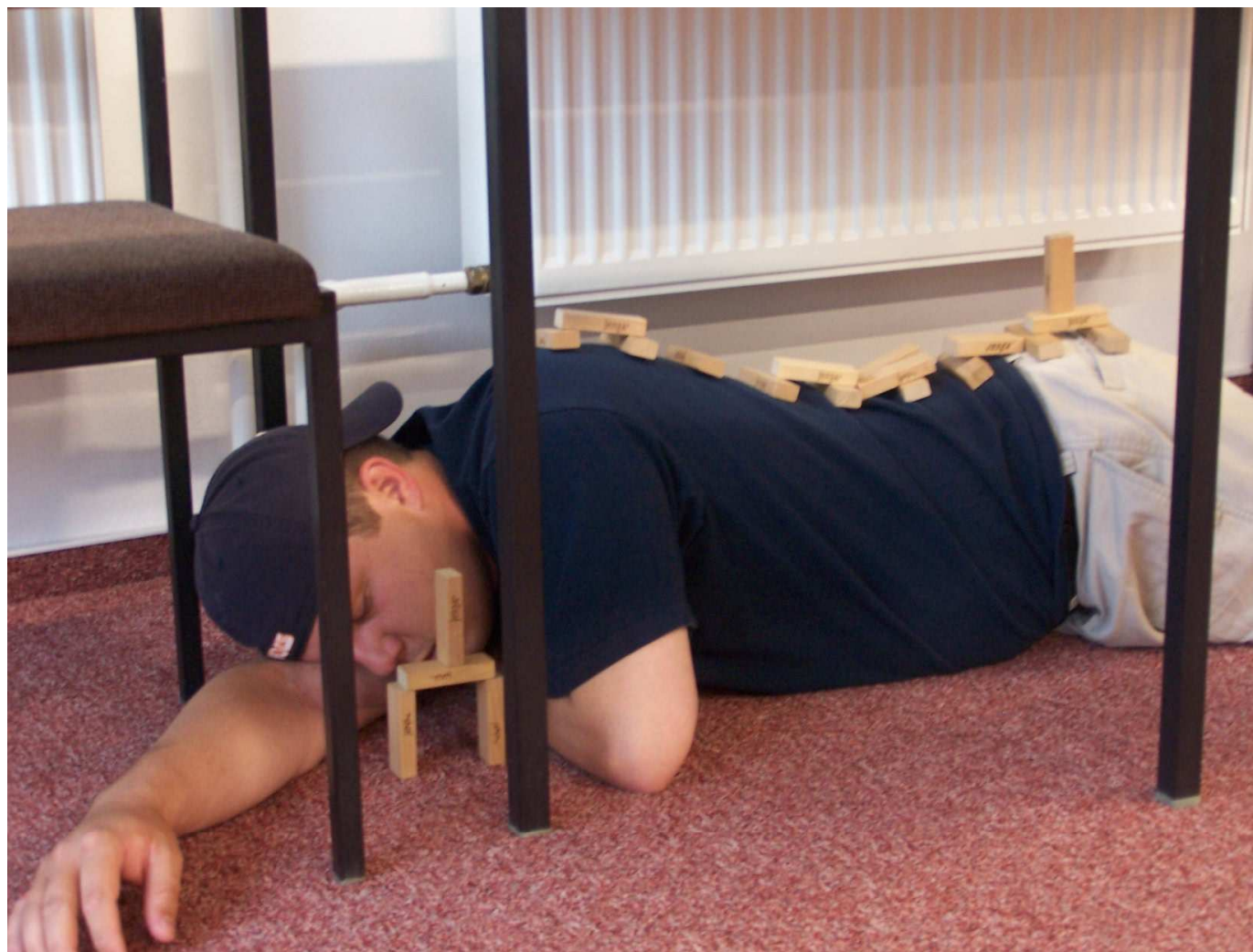




# Consciousness disorders, convulsive states



# Consciousness



- ▶ Active state of human psyche, expresses relationship between one's own personality and surrounding world.
- ▶ Alertness (vigilance), abstraction, verbalization, evaluation, self-consciousness (orientation in time, space, one's own personality).
- ▶ Most sensitive indicator of state of human brain (and its blood circulation).



# Orientation examination of consciousness

- ▶ spontaneously conscious
- ▶ reaction to being addressed
- ▶ reaction to touch
- ▶ reaction to painful stimulus
- ▶ no reaction
- ▶ reaction = opening of eyes; speaking; movement - flexion, extension, shivering
- ▶ (reaction of pupils to light, position + movement of eyeballs)



# Changes in **quality** of consciousness

- ▶ Changed conscious content  
(confusedness, stupefied consciousness)
- ▶ **The affected is disoriented;**  
**restless** | anxious | puzzled.  
Speaks discontinuously, without succession  
and meaning, asks repeatedly the same.

FA:

- ▶ **!! be calm, do not let the affected get hurt or  
endanger the surroundings!!**



# Changes in **quantity** of consciousness

- ▶ somnolence = as if sleeping, does not speak spontaneously, but is **able to wake up** by being addressed or touched, **fully oriented**, but without external stimuli falls asleep again
- ▶ sopor = does not react to common stimuli, able to be brought to partial consciousness by a short-term strong = painful stimulus (without verbal reaction, only hand movement or blinking)
- ▶ coma = deep unconsciousness = the affected cannot be woken up by either sound or a painful stimulus, passive position, slowed breathing, sunken tongue, body is lifeless, threat of inhaling content of stomach ... 0 reaction of pupils to light
- ▶ speed of change in consciousness – the faster the more serious



# Glasgow coma scale

▶ 3

15 points

coma            sopor            somnolence            consciousness

## Reaction

eyes opening:

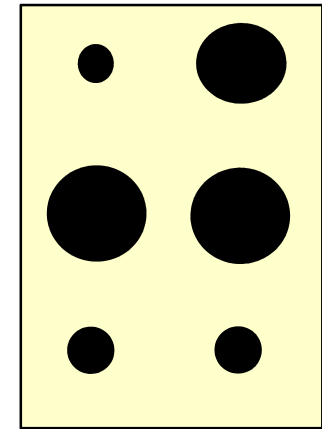
verbal:

motoric:

6			complies with an appeal
5		oriented	targeted reaction to pain
4	spontaneous	confused	non-targeted reaction to pain
3	to being addressed	inadequate	flexion
2	to pain	intelligible	extension
1	does not open eyes	no	no reaction

# Focal neurological symptoms:

- ▶ locomotion and perception disorder
- ▶ eye symptoms



- anisocoria (different width of pupils)
- maximum widening = mydriasis = insufficient blood circulation in brain
- maximum narrowing of pupils = miosis = intoxication with opiates
- **photoreaction disorder = reaction of pupils to light**
- **crossing of eyeballs (*squinting*), spont. movements**



# Causes of consciousness disorders:

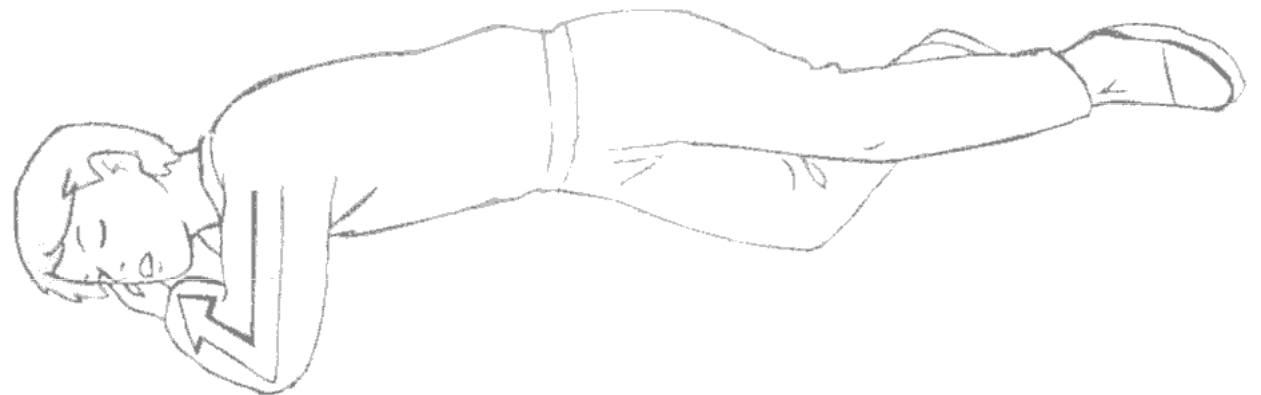
- ▶ blood circulation disorder (shock)
- ▶ worsening of brain oxygenation (suffocation, CO intoxication)
- ▶ brain injury (head injury, cranial fractures)
- ▶ increase in intracranial pressure (tumour, cerebrovascular accident)
- ▶ intoxication
- ▶ disorder of internal environment (hypo-/hyperglycaemia)
- ▶ infection
- ▶ epilepsy
- ▶ injury by electricity





# FA:

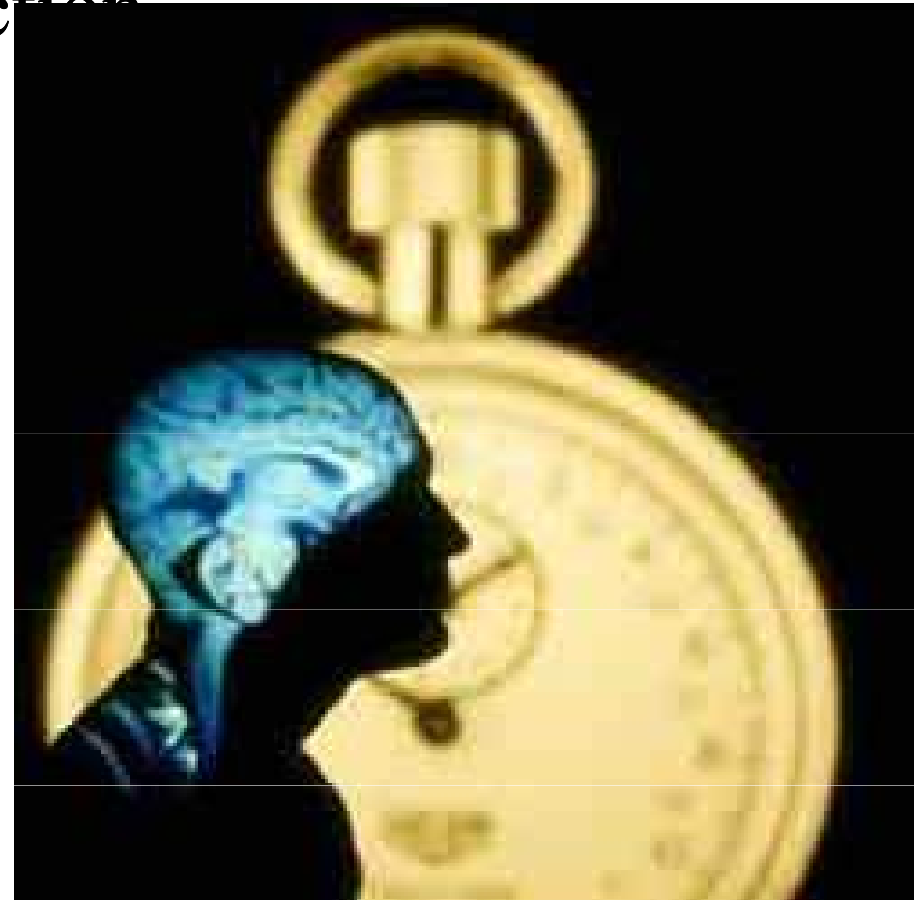
1. basic life functions (ABC = foreign bodies, tongue, ...)
2. if resuscitation is not needed – further examination – look for signs of head, neck, chest, abdomen or limb injuries
3. if spine is not injured – stabilised position and **breath and pulse monitoring.**
4. nothing per os, look for medicaments, ID for the diabetic, medical report, doctor's certificate
5. transport by EA





# Non-traumatic causes of unconsciousness:

- ▶ Cerebrovascular accidents (CVA)
- ▶ Brain inflammation = infection
- ...
- ▶ Collapse, faintness



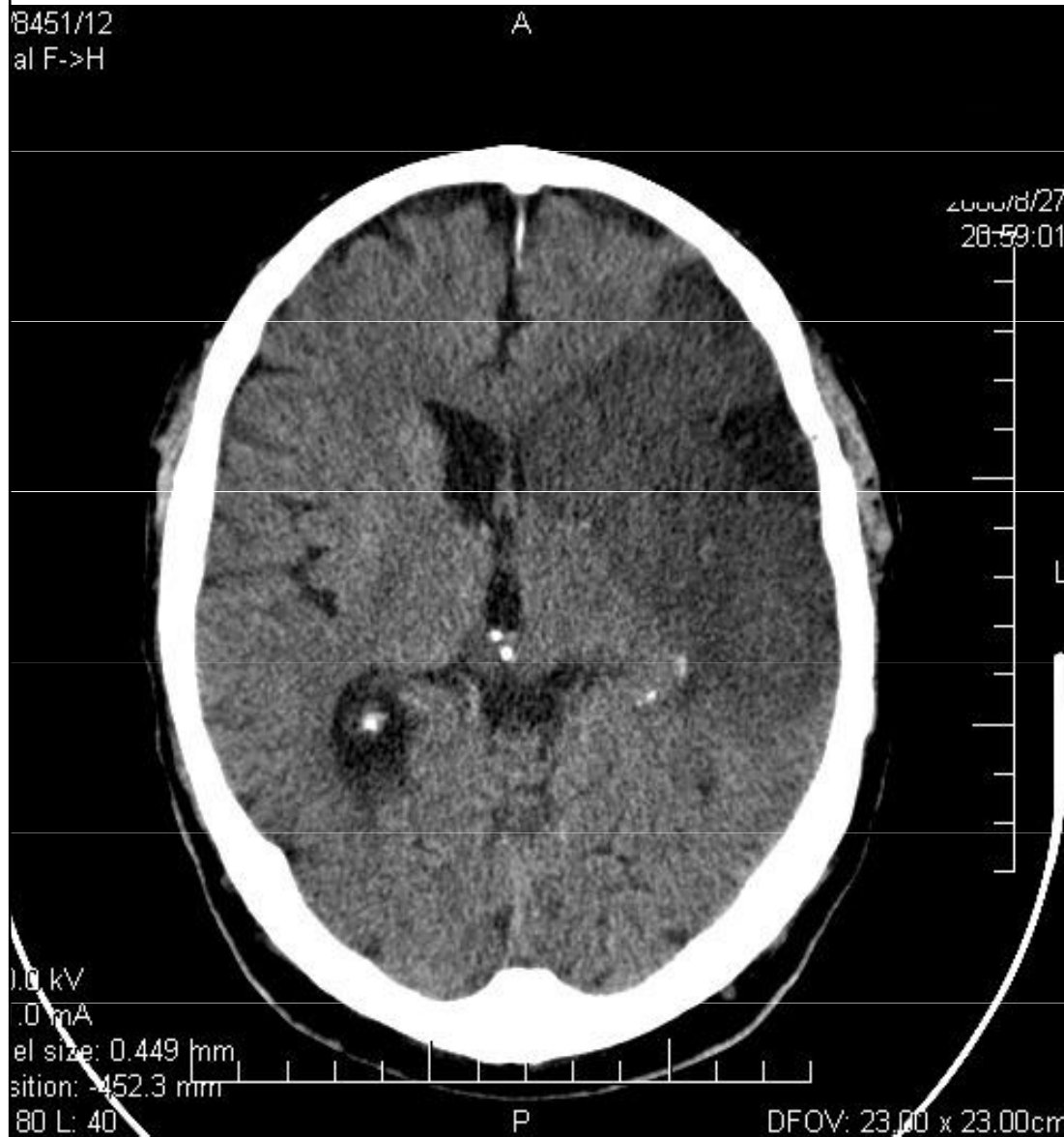


# CVA

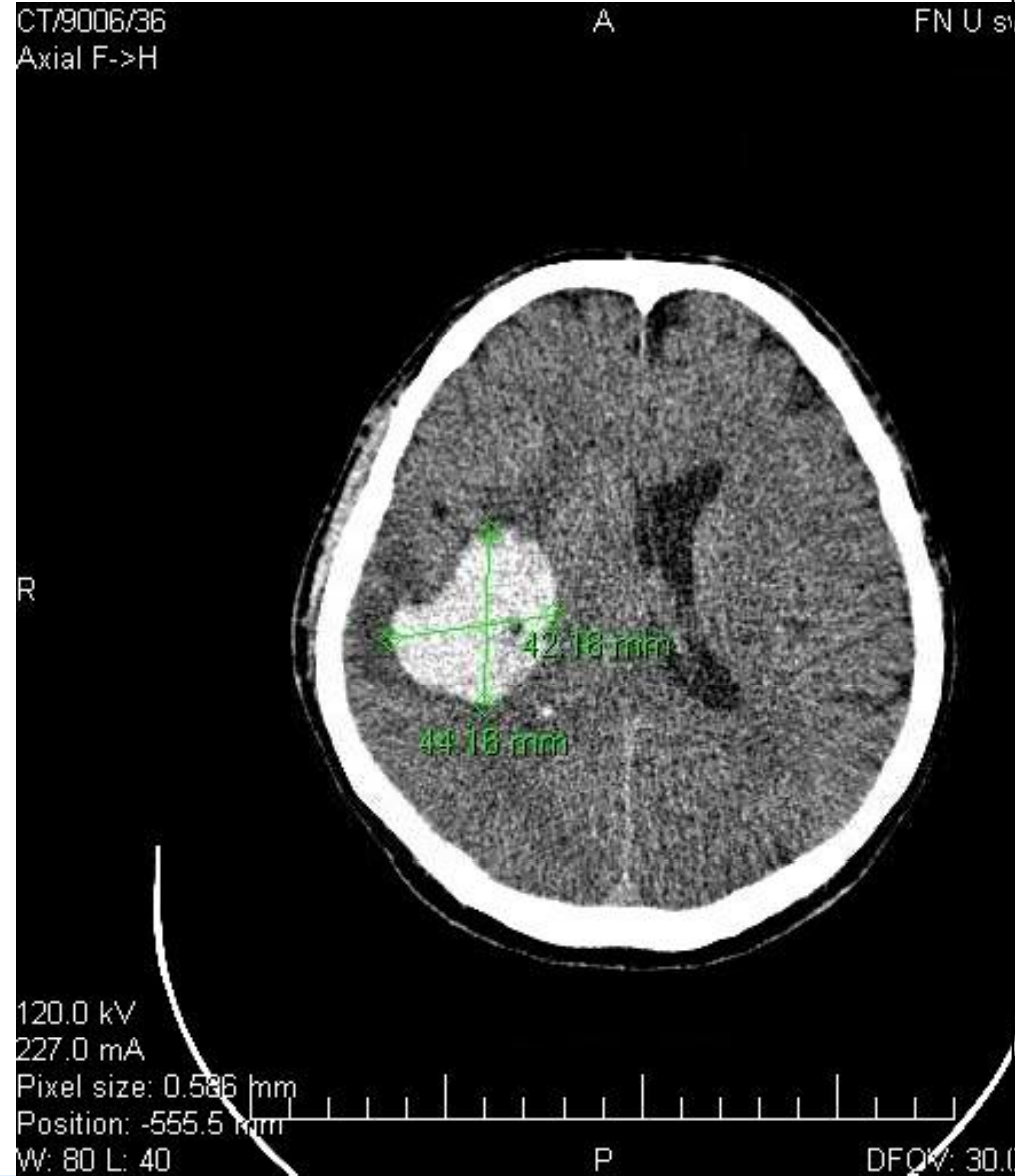
- ▶ **Bleeding** – from split blood vessel to cerebral tissue – in place of haematoma loss of function  
sudden loss of function (from 50 years),  
meningeal symptoms, often high blood pressure
- ▶ **Ischemic** – resulting from insufficient blood circulation (blood clots, decrease of blood pressure)  
typical mild consciousness disorder – only dizziness, nausea  
function: focal neurological symptoms  
meningeal stimulation does not occur
- ▶ **Embolism** accidents  
embolus to great blood circulation – head – partial obstruction of arteries  
\* for cardiac rhythm disorders



# ischemia

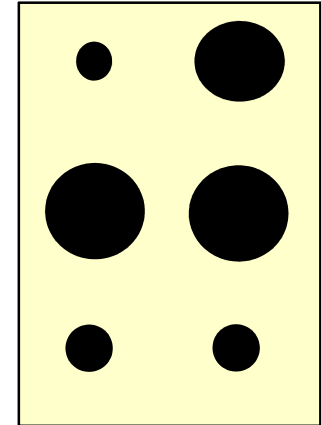


# bleeding



# CVA symptoms:

- ▶ Locomotion and perception disorder (*face asymmetry, droopy corner*)
- ▶ Eye symptoms
- ▶ Anisocoria (pupils differently wide)  
mydriasis, miosis
- ▶ Photoreaction disorder
- ▶ Eyeballs shift
- ▶ Loss of vision
- ▶ Nausea, vomiting, loss of balance
- ▶ Increase in pressure, slowed pulse



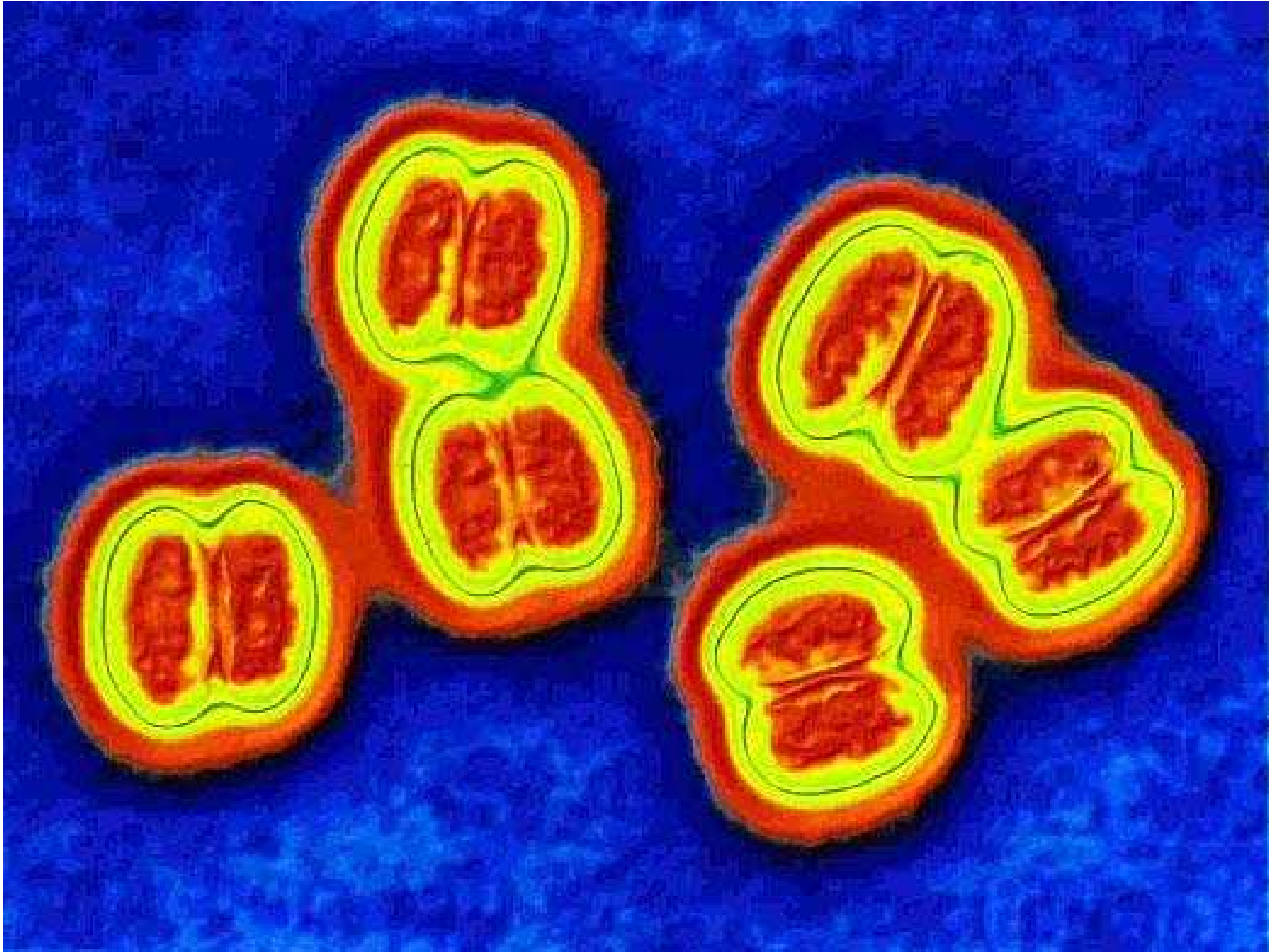


# FA for CVA:

- ▶ vital functions
- ▶ transport – ambulance – hospital
  - ▶ ABC
  - ▶ CT
  - ▶ thrombolytics up to 3 h from the beginning



# Meningococcus





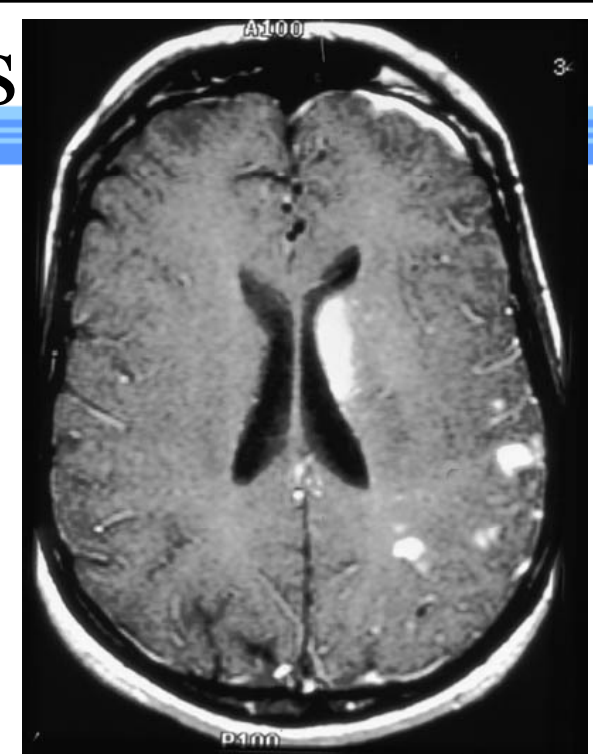
# ⚡ Inflammation of brain, meninges

## Encephalitis, meningitis

### ▶ Causes:

- bacteria (*Neisseria meningitidis* = meningococcus)
- viruses (herpetic virus = herpes)
- parasites

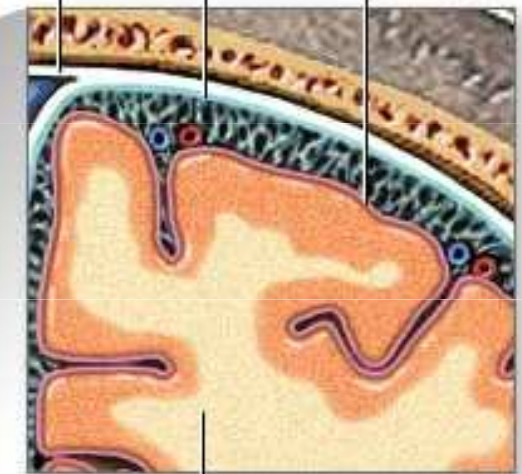
The meninges are the membranes covering the brain and spinal cord



Dura mater (2 layers)

Arachnoid

Pia mater



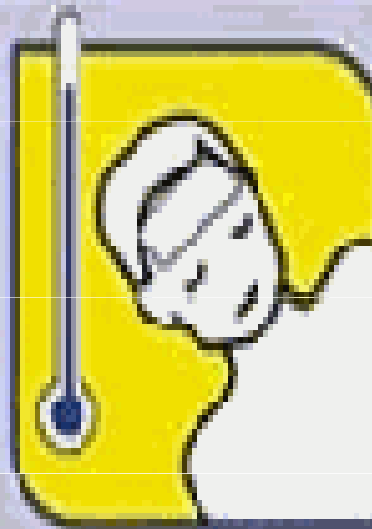
Brain



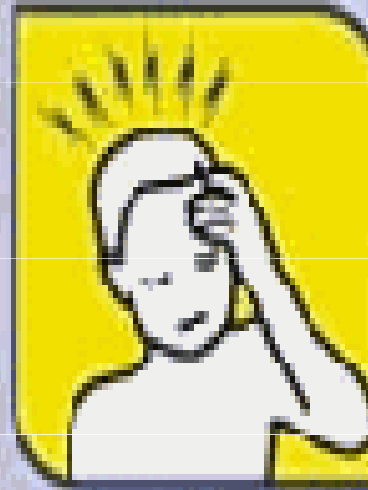
# Symptoms of meningitis:



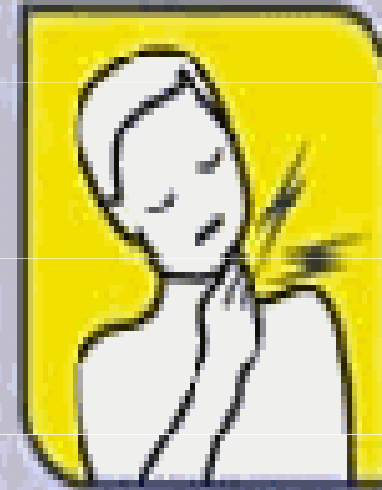
Vomiting



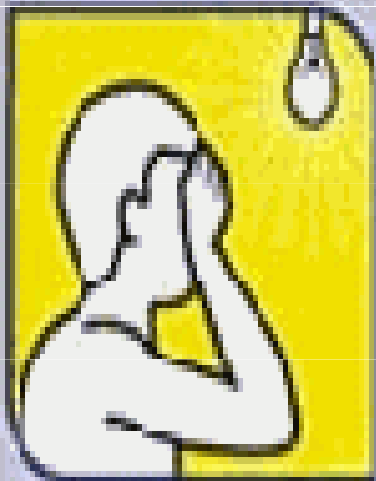
Fever



Headache



Stiff neck



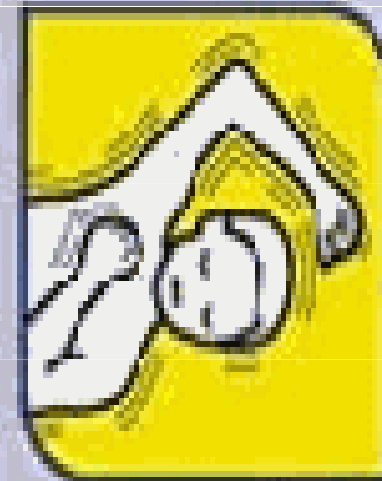
Light aversion



Drowsiness



Joint pain



Fitting



# Encephalitis, meningitis – symptoms:

- ▶ fever,
- ▶ breathlessness,
- ▶ meningeal symptoms
  - headache,
  - sickness, vomiting, dizziness
  - head bent backward, stiff neck muscles, flexion of limbs,
  - photophobia, hyperhearing



# FA:

- ▶ ABC
- ▶ temperature regulation, liquids (+paracetamol)– if conscious
- ▶ quiet
- ▶ medical examination (emerge
- ▶ hospitalisation



Mening. irritation present = high probability of meningitis



# Meningococcal sepsis:

Petechia:



Do not waste time = call ambulance  
(high mortality within 24 h in spite of treatment)

Penicillin administered in time can save life.



# line up



[WWW.FTIPKY.CZ](http://WWW.FTIPKY.CZ)



# Faintness, collapse

- ▶ Short-term unconsciousness caused by short-term insufficient blood circulation in brain.
- ▶ Caused by (failure of circulation regulation = hypo-tension) :
  - exhaustion, heat, long standing, hot space
  - pain, psyche
  - sudden change of position – quick standing up



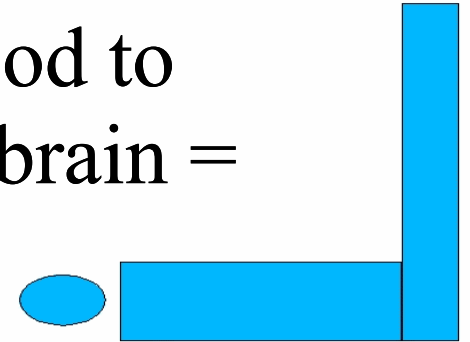
# Symptoms of faintness:

- ▶ being pale, sickness, sweating, low blood pressure
- ▶ loss of hearing, vision, loss of consciousness, fall
- ▶ **Short-term unconsciousness**
- ▶ bradycardia, **palpable pulse**



# FA for faintness:

- ▶ leave lying on the floor, raise legs = auto-transfusion position (better return of blood to heart – recovery of blood circulation in brain = recovery of consciousness)
- ▶ if recovery of consciousness is fast, colour returns, cause of faintness is known – doctor is not necessary
- ▶ while unconscious, ABC
- ▶ if longer than 1 min – ambulance (not a case of faintness)
  - epileptic fit, arrhythmia – doctor



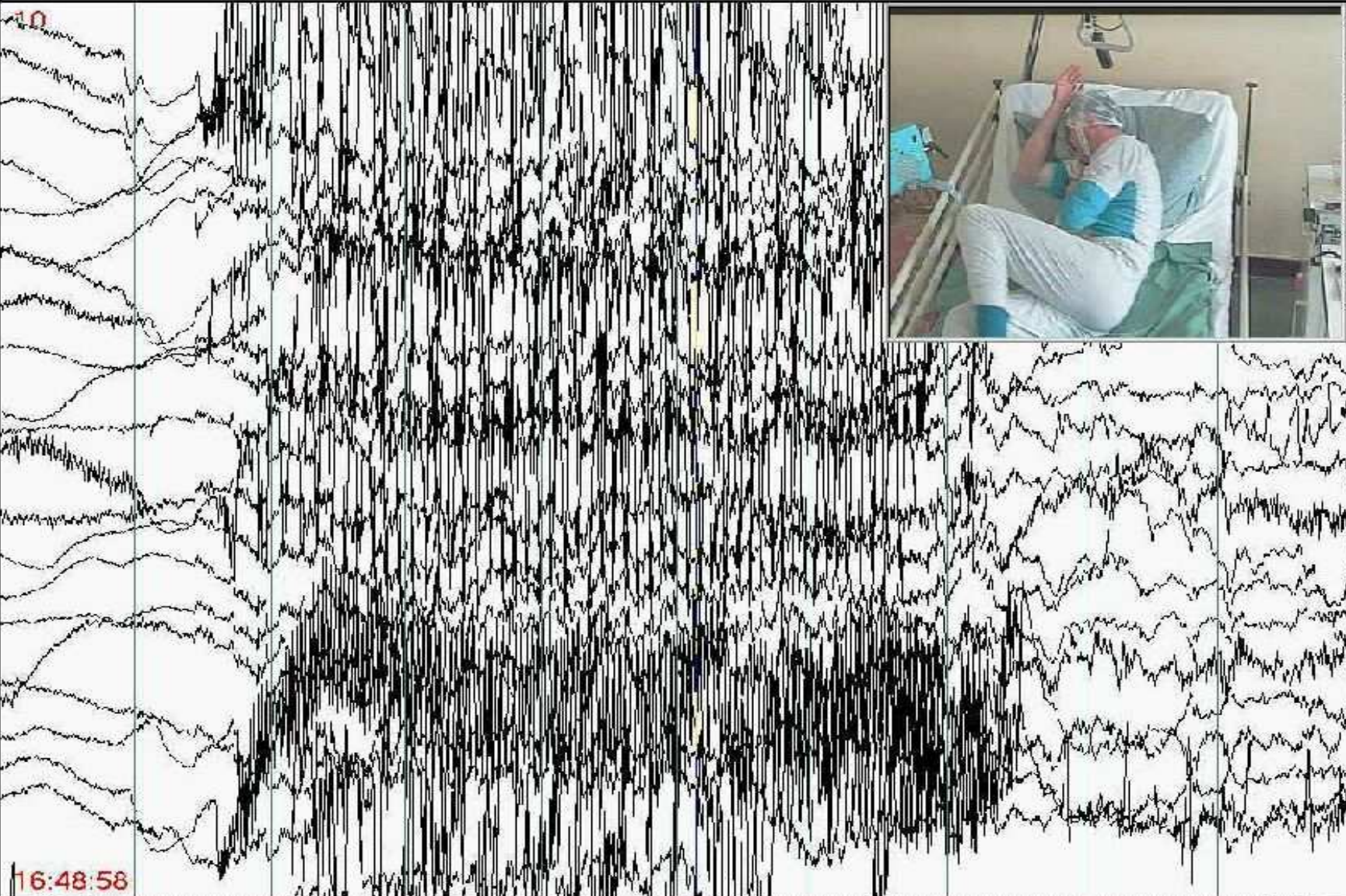


# Convulsive states


Scan Station - [ ]

File View Montage Signal Inbase Analysis Inbase Toolbox Options Help

Standard REFRACT 10 sets Full scale



16:48:58



Stroke Measure Rec.

- FP1-G19 E+
- FP2-G19 E+
- F7-G19 E+
- F3-G19 E+
- T2-G19 E+
- F4-G19 E+
- F8-G19 E+
- T3-G19 E+
- C3-G19 E+
- C2-G19 E+
- C4-G19 E+
- T4-G19 E+
- T6-G19 E+
- P3-G19 E+
- P2-G19 E+
- P4-G19 E+
- T6-G19 E+
- O1-G19 E+
- O2-G19 E+
- A1-G19 E+
- A2-G19 E+
- EKG E+
- DEF E+

Select SV

Zoom In Zoom out

DSens

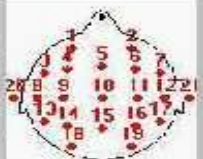
SRate Sens  
LF HF  
DIF DHF

DNoise AutoSearch

200V  
0.53X  
35IN

Track # U1  
0:01:35:03

Stop Play  
Sync





# Convulsive states

- ▶ convulsion = involuntary contraction of striated muscles
  
- ▶ occurrence:
  - at least 1x in lifetime in as much as 10% of population
  - maximum:
    - children 1/2 year to 3-4 years
    - ... puberty... +



# Convulsions – classification:

- ▶ with consciousness disorder:
  - febrile convulsions in children, epilepsy, eclampsia
- ▶ without consciousness disorder:
  - tetanus, tetany
- ▶ Types of convulsion:
  - **Tonic** – overall body stiffness, arched bent of torso, patient stops breathing (cyanosis) = muscle flexes and keeps tense
  - **Clonic** – repeated muscle twitches = alternating tension and relaxation





# Causes of convulsions:

- ▶ high temperature – febrile convulsions
- ▶ meningoccephalitis, brain inflammation
- ▶ epilepsy
- ▶ metabolic changes ( $\text{Ca}^{++}$ , hypoglycaemia)
- ▶ cerebrovascular accidents, intracranial bleeding
- ▶ tumorous illnesses
- ▶ poisonings
- ▶ eclampsia – (formerly EPH gestosis)



# FA for convulsions:

- ▶ Prevent secondary injury – fall, injury with surrounding objects
- ▶ Monitor duration of convulsions, unconsciousness
- ▶ During and after fit – ABC, stabilised position, limit commotion around = limit stimuli that could cause other convulsions
- Ambulance: breathing disorders, consciousness disorders, high fever, diabetes, little children, pregnant, **first** occurrence
- medical treatment: ordinary EPI fit in a known epileptic







# Emergence of convulsions in Epilepsy

- ▶ epileptic focus = cells with pathological electrical activity
- ▶ low spread threshold
- ▶ epileptic impulse = photostimulation (cinema, fire), hyperventilation, rhythmical sounds (on a train, music – drums)





# Epilepsy

- ▶ E. stimulus (rhythmical sound, colours, cinema, television)
- ▶ Brain reaction:
  - sensory symptoms (visual, auditory, olfactory perception)
  - fit of convulsions,
  - consciousness disorder
- ▶ Typical GrandMall: Aura, Cry, Fall, Fit
  - Tonic, Clonic, Urine, Sh-- (sleep)
- ▶ Other manifestations:
  - Absence = eyes fixed, eyes turned up
  - Convulsions localised at 1 limb, muscle group



# Epilepsy FA

## Call ambulance:

- first time in life
- diabetes
- child
- disorder of breathing
- **Status Epilepticus** = A prolonged seizure (usually defined as lasting longer than 30 minutes) or a series of repeated seizures; a continuous state of seizure activity.

## Not necessary call ambulance

- epi. patient – care about ABC, ...

# Febrile convulsions



- ▶ Convulsions + consciousness disorder, children (6M .. 6L) with fever (over 39°C), tachycardia, sweating.
- ▶ FA: cooling: remove blanket, wrap, if conscious – enough liquids, Paralen (painkiller).

During a fit of convulsions, unconsciousness (10 min) –

- Ensure clear airways.
- Do not prevent child from movements during convulsions.
- Do not put anything into mouth during convulsions (inhaling).
- Medical examination



# Eclampsia

- = advanced stadium of EPH gestosis (oedemas, proteinuria, hypertension), illness is related to pregnancy (placenta),
- ▶ oedema of brain, lungs – disorder of consciousness, convulsions, insufficient breathing, low blood pressure, shock
- ▶ FA: ambulance, hospitalisation, termination of pregnancy



# Tetany

= increased readiness for convulsions (tonic).

▶ occurs during lower concentration of  $\text{Ca}^{++}$  in blood:

changes of internal environment = alkalosis

- hyperventilation after psychical stress; (hysteria)
- after repeated vomiting

▶ FA: calm patient down, sit in half-upright position

▶ hyperventilation tetany – plastic/paper bag, reinhalation of  $\text{CO}_2$

▶ Doctor – Calcium i.v.



# Tetanus

- ▶ infection with *Clostridium tetani* = spores in soil  
--> wound --> toxin production (days) – block of neuromuscular transfer:
  - difficulties chewing,
  - trismus = flexed chewing muscles,
  - generalisation of convulsions
  - paralysis → suffocating while fully conscious
- ▶ Prevention: vaccination (re-vaccination á 10y)
- ▶ Prevention: treatment of wound with  $H_2O_2$
- ▶ FA&Th: artificial respiration



# Botulinism

- ▶ ingestion of contaminated food – Clostridium botulinum (home made canned food) – botulotoxin
- ▶ double vision, unclear speaking, difficulties chewing, swallowing
- ▶ muscular weakness, considerable muscular weakness, palsy without convulsions and while fully conscious
- ▶ FA: doctor – UPV, administration of antitoxin



# Summary:

- ▶ DR ABC (shake, shout)
- ▶ what's your name
- ▶ where are you
- ▶ what's the day today
- ▶ Do you have some pain?
- ▶ Can you move?
  - open, close eyes
  - whistle
  - extremities