Reducing an agent of deterioration in *Gyracanthus* spp. spines



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Gyracanthus is a large genus of Palaeozoic acanthodian fossil fish. The large spine fossils from their pectoral, dorsal and pelvic fins, and occasional shoulder bones, are often the only remains and proof that those fish existed. National Museum of Scotland (NMS) has a large collection of fossil spines found mostly in Berwickshire, the Lothians and Fife, Scotland, in early Carboniferous sediments (359-323 million years ago) and some from the Newsham Colliery of Northumberland, England (mid-Carboniferous).

Some of the specimens were collected in the 1800s and have been broken and repaired. Unfortunately, there is no information about the treatment and adhesive used. It is evident that the materials used to repair the spines were the best available in those years, although it has since proved to be unsuitable in the long term. The adhesive has lost its properties and failed its intended purpose to keep the whole spines together.

Lack of preventative conservation is evident. A simple use of adequate housing of the spine would create a protection against one of the agents of deterioration: physical forces, helping the whole collection to perpetuate for future years.

Former materials used to hold together specimens:

- Cork with unknown adhesives
- Adhesive of different compositions: ID in progress with the NMS Analytical and Research Section
- **Elastic bands**
- Tape
- Cellophane
- Unknown filler
- Plaster
- Plasticine
- Blue tack





Examples of drawer prior preventative



conservation



Solution to the problem:

- Clean and remove all deteriorated components
- Make sure that specimen labels are cleaned and restored
- Consolidate broken parts
- Discuss future use of the specimen with curator
- If needed for research or exhibition as a unit: conserve and glue all broken pieces together and create a support
- If not needed for research: conserve and create a support easily accessible for future research





Risks to specimens which may have resulted in damage

- Impact during travelling to the museum
- Failure of the adhesive used in prior conservation treatment
- Failure of fillers used in prior conservation treatment
- Failure of materials used to keep parts together
- Improper support
- Impact or collisions among other specimens or parts
- Shock
- Gravity
- Vibration
- Pressure
- Abrasion





IN CONCLUSION: One of the **10 agents of deterioration** is the **Physical Forces**, responsible for the majority of the problems in our heritage collection. We do not know how the collections arrived into the museum, in which conditions or which treatments the specimens had in the past. The Gyracanthus spines, as with much of the fossil collections, were stored in substandard conditions until 8 years ago when they were moved to a new purpose built store with controlled environmental conditions and new roller racking.

In this case, the physical forces have been mitigated against thanks to the creation of supports to reinforce weight, uneven shapes and fragility of the Gyracanthus specimens. On top of that, drawers in the racking have been improved by adding a 5 mm layer of plastazote (cushioning material) and each specimen has been upgraded by the creation of its own Plastozote[®] support.

Preventive conservation aims to reduce and slow down deterioration by monitoring, detecting and blocking the deterioration agents from acting on the physical or chemical structure of the collections, and preventing deterioration, decay and possible damage. In other words, preventive Conservation keeps collections safe.