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How the axe gave humans their hands: Discovery finds tool was key to our evolution

- **Newly discovered bone helps to explain the evolution of human hands**
- **The 1.4 million-year-old bone - a third metacarpal - shows how hands changed between 1.7 million years ago and 800,000 years ago**
- **It runs across the palm joining the wrist and middle finger and keeps the wrist steady while a small object is held between the thumb and fingers**
- **People with this bone had an evolutionary advantage as they could use stone hand axes more effectively**

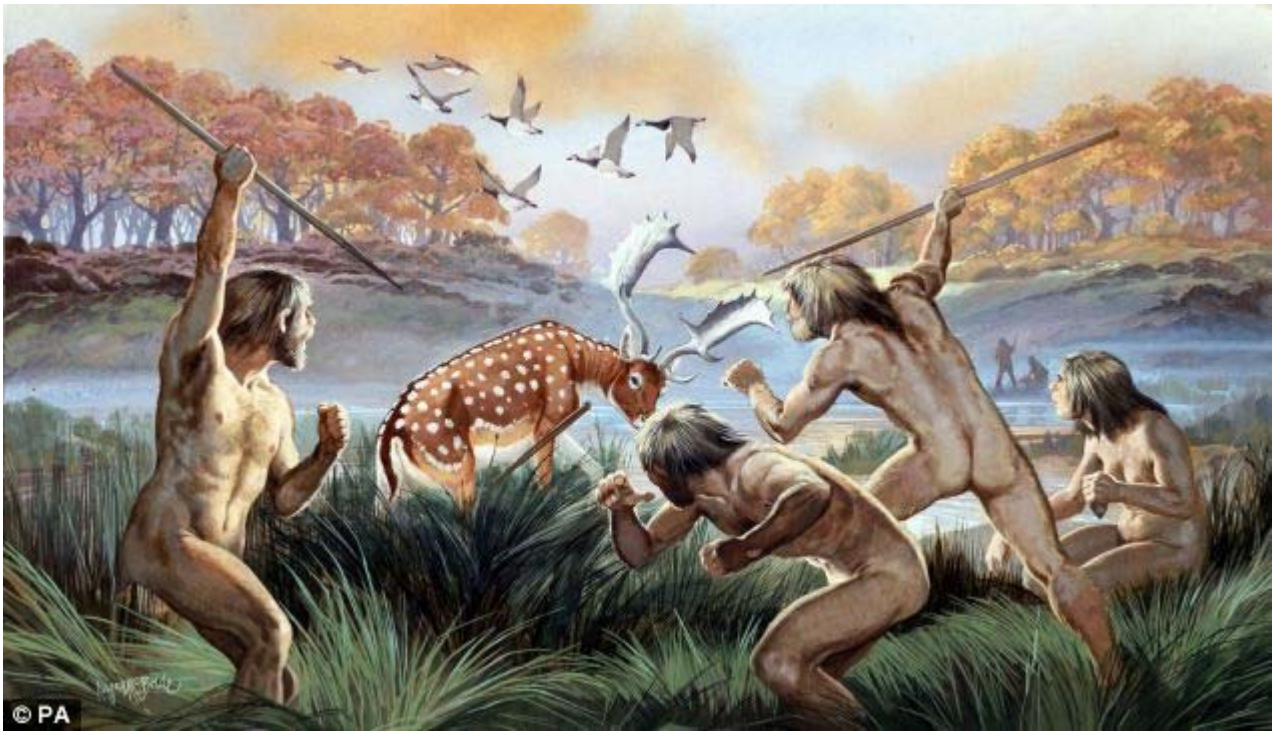
By Emma Innes

PUBLISHED:14:09 GMT, 12 April 2013| **UPDATED:**16:06 GMT, 12 April 2013

A newly discovered fossil is helping to explain how human hands evolved into their current form.

Until recently, how our ancestors hand's developed to be able to make full use of tools was a mystery.

However, the discovery of a new hand bone is helping to fill in the missing pieces in the evolutionary jigsaw.



A newly discovered fossil is helping to explain how human hands evolved to allow the efficient use of tools and weapons

WHAT DOES THE DISCOVERY TELL US?

The discovery of a 1.4 million-year-old third metacarpal bone fills a gap in the understanding of the evolution of the human hand.

It suggests that early man developed the bone as it enabled him to use tools and weapons more effectively meaning that he had an evolutionary advantage.

Before the hand evolved to include this bone, our ancestors had weak wrists that would not be strong enough to use a hand axe.

About 1.7 million years ago early humans created hand axes – some of the first stone tools – but how their hand's developed to be able to use them effectively has remained a mystery until recently.

Prior to the development of stone axes, our ancestors had weak wrists which would not be able to grip small objects as powerfully as is necessary to use a hand axe.

However, **New Scientist** reports that a new hand bone has been discovered that helps to explain how human hands developed between 1.7 million years ago and 800,000 years ago.

In 2010, a team from the National Museums of Kenya discovered a new hand bone in Kenya.

Scientists at the University of Missouri identified the bone as a third metacarpal – the bone which runs across the palm linking the middle finger with the wrist.

The bone, which is thought to be about 1.4 million-years-old, keeps the wrist stable while a person is holding a small object between their thumb and fingers.

It is thought that humans eventually developed the third metacarpal as those who had it initially were at an evolutionary advantage over those who did not because they could use tools and weapons

Hand bones of early Homo erectus are almost unknown, Richard Potts of the Smithsonian Institution in Washington told the New Scientist.

'Having such a well-preserved specimen begins to answer questions about hand evolution,' he said.

Dr Mary Marzke of Arizona State University explained to New Scientists that the bone proves that our ancestors' hands were showing signs of evolution into their current form as much as 1.4 million years ago.

It is thought that all humans eventually developed this bone as those who had it initially were at an evolutionary advantage over those who did not.

Stone tools helped shape human hands

11 April 2013 by **Sara Reardon**
Magazine issue 2912. **Subscribe and save**
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AROUND 1.7 million years ago, our ancestors' tools went from basic rocks banged together to chipped hand axes. The strength and dexterity needed to make and use the latter quickly shaped our hands into what they are today – judging by a fossil that belongs to the oldest known anatomically modern hand.

The 1.7-million-year-old Acheulean hand axes were some of the first stone tools. Over the next million years, hese chunky teardrop-shaped rocks became widely used before being replaced by finer, more precise flint tips. But how our ancestors' hands evolved into a shape that could make such tools is a bit of a mystery.

Before the hand axes appeared, our ancestors had primitive wrists: good for hanging from branches, but too weak to grasp and handle small objects with much force. And no hand bones had been found to fill the gap between 1.7 million years ago and 800,000 years ago – by which time humans had developed he hands we have today. Now, a new fossil is helping bridge that gap.

In 2010, a team led by Fredrick Kyalo Manthi of the National Museums of Kenya discovered an intriguing bone in he nor h of the country. Carol Ward of the University of Missouri and colleagues identified it as a third metacarpal, the long bone in the palm between he middle finger and the wrist.

Like modern human metacarpals, it has a small lump at its base – the styloid. This projec ion helps stabilise the wrist when the hand is gripping small objects between the thumb and fingers. Isotope dating revealed the bone to be about 1.4 million years old. It is likely to have belonged to *Homo erectus*.

Hand bones of early *Homo erectus* are almost unknown, says Richard Potts of the Smithsonian Ins itution in Washington, DC. "Having such a well-preserved specimen begins to answer questions about hand evolution," he says.

"This is an exciting find," agrees Mary Marzke of Arizona State University in Tempe. It shows hat our ancestors' hands were already evolving into their modern form 1.4 million years ago. The forceful, repetitive and sustained processes of tool use, such as digging with rocks, would have made stronger hands desirable, says Marzke.

This would have been par icularly useful for knocking off flakes to form and sharpen hand axes, says Potts. Once he important wrist features were in place, it became easier for later hominids to make smaller, finer tools.

Because he fossil is younger than the first tools, Ward's team believe it is the first evidence of anatomy evolving to suit a new technology. As stone tools became more widespread, those who had he wrist structure to use hem would have had an evolutionary advantage over their weaker-wristed kin. "The way we look today has been shaped by our behaviour over millions of years," says Ward. She presented the research at this week's meeting of he American Associa ion of Physical Anthropologists in Knoxville, Tennessee.

This article appeared in print under the headline "Stone tools helped shape our hands"