

The Softwheel is a new technology that incorporates a suspension device within the wheel that allows a consumer to add suspension to a chair simply by changing the wheels.



The Softwheel claims include;

Reduction in neck and back pain

Vibration reduction

Increased energy efficiency

Improved blood circulation

I tested a set of aluminum softwheels (the cheap ones) loaned to me by Permobil that had been calibrated to my weight.

I used the wheels on a daily basis for a period of two weeks and then tested them against a pair of Spinerger LX wheels

Both wheels were shod with Schwalbe Marathon tires inflated to 140psi. The ones of the Softwheel were brand new, the ones on the Spinerger LX sadly, were older and about 50% worn.

Chair and tester weighed 86 kg (190lbs) or 88.5kg(195lbs) (with soft wheel) weight distribution was 84:16 or 85:15(softwheel) with the c of g 6cm (2.5") forward of the rear wheels. The chair had 4 degrees of camber.

Each test was repeated at least three times or until I felt satisfied that I has at least three results that were similar and representative of actual performance.

Picture of Soft Wheel

Picture of Spinerger LX



Objective Tests	Softwheel	Spinergy LX	Take away
Weight (per pair)	6kg (13lbs)	3.6kg (8lbs)	Conventional bike wisdom tells us that adding weight to a wheel ^{1,2} (rather than the frame) has a more significant impact on the energy required to accelerate and brake. Even though there are conflicting opinions about the actual magnitude - increasing the weight by 60% had better have some significant benefits
Distance rolled on hard flat surface	7m (23')	8m (26')	Since energy efficiency has a direct correlation to distance rolled it is fair to say that in my tests the softwheel takes more energy to push on flat hard smooth ground.
Distance rolled on rumble carpet	3m (10')	3.4m(11')	It also takes more energy to push on a hard rough surface.
30m slalom (time)	37s	37s	The slalom which involves acceleration and braking of the wheels elicited no difference in time which surprised me. ³ The Spinergy LT did skid more than the softwheel when braking for the turns which might have been due to the tires being older. I also felt more tired after the Softwheel runs.
Fig 8 for 1 minute (complete "8's")	9.5	10	I got more skidding on the corners with the Spinergy wheels but still managed to complete slightly more reps. Might have been due to the more worn tire on the Spinergy wheel.

Subjective tests	Softwheel	Spinergy LX	
Ascending curbs	Same	Same	No difference in height I was able to climb or the impact I felt when doing it
Descending curbs	Softer	Predictable	Descending a curb was slightly softer with the Softwheel but on really large curbs >30cm (12") there was a disconcerting tendency for the Softwheel to make me feel like I would tip back as it compressed. This maybe something that a user would get used to but I don't know
Wheeling efficiency	Worse	Better	The information that comes with the Softwheels claims they are 16 to 25% more efficient than a standard premium wheel. My testing on smooth hard and rough hard surfaces suggested they took over 10% more energy to wheel. Furthermore, I felt each push took more effort while using the softwheel although I didn't feel the need to increase cadence to maintain speed. They just felt a little "heavy".
Vibration	Same	Same	I was unable to feel a difference between the vibrations transmitted by the two wheels either on hard smooth surfaces, irregular black top or the rumble carpet we have in our entrance foyer.

To Summarize, the wheels drew quite a few compliments from the wheelchair users I saw while testing. They do look cool and futuristic. It might also be that I am unable to appreciate the subtle vibration dampening effects they possess since I don't have chronic pain or severe spasticity- both of which are often aggravated by even a slightly rougher ride.

I would like to trial these wheels with clients who weigh the same as me but have pain or spasticity which is aggravated by vibration and or a rough ride.

Until I see otherwise I have to say that these wheels offer no appreciable benefit to a wheeler, in fact their weight and increased inertia may actually aggravate shoulder and wrist problems. Particularly when you consider the research done by Stephen Sprigle⁴ which revealed that the average user moves their chair about 90 times in a day and about 80 of those times are for very short distances. This suggests to me that for the average person stopping and starting is more important than rolling and heavier wheels are harder to stop and start than light ones.

It can be argued that the worn tires on the Spinergy wheels masked some of the differences between the two wheels. If I were conducting a more thorough study I would certainly match the tire wear for the two units. But the benefits of a \$5500 wheel should far outweigh any impact worn tires might have.

References:

1. We Can Prove Why Extra Mass On Bike Wheels Is Your Worst Enemy
author: rhett allain
<https://www.wired.com/2016/06/cycling-physics-extra-mass-bike-wheels-enemy/>
2. Do light wheels beat a light frame?
November 12, 2013 by [Cyclist Australia/NZ](#)
<http://cyclist.com.au/light-wheels-beat-light-frame/>
3. Evaluation of Total Wheelchair Resistance in Straight and Curvilinear Coast-Down Test
Jui-Te Lin, MS, PT, Stephen Sprigle, PhD, PT
<http://www.resna.org/sites/default/files/conference/2014/wheeled%20mobility/student%20scientific/lin.html>
4. Manual Wheelchair Use: Bouts of Mobility in Everyday Life
Sonnenblum et al
Rehabil Res Pract. 2012; 2012: 753165.
Published online 2012 July 15. doi: [10.1155/2012/753165](https://doi.org/10.1155/2012/753165)