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Vagus nerve stimulation - - intractable epilepsy therapy

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Nervus vagus stimulation

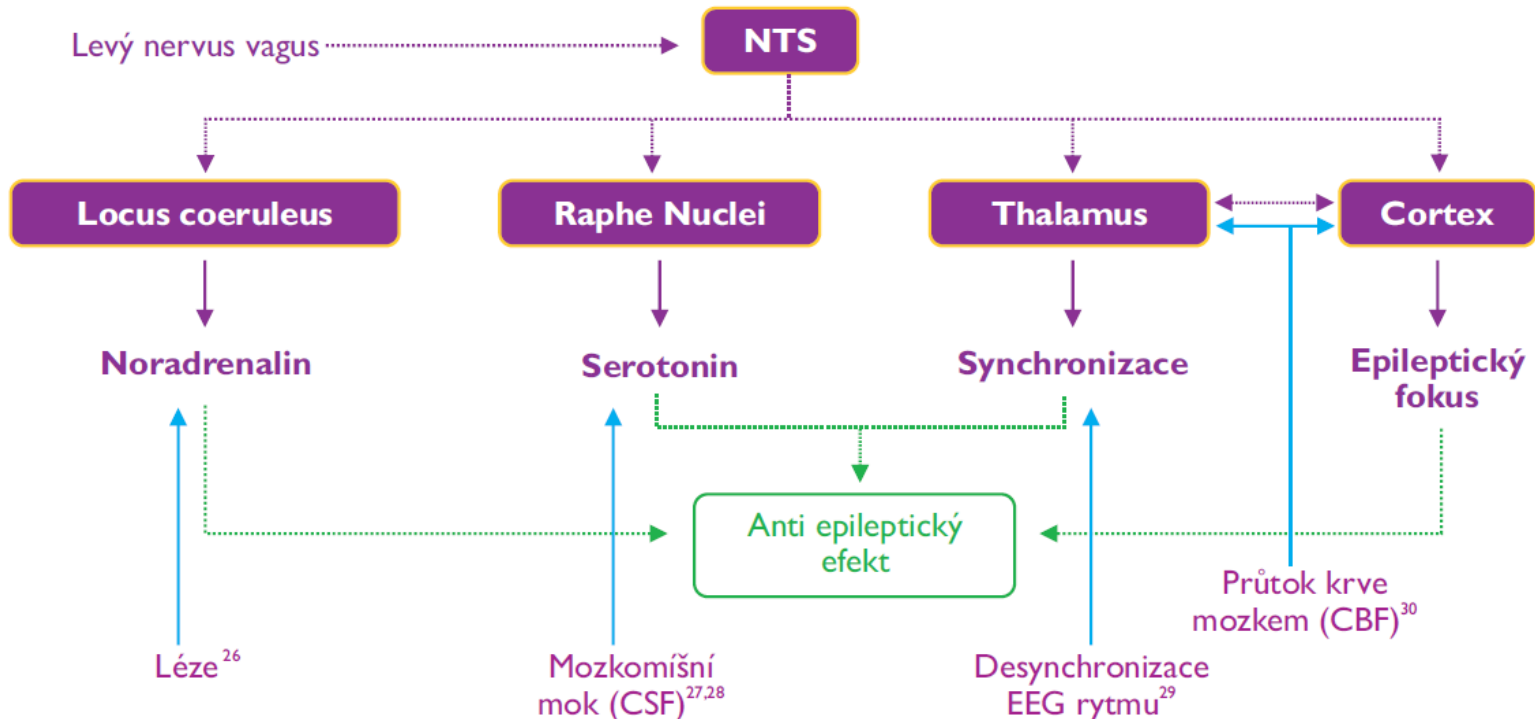
- Long-term vagus nerve stimulation (VNS) is a palliative treatment method for inoperable refractory epilepsy
- First implantation in humans in 1988
- The first implantation in Czech Republic in 1997
- Nowadays about 60,000 patients
- Czech Republic about 500 patients



Indication

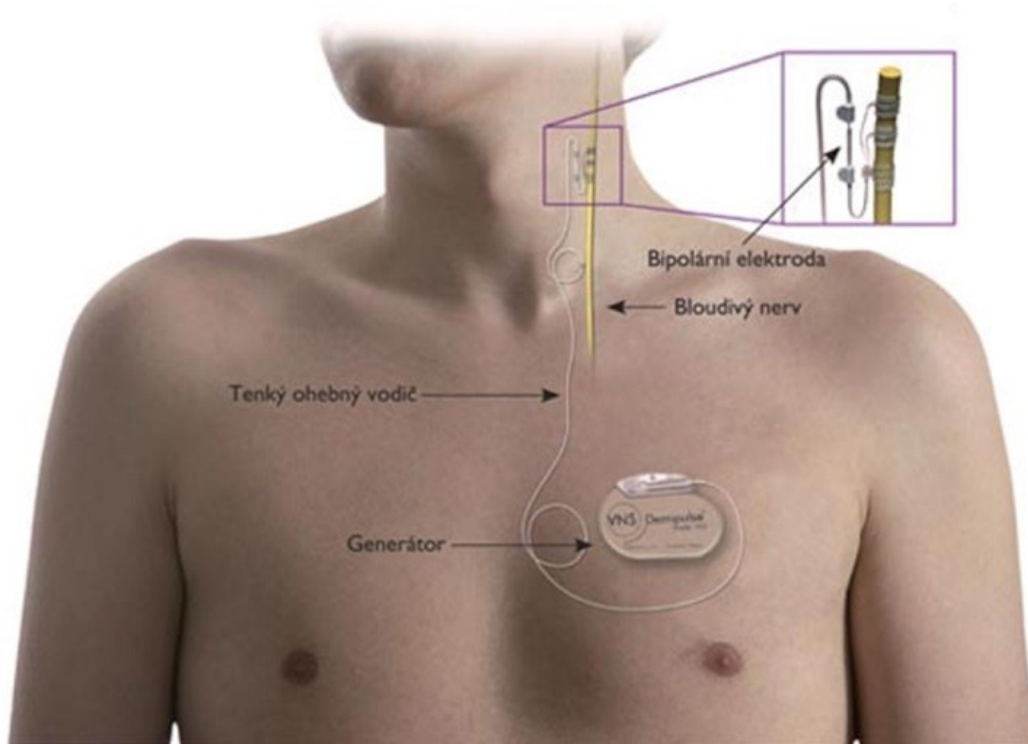
- The VNS Therapy System is considered as supportive therapy
- to reduce the frequency of seizures
- in epileptic patients non-responding to antiepileptic drugs
- with partial seizures (with or without secondary generalization) or generalized seizures

Mechanism of VNS effect



The method utilizes the ability of afferent vagus nerve fibres to transmit nerve impulses into the brain stem nuclei (especially the solitary tract nucleus) and in this way further into the the limbic system and thalamo-cortical circuits.

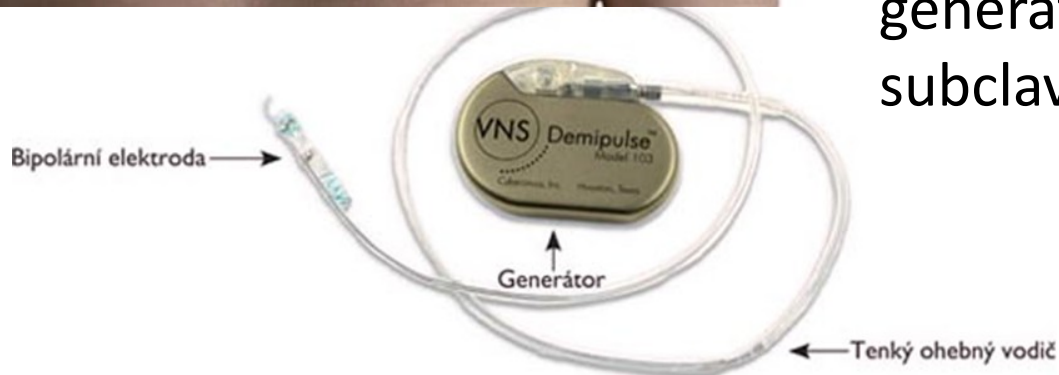
VNS implantation



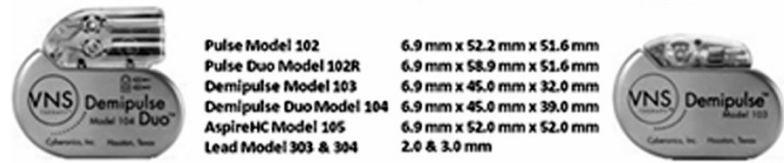
The principle - electrical stimulation of the left vagus nerve

through the bipolar electrode, which is connected to

implantable pulse generator in the subclavian area.



VNS implantation



Pulse Model 102	6.9 mm x 52.2 mm x 51.6 mm
Pulse Duo Model 102R	6.9 mm x 58.9 mm x 51.6 mm
Demipulse Model 103	6.9 mm x 45.0 mm x 32.0 mm
Demipulse Duo Model 104	6.9 mm x 45.0 mm x 39.0 mm
AspireHC Model 105	6.9 mm x 52.0 mm x 52.0 mm
Lead Model 303 & 304	2.0 & 3.0 mm



303



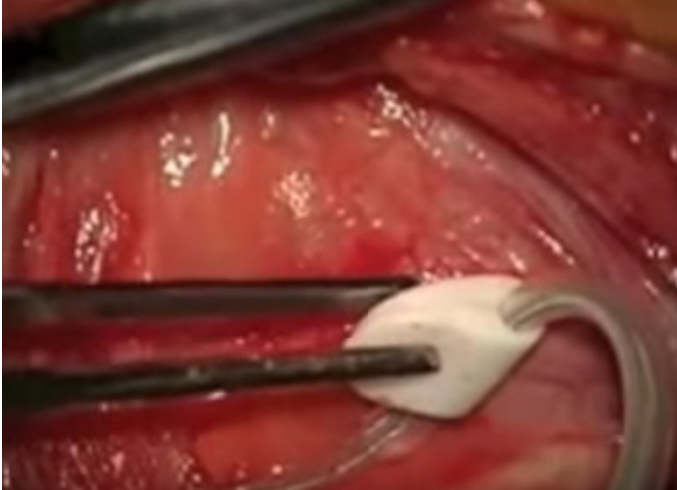
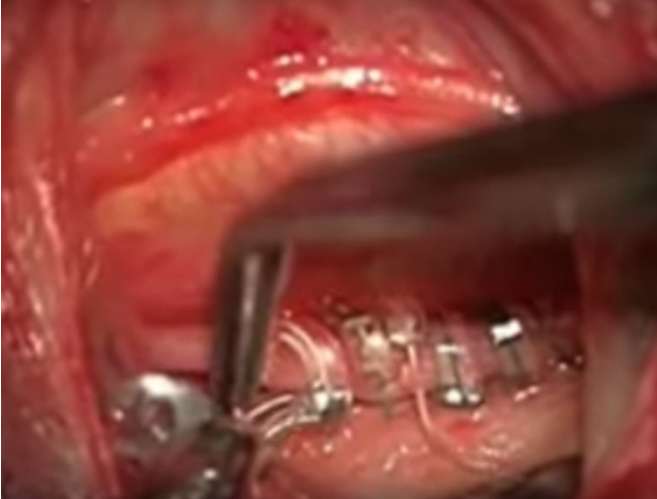
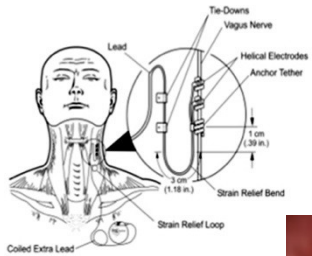
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VNS implantation



VNS implantation procedure



VNS implantation procedure

VAGAL NERVE STIMULATION

VNS implantation procedure



Setting VNS therapy parameters

using programming computer and
programming wand



Typical stimulation parameters:

Current output: 1.0 to 2.0 mA

Frequency: 20 Hz or 30 Hz

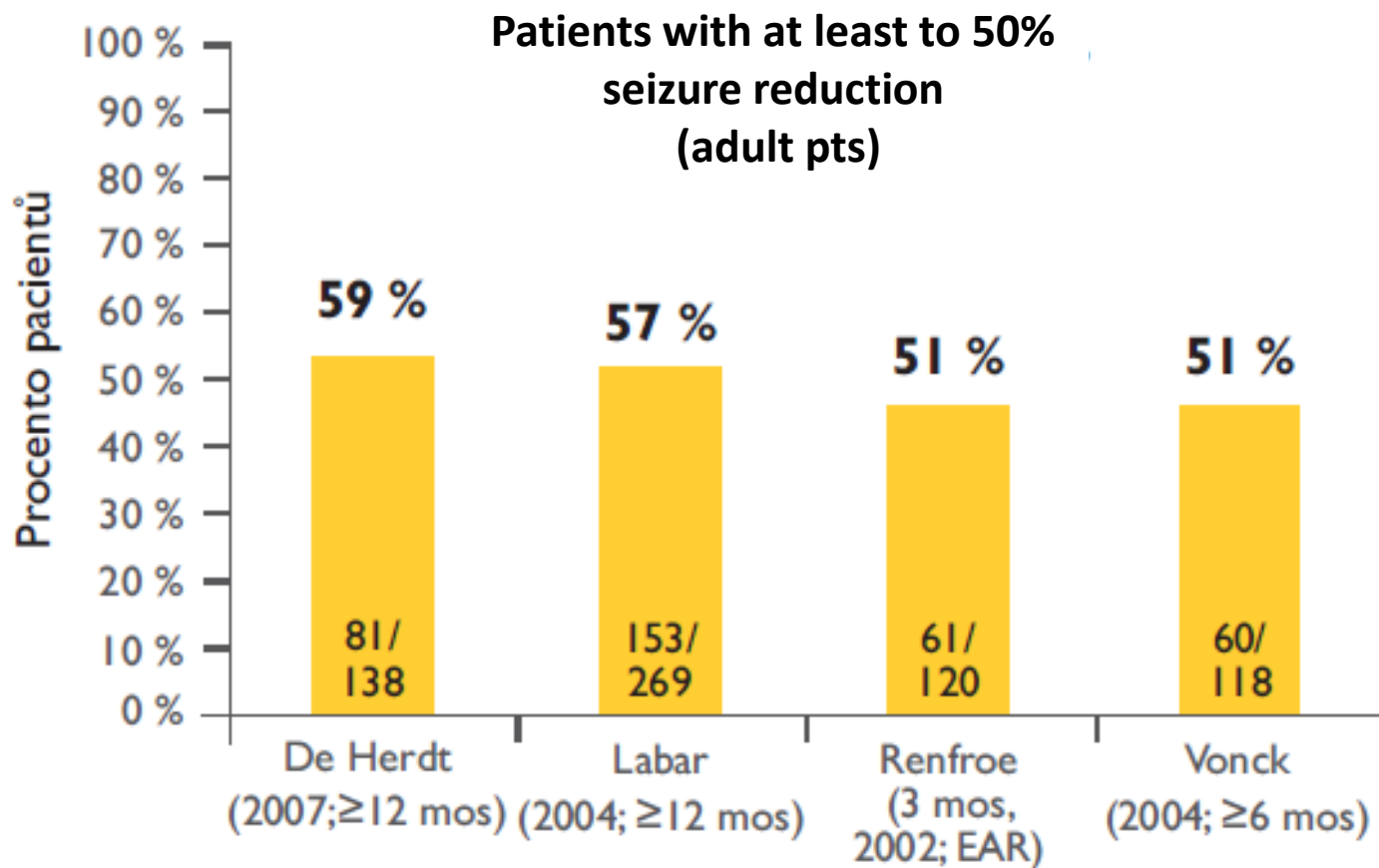
Pulse width: 250 or 500 μ s

Time ON stimulation: 30s

Stimulation OFF time: 3 or 5min

The effect of VNS therapy

Reduction in number and intensity of seizures



63% responders after 1 year, 55% after 2 years

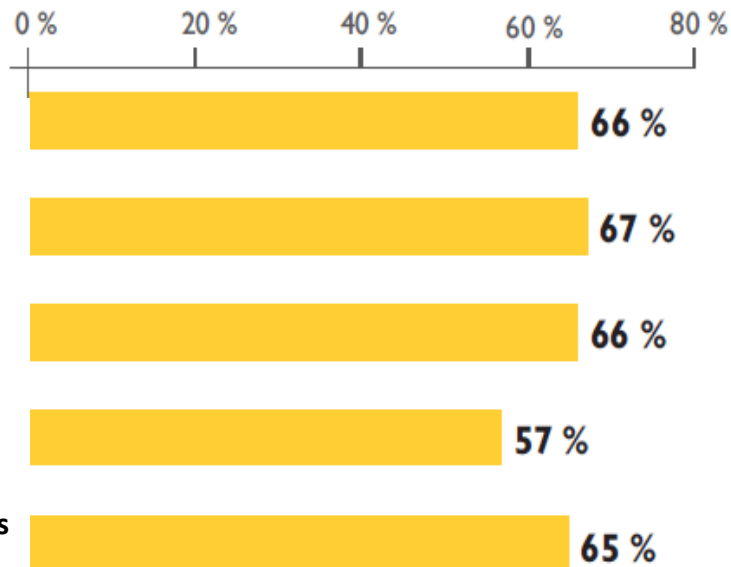
VNS therapy in Czech republic

ČESKÁ REPUBLIKA																			
	Brno		Brno dětská		NNH		FNM dětská		FNM dosp.		NNF		FTN dětská		FTN dosp.		Σ primo	Σ re	Σ
	primo	re	primo	re	primo	re	primo	re	primo	re	primo	re	primo	re	primo	re			
1997											1		1				2	0	2
1998							1										1	0	1
1999	17				8		1				6		2				34	0	34
2000	12				8		2				2		2	1			26	1	27
2001	9				4		6	2	1		1		4				25	2	27
2002	11						2						2		3		18	0	18
2003	9	5			6	1	5		8		4	3	3		1		36	9	45
2004	10	4			13	1	1		1		3	3	5		1		34	8	42
2005	11	3			3	2	1		1		1		1		1		19	5	24
2006	17	3			9	9	5				1		2				34	12	46
2007	13	2			3	4	1		4	1	1				1		22	8	30
2008	10	1	2	0	3		1		3		4				3		26	1	27
2009	17	3	2	0	7		4		7	1	3		2	2	2		44	6	50
2010	12	10	4	0	4	3	3		3	1	4	1	3	1		2	33	18	51
2011	18	8	2	0	6	5	4	0	3	1	1	0	0	0	1	4	35	18	53
2012	11	12	1	0	6	5	3	0	2	4	4	1	0	0	0	1	27	23	50
2013	13	5	3	1	4	4	1	1	4	4	5	4	0	0	0	2	30	21	51
2014	10	7	2	2	6	6	4	0	3	2	4	2	0	0	1	6	30	25	55
2015	8	17	3	2	5	7	2	1	3	2	2	1			1	4	24	34	58
2016	1	2	1														2	2	4
Σ	209	82	20	5	95	47	47	4	43	16	47	15	27	4	14	20	476	157	633

Quality of life and VNS Therapy

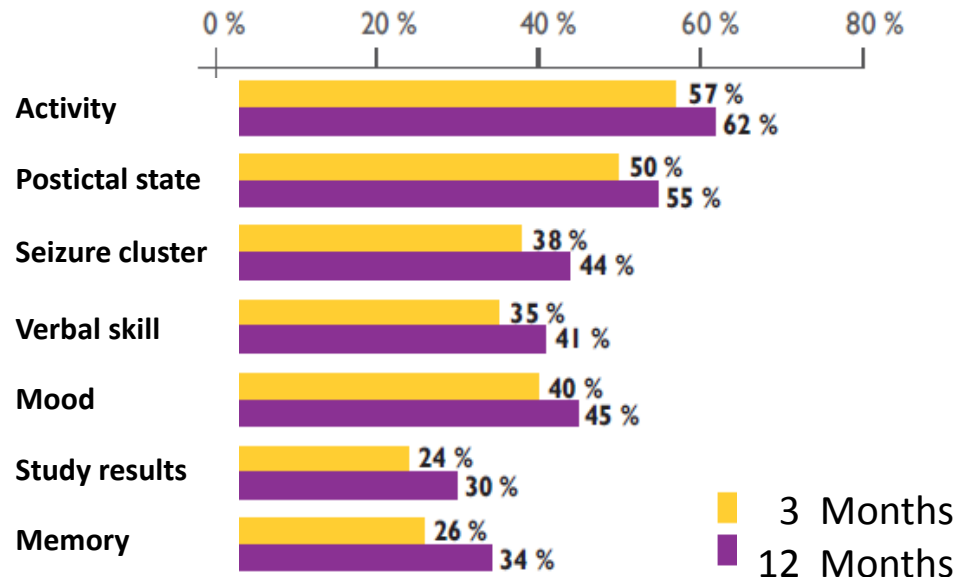
Patients with refractory epilepsy
(n=503)

% of pts reporting



Quality of life and VNS Therapy
(n=2 229)

% of pts with improvement or
significant improvement





VNS

