

## Swivel Vacuums and Ergonomics

by Dr. Gary Allread

Swivel upright vacuum cleaners are becoming increasingly common. The ability of these designs to maneuver around objects more easily than standard uprights is touted as an important benefit. To date, however, no publicly available ergonomics research has been found that specifically evaluates this swivel feature. If there were to be studies done in the future, it would be beneficial to test the impact of this design, namely: How does a change in motor location\* impact the physical effort to vacuum?



[Editor's Note: \*Some models locate the motor in the handle rather than in the base.]

The motor of a standard upright vacuum is often supported and stabilized by the floor, but with the swivel design, the motor may be raised onto the vacuum arm, suggesting that a user has to support and stabilize this weight during vacuuming.

When a user engages the swivel function, the motor's weight may torque the vacuum's handle and require the user to counteract this force.

Does the inverted pendulum (that is, a pendulum with a center of gravity above a pivot point making it unstable and subject to toppling) design of a swivel vacuum with a handle-mounted motor require more effort to simply keep it in place, compared to a standard upright?

How does the swivel function impact body postures? Does the ease of swivel result in users more often remaining in one place while vacuuming, rather than walking with it? And if so, does that result in more awkward work positions?

What is the impact of using a swivel upright vacuum occasionally (for example, a residential user) vs. regularly (for example, a hotel housekeeper)?

About the Author: Dr. Allread is the Program Director of [Spine Research Institute \(SRI\) Ergonomics](https://spine.osu.edu/research/spine-research-institute) at The Ohio State University. He works with companies and organizations to provide a variety of ergonomics technical support services; and coordinates Ohio State's popular *Ergonomics Short Course*, offered bi-annually, in both on-site and remote formats.

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