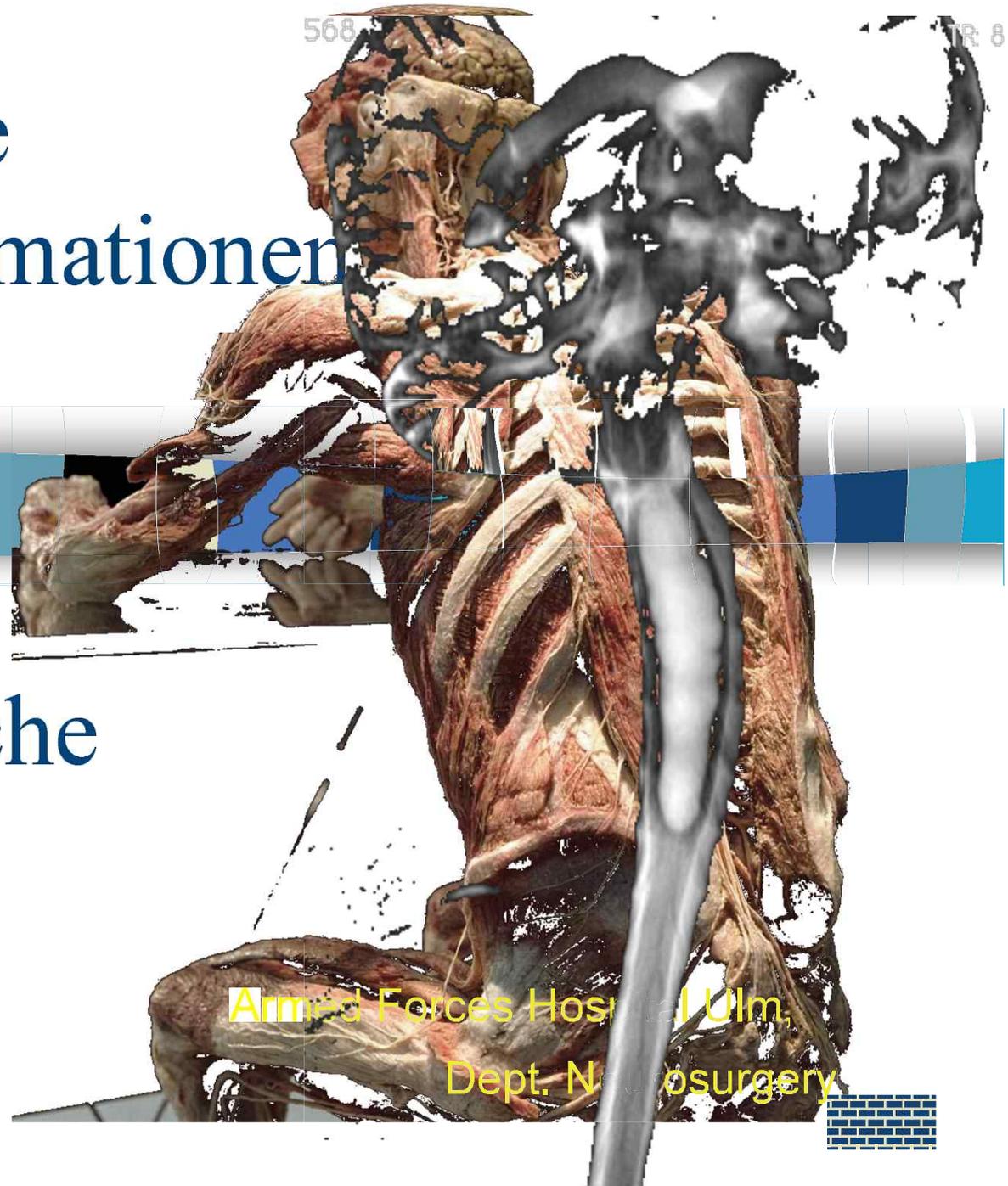


Syringomyelie Chiari-Malformationen

Von der Ursache zur Therapie

U.M. Mauer

Armed Forces Hospital Ulm,
Dept. Neurosurgery



Definition

jede Zyste im Rückenmark
in der Mitte oder am Rand
Verlauf fortschreitend



Symptome

Typisch:

Gestörtes

Kalt-Warm-Empfinden

Gestörtes

Schmerzempfinden,

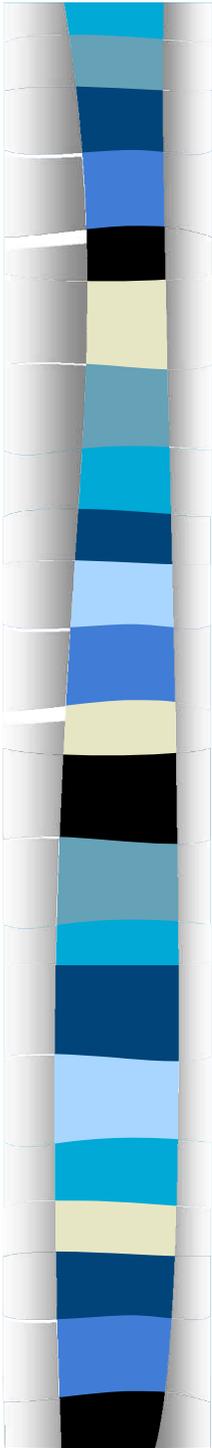
Aber:

Oft unerklärliche Schmerzen

Oft unerklärliche Ausfälle



**Mucius Scaevola überzeugt Porsenna
(508 v. C.)**



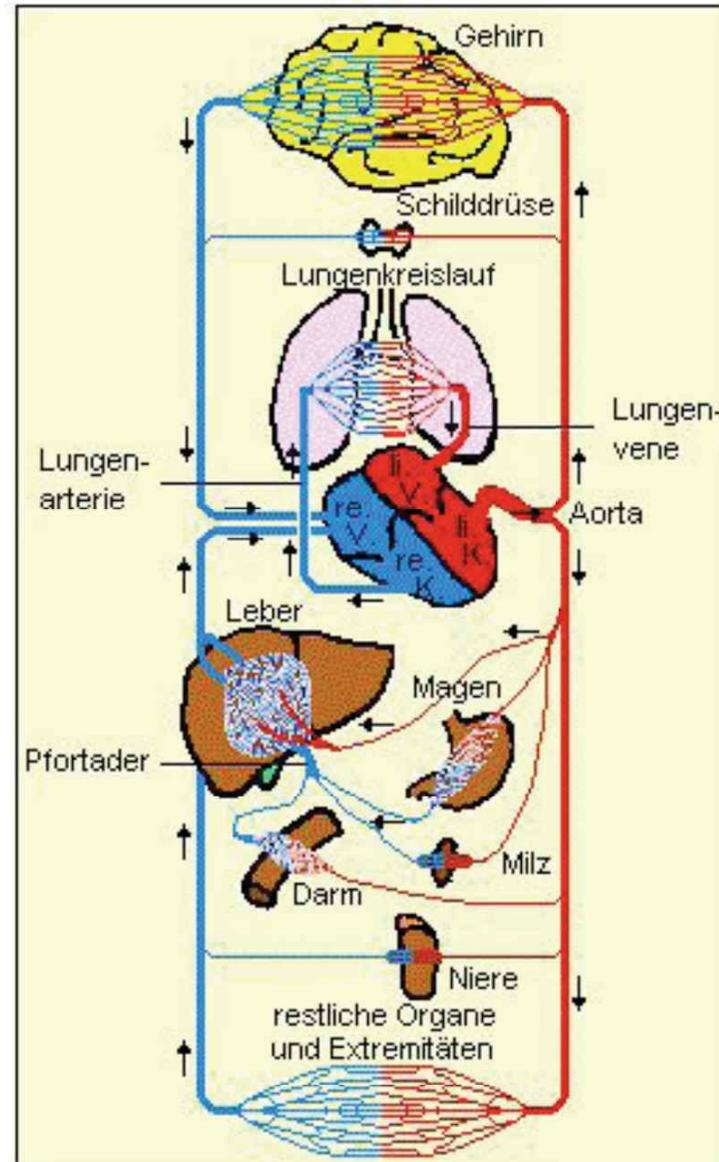
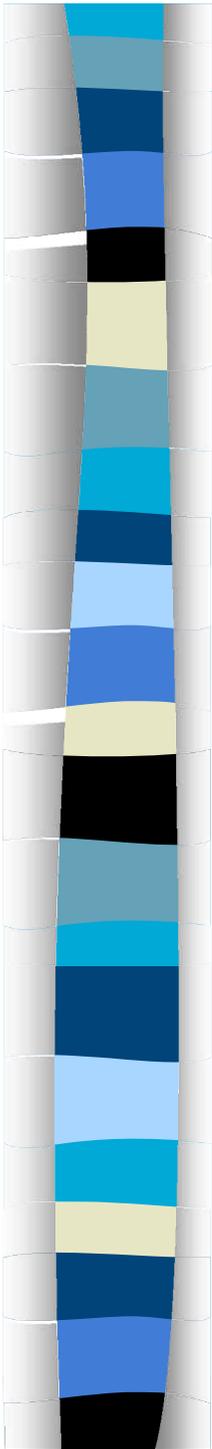
Entstehungsmechanismen
nur 3 akzeptiert !

**Behinderung Pulsation
Liquor !!!**

nicht eigenständig !!!

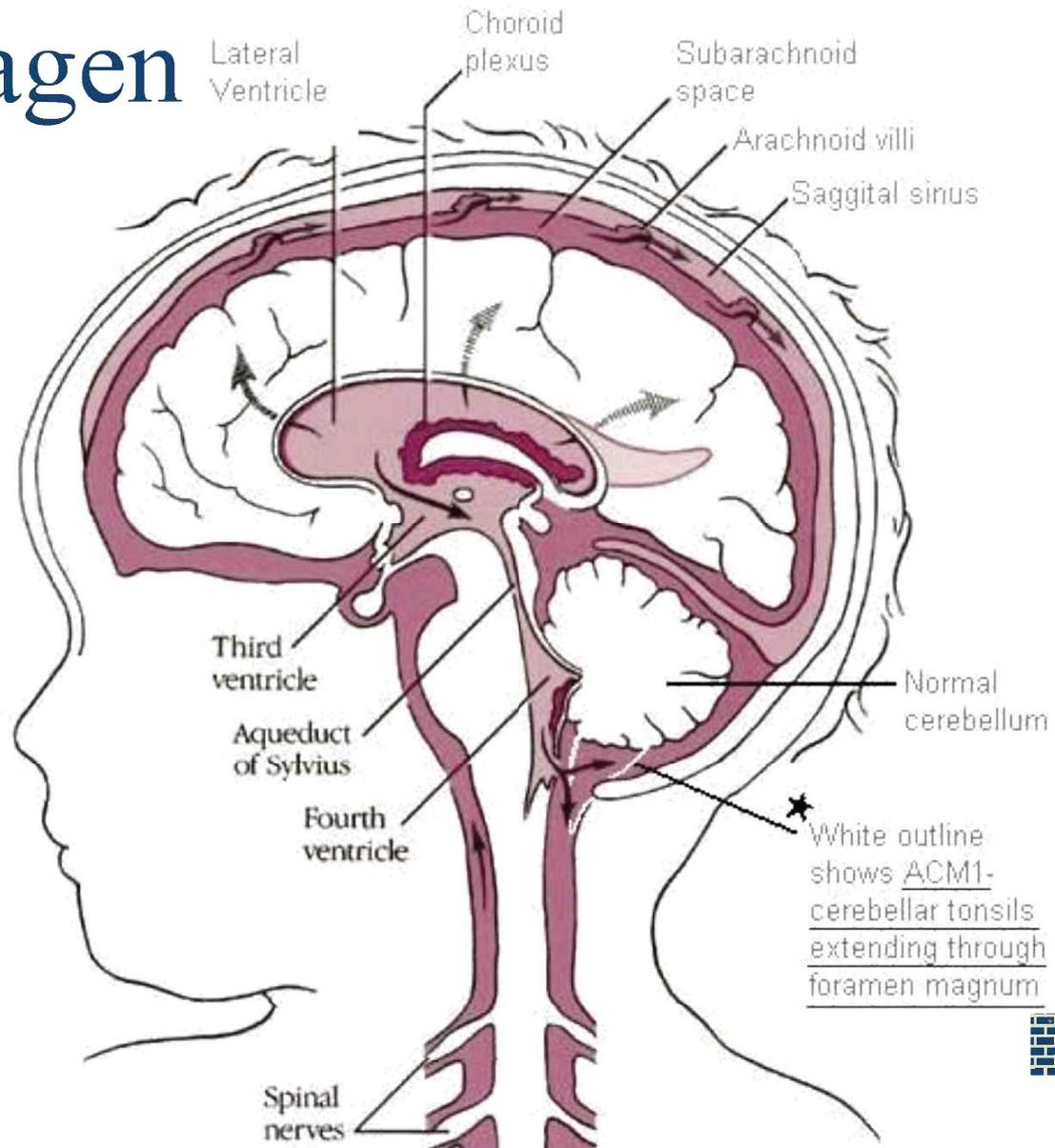
nicht wirklich verstanden !!!

Entstehungsmechanismen Grundlagen

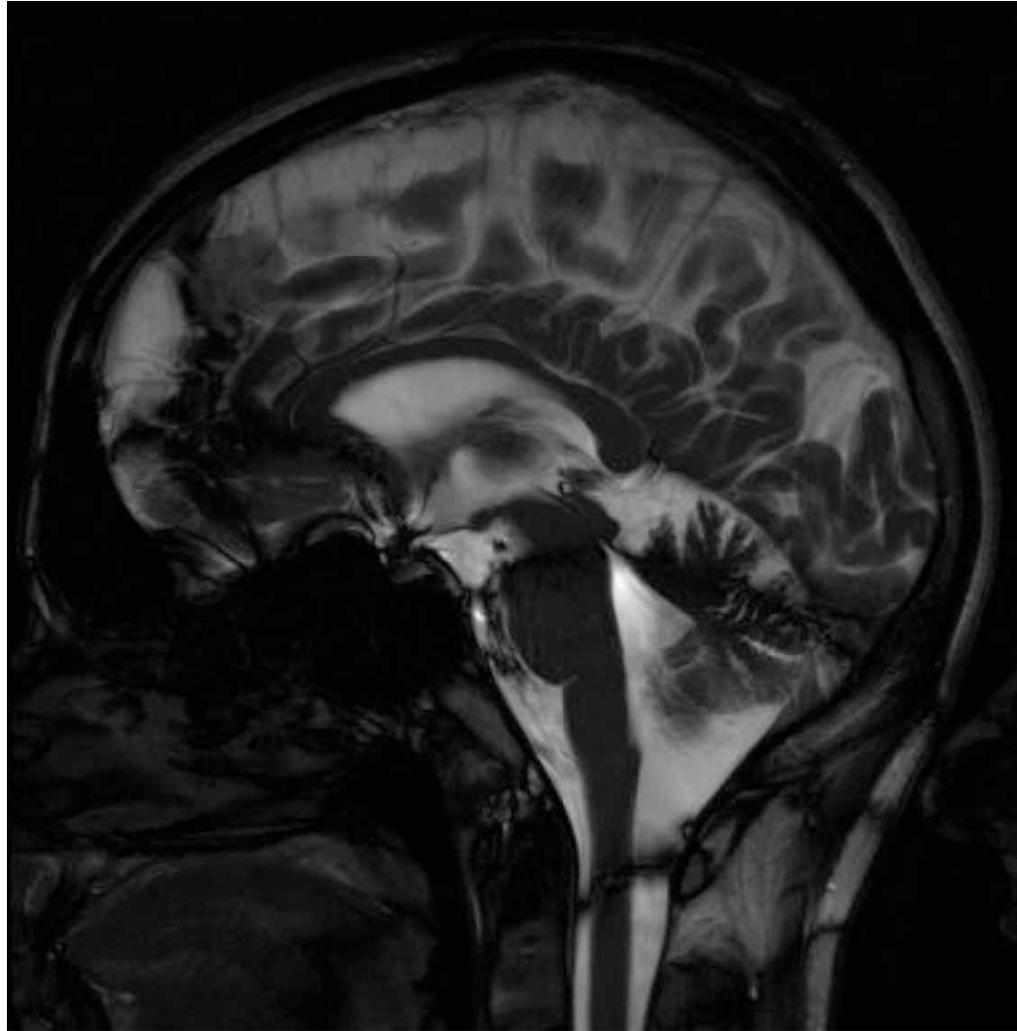
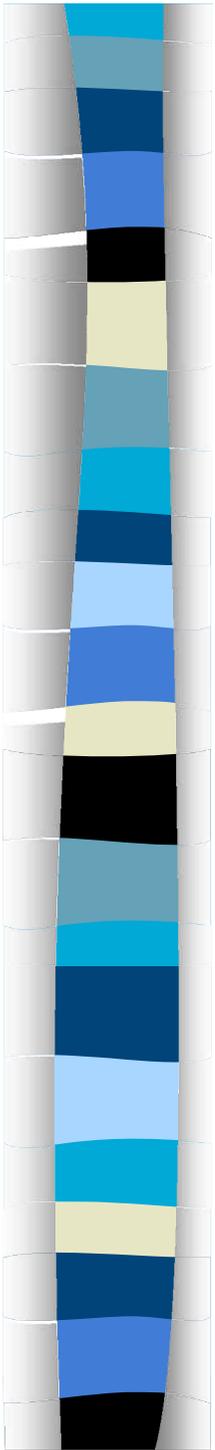


Entstehungsmechanismen

Grundlagen



normale
Liquorpulsation



normale Liquorpulsation

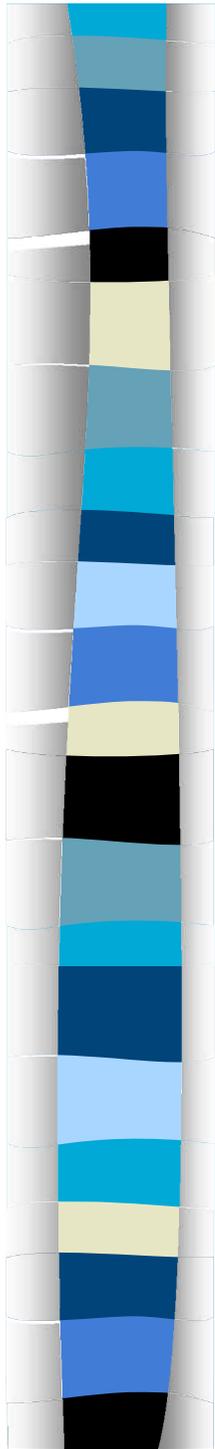
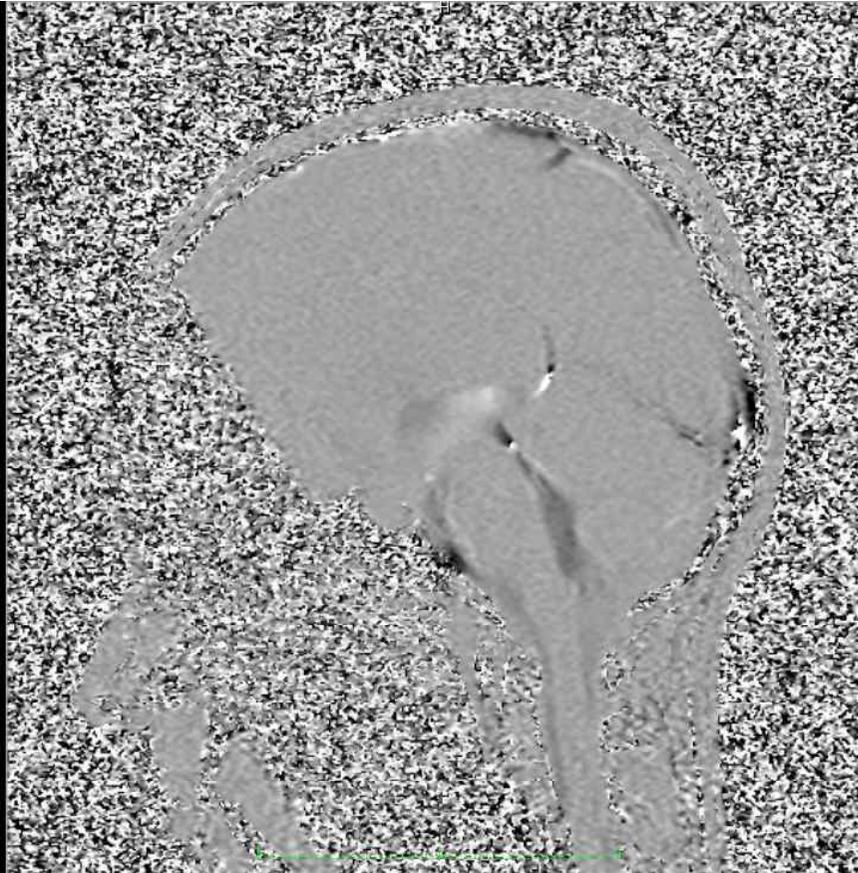


Image size: 512 x 512
View size: 1312 x 726
X: 0 px Y: 0 px Value: 0.00
WL: -270 WW: 4834

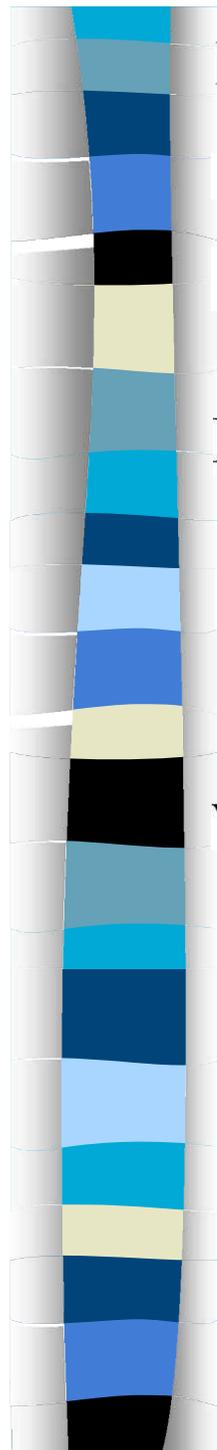
Im: 1/30
Zoom: 142% Angle: 0
Thickness: 4.00 mm Location: 0.06 mm



head general
1042878
20
TR: 67.0, TE: 18.0
fluss_h-f_sag_8cm-sec

2147
-270
-2687

12:41:46
14.07.06
Made with OsiriX



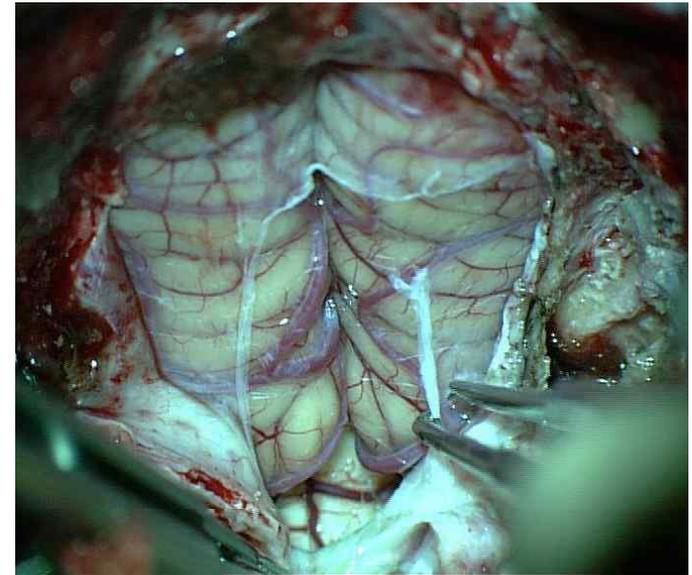
mit Syrinx verbundene Erkrankungen

Kopf

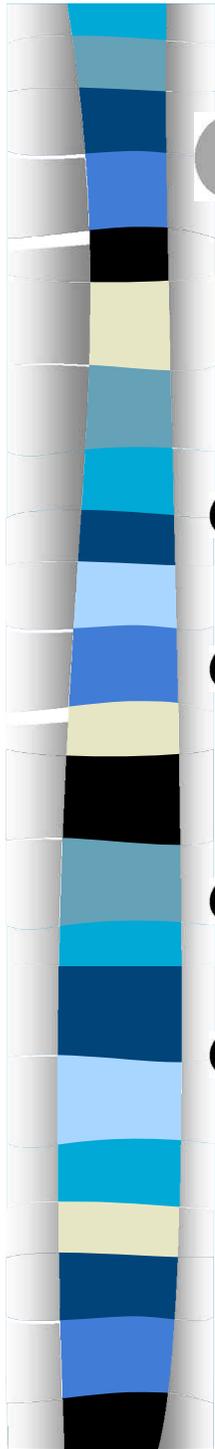
Fehlbildung
Entzündung
Tumor
Hydrocephalus

Wirbelsäule

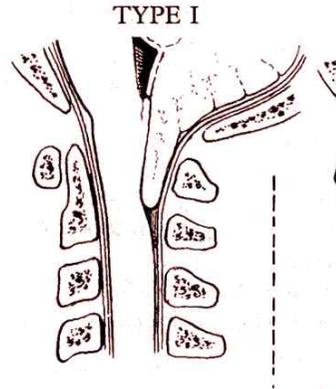
Fehlbildung
Entzündung
Tumor
Degeneration
Trauma



Chiari Malformation

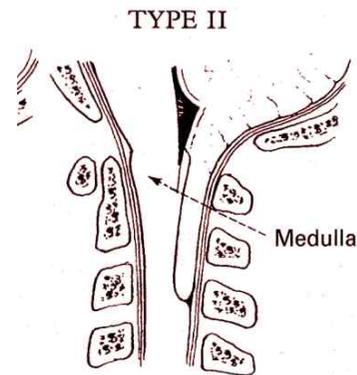


Chiari I



Tiefstand > 5 mm der Tonsillen

Chiari II

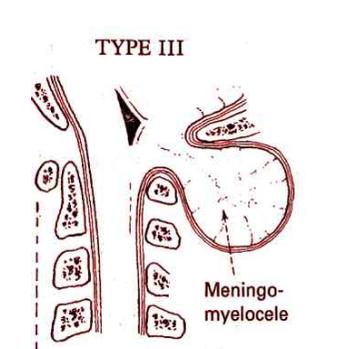


**Tiefstand von Kleinhirnteilen
und 4. Ventrikel**

Chiari III

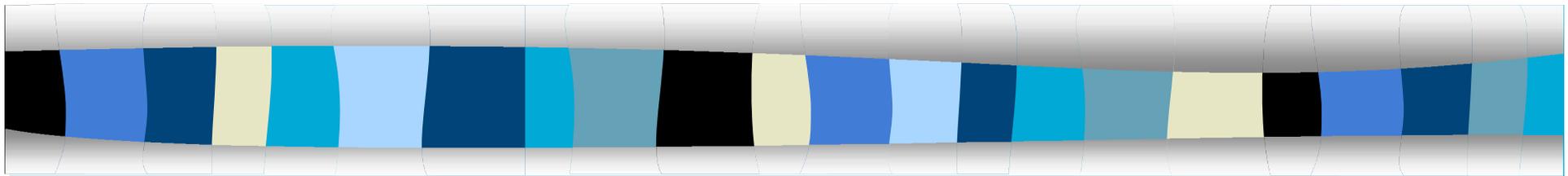
offenes Kleinhirn

Chiari IV



Kleinhirnminderanlage

Chiari Malformation Typ 0



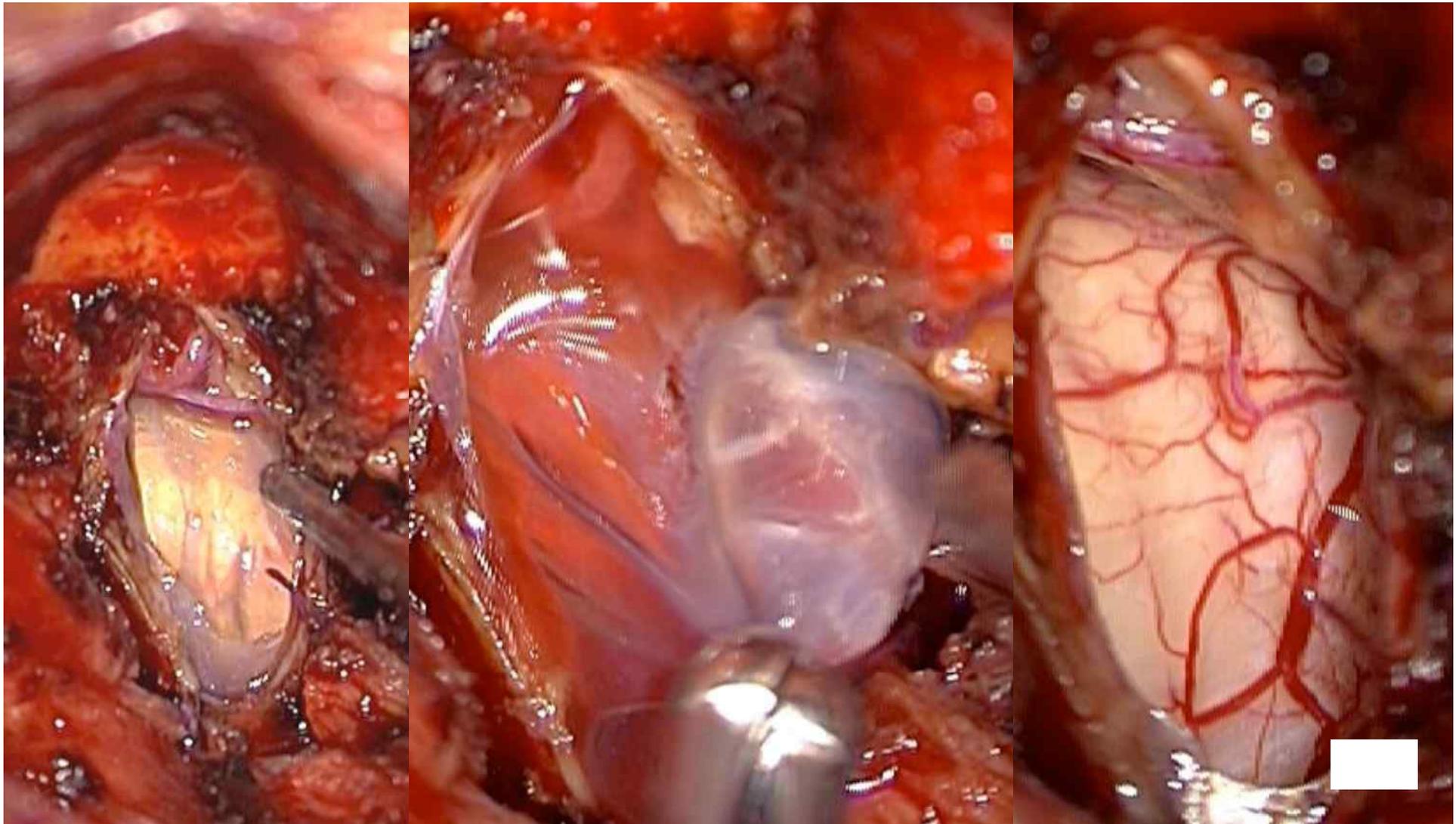
Verschluss IV. Ventrikel

Zu kleine hintere Schädelgrube

Kein Tonsillientiefstand

nach Iskandar, päd. NS AANS, Dec. 1997

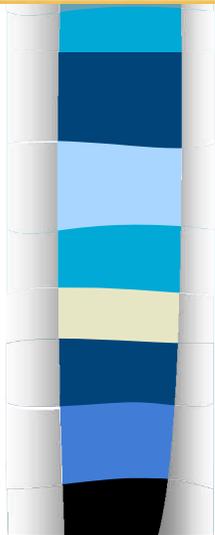
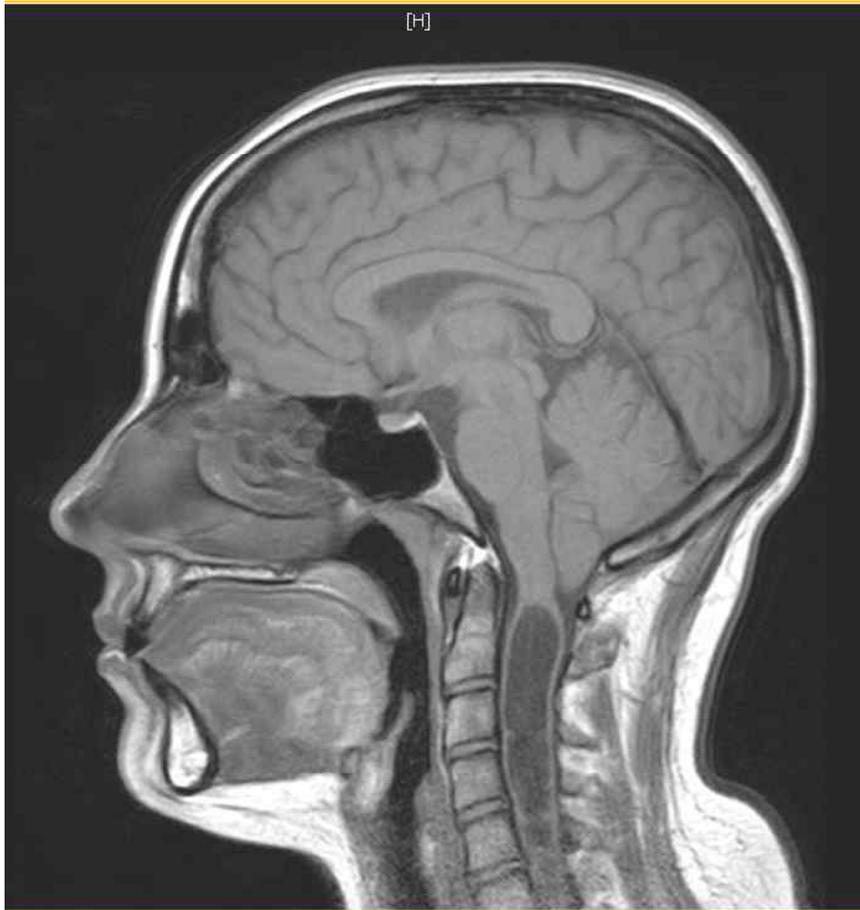
Chiari Malformation Typ 0



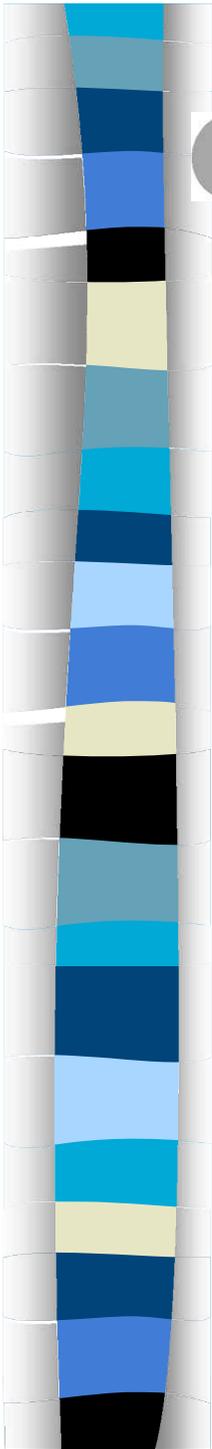
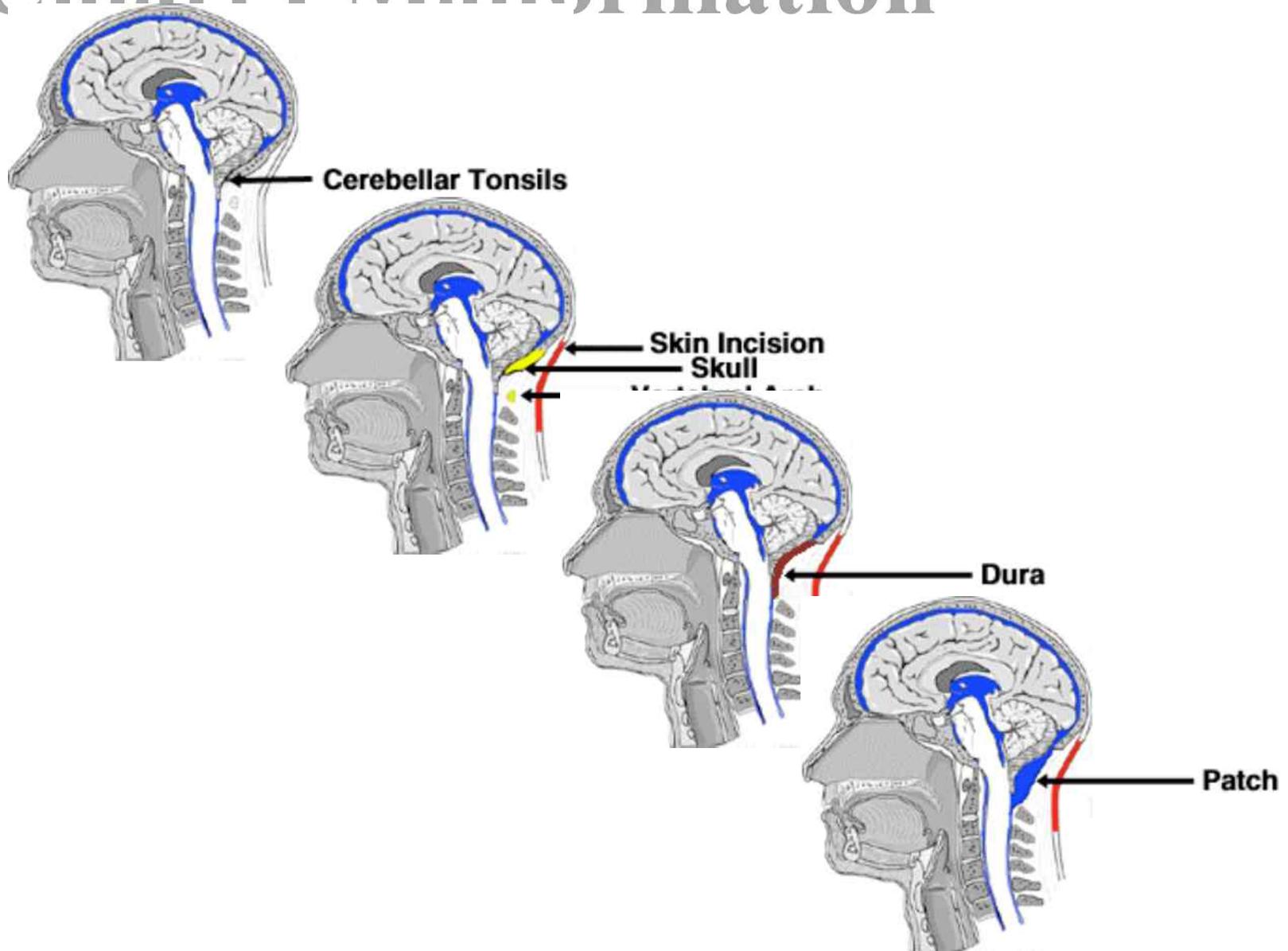


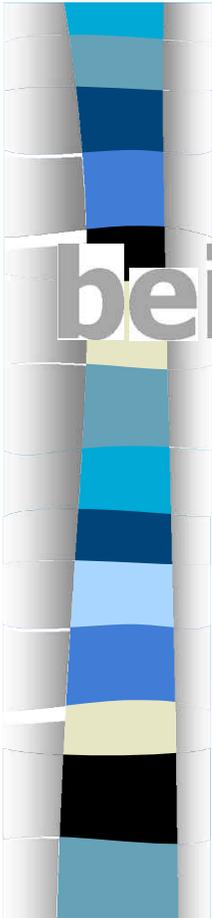
Chiari I - Malformation

Chiari I - Malformation

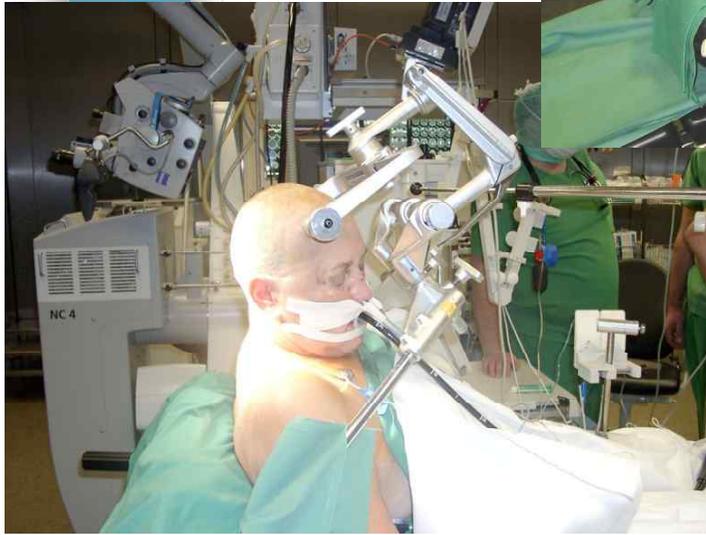
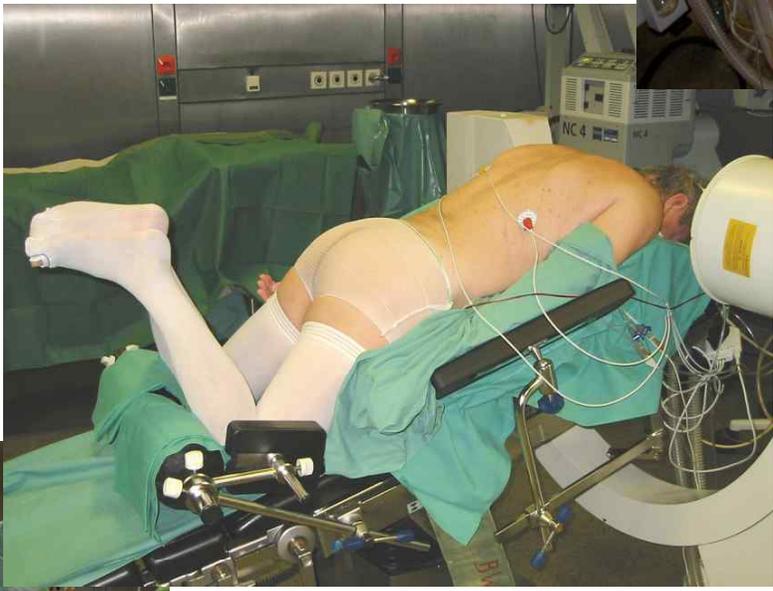


Chiari I Malformation

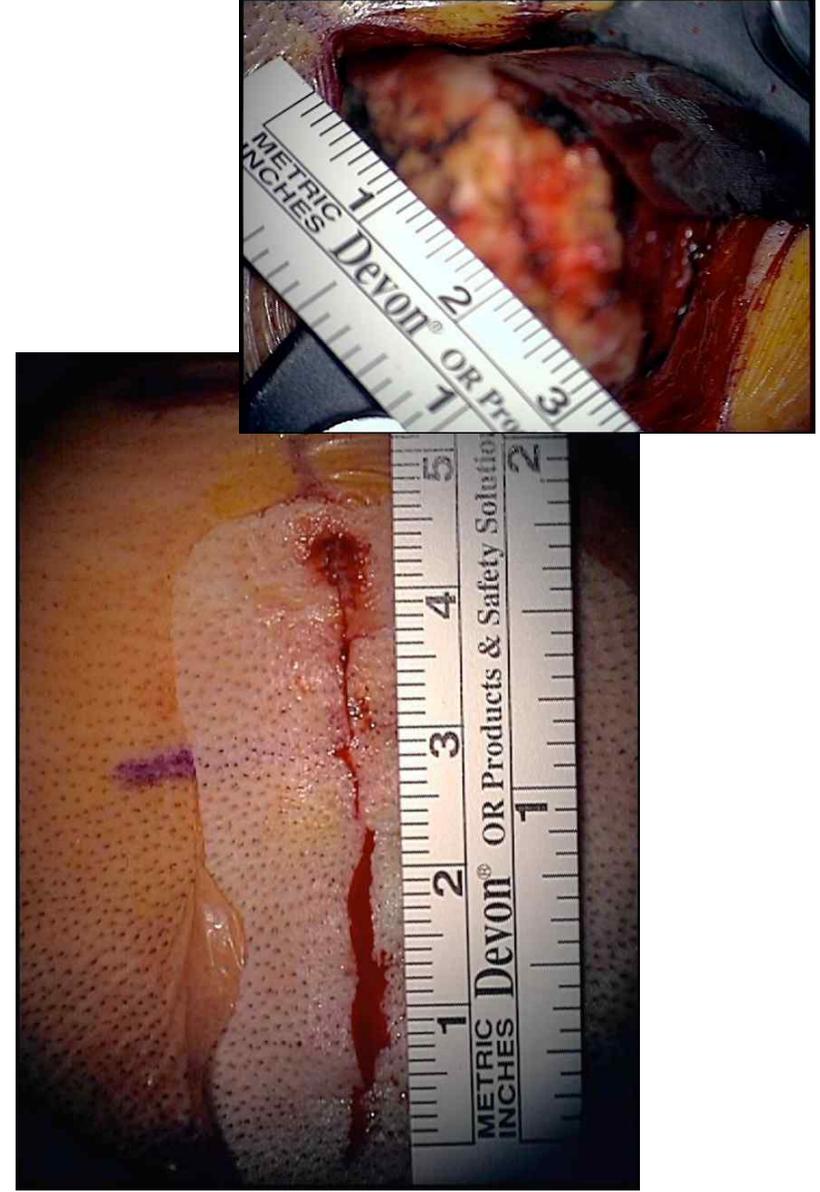
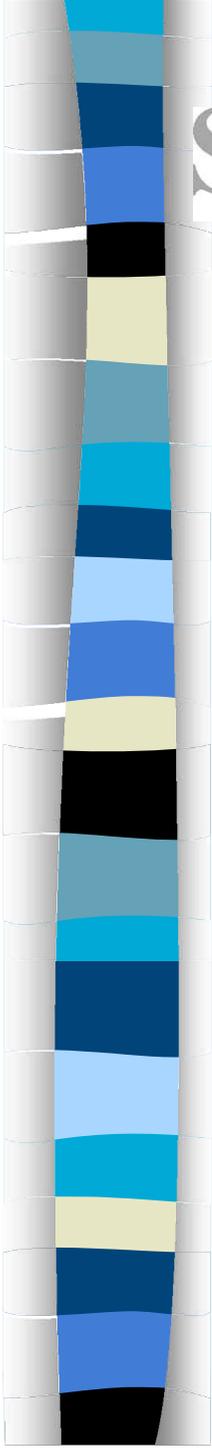




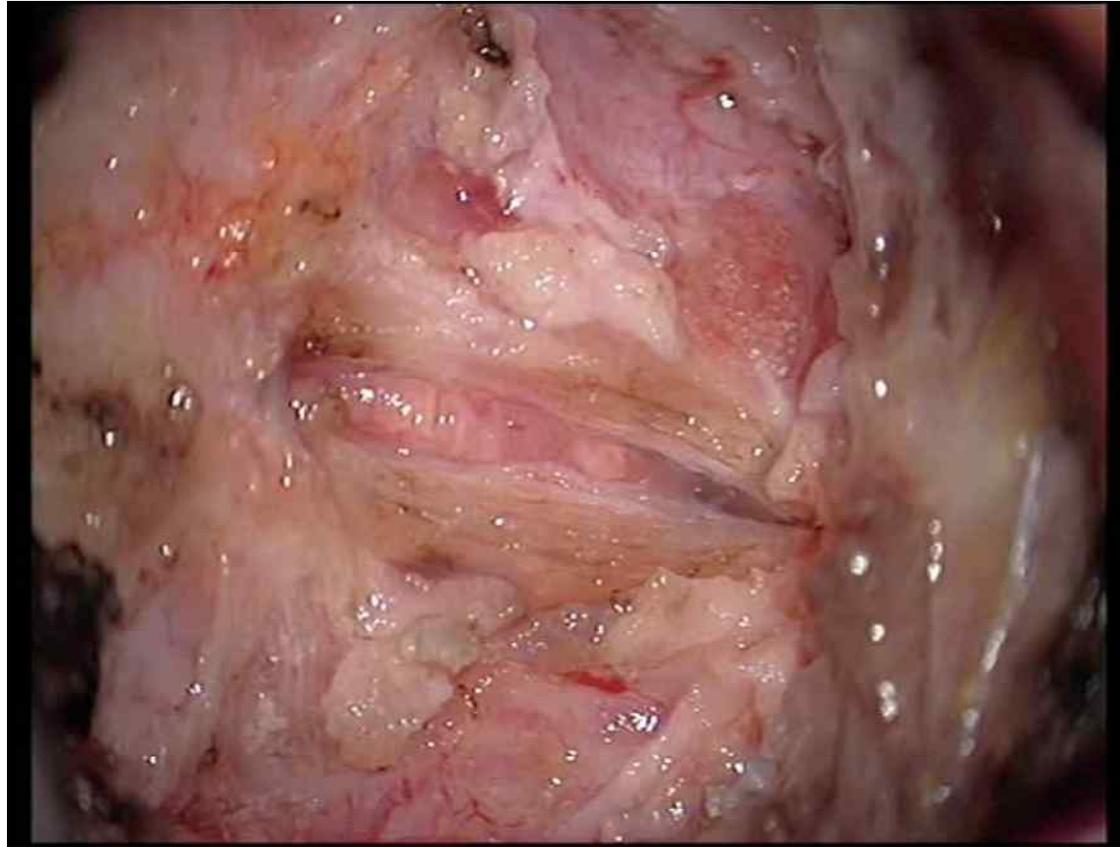
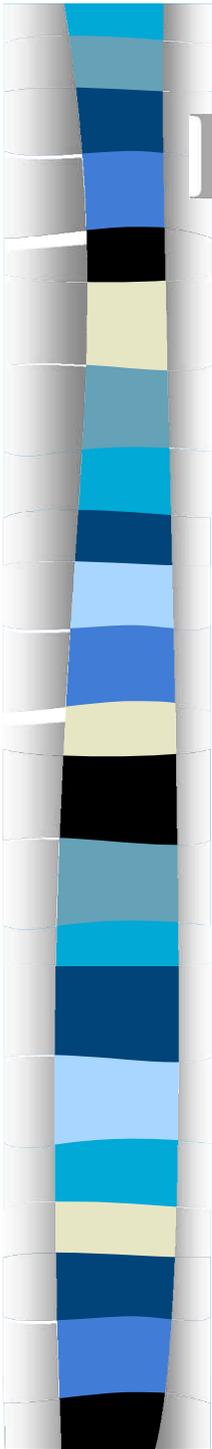
Lagerung bei der Operation

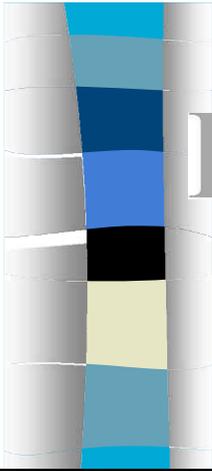


Sparsamer Hautschnitt

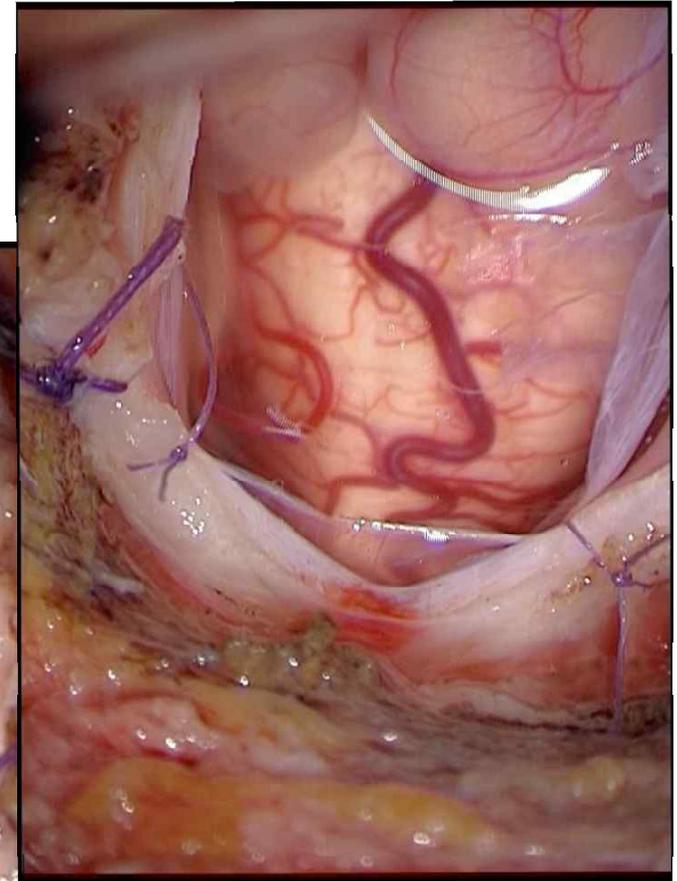
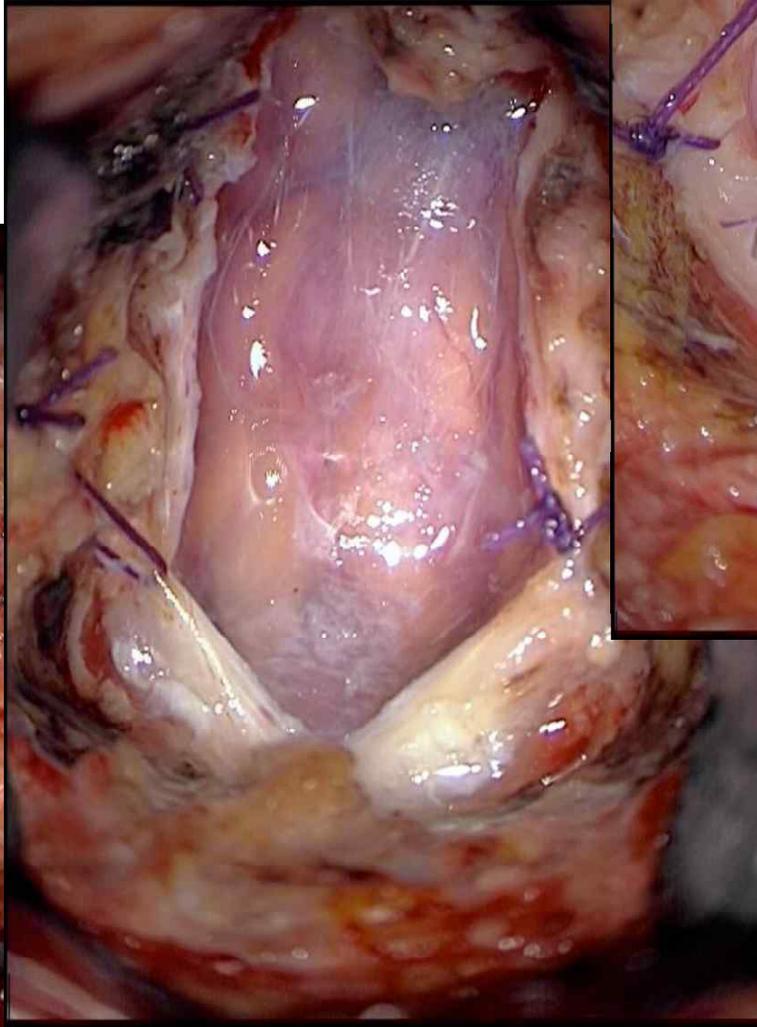
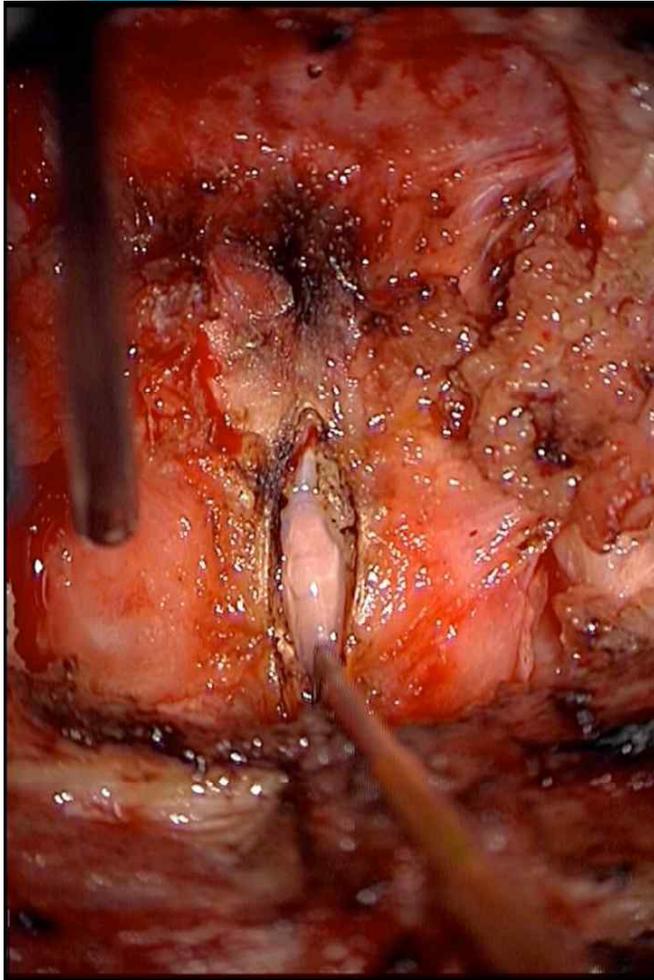


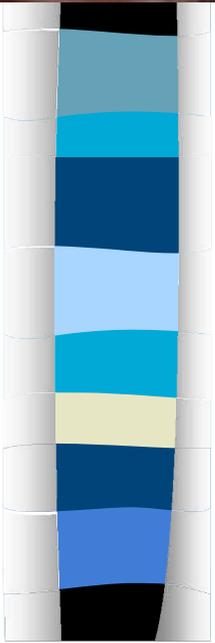
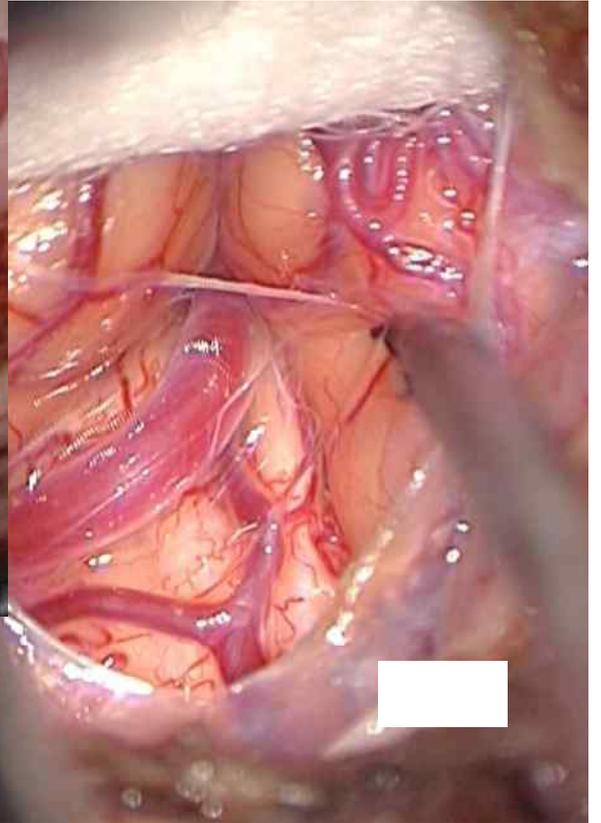
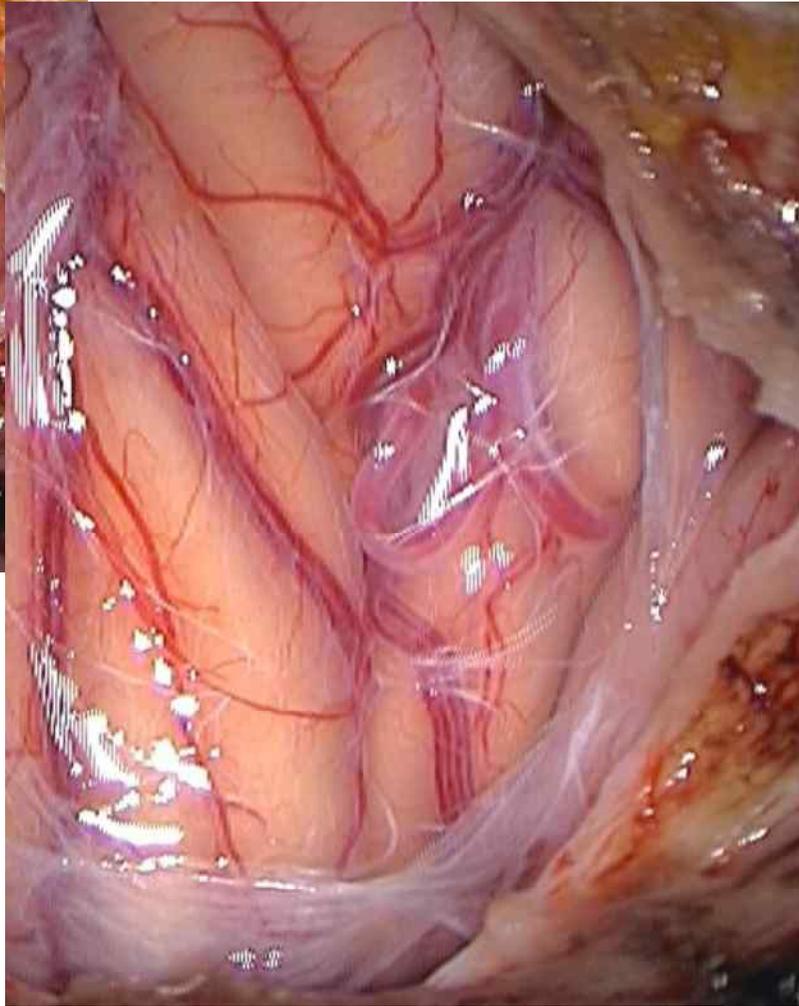
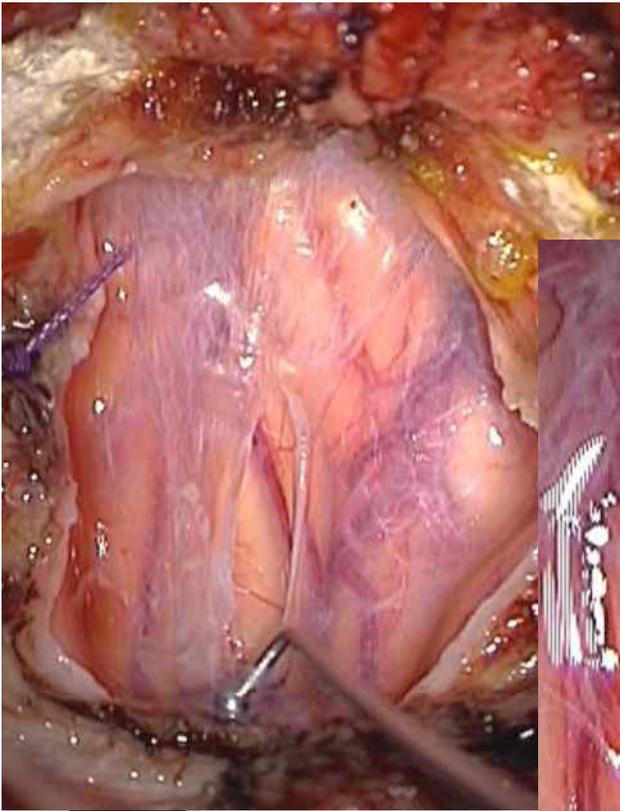
Pulsationen



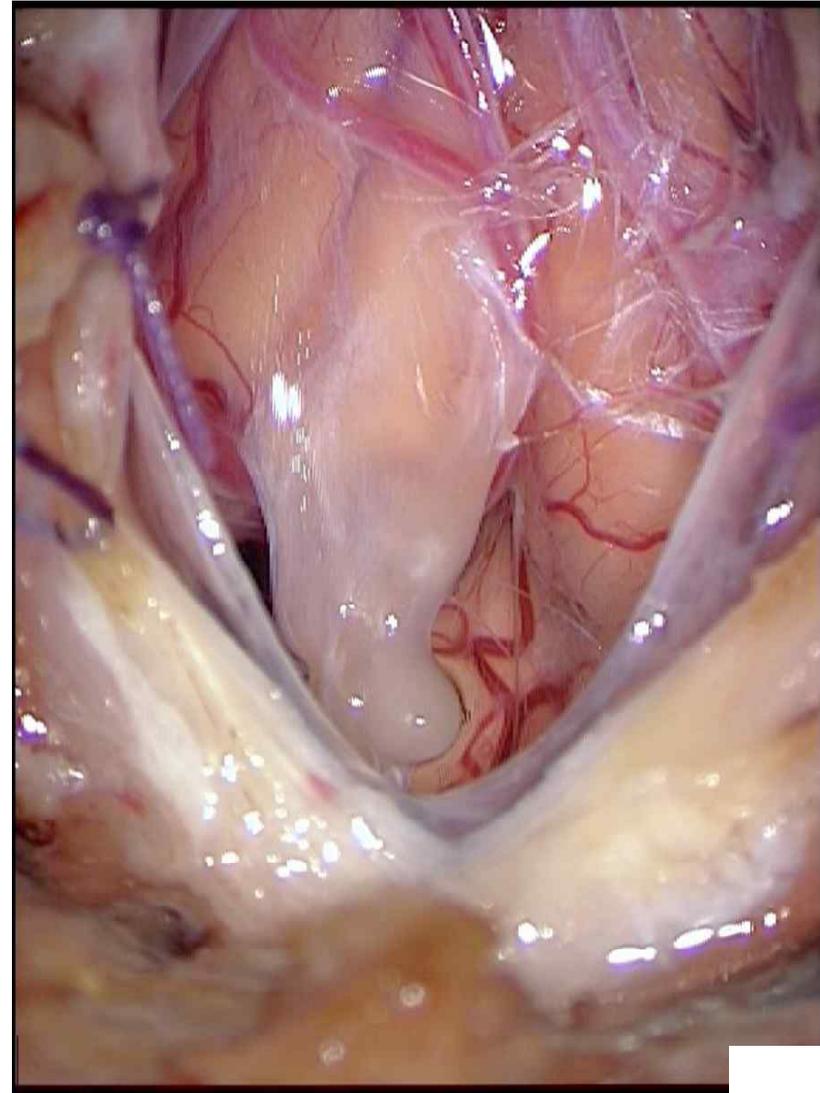
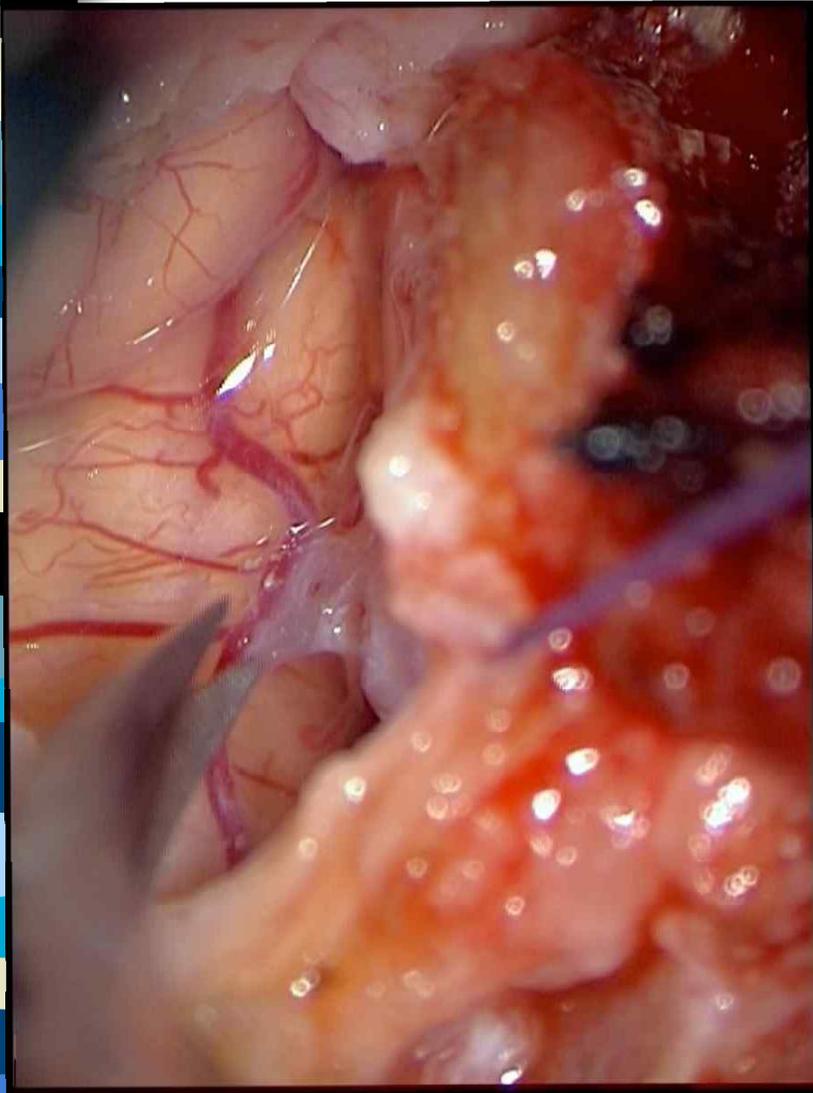


Duraeröffnung

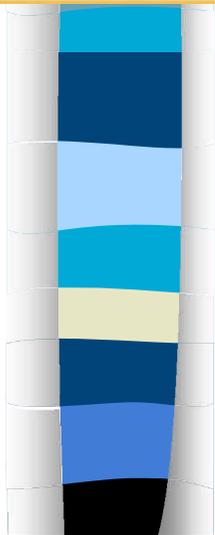
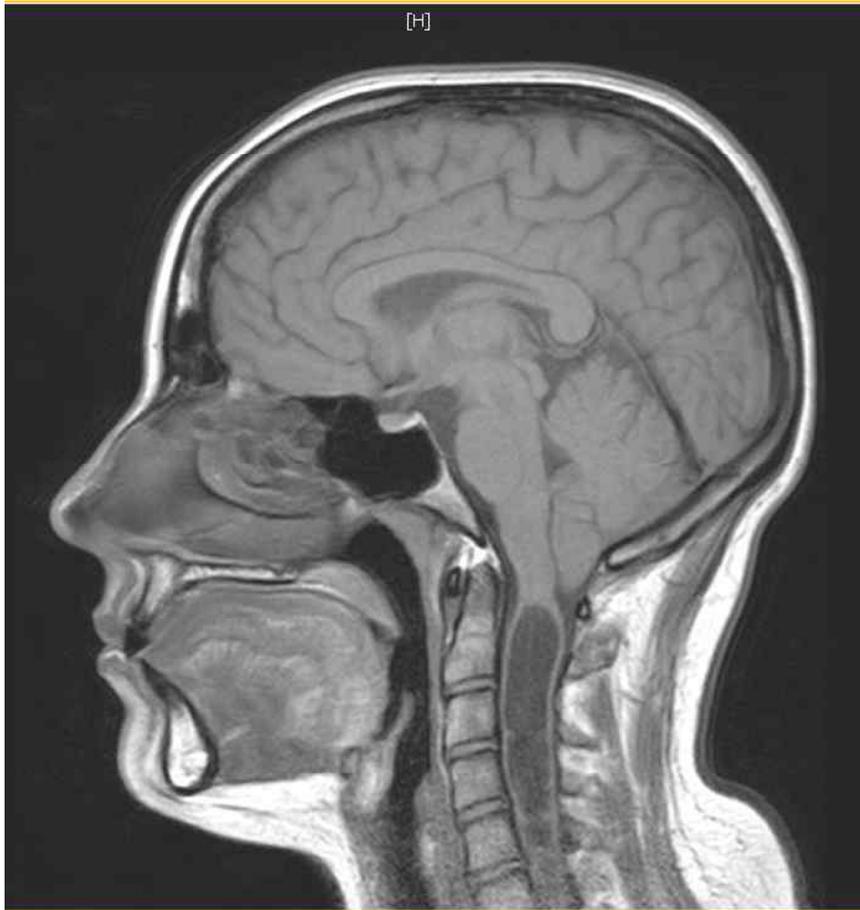




Chiari I Malformation



Chiari I - Malformation



Chiari I Malformation

OP-Indikation - Umfrage Weltweit

- Asymptomatische Chiari I, ohne Syringomyelie
- Kein einziger OP-Indikation

- Chiari I, mit Syringomyelie, mit Skoliose
- Jeder OP-Indikation

Nach Schijman E, Steinbok P (2004) International survey on the management of Chiari I malformation and syringomyelia. Childs Nerv Syst 20:341 - 348

Chiari I Malformationen

- kleine hintere Schädelgrube
- erhöhter intrakranieller Druck
- erniedrigter intraspinaler Druck
- Tethered-Cord-Syndrom
- (Hypermobilität kraniozervikal)

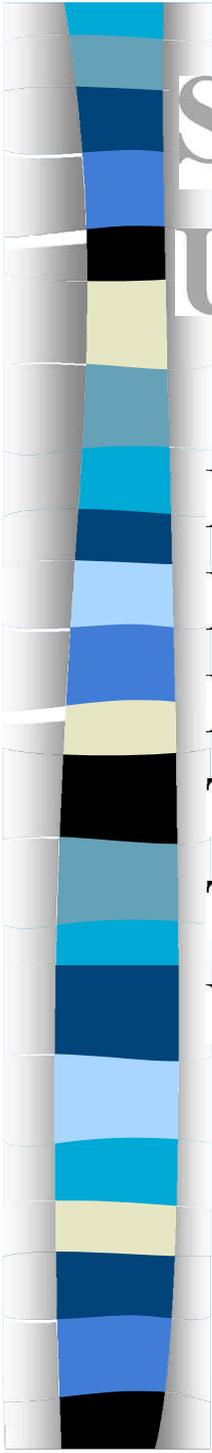
nach Milhorat et al, Br J Neurosurg 2007

Beispiel:
Shuntfehlfunktion
20 Jahr,
männl.



Syringomyelie

Ursache im Wirbelkanal



Entzündung

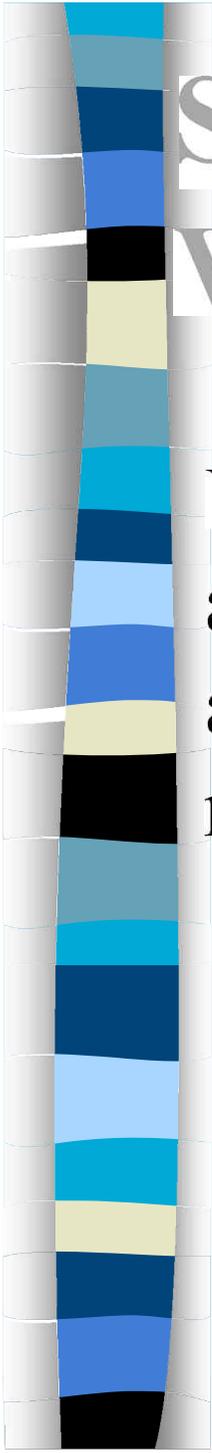
Blutung

Degenerative Veränderung

Tumor

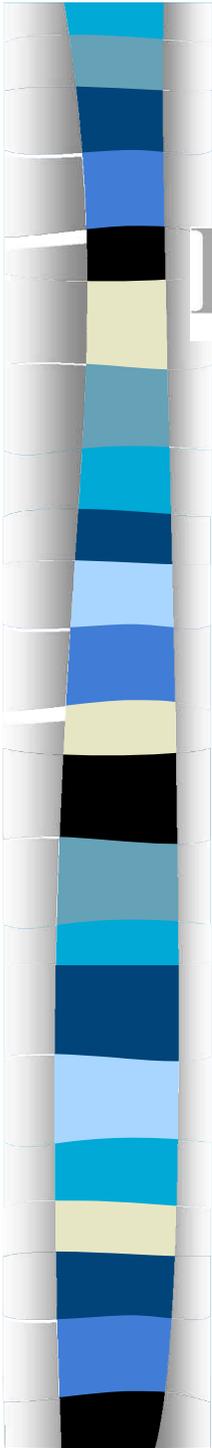
Tethered cord

Verletzung



Syringomyelie nach Verletzungen

Verletzung der Arachnoidea
auch ohne Rückenmarksverletzung
auch nach Jahren nach der Verletzung
nicht nur in der Höhe der Verletzung



Diagnostik der Syringomyelie

Kernspintomographie

immer erstmalig mit Kontrastmittel

immer erstmalig gesamtes Nervensystem

immer erstmalig Liquorpulsationsstudie

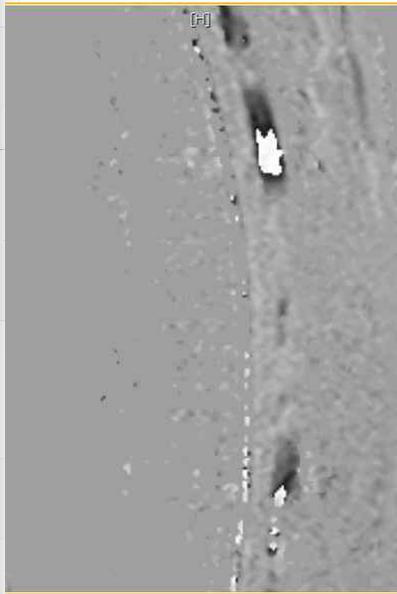
immer erstmalig Lumbalpunktion

MRT bei Syringomyelie

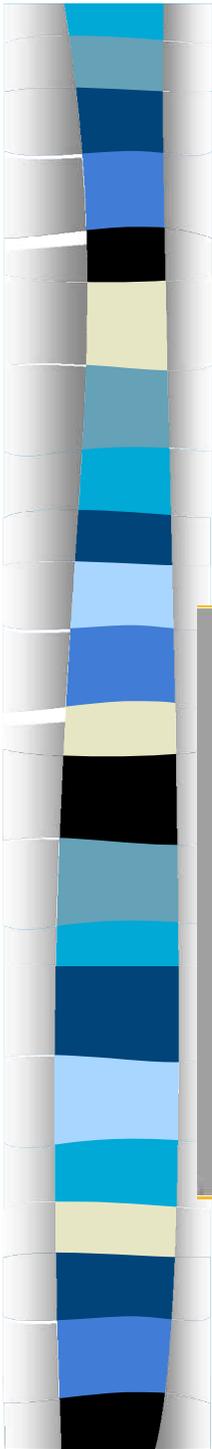
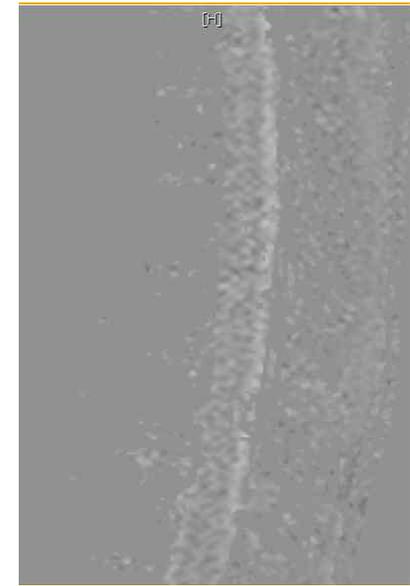
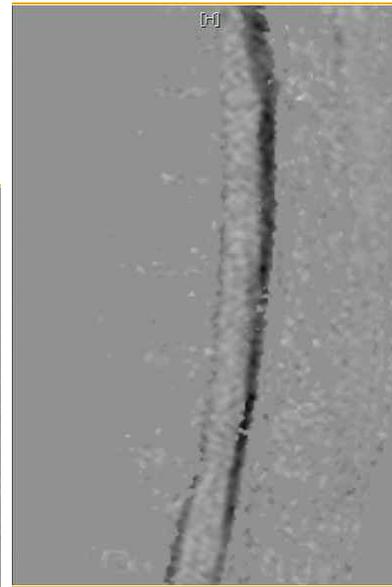
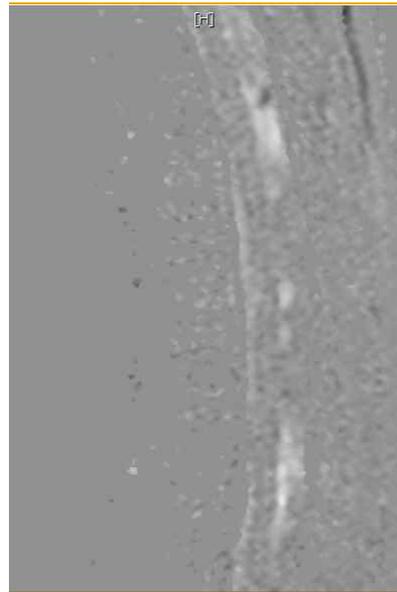


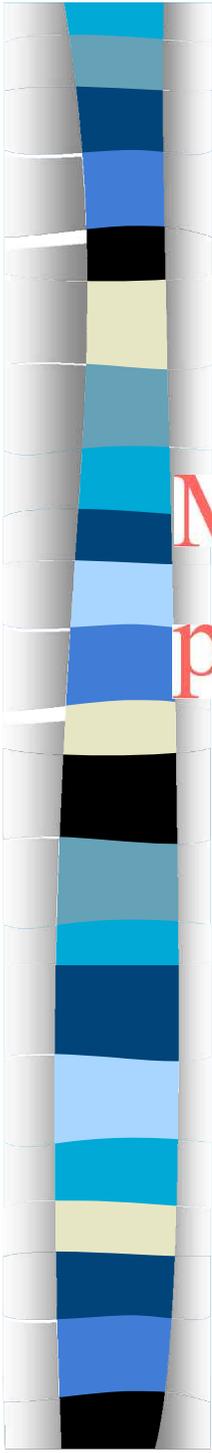
Liquorpulsationsdarstellung

vor der Operation



- **nach der Operation**





Diagnostische Möglichkeiten

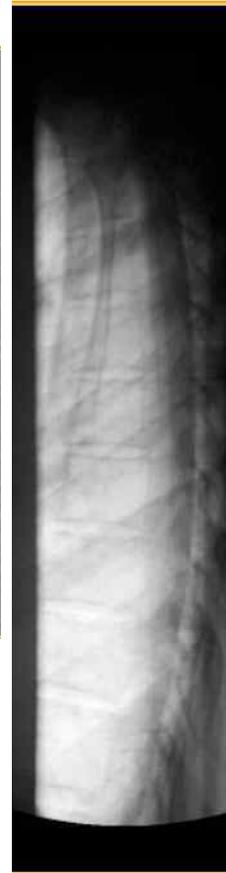
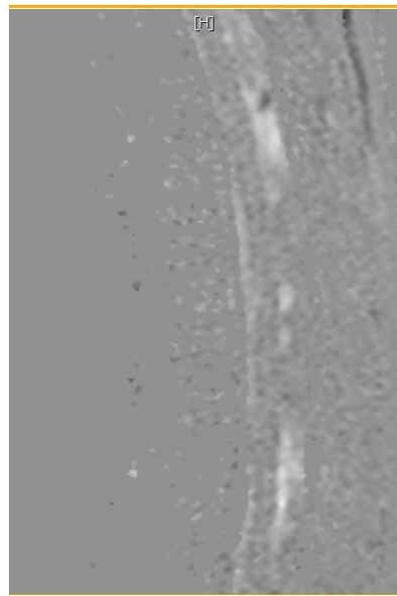
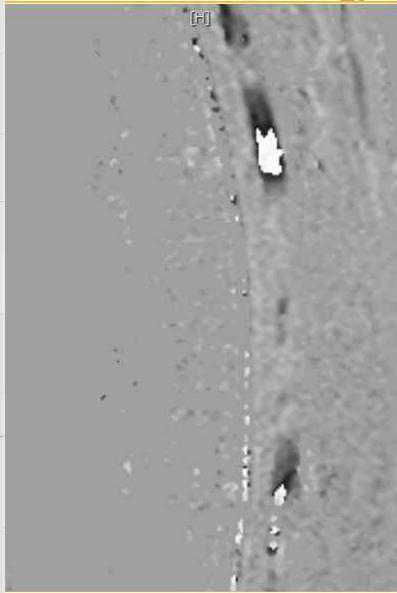
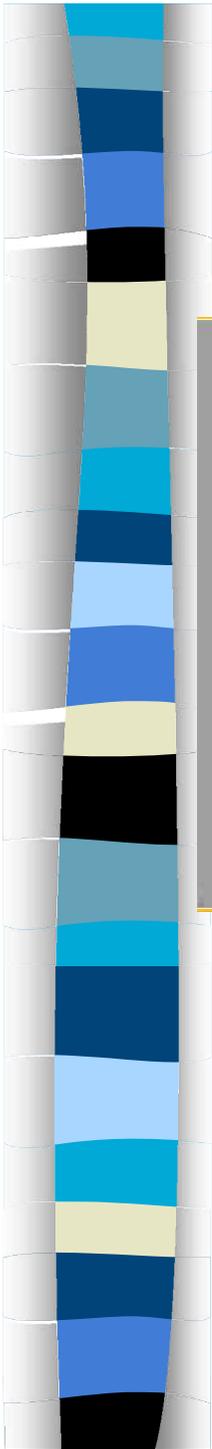
Myelographie/
postmyelo CT

**im Zweifel nicht sicher
für Verwachsungen !!!**

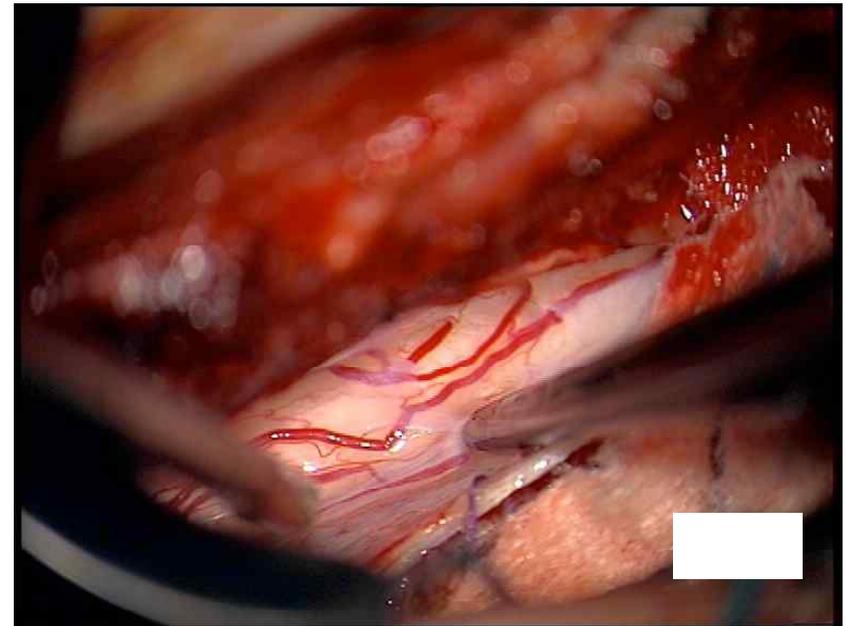
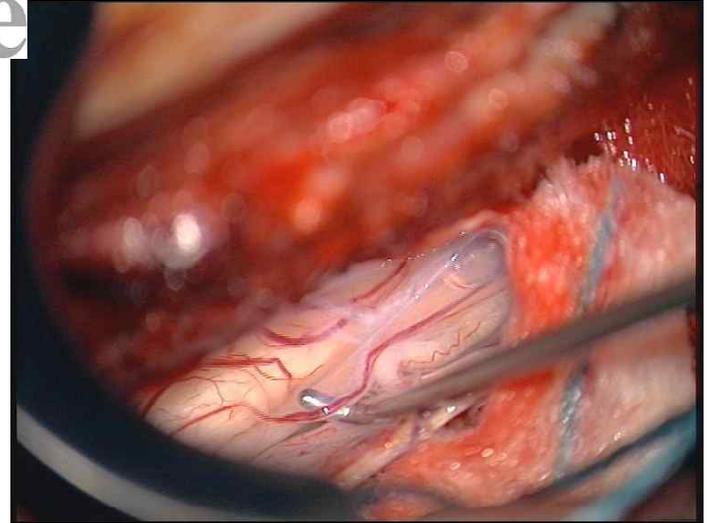
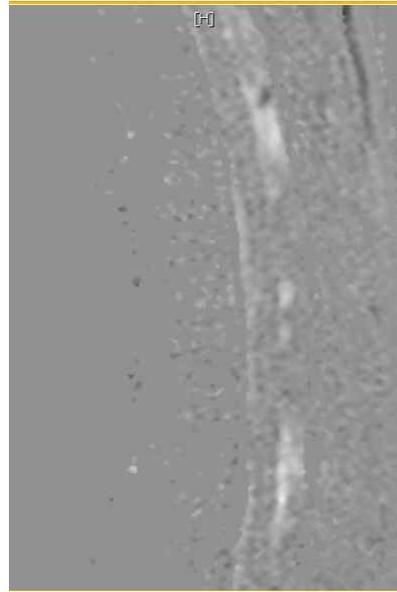
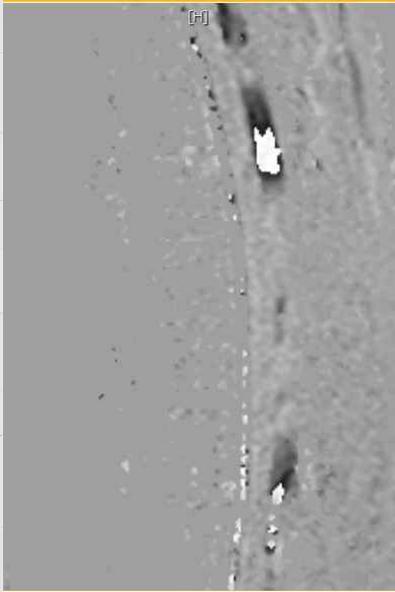
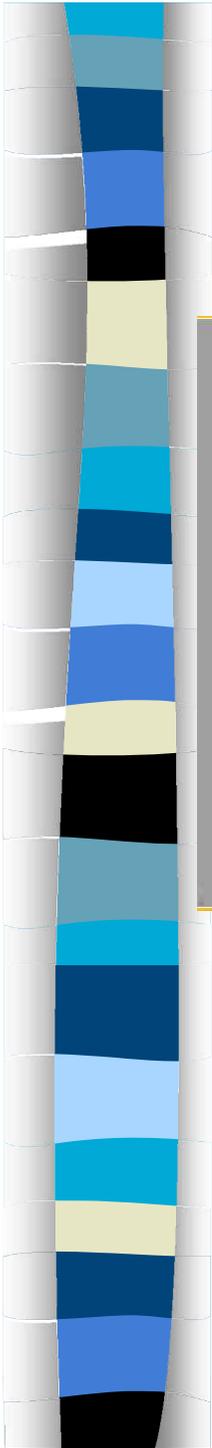
Myelographie/postmyelo CT bei Syringomyelie



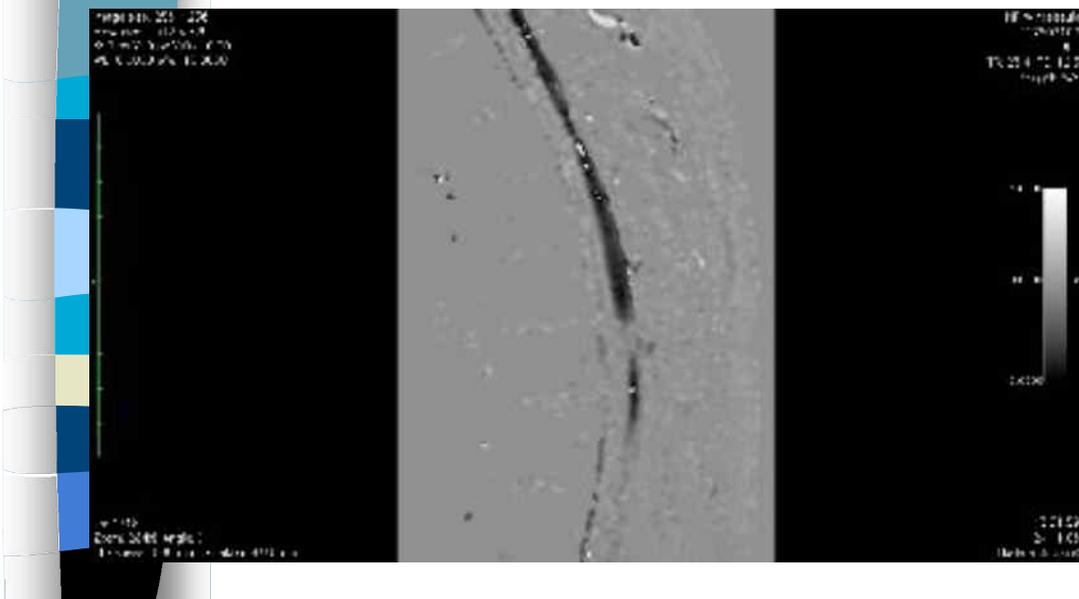
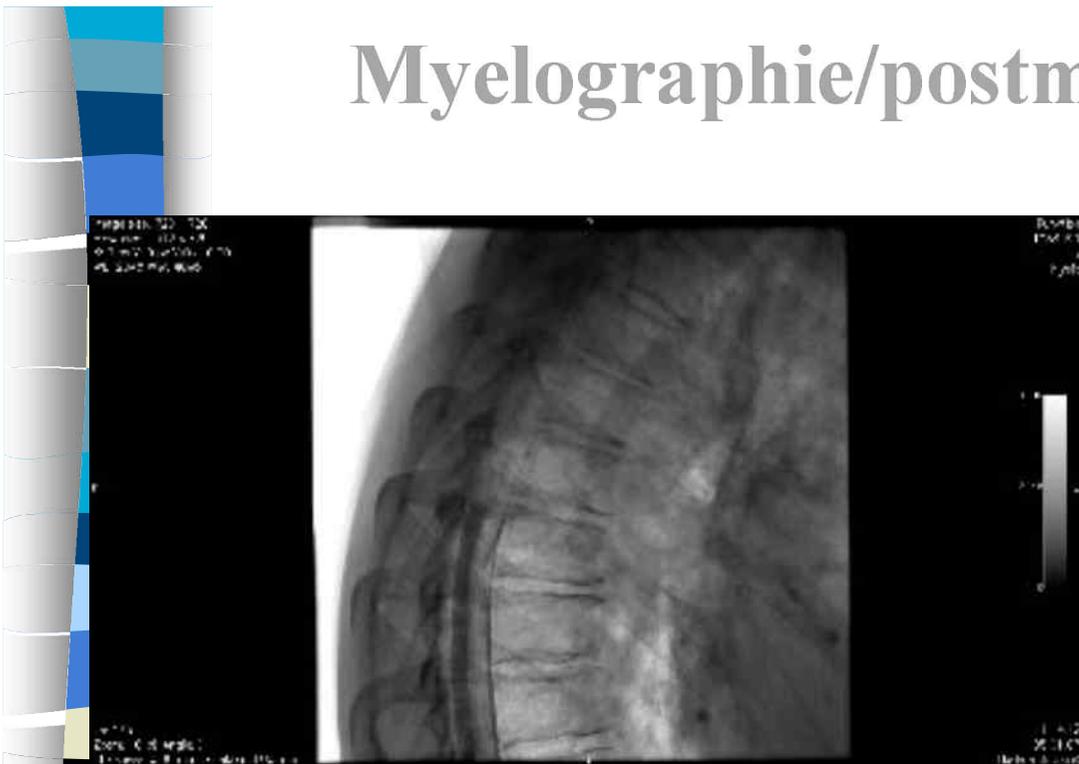
Myelographie/postmyelo CT bei Syringomyelie



Myelographie/postmyelo CT bei Syringomyelie



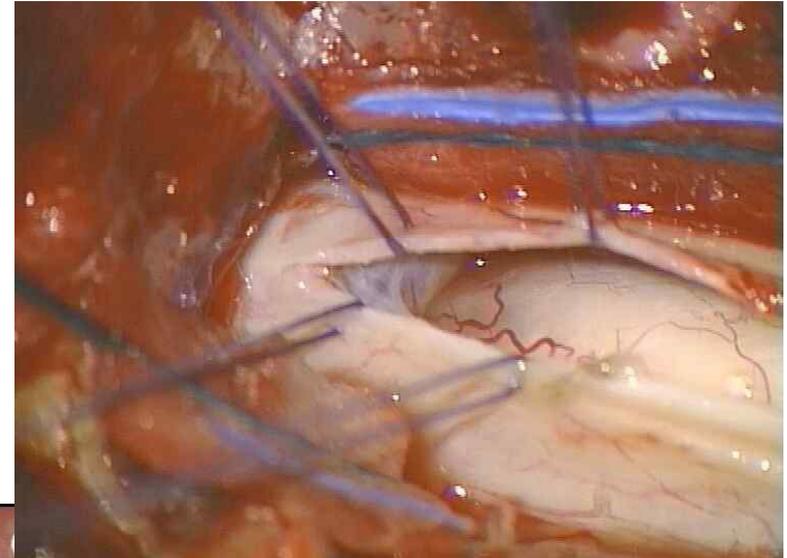
Myelographie/postmyelographie CT



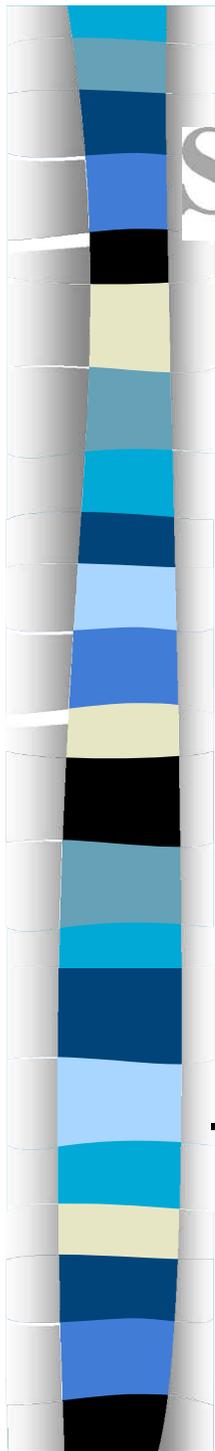
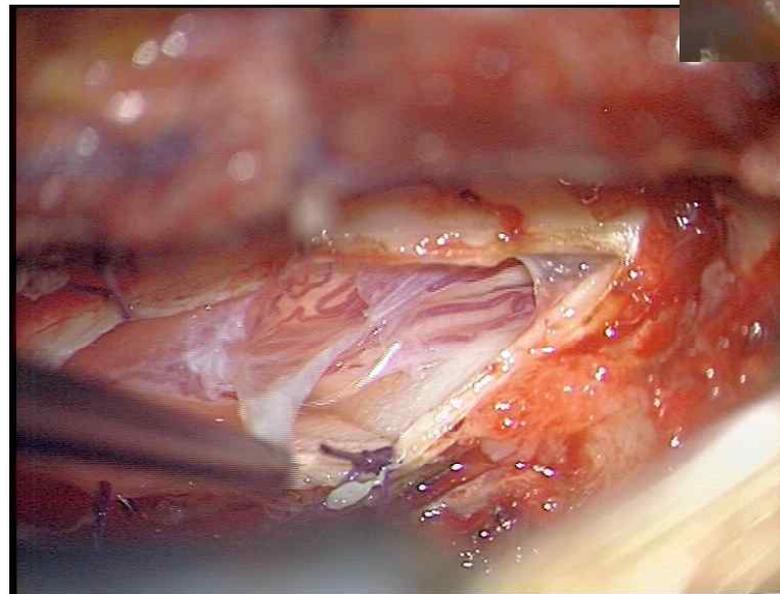
Spinale Ursache Syringomyelie

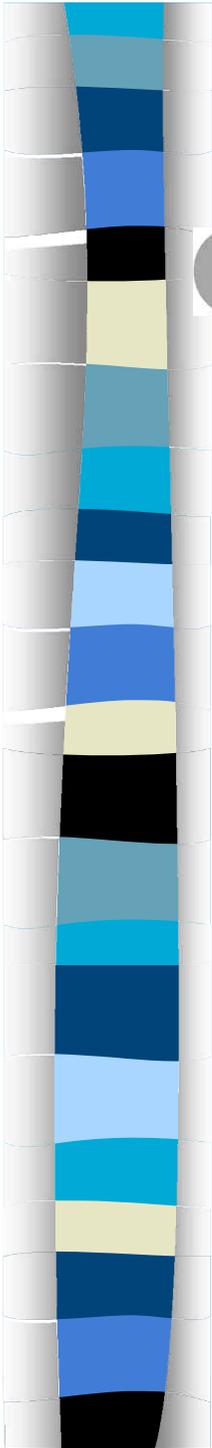
Subarachnoidale Adhäsion

- Zyste



- Netz





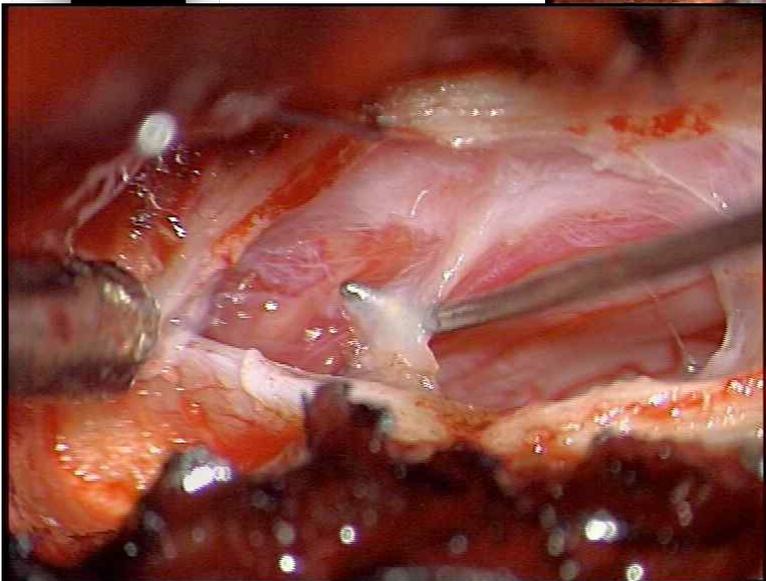
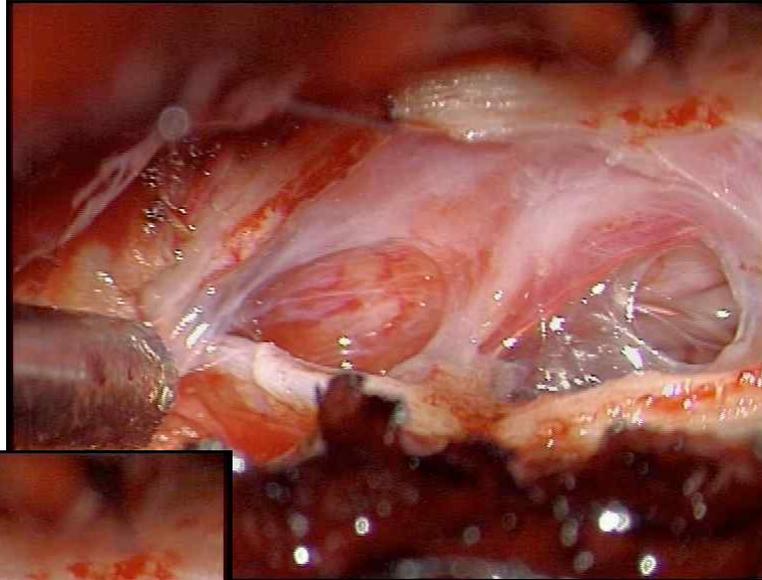
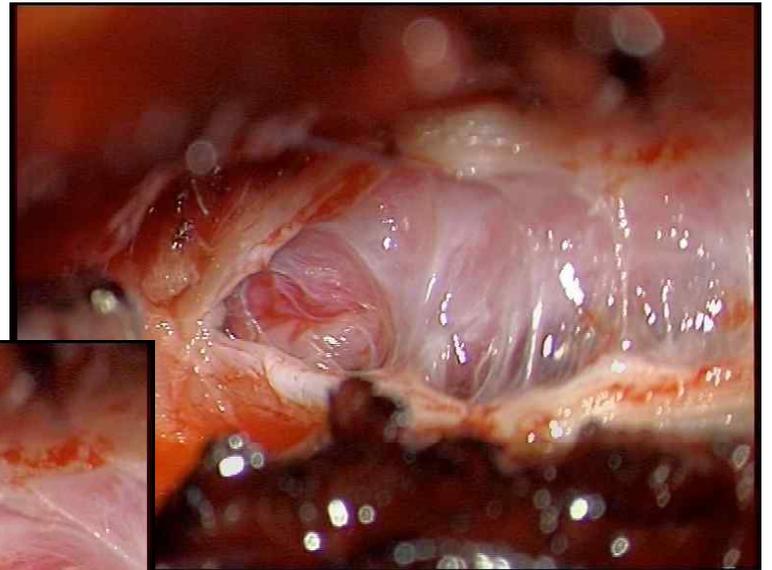
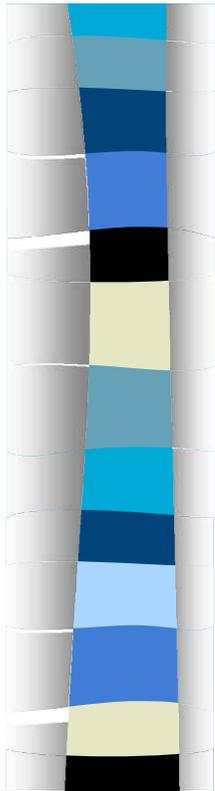
Operation bei Syringomyelie

Entlastung des Wirbelkanals

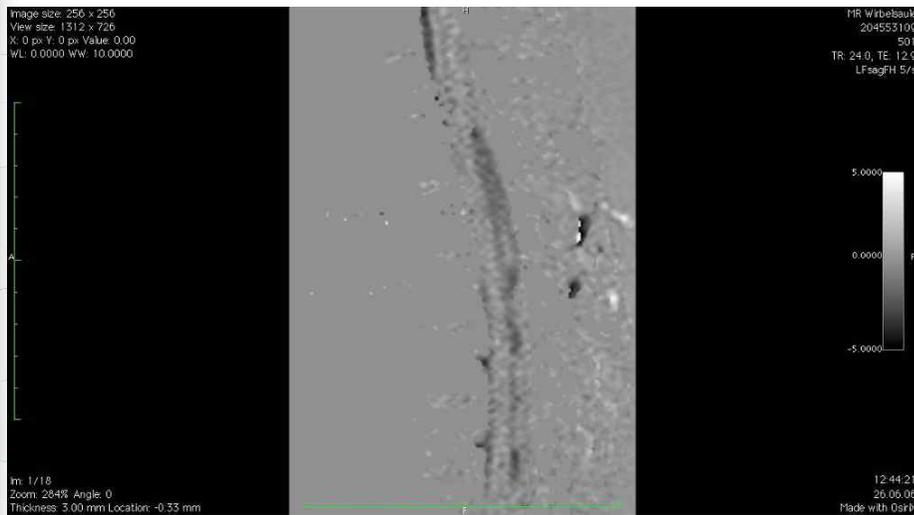
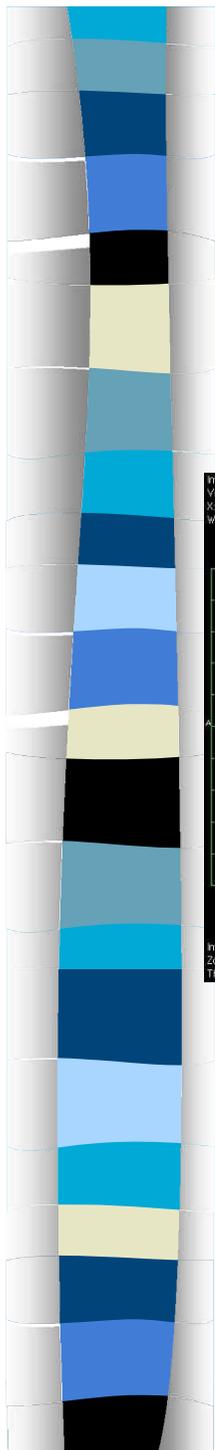
Lösen von Verwachsungen

Vermeiden neuer Verwachsungen

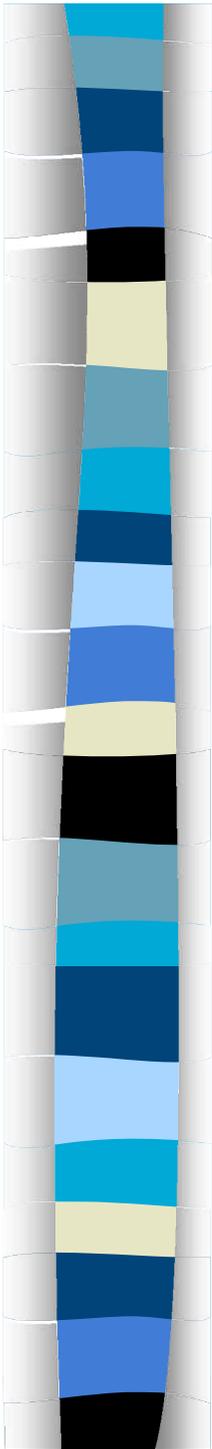
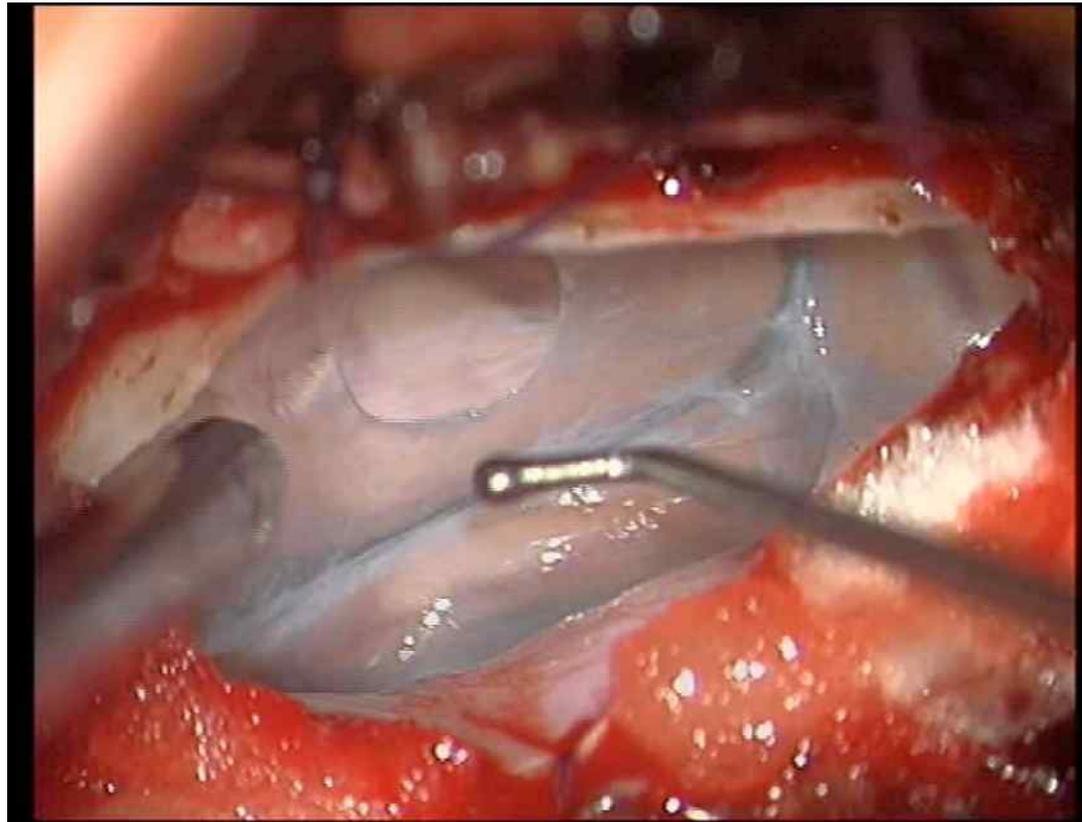
Surgical management



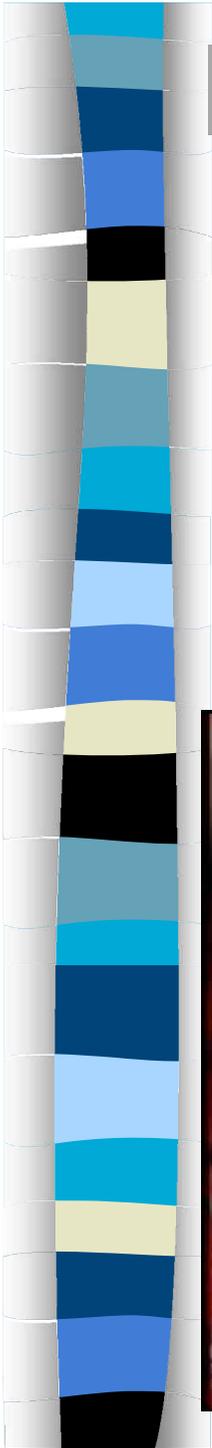
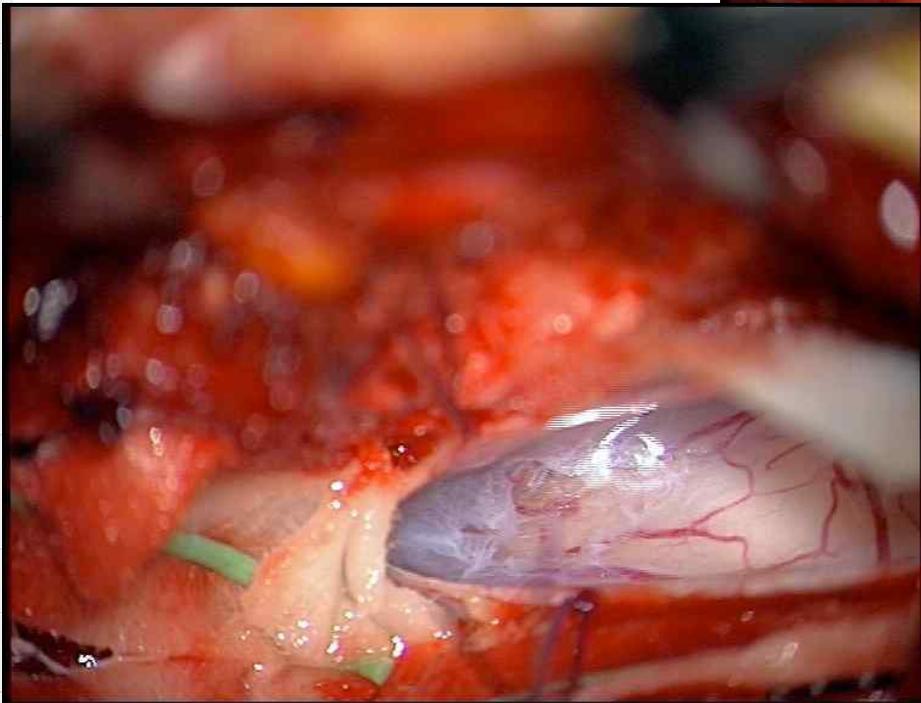
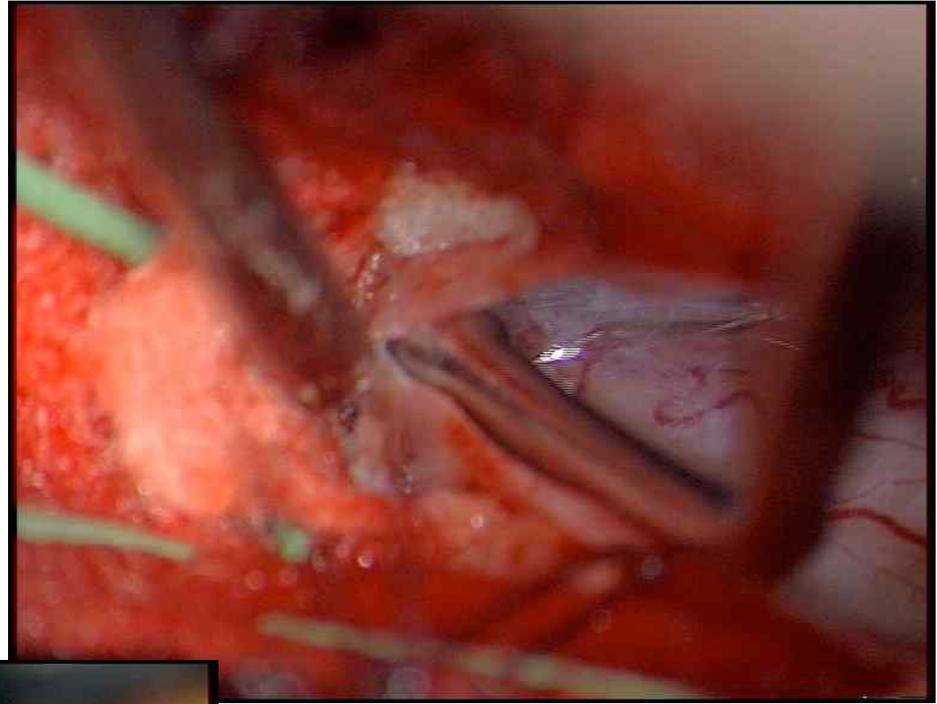
Arachnoidale Verwachsungen distal der Syringomyelie



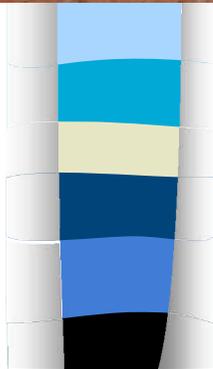
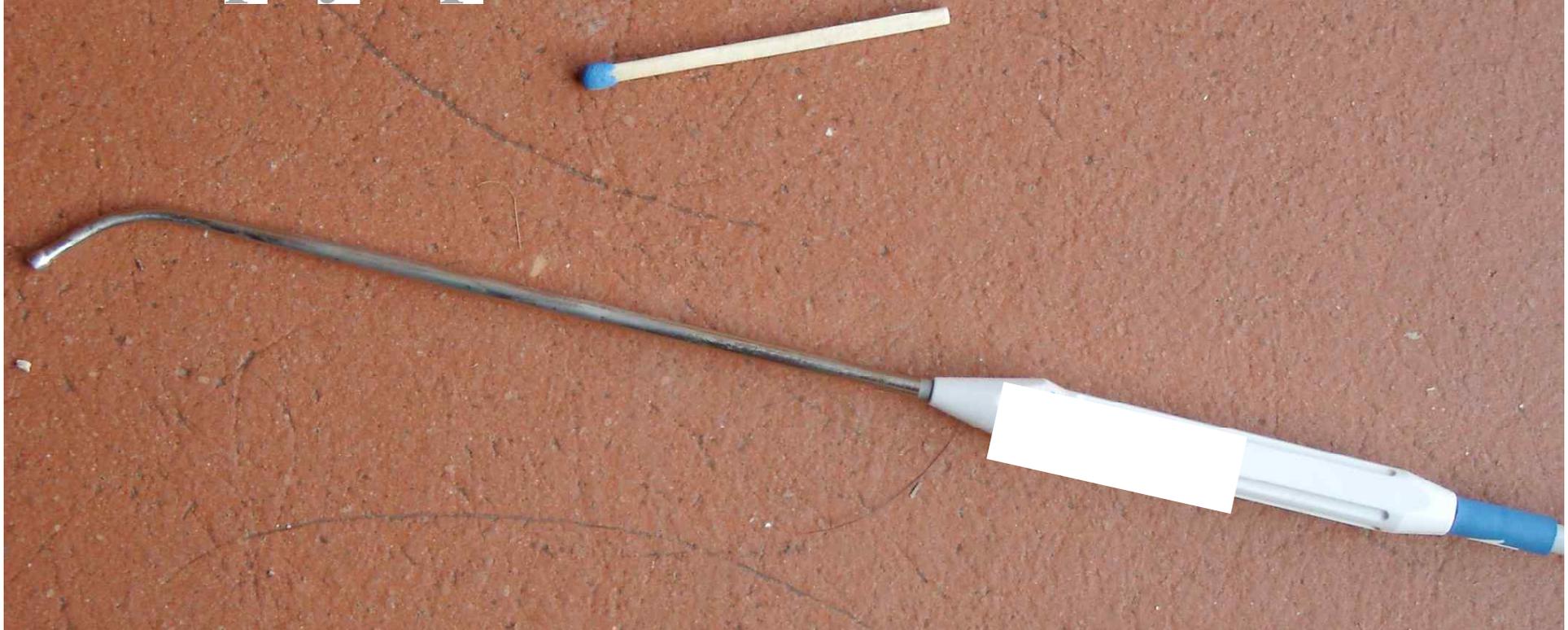
Typischer intraoperativer Befund



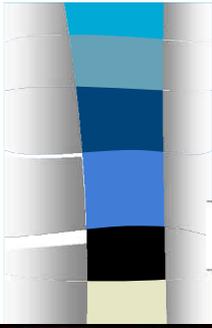
Endoskopie



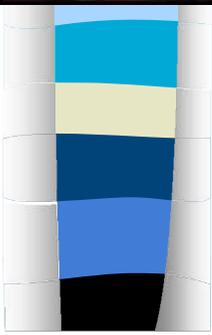
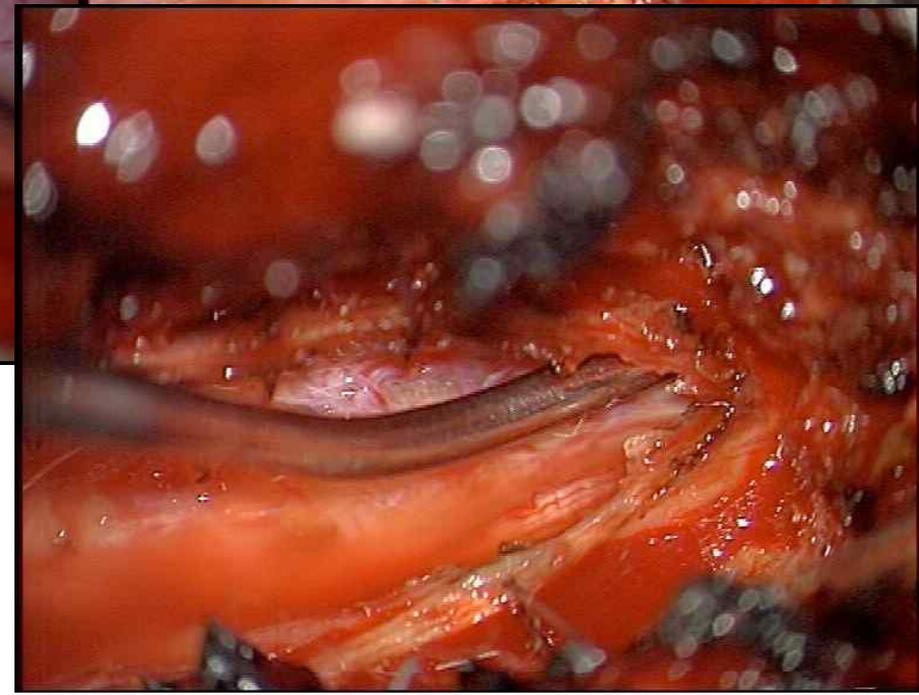
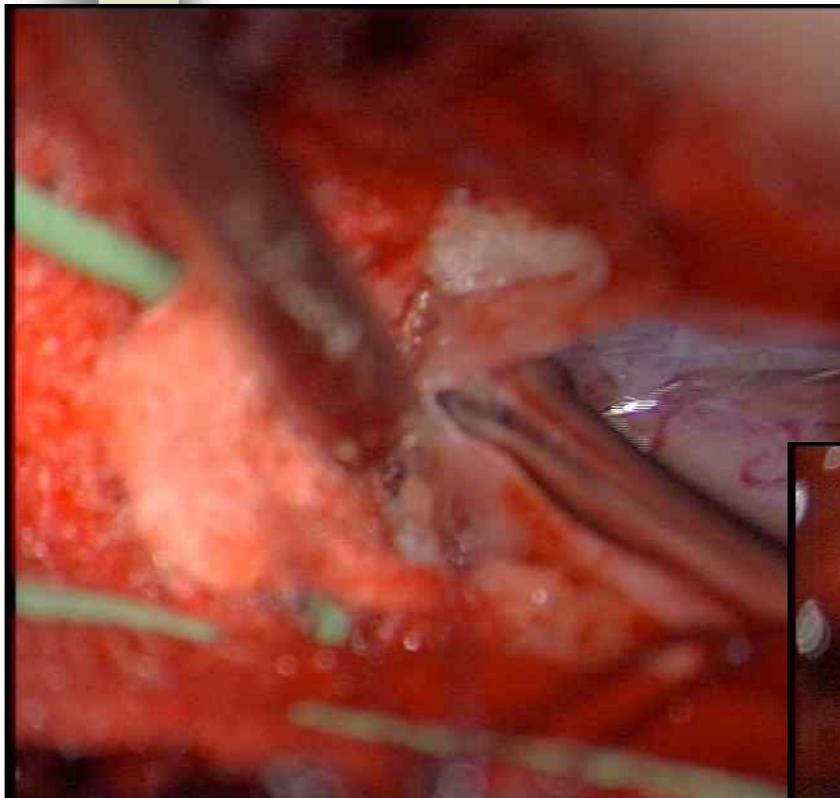
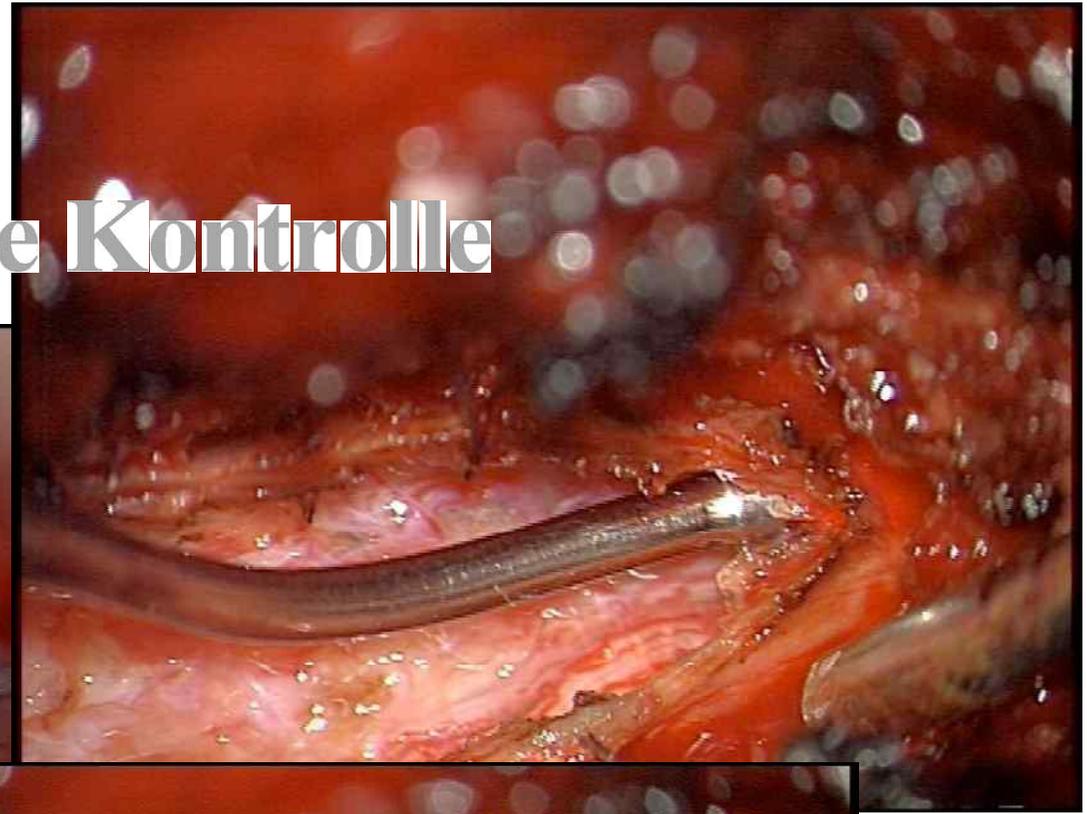
Murphycope®



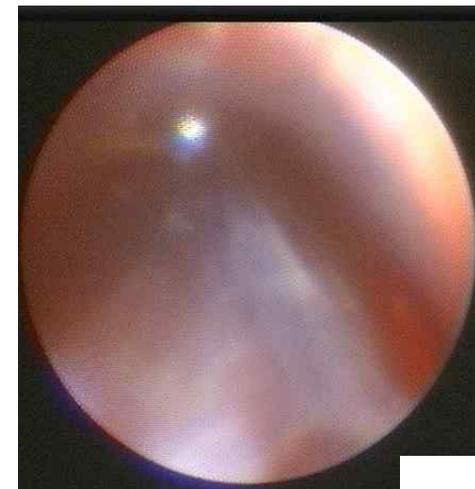
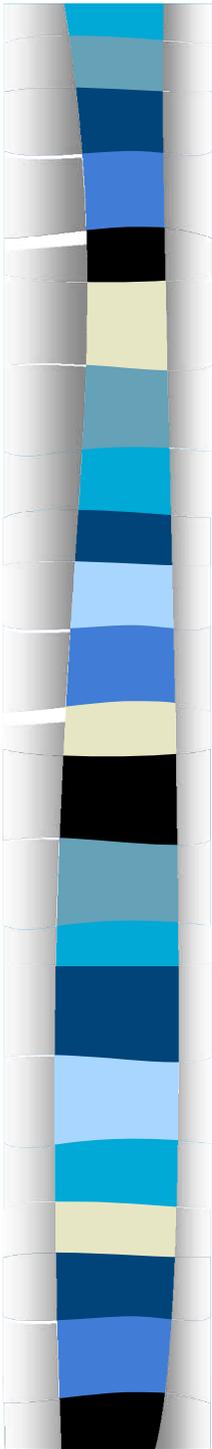
Durchmesser 1,4 und 2,3 mm
10.000 Pixel
frei biegsam, Spülkanal



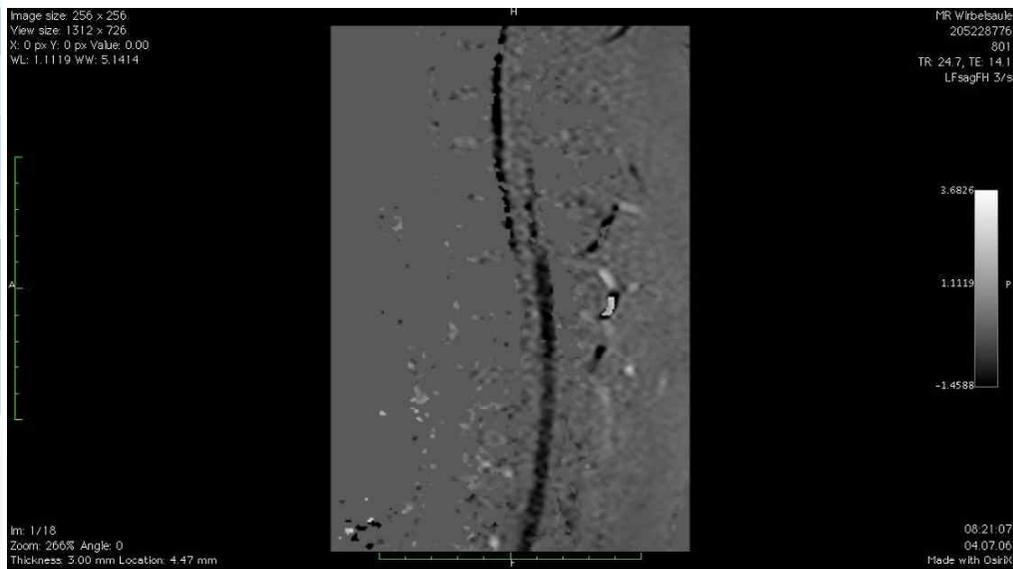
Endoskopische Kontrolle



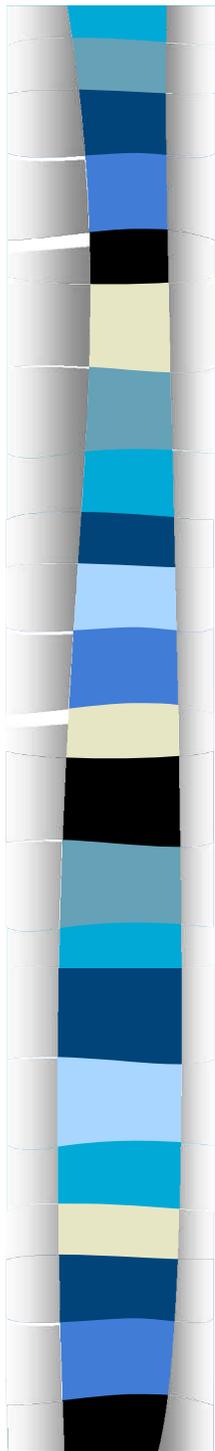
Endoskopische Kontrolle



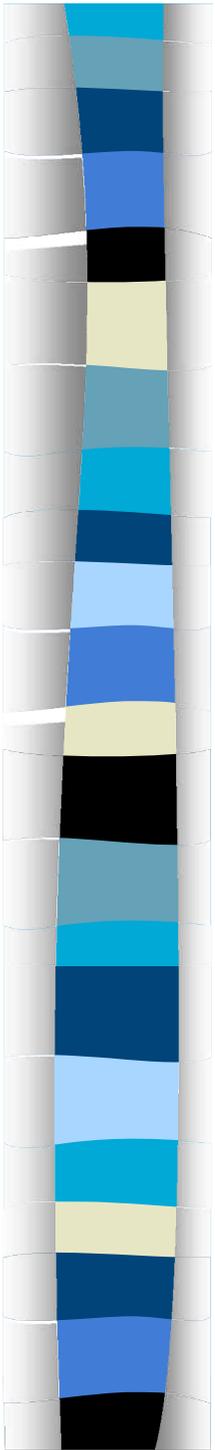
Arachnoidale Verwachsungen distal der Syringomyelie postoperativ

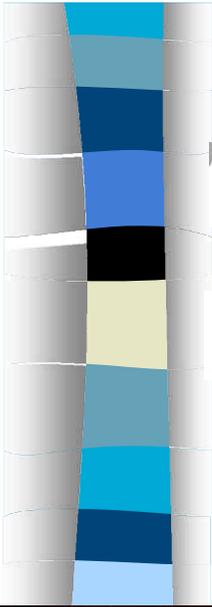


before surgery - after surgery



Posttraumatische Syringomyelie





Tethered Cord

