



Ötzi the Iceman has been 'reincarnated' by palaeontological artists Alfons and Adrie Kennis using forensic findings as well as artistic inspiration.

ANTHROPOLOGY

The Iceman defrosted

Marta Paterlini reports on an exhibition marking 20 years since Ötzi, one of the world's oldest natural mummies, was discovered under the Alpine ice.

As dead celebrities go, Ötzi the Iceman must be one of the most closely studied — he has been measured, X-rayed and dated. But the 5,300-year-old mummified corpse, found part-buried in ice on the Tisenjoch Pass in the Alps spanning the Italian–Austrian border in 1991, still holds surprises. Many of his secrets are revealed in *Ötzi²⁰*, a major exhibition that opened this week at the South Tyrol Museum of Archaeology in Bolzano, Italy, to mark the 20th anniversary of his discovery.

Wounded by an arrowhead in his left shoulder, Ötzi is thought to have frozen to death while fleeing attackers. Much of the analysis so far has concentrated on the belongings found with him, but this has shifted. “So far the attention has been on Ötzi’s clothes and tools. Now, the physical body becomes the focus,” explains museum director Angelika Fleckinger.

Central to the exhibition is a new reconstruction of his body by twin brothers Alfons and Adrie Kennis, Dutch palaeontological artists who previously put a face to

Ötzi²⁰: Life, Science, Fiction, Reality
South Tyrol Museum of Archaeology, Bolzano, Italy.
Until 15 January 2012.

Neanderthal man. The artists reconstructed Ötzi’s body by comparing his bone measurements, such as femur length, to those of men today. They sculpted muscles from modelling clay, attaching them to an appropriately sized skeleton. Using a polyurethane mould, they crafted a silicone torso, adding legs in resin and plastic. The model is finished with five thin layers of silicone ‘skin’, each painted individually.

The skull was made using accurate three-dimensional computerized tomography scans of Ötzi’s head as a guide. Ultrasound measurements of skull morphology and average skin and flesh thickness were used as the basis for modelling his facial tissues — a technique used in forensic medicine to reveal injuries. Together with traces of some mummified characteristics, “all these data gave us an estimate of his portrait, complete with wrinkles, hair and eyelashes,” explains Adrie Kennis.

“What I found peculiar was the small nasal cavities,” says Adrie. This trait, along with his fine bones, means that Ötzi would have looked fragile, he adds. The artists also think that he would have appeared older than someone in their mid-forties today, because his features would have been ravaged by greater exposure to the harsher, hotter climate of the time.

The reconstruction team had many discussions about the precise moment at which to depict him. “We agreed to stage it a day before his death, when he is wandering up to the mountains, a spark of stress on his face,” Adrie explains. Ötzi would have been uncomfortable — he was wounded and on his own, perhaps being followed. This sombre picture contrasts with his smiling face in the museum’s earlier model.

Even more striking is the colour of Ötzi’s eyes: not blue, as in the previous portrayal, but brown. This derives from the first analysis of the mummy’s DNA,

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Q&A Manolis Papagrigrorakis

Facing the past

The Athens-based orthodontist explains the art and science of reconstructing the heads of long-dead people from their skulls alone, including that of Myrtis — a young girl from more than 2,000 years ago, whose recreated face is our first glimpse of an ordinary ancient Greek.



M. J. PAPAGRIGORAKIS



extracted from a sample of pelvis bone.

When the mummy was defrosted in November 2010 for the first time since its discovery, researchers found that the stomach was filled with matter (previous analyses had been limited to the intestine). Using histological, morphological, DNA and botanical analysis, they aim to determine which bacteria Ötzi was carrying at the time of his death — information they hope will improve their conservation strategy and hint at his dietary habits.

Aside from his recent thaw, Ötzi is usually kept at -6°C and 98% air humidity, and is misted with water once a month. The droplets freeze on the surface of the body, preserving it in a thin shell of ice. The crystals on his skin are visualized in an installation by British artist Marilène Oliver, also on display in the exhibition. In *Ötzi: Frozen, Scanned and Plotted* (2007), Oliver converted a computerized tomography scan of the frozen body into an image by drilling some 50,000 holes into 80 acrylic sheets that were then stacked into a translucent three-dimensional block. The result is a ghostly impression of Ötzi's form.

*Ötzi*²⁰ embraces the full spectrum of the Iceman's discovery, his life and the media circus and scientific sleuthing that has followed. With plans to update exhibits throughout the year, the show provides a focus for the new scientific findings that are contributing to the emerging picture of Ötzi. ■

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Why did you decide to reconstruct an ancient Greek face?

For 30 years I have been combining my science, which deals in the bone structure of the lower face, with my hobbies of history and art, by studying the craniofacial complex of ancient Greeks. When Myrtis's unusually intact skull was discovered, I saw it as a great opportunity to reveal what an ancient Greek layperson looked like for the first time.

How did you feel when you first saw the finished picture of Myrtis?

It was very emotional to come face to face with someone who could have been your 80 times great-grandmother and at the same time your granddaughter, because she really resembles today's children. Our detailed reconstruction was published in the January 2011 issue of *The Angle Orthodontist*.

Where were Myrtis's bones found?

The building of the Athens Metro in 1994–95 brought to light a mass grave in what was once the public cemetery of ancient Athens. Archaeologists found at least 150 skeletons, apparently hastily buried. The site was dated to 430–426 BC, when Athens was besieged by the Spartans during the Peloponnesian War and an unknown epidemic struck the city.

How did you become involved in the reconstruction?

The archaeologists asked me to examine various bones, which we knew came from victims of the mysterious disease. Within the tooth pulp of three different skulls, we found genes that matched those from a bacterium called *Salmonella enterica* serovar Typhi, suggesting that the victims died of typhoid fever.

What drew you to Myrtis's remains?

One skull was small, belonging to a child,

and I saw something I hadn't seen in the other skulls unearthed from the mass grave — its jaw bore both permanent teeth and part of its deciduous (baby) dentition. The morphology of the front part of the lower jaw and brow ridge, as well as the size of the lower canine teeth, told us the sex. We deduced her age using X-rays to look at how complete the roots of her teeth were. This suggested that the skull belonged to an 11-year-old girl, to whom we gave the old Greek name Myrtis, meaning myrtle.

How did you reconstruct her face?

We placed numerous markers on her skull to reflect the average tissue depth across the face, according to data tabulated for people of various ages and of each gender.

The Swedish sculptor Oscar Nilsson formed 20 anatomically correct muscles using clay, and worked from the skull outwards until the tissue depth reached the markers. He gave her brown eyes, taking her Greek origin into account. The hairstyle and expression were decided after studying sculptures and depictions of children living at the same time as Myrtis.

Which features are the hardest to recreate?

The weak points are the ears, the tip of the nose and lips, where there is no bone — only soft tissues and cartilage that have disappeared. I used her dental arch to define the shape and position of her lips, and here my speciality helps. The coexistence of her adult and baby teeth create the look of an overjet, where the top teeth project forwards.

What would her life have been like?

We only know that she lived around 430 BC, when many of the values that sustain contemporary civilization were established. She probably witnessed the building of the Parthenon on the Acropolis in Athens.

INTERVIEW BY ALISON MCCOOK



Myrtis was rebuilt from a skull.

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