

# Surgical approaches to the brain and spinal cord

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- **trepanation or drilling** – the smallest approach
  - used for punctures (abscesses, cysts), puncture biopsy, evacuation chr. subdural
  - in an emergency, it can also be used diagnostically when epidural or acute subdural bleeding is suspected
  - a short incision is made on the skin, subcutaneous tissue and periosteum
  - drill by hand or with a power drill, the diameter of the hole is usually 10 mm
- **percutaneous tap** – targeted point tap with a diameter of 2.5-3 mm for puncture and drainage of the ventricular system
  - also for stereotactic performances
- **osteoclastic trepanation (craniectomy)** – by widening the hole with bone forceps (we will chip it into the surrounding area, ...)
  - usually during operations in the infratentorial space
  - supratentorial, it is mainly used in traumatology - in acute conditions (epidural or subdural evacuation), comminuted fractures of the calf, ...
  - it is fast
- **osteoplastic trepanation (craniotomy)** – the most common method of access to the supratentorial space in planned procedures
  - the skin incision has the shape of a horseshoe and a pedicle with a vascular supply, we make holes and cut through the bone between them either – with a **Gigli saw** or a craniotome
  - the most important thing is not to break the dura, we leave the periosteum on the bone (we fold it open like a book)
  - we close the wound by tilting the trepanation plate



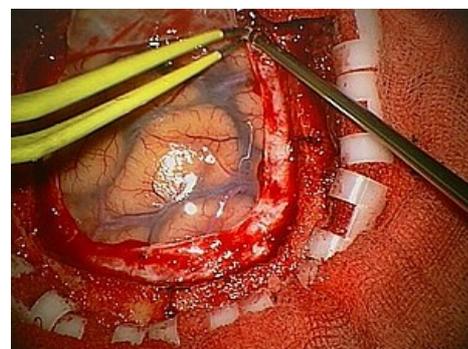
Trepanated skull, Bronze Age

## Cranioplasty

- a necessary consequence of osteoclastic trepanation is a bone defect
- this does not matter during operations in the back of the cranial fossa, because it is covered by a thick layer of muscles
- on the calf it is a problem (psychological as well - people are afraid of brain injury, ...), they have headaches from frequent fluctuations in pressure, ...
- it needs to be solved sooner or later with cranioplasty
- bone sources – rib, flat calf graft (from diploe division), tissue bank graft or synthetic material (acrylate resin)

## Hard diaper closure

- the suture must be waterproof, preferably with an atraumatic continuous suture absorbable material
- defects are solved by suturing a graft - fascia lata, periosteum, temporal fascia or even muscle
- with leaks, an epidural pseudocyst can develop and there is a risk of meningitis



Craniotomy, whitish dura mater and arachnoid visible

## Operative approaches to the spine

- **access from the dorsal side** – this is where we operate spinal intradural and epidural processes, lumbar disc herniations, some traumas
  - we remove the paravertebral muscles from the protrusions and arches to the minimum necessary extent, pull them away with a spreader
  - access can be unilateral or bilateral
  - transligamentous approach - via ligg. flava (interarcualia), e.g. for lumbar disc herniation
  - partial hemilaminectomy - we will bear next to ligg. still adjacent lat. edges of arches (lateral to proc. transversus)
  - foraminotomy – we will remove the bony structures of the dorsal wall of the foramen. intervertebrale (intervert. joint)
  - laminectomy – the widest access to the canal, we can bear proc. spinosus with a piece of arcus vertebrae
    - articular processes are preserved
    - for intradural tumor operations, decompression in degenerative canal stenosis, extraction of bone fragments in trauma, etc.
    - if we do not damage the intervertebral joints, the statics of the spine are not significantly disturbed
- **anterior approach** – it is used mostly in the neck area, less often in the chest and lumbar region

- on the cervical spine, this is how we operate on protrusions and osteophytes, extirpation of the meta in the body of the vertebra, in trauma
- access is between the cervical neurovascular bundle (remains laterally) and trachea with esophagus (medially)

## Links

### Related Articles

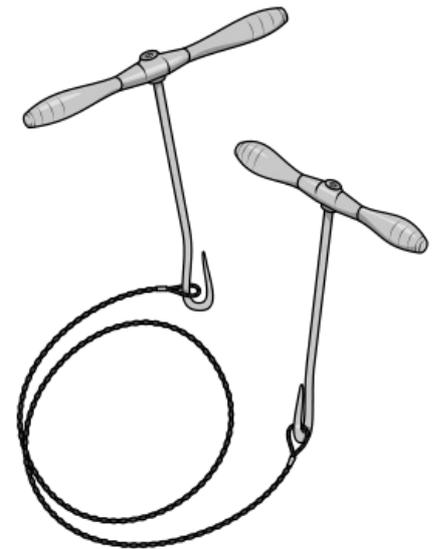
- Craniocerebral trauma
- Subdural hematoma \* Acute subdural hematoma \* Chronic subdural hematoma \* Epidural hematoma
- Surgical instruments
- Lumbar intervertebral disc herniation \* Medulla spinalis

### Resources

BENEŠ, Jiří. *Studijní materiály* [online]. [cit. 2009]. <<http://jirben.wz.cz>>.

### References

- ZEMAN, Miroslav. *Speciální chirurgie. 2.* edition. Galén, 2004. 575 pp. ISBN 80-7262-260-9.



Gigli's saw used in craniotomy