

Sampling Protocols

Ear Ossicles

- Excavation/extraction of single ear ossicle from complete crania/cranial fragments where necessary using a micro-excavation toolkit.
- Hand-carry ear ossicle to Francis Crick Institute for sampling in the ancient DNA clean room.
- The ossicle will be destroyed, but there is no impact on the rest of the skeleton.

Petrous portion of the temporal bone (fragments or forming part of a complete cranium)

- Cranium/cranial fragments hand-carried to the Francis Crick Institute for sampling in the ancient DNA clean room.
- Drilling of the jugular fossa to produce 50-100 milligrams of bone powder, creating a hole 2-3 millimetres in diameter (Fig. 1 and 2).
- Sampled petrous temporal hand-carried back to the archive.



Figure 1: Impact of sampling on the petrous portion of the temporal bone before (left) and after (right – arrow pointing to the drill hole).

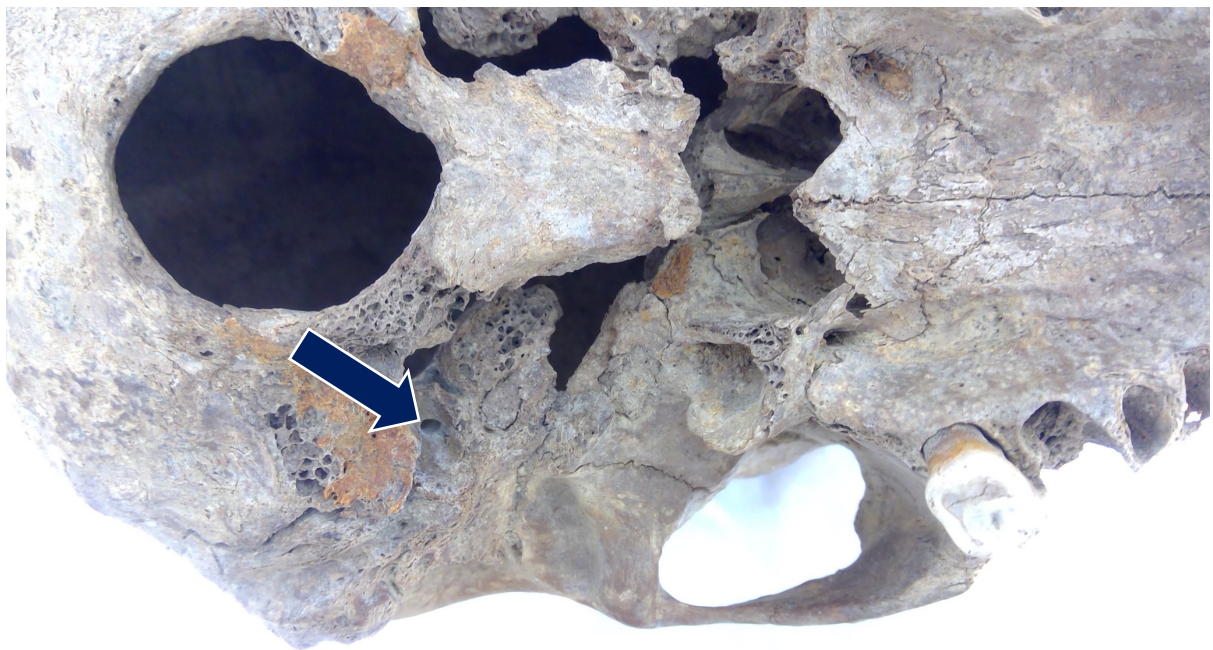
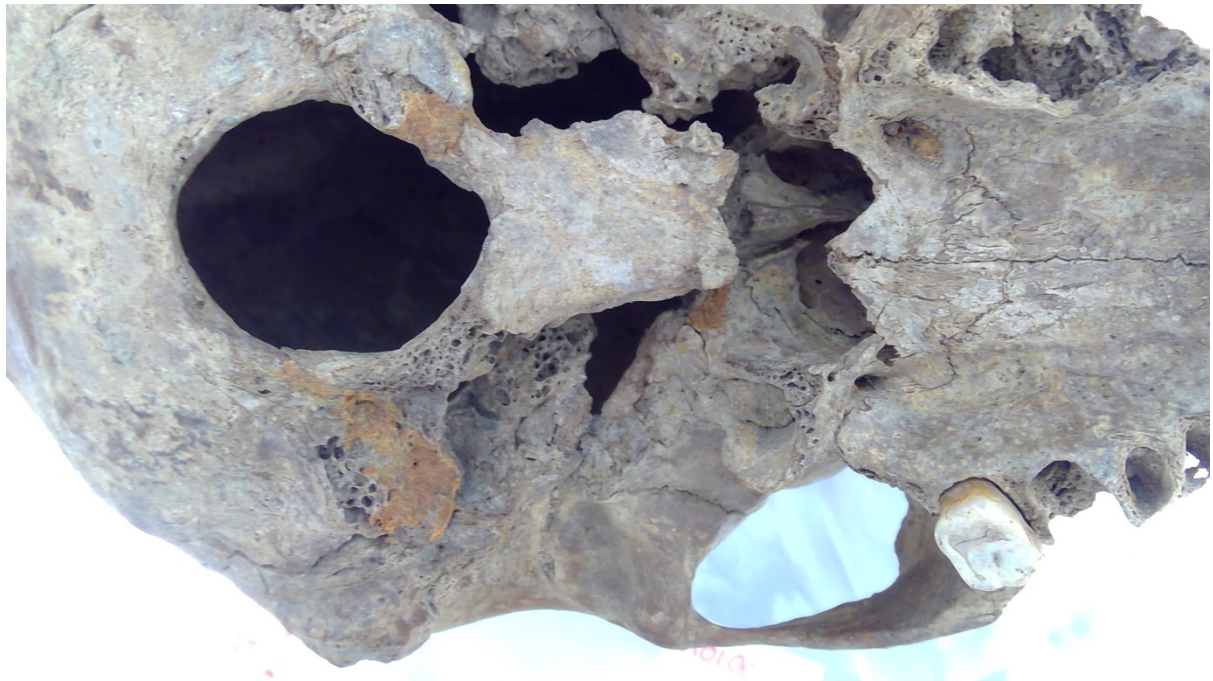


Figure 2: Impact of sampling on the petrous portion of the temporal bone within a complete cranium. Before sampling (top) and afterwards (bottom – red arrow points to the location of the drill hole).

Tooth

- Hand-carry tooth (preferably molar) to the Francis Crick institute for sampling in the ancient DNA clean room.
- Drilling of the tooth root to produce 50-100 milligrams of bone powder.
- Sampling for ancient human DNA will involve drilling powder from the root surface to concentrate sampling on the cementum: the part of the tooth where endogenous ancient human DNA tends to be better preserved. This method does not produce a hole but 'whittles down' the tooth root.
- If the sample is to be submitted for pathogen analysis, we will drill half of the powder from the dentine in the pulp cavity where microbial DNA is better preserved, producing a 2-3mm hole in the tooth root (Fig. 3).
- Sampled tooth hand-carried back to the archive.



Figure 3: A tooth that we have sampled for DNA analysis. The tooth root has been whittled down to collect cementum, and a hole has been drilled in the tooth root for dentine for pathogen analysis.

Ideally, we would want to sample petrous portions of temporal bones and teeth in the ancient DNA laboratory at the Francis Crick Institute to minimise the risk of contamination from modern sources. However, if institutional policies mean that this is not possible, we can sample 'in the field' using the same protocols. We have had success sampling bones in the field, however there is an increased risk of contamination from modern sources.

