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Title: The “ANT is not BAT” -principle of mastication

Abstract:

Crushing a piece of food comprising of hard and soft particles is not a stereotyped masticatory activity, but a very rationally motivated activity of mammalian jaw-closing muscles. The delicately controlled jaw-closing muscle reflexes correspond instantly and precisely to the proprioceptive sensations caused by the different resistance of the hard, or the soft parts of the food bolus. The increase of bite force is activated immediately as the proprioceptive neural information emanating from the periodontal mechanoreceptors of teeth, and as the stretch-sensing muscle spindles detect mechanical resistance of the food bolus. The soft parts of the bolus cause less muscle strain and fewer motor units are activated, and less bite force is created. However, numerous studies have shown the abrupt stall of activity of the human masseter and temporalis muscles within about 10 milliseconds (ms) from a tap contact on the incisor tooth. The inhibitory stall caused by the firing of the anterior tooth (ANT) periodontal mechanoreceptors is temporary, lasting some 50-70 ms. Existing studies of the control of jaw muscle activity suggest that a tap contact on a back-tooth (BAT) causes an entirely reciprocal reflex reaction, the excitation of jaw-closing muscles. This presentation focuses on explaining the neural background of the “ANT is not BAT” -principle. Understanding the instantaneous and reciprocal changes of bite force during mastication has profound influences on the clinical practices of the rehabilitation of teeth and jaws.

Biography

Dr. Lauri Vaahtoniemi earned his PhD from the University of Oulu, Finland studying bacterial attachment to oral epithelia, but for most of his career he has been practicing clinical dentistry. He is oriented to the comprehensive dental care of severely compromised dentitions and TMJ patients, and he is familiar with the clinical use of the T-Scan bite analysis system, He has written blog articles discussing the etiology and treatment of TMD and occlusion-related problems in dental patients. He has recently introduced a method for the assessment of dental occlusion parameters for clinical studies utilizing the T-Scan. Presently, at the age of 62, he is devoting his time to writing and educating about the neural basis of jaw muscle reflexes.