

INSIDE JEB

Sauntering macaques: not walking but running



A still from one of the macaques moving across the force plate. Photo credit: Reinhard Blickhan.

No nature documentary seems complete without a whimsical shot of macaques (*Macaca fuscata*) taking a winter spa break in a Japanese hot spring. But when human locomotion expert Reinhard Blickhan from Friedrich-Schiller University, Germany, visited the country in 2014, he discovered that some Japanese macaques have another talent. His colleague Naomichi Ogihara from Keio University introduced him to the 1000 year old traditional Japanese performance, known as Sarumawashi, where the animals walk and perform on two legs. Knowing that macaques trained in the Sarumawashi tradition are a dwindling resource, which could allow scientists to understand how humans evolved to move on two limbs, Blickhan was intrigued when he learned that the primates never appear to run. They seem to prefer walking or sauntering instead. Yet, the primates were clearly able

to jump as they vaulted over hurdles and walked on tiny stilts. ‘It appeared that they should be able to run’, he says. As Ogihara and his colleague Eishi Hirasaki have been investigating the movements of the versatile mammals for almost 20 years, Blickhan teamed up with the duo to film some of the trained Sarumawashi macaques as they sauntered at various speeds across a force plate in the ground to find out why the animals never seem to run.

However, when the trio and Emanuel Andrada from the Institute of Zoology and Evolutionary Research, Germany, analysed the primate’s movements, they were astonished to realise that the animals were in fact running all the time. ‘Our complete dataset does not contain a single trial which we could classify as walking’, says Blickhan. The difference was that the

macaques that were moving at a walking pace weren’t making it into the air between strides like conventional human runners. Instead of swinging forward like an upside down pendulum as they took a stride forward, the primates’ limbs were working like springy pogo sticks, in the same way that our legs behave like bouncy energy-storing springs that lift us into the air when we are running. The macaques’ legs were not stiff enough for them to become airborne at low speeds, leading them to bounce like runners but remain in contact with the ground. The team also realised that the primates are incapable of vaulting their bodies over the top of their legs like human walkers because their limbs were not stiff enough. Instead, their legs compressed as they bounded, like grounded runners.

However, the animals did become airborne at the higher speeds, although only for a brief moment and they never sprinted like humans. ‘This is the first time that this has been observed in macaques’, says Blickhan. The team also suspects that although walking on two limbs is costly and inefficient for the primates, the animals’ posture and grounded ‘running’ style may help them to improve their stability to make the best of the situation.

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