

Cervicogenic Headache

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Neurological Teaching Course
World Federation for Neurorehabilitation
February 1, 2013,
No.2 Military Hospital, Yangon, Myanmar

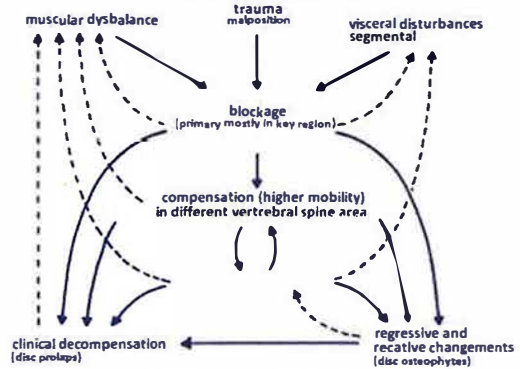
Cervicogenic Headache Pathogenesis

- Functional disturbances of cervical spine, upper part (hypomobility, hypermobility)
- Insufficiency of neck muscles and additionally of other vertebral spine muscles
- Muscular disturbances of cervical spine and other vertebral spine region (hypertonus, trigger points)
- Stretchposition of cervical spine
- Malposition of the whole vertebral spine
- Degenerative changes of the cervical spine, mostly upper part

Synonyms

- cervicogenic headache
- vertebrogenic headache
- spondylogenic headache
- tension headache ("Spannungskopfschmerz")

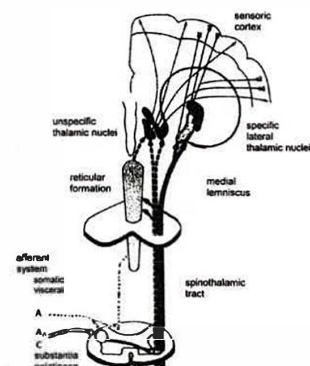
Pathogenesis of vertebral disturbances, reflector reactions



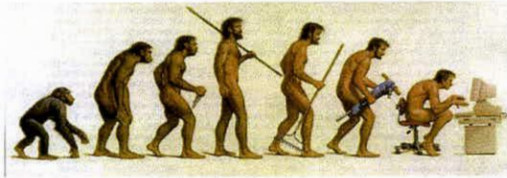
Cervicogenic Headache Etiology

- Mostly caused by nociceptive afferences from the occipital-cervicogenic region,
 - Disturbances of the atlanto-occipital joint
 - Blockage of the passive, partly active mobility with disturbance of the segmental and coordinated muscle groups
 - Muscular dysfunction
 - Muscle spasm, myogelosis, tendomyosis inducing activation of pain afferences
 - Local hyperalgetic areas in cutis and subcutis, caused by disturbed regional joints and muscles
 - referred pain syndrome
 - Irritation signs in middle and lower cervical spine

Vertebral disturbances sensory pathways



Evolution of human gait



Evolution from „Homo erectus“ to „Homo sedens“

Human axis organ (II)

Position regulated by postural and turning reflexes of the midbrain pontine centre

- Basis for all movements of the human body in the gravity field
- Permanent adaptation of position of the human body in the gravity field and in locomotion
- Readaptation of body position during movement and locomotion, regulated by the postural and turning reflexes due to receptors of cervical spine, lumbar and thoracic spine and the vestibular apparatus

Vertebral column – term of the description period of anatomy

Human axis organ – central organ of the human body

Development of the axis organ, the vertebral column

- Tunicata, external skeleton
- Development of Chorda dorsalis (amphioxus)
- Development of cartilage fish
- Development of the vertebral column
 - Horizontal position of the vertebral column
 - bone fish, amphibians, reptiles
 - arch bridge construction, partial developed
 - terrestrial tetrapods (mammals, aquatic mammals)
 - arch bridge construction, full developed
 - Vertical position of the vertebral column
 - human being
 - lattice tower construction

Human axis organ (I) Functions

- Carrying the human head with brain and important sensory organs
- Carrying the human body
- Covering and carrying the spinal cord
- Fixation of shoulder girdle and upper extremities
- Fixation of pelvis with lower limbs
- Fixation of inner organs:
 - chest with cardio-respiratory organs
 - abdominal organs
- Responsible for movements of the head in all directions
- Responsibility for the movement of body and extremities
- Responsibility for locomotion

Tetrapods arch bridge construction

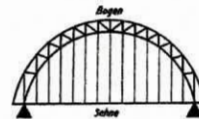


Abb. 6. Schema des Konstruktionsprinzips der Säugerwirbelsäule. Nach SALLER.



Abb. 4. Schema der Wirbelsäule eines primitiven Säugetieres. Nach BÖCKA.

- Bow consists of two parts: upper belt and lower belt
 - Upper belt: vertebral arch, spine of vertebra, ligaments, back muscles
 - Lower belt: vertebral body, vertebral disc, ligaments, short and long tendons
- bow string: cranial fixed by the ribs (chest), caudal fixed by abdominal muscles

Tetrapods scheme of the arch bridge construction

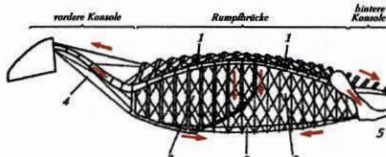


Abb. 7. Schema des Konstruktionsprinzips der Wirbelsäule beim Vierfüßler: 1. Wirbelsäule in Form einer flachen Kyphose; 2. Sehne in Form der langen ventralen Rumpfmuskels; 3. Querverstreungen in Form der Rippen und schiefen Rumpfmuskels

- Flat kyphosis of spine (1)
- Bow string long ventral trunk muscles (2)
- Ribs (chest) and diagonal trunk muscles (3)
- Anterior console (4)
- Posterior console (5)

Tetrapods

big herbivores
spine serves during locomotion
only for fixation of the four extremities

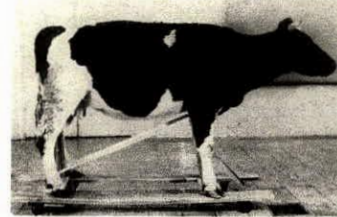


Abb. 9. Ausgestopfte Kuh. Das Präparat zeigt, daß die Bogenbrücke auch nach dem Tode noch tragfähig ist.

Vertebral column in tetrapods

- Cervical spine
 - Carrying the head with brain, sensory organs including vestibular apparatus
 - Responsible for free movement of the head
 - Receptors for gravity stimulation (neck muscles, tendons, cervical joints)
- Thoracic and lumbar spinal spine fixation of the extremities for standing and locomotion
- Fixation of ribs and the diaphragm for respiration
- Fixation of inner organs
- Tail, used for balance (special motion receptors)
- Balance of body, continuously regulated by postural reflexes of midbrain-pontine centres
- Support in jumping of specified mammals

'Great' vertebrates tetrapod and bipeds in normal gravity



Tetrapods Spine maximal integrated in the running movement, galloping dog - high speed possible

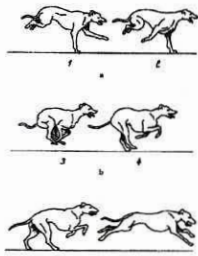


Abb. 10-11. Bewegungslage eines galoppierenden Hundes mit maximaler Belastung der Wirbelsäule.

Vertebral column functional changes in special biotopes transient lordosis in the lumbar region



Lithocranium
Walleri

- a) Arch bridge construction
- b) Lordosis during feeding

Abb. 11a. Giraffengazelle (Lithocranium Walleri) im Stand. Nach Böhm.

Abb. 11b. Aufgerichtete Giraffengazelle (Lithocranium Walleri). Nach Böhm. ... Man beachte die jetzt eintretende Lordose.

Lift-grasp-climbing position

development of neck and lumbar lordosis
dome construction of vertebral spine



Arch bridge construction changing to lattice tower construction during upright position

Abb. 12. Lordose (schematisch) beim Aufrichten im Zuge des Stemm-Greif-Kletterns.

Atlas, the titan giant

Means: „Who is carrying“

Son of Lapetos and of the okeanide Klymene



Carrying the globe

Lattice tower position



a)



b)

- a) Human: lattice tower position
- b) Gorilla: lattice tower position, rest of vault bridge construction

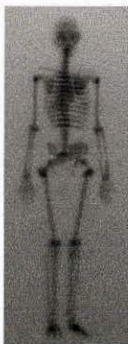
Special function of cervical spine for turning movements in 3 dimensions due to development of the Atlas-Axis-system

Three steps:

1. Evolution of 2 condyles on os occipitale (amphibians),
2. Development of the atlas-axis-joint, rebuilding of dens by loss of the first disc (tetrapods),
3. Specification of axis-dens-system: human, primates, ... great autonomy, high vulnerability

Homo erectus, lattice tower position

dome function of the vertebrates

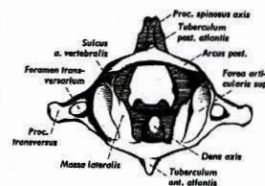


Cervical lordosis
thoracic kyphosis
thoracic-lumbar lordosis
fixed kyphosis of sacrum

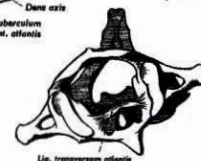
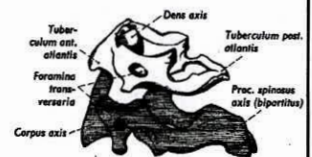
“Design of the human vertebral column is uncompleted” (Koch, 1964)

Atlas-Axis-system, different positions

Atlas and Axis, cranial view



Atlas and Axis, view from dorsolateral



Turned atlas, fixed dens axis

Vulnerability of the human vertebral spine

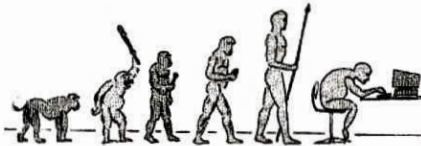
unfinished development of lattice tower position,
high vulnerability of axis-dens-system

- overloaded due to non-physiological use of human posture (industrial life), especially of cervical spine, lumbar region,
typical symptoms (Mumenthaler, Schliack)
- psychological factors, leading to regional dysfunction of vertebral spine, mainly upper part, muscular tension
- motion trauma of cervical spine (whiplash injury), mostly including the other parts of vertebral spine
typical acute symptoms, long-lasting dysfunction, sometimes defect states

Cervicogenic headache

- Neurological findings
 - Dysesthesia on scalp, one side, both sides
 - Dysesthesia in C2 (sometimes)
 - Dysesthesia in trigeminal area (sometimes)
first branch or all branches, one side, both sides
 - Pressure pain occipital, one side, both sides
- Orthopedic findings
 - blockage occipital/C1, C1/2
 - tensed region upper neck part
 - pressure pain paraspinal upper cervical spine
 - stretch position of whole vertebral spine
 - dysfunction of other vertebral spine

From tetrapods to homo sedens
high vulnerability of the cervical spine
due to direct impacts and to
malfunction due to industrial life



Cervicogenic headache Differential diagnosis (I)

- Meningeal headache (meningitis, SAB, etc.)
- Headache due to CSF disturbances
 - CSF pressure headache
 - CSF sub pressure headache
- Headache due to cerebrovascular disturbances
 - stroke
 - intracerebral hematoma
 - hypertensive attack
 - Arteritis temporalis
- Headache due to intracranial space occupying processes

Cervicogenic headache Symptomatology

- Pressure headache, from neck region to occipital, mostly to the forehead, both sides, seldom one side
- Helmet-feeling, sometimes ring-shaped feeling
- Pressure feeling retro-bulbar
- Increase of pain during coughing, unpleasant position of head and body, during fever state
- Initiation due to external influence
 - local cooling, trauma of vertebral spine, etc.
- Additional pain symptoms:
 - pain distribution in C2 with dysesthesia
 - atypical face pain
 - pseudo-trigeminal pain

Cervicogenic headache Differential diagnosis (II) Vasomotoric headache

- Migraine (different forms), Migraine cervicale (old terminology)
- Cluster headache
 - Erythroprosopalgia = Horton neuralgia
 - Chronic paroxysmale Hemicrania (CPH)
 - Hemicrania continua (HC)
- Rare vasomotoric headache
 - Ice cream headache
 - coughing headache
 - Carotidodynia

Cervicogenic headache Differential diagnosis (III)

- Occipital neuralgia, (over diagnosed, Mumenthaler, 1970)
 - differentiation to cervicogenic headache not possible clinically
 - Insertion tendinosis of neck muscles
 - local zones of hyperalgesia
 - often disturbances of occipital joints
- Tension headache, real form
 - differentiation to vertebrogenic headache clinically not possible
 - diagnosis only acceptable:
 - no signs of cervico-occipital irritation
 - no signs of cervical irritation
 - no effect after special vertebral treatment
 - psychic irritation

X-ray cervical spine female patient, 47^a diagnosis: cervicogenic headache



a) Retroflexion, blockage upper part, dysbalance occipito-atlanto-axial joint



b) Anteroflexion, blockage in upper part and lower part of cervical spine

Upper cervical syndrome

- Combined symptoms
 - Cervicogenic headache
 - Cervicalgia
 - Migraine cervicale (old terminology)
 - Cervicogenic dizziness
 - attacks of vertigo, spontaneous or due to quick head movement
 - in addition:
 - middle and lower cervicale syndrome
 - cervico-dorsalgia, dorsalgia, lumbalgia
 - combination with pseudoradicular symptoms

Cervical MRI female patient, 47^a diagnosis: cervicogenic headache



Stretch-position of cervical spine, mostly upper part, multisegmental disc protrusion, incipient vertebral stenosis C5/C6

Cervicogenic headache Examination program

- Neurological examination
- Manual examination, functional state of vertebral spine, especially cervical spine
- Examination of malstereotypias of body position and body movement
- X-ray of cervical spine with functional radiogram
- X-ray of the additional vertebral spine
- Cervical MRI

Cervicogenic headache Therapy program

- Deblockage of blocked cervical spine motion segments, using manual therapeutic methods, mainly postisometric relaxation (Lewit)
- Physiotherapy program for correction of malposition and malstereotypes
- Physiotherapy program for correction of insufficient neck muscles and vertebrogenic muscles
- Local infiltration of tensed muscle areas, tendomyogelosis, etc.,
Xyloneural
"Tilscher scheme"
- Drug treatment
Muscle relaxants, analgetica, etc.