

Right Side Up! Or the righting reflex in cats

It's almost become a joke saying now, that a cat always lands on its feet, however it is a physical characteristic of the species, the innate ability to turn in mid air and gracefully land feet first.

This ability first appears in kittens at around the age of three weeks and by six to seven weeks is perfected. Physically the ability to do this is due to an unusually flexible spine and no functional clavicle. It is however a height limited behaviour and for most cats the minimum safe height is approximately 30cm. A study carried out in the USA appeared to show that actually injuries to cats that jumped out of tower blocks (so called high rise syndrome) reduced after a certain number of floors high, this was until it was pointed out that actually any higher than that and there probably weren't as many survivors to have their injuries treated!

Tailless cats are surprisingly also able to self right as the actual movement relies more on the hindlegs and conservation of angular momentum. They use their vestibular and ocular apparatus to initially identify up from down, and twist themselves to be facing downwards, but without changing their angular momentum. This is achieved by bending in the middle so that the front of their body is rotating about a different axis from that of the rear half. The cats then tuck in their front legs and extend their hind legs to increase the moment of inertia. Thus by extending and retracting legs and rotating its tail the cat can change the speed at which it rotates, which in turn gives it control over which part of its body come in contact with the ground.

Cats also have other features that can reduce damage from a fall, small size, light bone structure and thick fur. These all help to decrease the cats' terminal velocity, while falling the cat spreads out its body to increase drag much like a flying squirrel, allowing more time for the righting reflex to be engaged.

However, this does raise one interesting question. What would happen if you were to attach a piece of buttered toast to the cat's back,



battered side up? What would take precedence.....the buttered toast or the cat? Or would you end up with perpetual motion?

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