ANGULAR MOMENTUM CONSERVATION AND THE CAT TWIST

Simple Explanation

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CAT TWIST — SIMPLE EXPLANATION
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- Swing single dumbbell weight from right hand to left hand behind back, then from left hand to right hand in front. This will assist a hula hoop-like swing of the hips.

- Entire upper body, legs, and platform will twist in opposite direction.

- All motion stops and starts together. Angular momentum remains zero at all times. (Zero net torque.)

- Body and weight end up in original configuration, but now facing a different direction. (Possibly 180-degree twist.)

- Cat does similar maneuver about horizontal axis, but bends its spine and swings it around to twist in the opposite direction. (From feet up to feet down.)

Note: The two “ends” need not move together and, in fact, sometimes twist at different rates.

Original detailed analysis of torque-free twist:
The **NET** torque is zero, thus the **TOTAL** angular momentum remains zero.
THE FALLING TWISTING CAT

To view a video of a mechanical twisting cat (Gallicat) and over 150 other short movies of physics demonstrations, go to www.physics.weber.edu/gall1
SUMMARY and CONCLUSIONS

- Angular momentum is conserved.
- “Legs in/legs out” is not sufficient.
- “Bent spine” has proven necessary and sufficient.
- “Orbit” and “spin” are both required.
- Humans can perform the maneuver about a vertical axis while on a turntable.
- The mechanical “gallicat” demonstrates how the real cat flips over to land on its feet.
REFERENCES


• *Gallicat Video*-www.physics.weber.edu/galli (go to “Cat-Twist”)

• *Gallicat Purchase*-www.teachersource.com (go to “Physics” then “Laws of Physics”