Clinical Research on Foot & Ankle
ISSN: 2329-910X

Turaman C, Clin Res Foot Ankle 2024, 12:S4

Commentary Open Access

Evolutionary Trade-Offs of Bipedalism-The Wretched Human Foot

Cem Turaman*

Department of Biology, Hacettepe University, Ankara, Turkey

***Corresponding author:** Cem Turaman, Department of Biology, Hacettepe University, Ankara, Turkey; E-mail: c.turaman19@gmail.com

Received: 26-Jan-2024, Manuscript No. CRFA-24-126385; **Editor assigned:** 29-Jan-2024, Pre QC No. CRFA-24- 126385 (PQ); **Reviewed:** 12-Feb-2024, QC No. CRFA-24-126385; **Revised:** 19-Feb-2024, Manuscript No. CRFA-23-126385 (R); **Published:** 26-Feb-2024, DOI: 10.4172/2329-910X.S4.002

Citation: Turaman C (2024) Evolutionary Trade-Offs of Bipedalism–The Wretched Human Foot. Clin Res Foot Ankle S4:002.

Description

Bipedalism is probably the most extraordinary feature that distinguishes humans from animals. Bipedalism was selected and maintained throughout evolution because it offers numerous advantages. But evolution has a dark side as well as its benefits and human history is littered with evolutionary trade-offs. Each living creature's body is formed by small embellishments to maximize reproduction rather than health, and it is riddle with compromises. Our body is a complex collection of adaptations, each with advantages and disadvantages that may conflict. Due to bipedalism, our feet pay the price for our acquired abilities, such as the development of intelligence, hand skills, and language usage.

The human foot is significantly exceptional among primates due to its permanently bent forward structure and toes aligned with the big toe. In order to achieve this structure, our ancestors have compromised their ability to climb and gave up their prehensile feet. Among all extant and extinct primates, our ancestor is the only species who abandoned its prehensile feet. All other extant primates have a grasping hallux that resembles the thumb, and the foot hallux, as the most conservative primate anatomic adaptation, is the indicator of the behaviour of tree climbing. Whereas the dramatic anatomic modifications in the human foot indicate an evolutionary adaptation; it is due to this evolutionary adaptation that terrestrial bipedalism has replaced tree climbing as a lifestyle. Foot plays two crucial roles in the upright gait and bipedalism. It functions as a pushing lever first, and then as a energy diffuser in difficult situations such as running and jumping.

Our foot differs from other primates in that our toes are shorter and our hallux is not opposite the others. If the hominins have begun to walk bipedally on trees, once they climbed down from the trees and began to walk long distances on clearings, the selective pressure on our feet must have increased. Except for the humans, the hallux of all the primates emerges straight posture at first, then turns. In human bipedalism, when the heel touches the ground while walking, the calcaneus and the leg joints are exposed to bigger impacts compared to other primates. Thus, the joint surfaces of the human leg have enlarged and spread the power on the heel to a larger surface, resulting in a healthy dispersion of mechanical tension between the bone and the cartilage. Increases in the human calcaneus, distal femur and the proximal tibia porosity, increases the energy absorption capacity of these bones. Enlargement of the distal femur and proximal tibia and the excessive calcaneus porosity compared to those of the apes, indicates a systemic adaptation to bipedalism.

The shock-absorbing effect of the human pedal arch is better understood in pathologic cases where the arch flattens. Fatigue fractures of the metatarsals, fibula, and tibia occur in flatfoot soldiers who are forced to walk long distances without the protection of the arch. Plantar fasciitis and epin calcanei are diseases seen only in humans. The foot arch supporting mechanism of aponeurosis, can only function on the human foot, which has a big toe that is consistently aligned with the long foot axis. The pedal arch, together with its supportive anatomic specifications, is observed only in humans and its ancestors. There are other pathologic cases associated with the arch affecting only bipedal humans. Hallux valgus and hallux varus are the most common. Because only humans have a foot arch among all extant mammals, it is natural that humans are the only species who suffer from flatfoot or pes planus. Even though there is no evidence that our first bipedal ancestors have suffered from these disorders, because the modern people keep suffering from them, we can conclude that our ancestors have probably bared the same disorders.

Flat footedness is a condition in which the arch of the foot either fails to develop or collapses permanently. This causes many problems, including injuries, because a collapsed arch changes the form of the foot and leads to irregular movements in the tarsus, knee and even the hips. Flat-footedness is an evolutionary mismatch. Every stage of human evolution is replete with extravagant variations observed in lower extremities. Flat-footedness is an atavism which emerges as a result of the loss of recently evolved functions in the course of human history. No other foot deformity is observed as frequent as the hallux valgus. The collapse of the neuromuscular mechanism that protects the hallux condylar joint causes hallux valgus. hallux valgus can be recognized as a terrestrial maladaptation that emerged as a result of the transition from arboreal adaption into bipedalism. Another common problem related to wearing shoes is plantar fasciitis. The plantar fascia inflammation, which works in tandem with the muscles to protect the pedal arch, is the cause of the acute and bitter pain felt when waking up in the morning or after running. Ultimate/evolutionary aetiology is that we only recently begun to walk on two feet, and natural selection has yet to find the time to strengthen the fascia sufficiently.

Our foot pays the highest price for our bipedal gait, and we can complain about our foot pain because of our linguistic abilities, which we acquired as a result of the bipedal lifestyle. Most people complain about foot problems and we get tired of the long-term, ineffective treatments. Health services attempt to alleviate these people's pain rather than addressing the cause of the pain. Strong and flexible feet are healthy feet but instead of strengthening the foot of the patient, the health care providers recommend orthoses and shoes with arch supporters and solid soles. The doctors tries to solve the problem with analgesics, orthoses and shoes with arch supporter prescriptions. Shoes are highly demanded in the modern world and the general opinion is that comfortable shoes with solid soles are healthier than barefoot. It is indeed true that most shoes, especially trainers are very comfortable. However, this comfort comes at a price which we ignore. On the sole of our foot, we have a dense and extensive neural network

that triggers certain reflexes in our brain, which helps in injury prevention. Pricking the soil beneath our feet may help us perceive its shape and heath, as well as send crucial data to our brain. This feedback is prevented by shoes prevent; the ticker the sole is the less data we perceive.

Being barefoot for longer periods of time and wearing minimal shoes can be encouraged beginning from childhood, so that the feet can develop healthily. As we try to comfort our miserable feet with orthoses, surgery and pills and enclose them in so-called techno-shoes, modern feet will keep concerning medicine for a long time. Many orthopaedic problems can also be avoided by standing up as much as we sit on chairs and squat. From an evolutionary perspective, and with a critical awareness of these devices that the majority accepts as normal, we can choose less damaging shoes and devices.