

Autonomic Function Testing Table

Non-invasive tests of cardiovascular, sudomotor, and pupillary autonomic function.

By Melissa Cortez and Guillaume Lamotte for *The Dysautonomia Project* book, Second edition.

Test	Methods	Response		Cause**
		Normal *	Abnormal	
Active standing Also known as orthostatic vitals	BP and HR supine after at least 5 minutes supine, and standing after 1 minutes, 2 minutes, 3 minutes, 5 minutes, 7 minutes, and up to 10 minutes.	↑HR<30 beats/min Stable BP or ↓SBP<20 mmHg, ↓DBP<10 mmHg	Neurogenic OH: ↓SBP >20mmHg and or ↓DBP>10 mmHg with ΔHR/ ΔSBP <0.5 (classic within 3 min. vs. delayed after 3 min) POTS: ↑HR>30 beats/min No OH ↑HR>40 beats/min ages 12-19	Sympathetic +/- cardiovagal failure Hyperadrenergic state, hypovolemia, limited autonomic neuropathy, deconditioning, poor vasomotor tone
Head-up tilt	Passive head-up tilt at 70-degree. Continuous recording of heart rate, breathing, beat-by-beat blood pressure	↑HR<30 beats/min Stable BP or ↓SBP<20 mmHg, ↓DBP<10 mmHg	Neurogenic OH: ↓SBP >20mmHg and or ↓DBP>10 mmHg with ΔHR/ ΔSBP <0.5 (classic vs. delayed) POTS: ↑HR>30 beats/min No OH ↑HR>40 beats/min ages 12-19 Vasovagal syncope: rapid ↓ in HR and BP during the study	Sympathetic +/- cardiovagal failure Hyperadrenergic state, hypovolemia, limited autonomic neuropathy, deconditioning, poor vasomotor tone Reflex syncope
Heart rate response to deep breathing (6 breaths/minute)	Maximum-minimum heart rate	>10 beats/minute (age dependent)	<7 beats/minute (age dependent)	Cardiovagal failure
Valsalva ratio	Longest R-R after the Valsalva maneuver / shortest R-R	Age dependent	Age dependent	No rebound bradycardia during phase IV: vagal failure

	during the Valsalva maneuver			No tachycardia during phase II: vagal +/- sympathetic failure
Blood pressure responses to the Valsalva maneuver	Forced expiratory pressure (40 mmHg) for 12 to 15 seconds) in the supine position or 20 degree-tilt	Late phase II is present, blood pressure recovery time < 3 seconds, phase IV is present	Absent late phase II, blood pressure recovery time > 6 seconds, phase IV is absent	Sympathetic failure
Thermoregulatory sweat test	Subject lies in heat box until core temp rises by 1°C or to 38°C. Anterior body surface is powdered with alazarin red powder which changes to purple when wet	Sweating changes alazarin powder to purple	Central, postganglionic, skin and sweat glands	Hypo or anhidrosis, heat intolerance
Axon reflex (QSWEAT or QSRAT)	Activation of axon terminal by iontophoresis of acetylcholine with quantification of sweat volume	Sweating produced	Sympathetic postganglionic sudomotor axon, skin or sweat glands	Hypo or anhidrosis
Pupillometry	Measurements of the pupils' responses to illumination or to drugs	Exposure to light constricts the pupils. Exposure to darkness dilates the pupils. Quantitative measures.	Abnormal constriction or dilation of the pupils (miosis, mydriasis, Adie's pupils, etc.)	Sympathetic and/or parasympathetic failure

Abbreviations: BP = blood pressure; DBP = diastolic blood pressure; E/I = expiratory/Inspiratory ratio; HR = heart rate; OH = orthostatic hypotension; QSWEAT = quantitative sweat measurement system; QSART = quantitative sudomotor axon reflex testing (QSART); SBP = systolic blood pressure.