotestis and hermaphroditism.

In light of these considerations we prefer to withhold the diagnosis of the sex; in fact, only a DNA examination could give us the absolute certainty of the sex.

Conclusions

We observed a multitude of fissures with definite margins on the upper and lower limbs, and on the neck, while the lacerations on the abdomen and thorax have jagged edges. Therefore, it is possible to locate fissures with definite margins in all of the areas where the muscular fibers contract a relationship with bones, independently from the distensibility, wrinkles and rugae of the cutis.

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