METHODS OF PREPARATION OF THE OSTEOLOGICAL MATERIAL

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The bone is the only component of the vertebrate body which generally remains throughout the time and many times not even like that if the environmental conditions are not favorable like the exposure to the weather agents or chemical characteristics of the land. Bones are an invaluable source of information of the individual who was in life and therefore are many the disciplines interested in the knowledge of osteology. The osteology is essential for the studies of medicine and veterinary especially if we consider the new technologies of diagnose through picture which allow us to see showings which are impossible to be seen through conventional X rays. In physical anthropology paleontology, paleopathology, zoology and forensic sciences, to be able to have osteologic collections makes it much easier its knowledge and allows the investigation. The osteologic collections are a historic reference for the study of disappeared population or for the comparison of species throughout the time being very useful for ecologists, climatologists, and general historians.

The collections of biological materials are a first-class scientific patrimony which we should not waste as it is scientifically better valued in the long run, produces wealth as it is the point of attraction for investigators and in the case of the exhibited material, generates attitudes in the future professionals.

These are the methods of preparation normally used in the collection of the Museum of anatomy of the University of Valladolid although on some occasions it is experienced in other ways.

In the case of preparation of animal skeletons, there is a legislation of Animals Subproducts not destined to Human Consumption which authorizes and regulates the points of origin, destination, transport, and destruction of the remains of dead animals. Besides this, in the case of animals included in the International Convention of Threatened Species, these should be accompanied by the corresponding permission (Compulsorily if they are Appendix I).

SKELETONS TAKEN FROM BURIALS

It consists exclusively of the cleaning of the skeleton bones so that they are handy. In the case of human skeletons, it is previously necessary to have the adequate permissions and these skeletons can never come from the burials of less than 10 years since their death. The temporary burials are of at least 10 years since their death, after which the relatives have the option of renewing the grave or not in which case the burial ground reduces the remains which can go to an ossuary, mass grave or be cremated. Each autonomous Community has its rules about the transport of the remains.

- Immersion of the bones in water for a week.
- Soft cleaning with a brush and running water.
- Immersion in oxygenated water of 20 vols. from 3 to 7 days depending on the whiteness we want to get.
- Rinse with a lot of running water to eliminate the remains of oxygenated water. It is convenient to leave the bones in water for two days.
- Drying at a normal temperature…Make sure they are dry before storing them. If it is not done like that, it is possible that we can see fungi.
- Store them in dry places preferably in cardboard boxes. Do not use airtight packages which can favour the growing of fungi.

SKELETONS FROM SOFT SPECIMENS (WITHOUT PREVIOUS FIXING)

Method of boiling with Borax (Tetraborate sodium)

- Individualisation of hands and feet.
- Defleshing.

- Boiling in water with sodium tetraborate at 3%The whole skeleton with hands and feet in net bags or crystal recipients with the cover with holes in the same recipient... The boiling time varies depending on the size. As an example, the human skeleton about 6 hours and the squirrel about 3 hours.
- Rinse with running water. Use nets and colanders so that small teeth and bones are not lost.
- Immersion in oxygenated water of 20 volumes till the desired whiteness is got. (We only do this step if the bones are going to be exhibited or articulated)
- Immersion in running water for one day changing it two or three times.
- In case the bones remain greasy, immersion in xylol (it can also be used acetone, toluene, or petrol... Human skeleton for 2 months, squirrel for 15 days
- If they have been put in xylol, before drying them they must be boiled for 30 minutes placing the bones in the water already boiling. This step must be inevitably done under an exhaust hood with a face mask and preferably not to remain present during the boiling owing to the high toxicity of the steams of xill. If after this step they are still greasy, small drillings can be done in the diaphysis so that the thinner penetrates better.
- Drying at room temperature. If they are placed in very hot areas or on radiators, the bones can be deformed, and the teeth can fall apart.
- Storing in dry paces preferably in carboard boxes. Do not use airtight packages so as not to favour the growing of fungi.
- Enzymatic method with Neutrase (Pepsina) (indicated for small animals or human hands and feet
- Defleshing
- Immersion in water with Neutrase at 1% to 35% at 45% C for three days (in a stove)
- Rinse with a lot of running water.
- Drying

Method of maceration (It needs a space apart and well ventilated)

- Defleshing
- Immersion in a water tank (The time depends on the water temperature and the rhythm of water changing): Hands and feet can be individualised.
- It is advisable the daily changing of water.
- The package must be in a dark place and airtight to avoid the proliferation of seaweeds.

Method with dermestids. (For small skeletons which we want to maintain in anatomic connection like a bird or lizard) The dermestids are small beetles which take part in the final phases of putrefaction.

- Defleshing
- Drying of the cases
- Introduction in a terrarium with some humidity and a temperature of 28 to 30ªC

The skeletonization depends on the number of insects and their grubs.

- Once we have the skeleton we have to freeze at a temperature of-20ªC for six hours to destroy the insects and grubs as they could become a plague.

The terrarium must be prevented from the direct light and they must always have food to maintain the colony. To maintain the temperature, it is advisable to have at the bottom a thermal blanket like the ones used to maintain the reptiles.

The dermestids can be obtained by placing a case in the field in a summer day.

BODIES AND FIXED PIECES

The skeletonization of fixed specimens (formol, glutaraldehyde etc) is difficult and the results are extraordinary. We must do it with useful pieces because of their characteristics as single samples for investigation or exhibition... It is not advisable to obtain osteologic material for teaching:

- Defleshing
- To follow the same process as for the Borax but at a concentration of 30% and using double amount of time.
- It is possible that we need to repeat the process two or three times.

CONSOLIDATION OF FRAGILE BONES

In the case when the bones are broken while being manipulated and we want to maintain because of their characteristics, we must compact them with hardening thinners. Apart from expensive products destined to fossilized bones like the Paraloid, the cheapest method is to soak in colourless latex.

- Submerge the bones in a dissolution of latex (Alquil®) at 50% for two days.
- Dry and drain at a room temperature till it gets dry.

It is convenient to change the position while it is getting dried and leaning on one or two points.