DIYORBEK'S IELTS

When and why did we learn to stand on our own two feet?

We may never know for exactly how long humans have walked on two legs, and the debate about why we do it continues, but evidence and research give us plenty of clues.

For many years, scientists and anthropologists disagreed about whether early humans started walking on two legs before or after their brain had increased. The predominant view was that brain size was important, and until our brains had reached a particular size and mass, bipedal movement would have been impossible. Then, in 1974, two scientists, Donald Johanson and Tom Gray, were mapping a remote area of Ethiopia when by chance they came across some fossilised bones which appeared to be from an early human, Australopithecus afarensis. Excavation of the site led to the discovery of several hundred more bones and bone fragments, all from a single skeleton. Scientific research of the bones later that year showed that they were 3.2 million years old and belonged to a young female hominid who the scientists nicknamed 'Lucy'. Most remarkably, however, the research showed that while Lucy had a very small brain compared with humans today, she was also bipedal.

How did the scientists know this? Lucy's leg bones were angled relative to the condyles (knee joint surfaces), which allow bipeds to balance on one leg at a time when walking. There was also a prominent lip in the knee to prevent the patella (the knee cap) from dislocating due to this angle. Evidence was also found in Lucy's pelvis, which was able to accommodate an upright stance and the need to balance on only one limb with each stride. The shape of her ankle also showed that her big toes would have aligned with her other toes, which would have sacrificed manipulative abilities for efficiency in bipedal locomotion. Her feet, therefore, would have been used almost exclusively for getting around rather than for holding things. Finally, her backbone showed evidence of the spinal curvature necessitated by a permanent upright stance.

Lucy's discovery was exciting for two reasons. Not only was she bipedal in spite of her brain size, but she was also believed to be our oldest ancestor. However, a discovery over thirty years later changed all that. In 2005, Professor Yohannes Haile-Selassie, head of Physical Anthropology at Cleveland Museum of Natural History, led an international team that discovered and analysed a 3.6-million-year-old fossilised partial male skeleton. It was found in the Woranso-Mille are of Ethiopia's Afar region, and it took Professor Haile-Selassie's team over five years to excavate. The team recovered the most complete shoulder blades ever found in the human fossil record. A significant portion of the rib cage was also found.

It was a significant find because this early hominid, also a member of Australopithecus afarensis, is 400,000 years older than Lucy, and significantly larger in size. Research on the new specimen revealed that advanced, human-like bipedalism occurred much earlier than previously thought. The specimen was nicknamed 'Kadanuumuu', which means 'big man' in the Afar language and reflects its large size. The male hominid stood between 1.5 and 1.7 metres tall, while Lucy stood only 1.1 metres tall. This individual was fully bipedal and had the ability to walk almost exactly like modern humans.

Kadanuumuu's discovery was important for another reason. Despite all the research, there were still some in the scientific world who felt there was insufficient proof that Lucy walked fully upright. 'AS a result of our discovery,' said Haile-Selassie, 'we can now

confidently say that Lucy and her relatives were almost as proficient walking on two legs as we are, and that the elongation of our legs came earlier in our evolution than previously thought. Until now, all of our understanding of Australopithecus afarensis' locomotion has been dependent on Lucy. Unfortunately, because she was an exceptionally small female with very short legs, this gave some researchers the impression that she was not fully adapted to upright walking. This new skeleton falsifies that impression because if Lucy's frame had been as large as this specimen, her legs would also have been proportionally longer.'

Professor Haile-Selassie's research goes a long way to explain when humans began walking upright. However, one tantalising question remains: why did we start walking upright? There are several schools of thought, but two are particularly compelling. One is that bipedal activity is linked to the need to carry as much as possible. 'Something as simple as carrying, an activity we engage in every day, might have, under the right conditions, led to upright walking,' says Dr Brian Richmond, who carried out research on bipedal movement in apes. 'Standing on two legs allowed early humans to carry more at one time because it freed their hands.' It is possible to observe this in apes. While many are capable of short bursts of bipedal movement, they only choose to do it when they need to carry something. And, interestingly, the more valuable the object is to them, the more they are prepared to walk on just two legs in order to carry it.

However, another group of researchers working at the University of Arizona has conducted a study which suggests that walking upright is more beneficial because it saves energy. 'For decades now researchers have debated the role and evolution of bipedalism,' said David Raichlen, Assistant Professor of Anthropology. 'However, the big problem in the study of bipedalism was that there was little data out there.' Under his guidance, a group of researchers at the University trained five chimpanzees to walk on an exercise machine while wearing masks that allowed measurement of their oxygen consumption. The chimps were measured both while walking upright and while moving on their legs and knuckles. That measurement of the energy needed to move around was analysed alongside results from similar tests on humans. Raichlen discovered that humans walking on two legs use only one-quarter of the energy that chimpanzees use while knuckle-walking on four limbs. And of course using less energy means you need to eat less, which leaves more time for other things.