#sppc2020alvarez | Restoration of Volumetric Reintegration on Vertebrate Fossils Using Dental Baseplate Wax and Plaster

RESTORATION OF VOLUMETRIC REINTEGRATION ON VERTEBRATE FOSSIL USING DENTAL BASEPLATE WAX AND PLASTER

Stella Maris Alvarez

Introduction

Methods and Materials

Fragment adhesion

Volumetric reintegration

Results and Conclusions

References

Author: Stella Maris Alvarez

Fundación de Historia Natural "Félix de Azara" - Universidad Maimónides - CONICET, Argentina

At the Museum of Natural Sciences "Bernardino Rivadavia", I carried out an intervention on the specimen of *Sclerocalyptus* Ameghino, MACN-PV 18.107, from the Pleistocene of Buenos Aires province, Argentina. The scapulae were poorly preserved due to multiple fractures and parts of the bone were missing. First, small fragments were adhered to each other with cyanoacrylate. Some sections of scapulae were less than 4mm thick. The volumetric reintegration method was then used to complete the missing parts. Dental baseplate wax (useful in odontology and archaeology) was used to hold the filling material, which has thermoplastic properties. Wax was softened by immersing it in hot water because it is known that when wax is exposed to sources of dry heat, it melts too much on the surface and liquefies, filtering through the pores of the fossil, and is very difficult to remove. On the other hand, an advantage of immersion in hot water is that the wax softens homogeneously without reaching a liquid state, giving malleability and sticky viscosity. Once adhered wax was dry, successive small amounts of plaster were placed (using the dot technique) onto the wax near the bone until the missing layer was complete. This technique prevents plaster from sticking out (burrs). The main aim of this work is to shed light on a new plaster filling technique for incomplete and fragmentary fossils that are very thin, and which allows a functional and neat filling, without adverse consequences for the fossil.

Discuss this poster on Twitter:

@OriginalGCG #sppc2020alvarez

Forgot your username?
Need help logging in?

RESTORATION OF VOLUMETRIC REINTEGRATION ON VERTEBRATE FOSSIL USING DENTAL BASEPLATE WAX AND PLASTER

Stella Maris Alvarez

Centro de Ciencias Naturales, Ambientales y Antropológicas, Fundación de Historia Natural "Félix de Azara" - Universidad Maimónides, Hidalgo 775, Ciudad Autónoma de Buenos Aires, Argentina.
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

For questions or comments write to: **stella.maris2606@gmail.com**

Introduction

It was carried out an intervention in the specimen of *Sclerocalyptus* Ameghino, with catalogue number MACN-PV 18.107, from Pleistocene of Buenos Aires province, Argentina, at the Museum of Natural Sciences "Bernardino Rivadavia" (MACN).

Scapulae were poorly preserved due to multiple fractures and missing parts of bone, particularly on the dorsal border and the infraspinatus fossa. These parts are thin and fragile, so it was decided to carry out corrective conservation (ICOM-CC 2008) by means of a volumetric reintegration using a dental baseplate wax and plaster. The minimal intervention criterion was applied (Frazzi 2012: 62-65).

This work shows a plaster filling dot technique for incomplete and fragmentary fossils of very thin thickness, which allows a functional and neat covering, without adverse consequences for the fossil.

Methods and Materials

Fragment adhesion

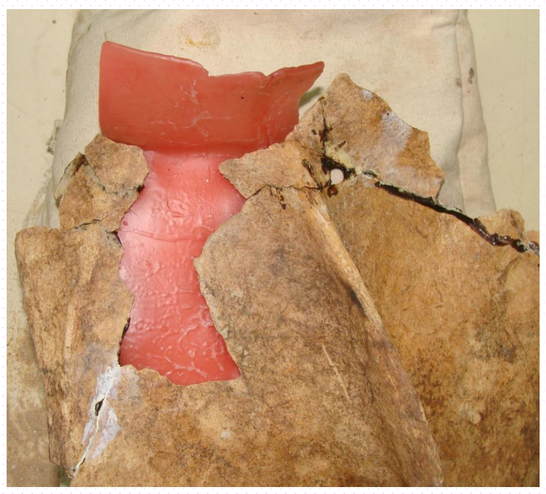
- Superficial cleaning of the bone was carried out using a dry brush, and then another moistened with ethanol 70%. Once dry, both sides were covered with two coats of B-76, allowing them to dry well between them.
- Fragments were cleaned with a dry brush to remove dust on them, particularly on places to be glued to avoid phase shifts between elements.
- To organize the pieces, they were separated by color and texture (each area of the fossil is different). First of all, the small elements were sticked together with cyanoacrylate (another possible adhesive is UHU Universal®) and after that, they were added to larger piece.

Volumetric reintegration

1. The water was heated at moderate heat until steam was observed on the surface.

2. The wax plate can be trimmed. Ensure that the wax exceeds (at least 1 cm) the edges of the space to be filling.

3. The upper edge of the wax was held and dipped into the water for a few seconds. The surface of wax shouldn't turn white; this will happen if immersion time is prolonged. Also, it can melt and disperse in water.



4. The wax plate was removed from the water, placed on the area to be treated and gently pressed to take the shape of the gap. If the hole has a free edge, it is convenient to fold the edge of wax to generate a containment rim.

   Observation: if wax comes off the fossil, then a sandbag can be used to support the wax. The fossil is placed on the wax so that it fits again.

Figures. Dots technique. It was not possible to photograph at the time of the work. Therefore, on these images are shown a recreation of the technique using a piece of cardboard simulating the bone.

5. Fluid plaster was prepared, carefully applied so as not to generate excess protruding from space to fill. This was achieved by adding whit a stainless-steel spatula small amounts (dots) of plaster over wax and near the bone. Then gently plaster slowly approached the bone causing it penetrates through the pores of the fracture, but without exceeding its height. This procedure must be repeated as many dots as necessary to cover the surface to rebuild.

6. The surface was smoothed with the spatula. Plaster was allowed to dry approximately one day to ensure drying.

7. Then, the wax was peeled off with a soft pulled down and the filling was maintained at the desired location.

8. If the plaster has been spilled on the fossil, it can be removed with a scalpel and then sanded carefully to avoid scratching the bone. If necessary, the surface of the plaster can be smoothed.

9. To consolidate the treated area, it is recommended to cover it with a layer of B-76.

Materials

Fossils
- Two scapulae.

Supplies
- Paris-type plaster ($CaSO_4$ ½H_2O).
- Pink dental modeling wax in plates. Summer. Perfectín, Subitón-Prothoplast®.
- Fine-grained sandpaper (No. 400 to 600).
- Cyanoacrylate (La Gotita®).
- Polyvinyl butyral (Butvar B-76®) at 25% w/v in pure ethanol. (Bisulca *et al*. 2009).
- Soft bristle brushes.
- A small metal pot.
- Latex or vinyl gloves.
- A laboratory stainless steel spatula.
- Scalpel.
- Sandbag.

Results and Conclusions

As a result, both sides of the workpiece are completely filled, showing the effectiveness of using the wax as a support and the dots technique for applying the plaster.

At the end of the work, an aesthetic, integrated and functional piece was obtained. This procedure in general does not compromise other areas of the fossil, and plaster volumetric reintegration does not interfere with anatomical studies of the bone.

The dental wax was choosing such as supporting for the plaster. When it is immersed in hot water, it is softened homogeneously without reaching a liquid state, giving malleability and sticky viscosity. This condition prevents wax filtering through the pores of the fossil, a difficult situation to reverse without affecting the specimen.

References

BISULCA, C., KRONTHAL ELKIN, L. and DAVIDSON, A. 2009. Consolidation of fragile fossil bone from Ukhaa Tolgod, Mongolia (Late Cretaceous) with Conservare OH100. *Journal of the American Institute for Conservation*. **48**(1):37-50. doi:10.1179/019713609804528098.

FRAZZI, P. 2012. Conservación y restauración de lozas de excavaciones arqueológicas en la ciudad de Buenos Aires y periferia. Published by Instituto de Patrimonio y Arqueología Fundación Turismo para Todos. http://www.iaa.fadu.uba.ar/cau/?p=8856. Accessed 22/09/2020.

ICOM-CC. 2008. Terminology to characterize the conservation of tangible cultural heritage. Resolution adopted by the ICOM-CC membership at the 15th Triennial Conference, New Delhi, 22-26 September 2008. http://www.icom-cc.org/242/about/terminology-for-conservation/?showRightbar=myTools#.X2-kTmhKhPY. Accessed 25/09/2020.

Acknowledgments

The author acknowledges to Santiago Monaldi, Ihona Winiger, Leandro Martínez, Andrea Cambiaso, Magalí Cárdenas, Pedro Monaldi, SPPC Organizing Committee and GeoCurator.