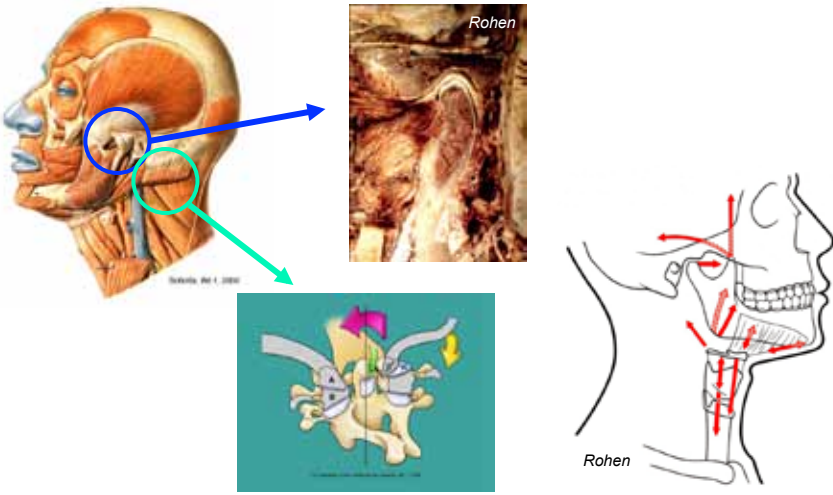




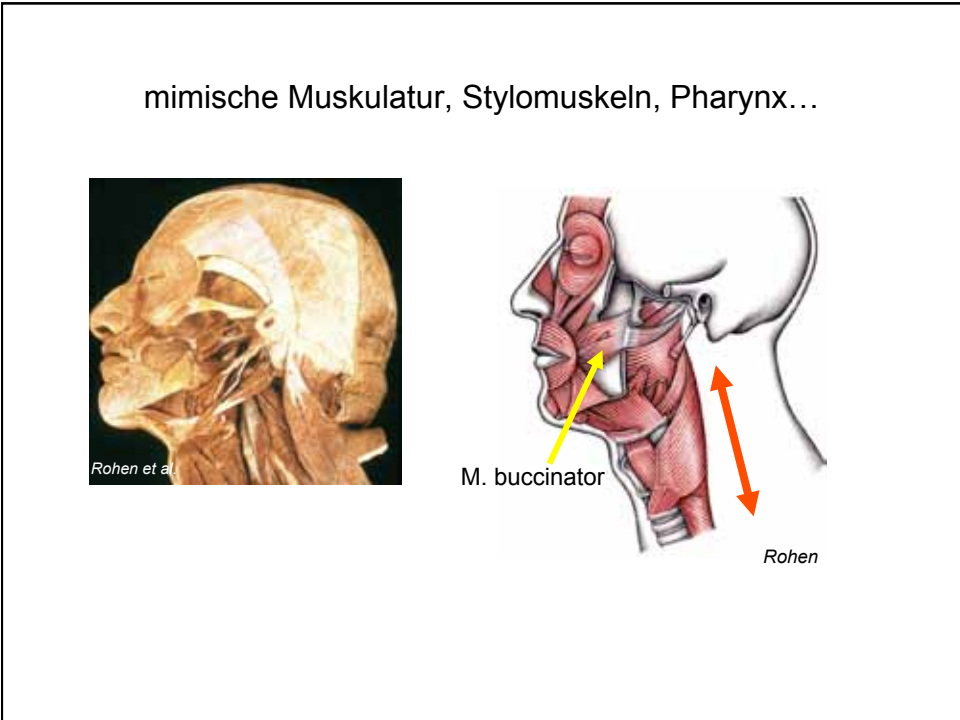
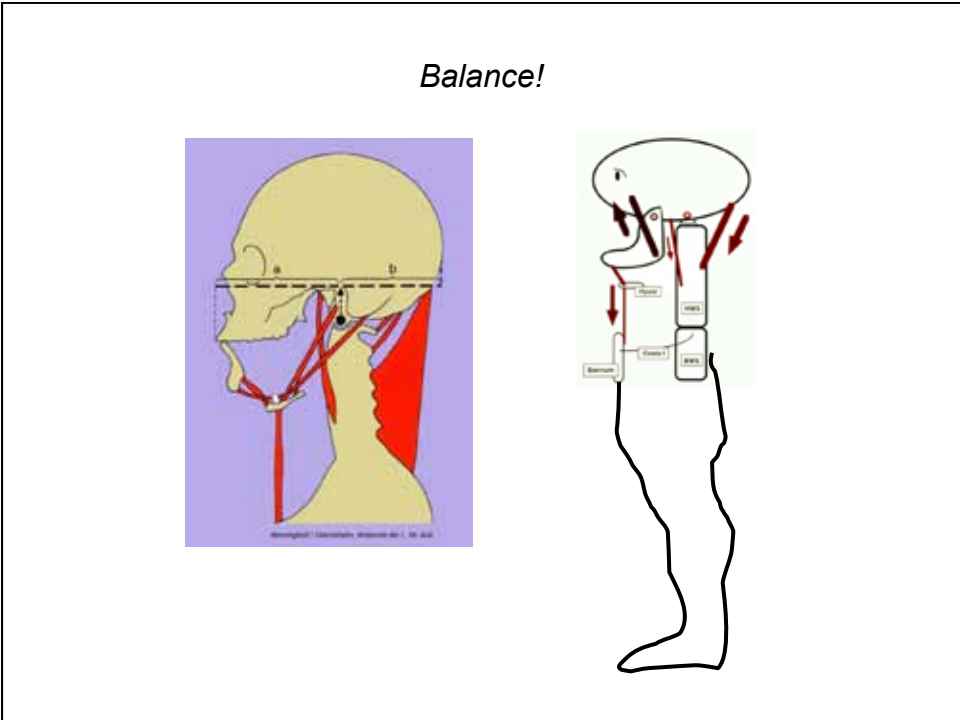
Neuroanatomie des Kopf-Hals-Übergangs: Schwindel? Kopfschmerz?

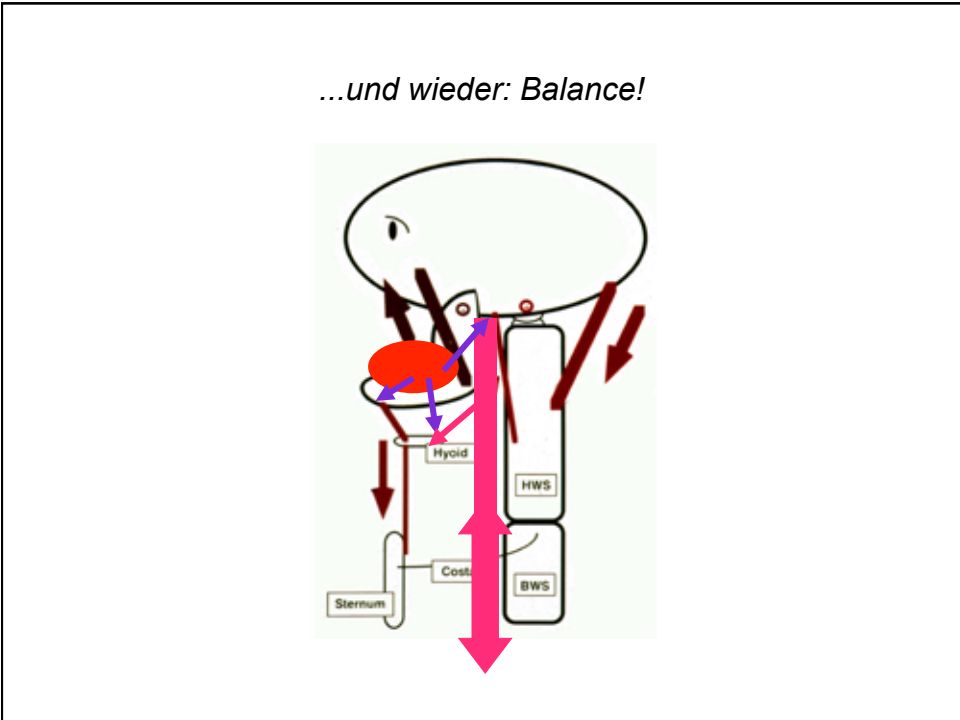
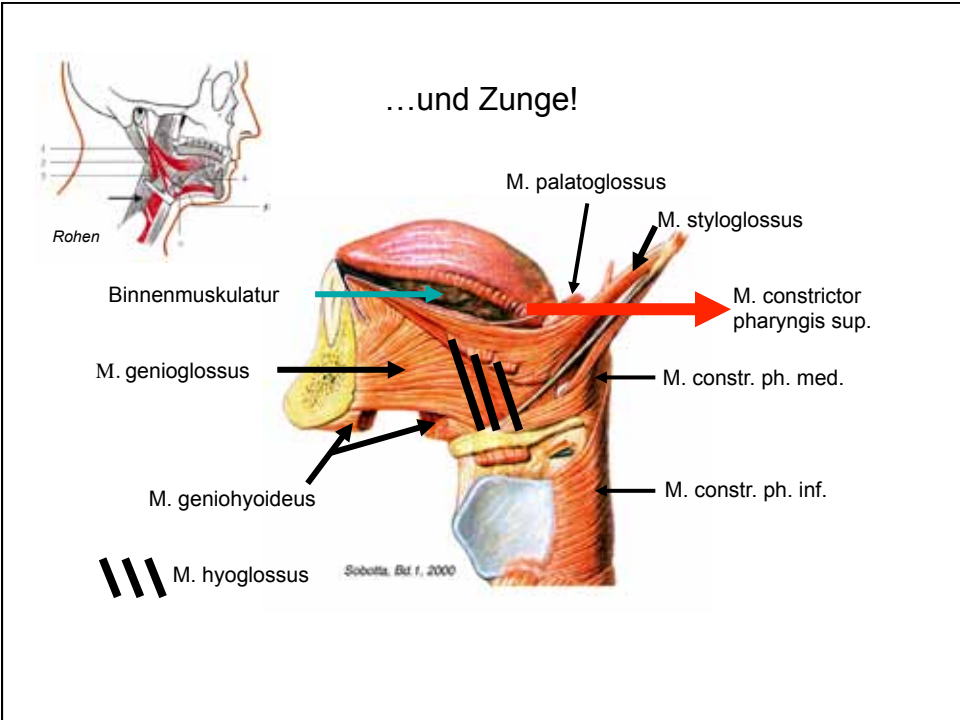
Winfried Neuhuber
Institut für Anatomie
Universität Erlangen-Nürnberg

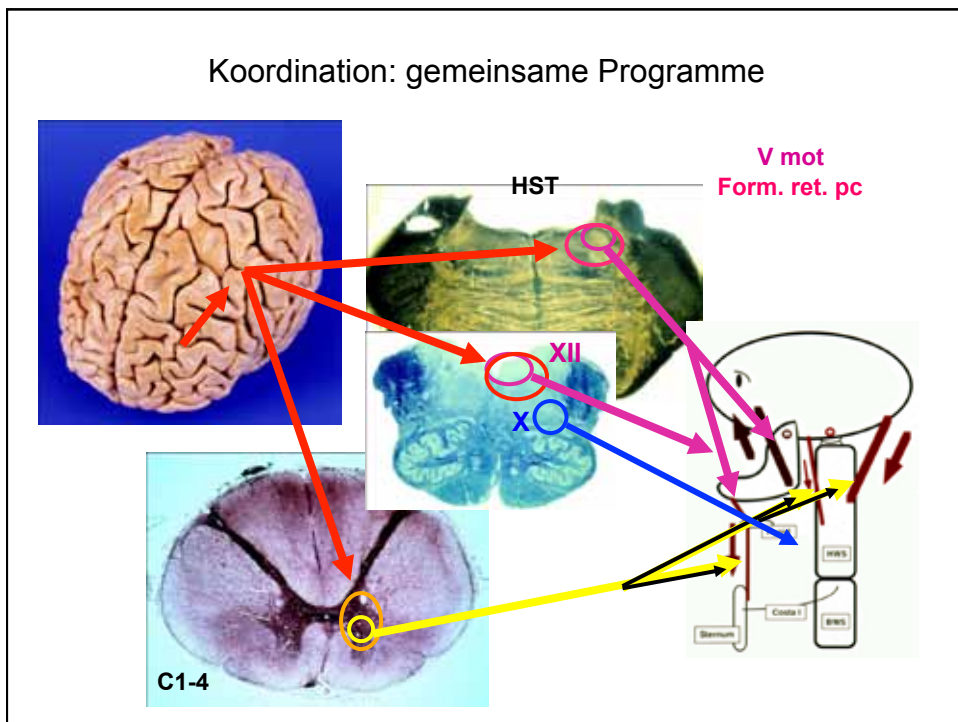
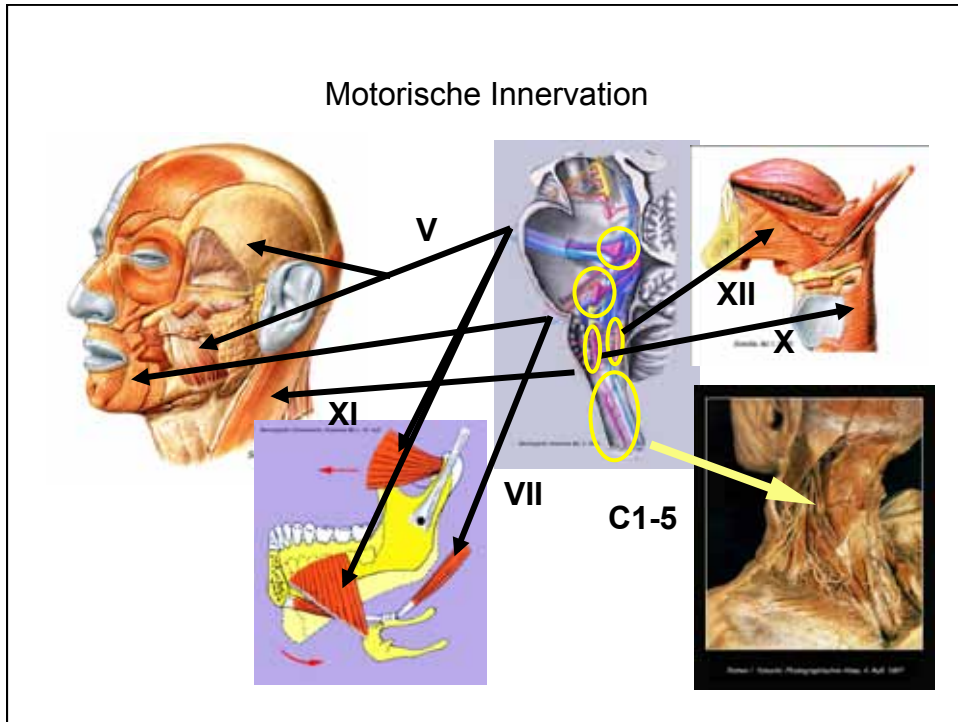


The image contains four anatomical diagrams: 1) A lateral view of the human head and neck with a blue circle around the ear and a green circle around the neck, with arrows pointing to other diagrams. 2) A photograph of a dissected ear labeled 'Rohen'. 3) A diagram of the temporomandibular joint (TMJ) with colored parts. 4) A schematic diagram of the head and neck with red arrows indicating muscle fibers and labeled 'Rohen'.

Kaumuskeln, Hals- und Nackenmuskeln,
Kiefergelenk, Kopfgeelenke







Muskelinnervation efferent/afferent

Muskelspindel – **bes. dicht in Halsmuskeln!**

motorische Endplatten

Orig.: M. Müntener

Sensorische Innervation Kopf/Hals

Konvergenz v.a. im oberen zervikalen Rückenmark

V

VII

IX, X

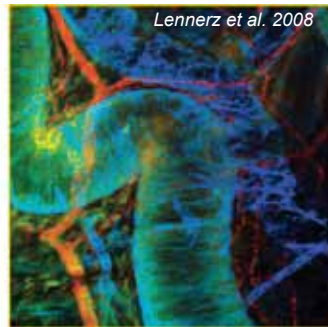
C2/3

Exterozeptiv:
Haut und Schleimhäute

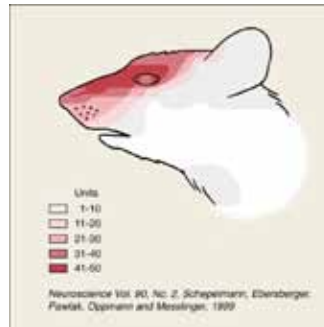
Propriozeptiv:
Muskeln und Gelenke

Viszerozeptiv:
Blutgefäße (extra-, intrakraniell)
Dura!

Dura-Innervation

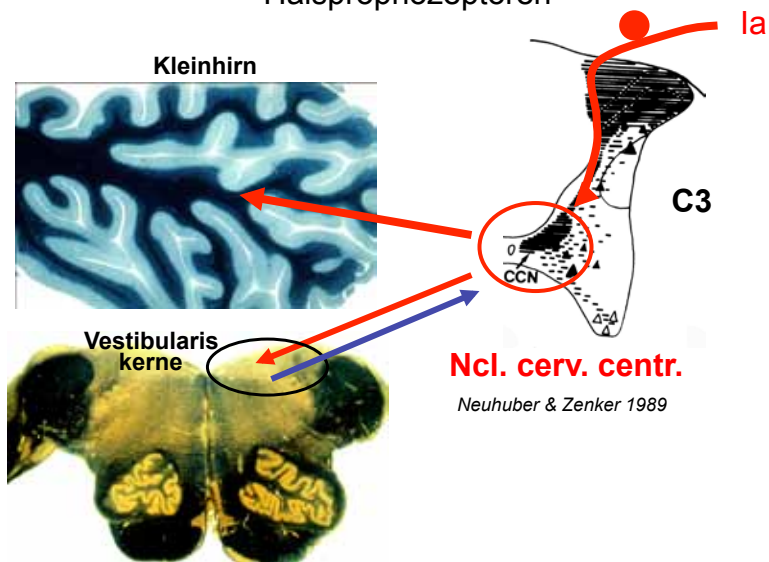


Dura cranialis (Ratte)
CGRP/CRL/SMA

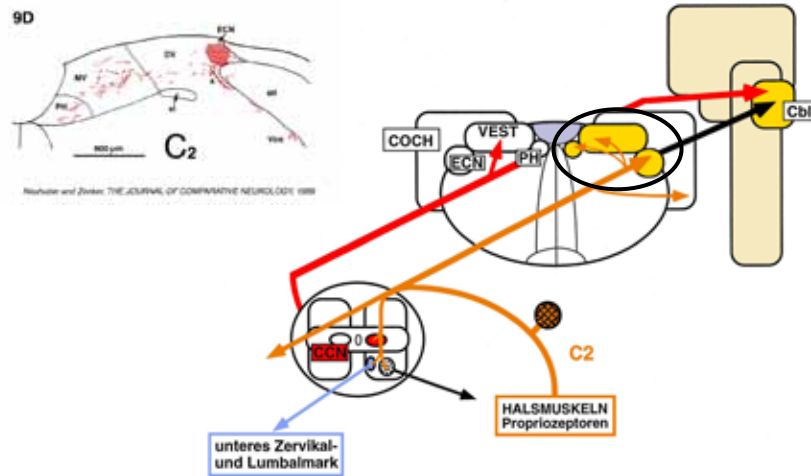


Konvergenz Haut, Muskel, Dura
in C1/2 (Morch et al. 2007)

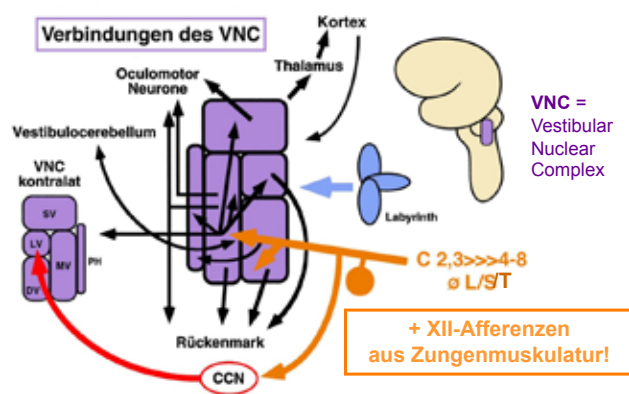
Halspropriozeptoren



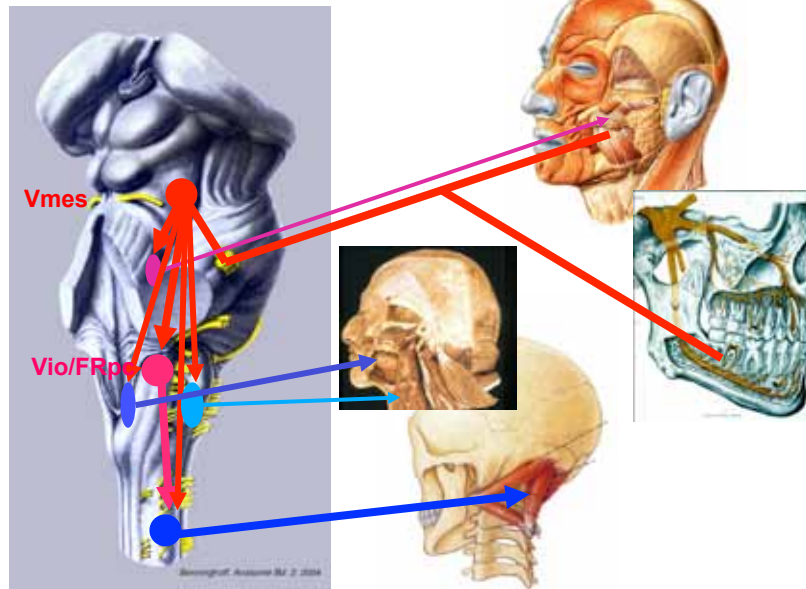
...und ihre Verbindungen nach rostral



Hals und Gleichgewicht(-störungen?)



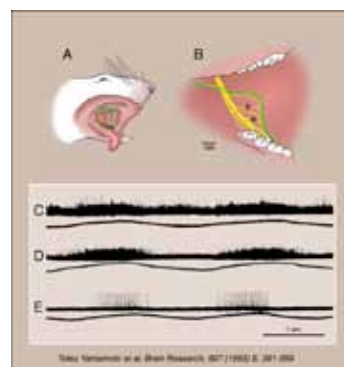
Koordination über Afferenzen: Kiefer-Nacken



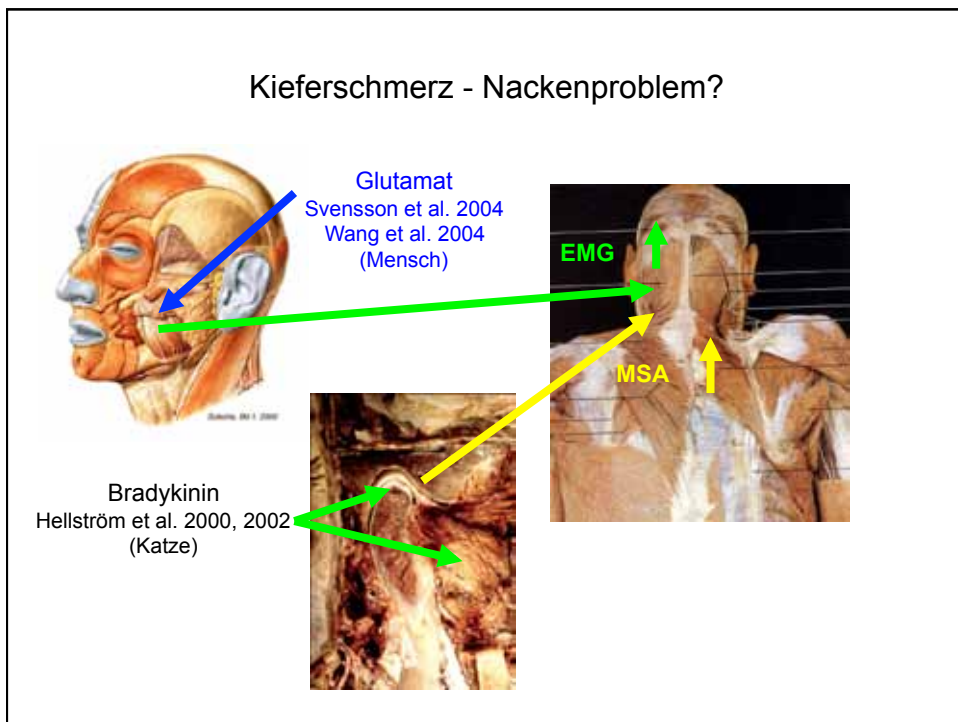
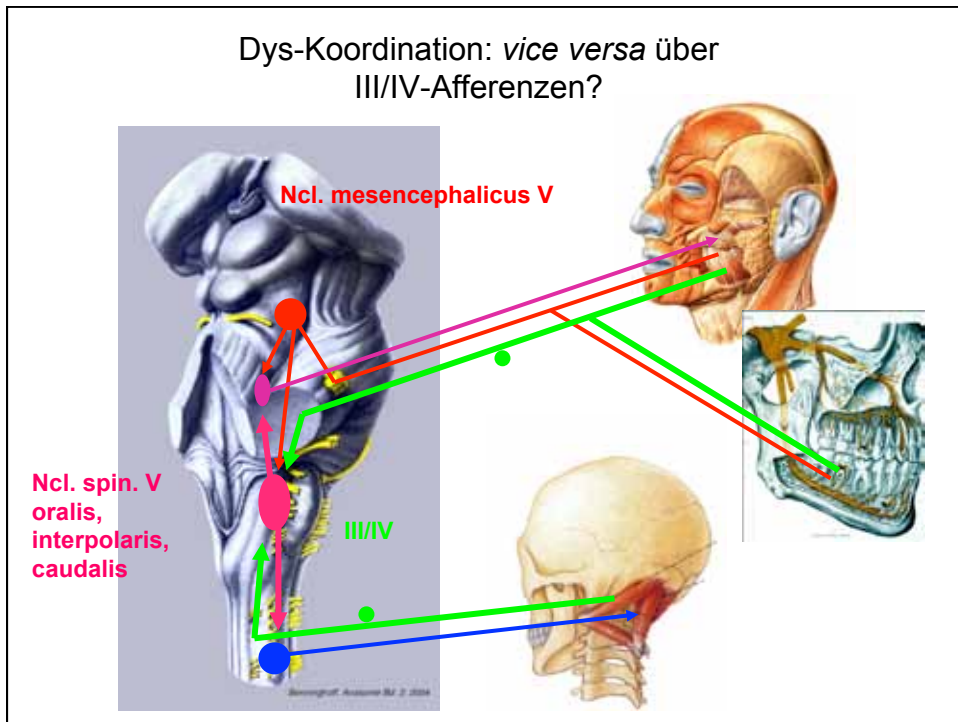
Ein neuer Mechanosensor:
das Juxtaorale Organ (Chievitz)




Zenker 1964



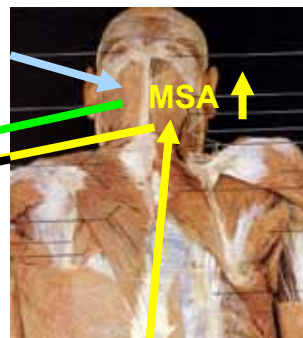
Afferenzen über N. buccalis



Nackenschmerz – Kieferproblem?




Glutamat



MSA ↑

?

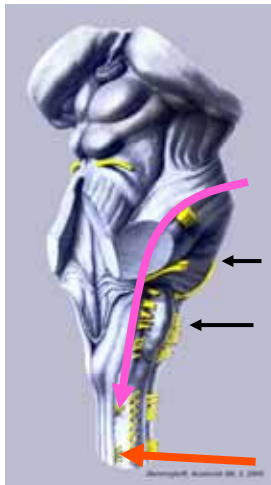


↑ **EMG-:** Svensson et al. 2004

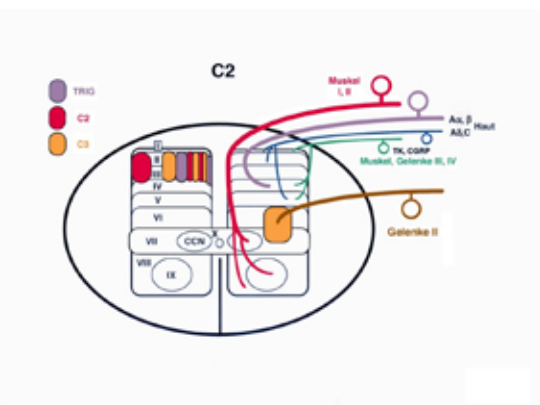
↑ **EMG+:** Wang et al. 2004

Bradykinin
Thunberg et al. 2001

Konvergenz: Schmerzübertragung Kopf/Hals



C2



TRIG
C2
C3

Muskel I, II
Ax. β A&C
M. corp
Muskel, Gelenke III, IV
Gelenke II

C2/3

