Requirement catalogue Height Adjustability in the Ergonomic Crutch

Typ of Requirement	Requirement	Mountain bike Saddle post	Gas spring office chair	Gas spring Trunk Lid	Bicycle brake
Must Have Criteria	Can hold vertical load of 80kg (half of the pilots' weight and the weight of the exoskeleton with a safety factor of 1.33)	Fulfilled	Fulfilled	Depends on the model	Should be fulfilled with pins
	Mechanism can hold 702MPa of bending stress	Fulfilled	Fulfilled	Fulfilled	Fulfilled
	No turning of crutch pipes relative to each other during use	Fulfilled	Not fulfilled	Not fulfilled	Fulfilled
	No damping during usage of crutches	Fulfilled	Depends on the model, mostly not fulfilled	Not fulfilled	Fulfilled
	Lock and dislock mechanism at end stops	Fulfilled	Fulfilled	Not fulfilled	Fulfilled (Uncertainties exist)
	At least 150 mm cylinder capacity	Depends on model	Depends on model	Fulfilled	Fulfilled
	Fast extension	Medium	Not fulfilled	Not fulfilled	Fulfilled
Optimization Criteria	Weight	480g – 800g	With needed cylinder capacity around 1.5kg	Around 400g	Unclear (probably around 0.5 kg)
	Easy to use locking mechanism	Fixation already integrated	Fixated if valve is closed	Needs an external mechanism	Bicycle brake handle mechanism
	Costs	Around 550 CHF + Bruno, material for adapter	Around 100 CHF springs, material for handle, material for handle	Around 100 CHF springs, material for handle, material lock mechanism, material adapter	20 CHF – 100 CHF springs, 20 CHF brake cable, ev. 50 CHF brake handle, Bruno, material costs
	Design Effort	Medium	Large	Large	Large
Nice to Have Criteria	200 mm cylinder capacity	Not fulfilled	Depends on model	Fulfilled	Depends on design
	Several height settings	Stepless adjustable	Sleeplessly adjustable	None	Holes can be added at needed heights