The led scientists to questions the very origins

Environment

The acquisition of bipedalism is one of the greatest achievements in all of human history.

Australopithecus afarensis, one of human’s most well known ancestors, was first discovered in different parts of Africa, including Ethiopia, Kenya, and Tanzania. At the time of its discovery, the fossils of A. afarensis, which date back to 3. 2 million years ago, were the oldest of its kind to show that human ancestors walked on two legs (Gibbons, 2009). More recently, other fossils have surfaced of an older ancestor, Ardipithecus ramidus, that are 4. 4 million years old (Gibbons, 2009).

While a picture is forming of when human ancestors began to walk on two legs, the questions of how and why this transition occurred still remain. This paper will analyze the different hypothesis for why humans began to walk upright and the effect this had on humans. Through a combination of environmental pressures, social interactions, the way in which humans give birth, the search for food, and the need to free their hands, our ancestors distanced themselves from other primates by evolving the ability to walk upright. In 1974, a team of experts were conducting a dig to survey a particularly fossil rich area in Ethiopia, when they came upon different bone fragments that were later classified as A.

afarensis. Before this discovering, it was unclear as to how humans began to walk upright, let alone why. This discovery by paleoanthropologist Donald Johanson and his team led scientists to questions the very origins of humans (Kimble & Delezene, 2009). This discovery revealed to scientists a distinct shift between humans quadrupedal ancestors and their new bipedal forms.

What became clear was that australopithecus afarensis was the key to show that humans had a distinct shift between their quadrupedal ancestors and their new bipedal forms. While fossils can show a great deal about human’s early ancestors, they cannot tell the whole story.

The remains of A. afarensis can only show so much about this important transformation. One major influence on the bipedalism of early humans was the topography that surrounded them. Before the late-middle of the Miocene in East Africa, habitats were more closed off, and densely crowded with trees. Around this time, a shift towards open environments began (Jablonski & Chaplin, 1992). Early humans were faced with new ways to gather food, avoid predators, and interact amongst themselves.

The loss of trees wasn’t the only change in the topography; the earth itself got rockier, and required human ancestors to climb more than before. Rocky structures made for the perfect stabilization tool for the ancestral hominids. Like a toddler learning to walk, the rocks allowed for them to not only improve their posture, this type of topography also offered an access to food resources and a way to hide from predators (Winder, I. C., King, G.

C. P., Devès, M., & Bailey, 2013). This change in the environment and topography allowed for effective, long term, habitual walking (Winder, I.

C., King, G. C. P., Devès, M., & Bailey, 2013). These and other environmental changes in Africa required the evolution of bipedalism (Jablonski & Chaplin, 1992).

`Another contributing factor to the acquisition of bipedalism was the freedom it brought to early hominids. By standing on two feet, ancestral hominids were able to free their hands, a vital tool in many respects. From reaching for food, to makings tools and holding children, having the ability to use two hands was a major step forward. This skill is especially important for handling children. By requiring mothers to move to just two legs instead of four, this adjustment allowed for human ancestors to gain even more abilities that are innately human. The key trait driving the birthing methods of humans and the way they subsequently hold their children, is their hairless gene (Sutuo, 2012). Unlike many other primates, humans do not have long hair for children to tightly grasp.

Without the ability to hold onto the mother securely, it is essential that the mother has one or two hands free to hold onto the child (Sutuo, 2012). This hairless trait forces mothers to have multiple hands free; for early humans, walking on two legs would have been imperative to survival. This important ability also allowed for human ancestors to outcompete other primates. Being able to walk upright, and all of the assets that come with it, were the keys that allowed humans to surpass every other organism on the planet.

Food was another driving factor that led to bipedalism. Food and the search for it dominates every aspect of human life. Walking on two legs served two important purposes in regards to food: it was much easier to walk to find food and it was easier to conserve energy on two legs instead of four. Along with the changing environment in Africa, came a shift in the food supplies. Due to an increasingly uneven allocation of food in Africa, Hominids had to walk farther distances and they encountered different types of terrain in

their never ending search for food (Jablonski & Chaplin, 1992). By walking on two legs, it was much easier to reach food in trees and other high areas.

Scientists estimate that apes spend 80. 4% of their time in a bipedal posture when foraging for food (Kuliukas, 2002). This shows that the search for food would have been a driving factor for switching to bipedalism. The ability to use two hands to carry food for longer distances also increased the utility of bipedalism.

The second advantage to bipedalism involving food deals with energy consumption. Scientists have found that long range foragers, like ancestral hominids, require less energy when walking on two legs compared to four (Leonard, 2002). The combination of food scarcity and the need to conserve energy strongly favored the selection of bipedalism. Social interactions between early hominids also played a role in the acquisition of bipedalism. As the environment changed around them, human ancestors were faced with multiple challenges, finding a mate was one of them.

In a fight between two males, standing on two legs would have proven to be a huge advantage (Carrier, 2005). By standing on two legs instead of four, two limbs are readily available to strike an opponent. Many species already utilize a bipedal posture when fighting, but mammals are especially powerful when fighting on two legs (Carrier, 2005). In terms of mating, males who were taller and thus able to fight in a more productive manner, were more desired by females (Carrier, 2005). The ability to compete with other males and win demonstrates reproductive success to females. The way in which humans give birth is the final key clue as to how bipedalism was selected for

in humans. While different from modern humans, early human ancestors had birth canals unlike any other non-human primate (Rosenberg & Trevathen, 2002). The shape of the pelvis grew larger as our ancestors grew smarter, and this allowed for an easier transition to bipedalism (Lovejoy, 1988).

This larger pelvis made it easier for our earliest human ancestors to walk upright. Fossil evidence shows that even before our brains grew as large as they are today, there were signs of large pelvises; this means that even though large pelvises assisted with the birthing process, they also served to help walking on two legs. This means that habitual bipedalism was one of the earliest traits in ancestral hominids (Rosenberg & Trevathen, 2002). The way in which humans give birth is markedly different than any organisms on earth, and this is due to bipedalism. Due to the fact that humans stand on two feet, it is very difficult to give birth unassisted. Evidence of assistance during birth dates back to some of our earliest ancestors (Rosenberg & Trevathn, 2002). This connection between birthing, birthing assistance, and the size of human pelvises shows that habitual bipedalism was clearly one of the earliest acquisitions of early hominids.

In conclusion, our ancestors were pushed to make the transition to bipedalism due to many factors including, environmental stresses, the continuous advantages that come with the freeing of hands, the need to find food in different ways, social interactions, and lastly, due to the way in which they gave birth. There are many questions still plaguing scientists regarding bipedalism. In the future, scientist must be able to pinpoint exactly when this transition happened. While it seems clear that australopithecus afarensis walked on two legs, were they our first ancestor to do so?