Fact Sheet

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Closed Loop Stimulation

The Closed Loop Stimulation (CLS) rate-adaptive algorithm is available exclusively in BIOTRONIK pacemakers, implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy (CRT) devices. Patients with CLS devices benefit from dynamic device therapy. Exercise and acute mental stress naturally cause the pulse to quicken in healthy patients. CLS is the only technology that mimics this feedback loop, adjusting cardiac device patient heart rates in response to physical activity and other demands.

How does CLS work?
When the heart is unable to increase its rate with physical exertion (chronotropic incompetence), it cannot pump enough blood to meet the body's needs. This can lead to syncope (fainting) or other issues.

To treat these conditions, CLS translates information about myocardial contractility (the strength of the heart muscle's contraction) into a pacing rate adjusted by the patient's own cardiovascular control system. CLS does this by monitoring and processing intracardiac impedance signals, correlated with the volume of blood in the heart's ventricles (pumping chambers).[1] A lower impedance signal is caused by a larger volume of blood in the ventricles and vice versa. Detectable changes in myocardial contractility are associated with the heart's response to exercise and acute mental stress.[2] By monitoring these changes, CLS continuously sets a pacing rate appropriate to the patient's physiologic demands at any given moment.[2]

References:

[1] Osswald S et al. *Pacing Clin Electrophysiol*. 2000, 23(10).
[2] Lindovská M et al. *Europace*. 2012, 14(11).