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Tooth enamel helps identify the sex of a Neanderthal skeleton

A new documentary has recreated the face of a 75,000-year-old Neanderthal found in Iraqi Kurdistan. The flattened skull was rebuilt from hundreds of bone fragments by a team of archaeologists and conservators led by the University of Cambridge. *Secrets of the Neanderthals*, produced by BBC Studios Science Unit, is released on Netflix worldwide.

“The skulls of Neanderthals and humans look very different,” said Dr Emma Pomeroy, a palaeo-anthropologist from Cambridge’s Department of Archaeology, who features in the new film. “Neanderthal skulls have huge brow ridges and lack chins, with a projecting midface that results in more prominent noses.”

Neanderthals are thought to have died out around 40,000 years ago, and the discoveries of new remains are few and far between. The Neanderthal featured in the documentary is the first from Shanidar Cave for over 50 years, and perhaps the best-preserved individual to be found this century.

The head had been crushed, possibly by rockfall, relatively soon after death – after the brain decomposed but before the cranium filled with dirt – and then compacted further by tens of thousands of years of sediment. The skull was flattened to around two centimetres thick. The team carefully exposed the remains, including an articulated skeleton almost to the waist, and used a glue-like consolidant to strengthen the bones and surrounding sediment.

In the Cambridge lab, researchers took micro-CT scans of each block before gradually diluting the glue and using the scans to guide extraction of bone fragments. Over 200 bits of skull were pieced together freehand to return it to its original shape, including upper and lower jaws.

The rebuilt skull was surface scanned and 3D-printed, forming the basis of a reconstructed head. New analysis strongly suggests that this Neanderthal was an older female, perhaps in her mid-40s according to researchers – a significant age to reach so deep in prehistory.

Without pelvic bones, the team relied on sequencing tooth enamel proteins to determine her sex. Teeth were also used to gauge her age through levels of wear and tear – with some front teeth worn down to the root. At around five feet tall, and with some of the smallest adult arm bones in the Neanderthal fossil record, her physique also implies a female.

Visit www.cam.ac.uk/stories/shanidar-z-face-revealed for the full story and more photos.



Dr Emma Pomeroy with the skull, which is on loan from the Kurdish authorities.

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