Models regarding the emergence of bipedalism

There are over ten hypotheses as to how and why bipedalism evolved in humans and when. Bipedalism evolved well before the large human brain or the development of stone tools. Bipedal specializations are found in australopithecus fossils from 4. 2-3. 9 million years ago. The different hypotheses are not necessarily mutually exclusive and a number of selective forces may have acted together to lead to human bipedalism. Possible reasons for the evolution of human bipedalism include freeing the hands for tool use and carrying, sexual dimorphism in food gathering, changes in climate and habitat (from jungle to savanna) and to reduce the amount of skin exposed to the tropical sun. Another explanation is the mixture of savanna and scattered forests forced the first humans to travel between clusters of trees and bipedalism offered greater efficiency for long-distance travel between these clusters than knuckle-walking quadrupedism.

Step One: Tool Use

Evidence for use of stone tools first came from Olduvai Gorge in Tanzania. These tools were found in the lowest levels dating to nearly 2. 0 million years ago. In southern Ethiopia, stone tools dating to as early as 2. 3 to 2. 4 million years ago have been discovered. Someone or something has modified the. There are different kinds of tools as well. The overall evidence suggests that between 2. 3 and 2. 5 million years ago hominids began to use stone materials as tools. The first stone tools were probably made for two purposes: cutting something and pounding on something. Obviously you can cut and pound plant materials or use stone tools to dig for roots and such things. However, it is far more likely that some hominids began to cut hides and meat and chop on bones to extract protein rich marrow. Of all of the

tools made, the most important was probably the sharp flake that provided the edge by which one could cut even the toughest hides. It is probably unfortunate that the first stone tool tradition, the Oldowan Tool Tradition, is defined as a “ core-chopper tradition”. Cores are the means to detach flakes and it is these that were so vital to early hominid stone tool users.

Step Two: Bigger Brains

About one million years ago, hominoid mammals started to exhibit rational thought, a mental process that represented an important advance over simple natural and emotional reactions. Rational thought or is the conscious ability to add sensory input with memory by the use of logical thought processes. Also, morality emerged, which was reliant on the emergence of intelligence. Modern humans (homo sapiens) appeared approximately 160, 000 years ago. And until about 12, 000 years ago, when agriculture developed, they lived in small groups as hunters and gatherers. They had large brains that had evolved like everything else because it gave the individual and the group, as well as the individual within the group, a competitive advantage: Language allowed better communication within the group and higher forms of thinking. The passing on of knowledge from generation to generation, culture, evolved simultaneously or sometime later. The transfer of more complex information, ideas and concepts from one individual to another, or to a group, was probably the single most advantageous evolutionary adaptation for species preservation. The advantage of learning from passed on knowledge is it allowed foresight and planning. This gave them the ability to adapt to various environments and move to the top of the food chain. With these developments, social survival

skills within the group became more important, for the socially fittest produced more offspring. Hence, the larger-brain-yielding genes were more successfully passed on.

Step Three: Thermoregulatory Advantages

Wheeler's thermoregulatory model proposes, " as the selective pressure, bipedalism conferring reduction in heat gain and facilitation of heat dissipation. Bipedalism raises the mean body surface higher above the ground, where more favorable wind speeds and temperatures prevail. Greater wind flow translates to higher convective heat loss. Bipedalism reduces evaporative cooling requirements and conserves body water. Vertical orientation also minimizes direct solar exposure during the time of day when the solar radiation is most intense." This basically says that by being upright, hominids were exposed less to harmful elements yet gained the benefits of others.

Step Four: Travel For Food

More specific causes for the adoption of upright posture could be things such as carrying, display or warning, new feeding adaptations, tools, or a combination of these. A conservative view is that the hominid ancestor maintained the typical hominoid foraging regime in a Miocene habitat in which food was becoming more and more widely dispersed and required greater terrestrial travel to harvest. Bipedalism could easily have been the mode of terrestrial travel for this tree adapted hominoid, as it is in all of the modern species of lesser apes, since modern hominoids are equally efficient as bipeds or as quadrupeds at normal speeds. Given the added advantage of

free forelimbs, bipedalism for a small hominoid seems likely. The adoption of bipedalism by a Miocene hominoid need not be taken as such an unlikely occurrence, especially given the fact that all lesser apes today are habitual bipeds and bipedalism can easily be adopted by modern chimpanzees in the wild.

Step Five: Avoid Predators

During the terminal phase of the Miocene era, or around five million years ago, the climate began to shift from wet subtropical to much more arid, grassland conditions. Over the next three million years, the heavy forest cover gradually died out and tree based hominid ancestors were forced down onto ground. There, they faced the most brutal lineup of predators in the world, including lions, leopards, hyenas, and possibly wild dogs in large packs. Survival in such environments is limited to either predator avoidance or running and hominids such as A. afarensis would have been vulnerable due to lack of swift movements necessary to escape predators. Bipedalism also exposed early hominids to predators by making them upright. They were forced to rely on binocular vision for predatory avoidance, but in cases where a predator was not seen, they were easy prey for ambush hunters. Also, their plant food diet increased their exposure to predators. The combination of other factors such as smaller body size, and lack of sharp teeth or claws also increased vulnerability of hominids to this fate. Only a few fossilised examples are available; according to the taphonomic studies of Hart and Sussman(2005), 5% of A. afarensis fossils show evidence of having been eaten.

Conclusion

The emergence of hominids become bipedal has without question was one of the biggest factors in the development of civilization. If our early ancestors had never left the trees, we would not be where we are today, or they wouldn’t have developed the way they did. By becoming bipedal it allowed them to travel greater distances and use their bodies in different ways. The bigger brain and the use of tools really allowed hominids to further the range of their existence and become more well rounded. There really cannot be enough said about the emergence of bipedalism. Civilization is directly a result of everything this ability allowed hominids to do.