

6.10.2025

1+2

VORLESUNG „FUNKTIONELLE ANATOMIE“

WS 2025/2026

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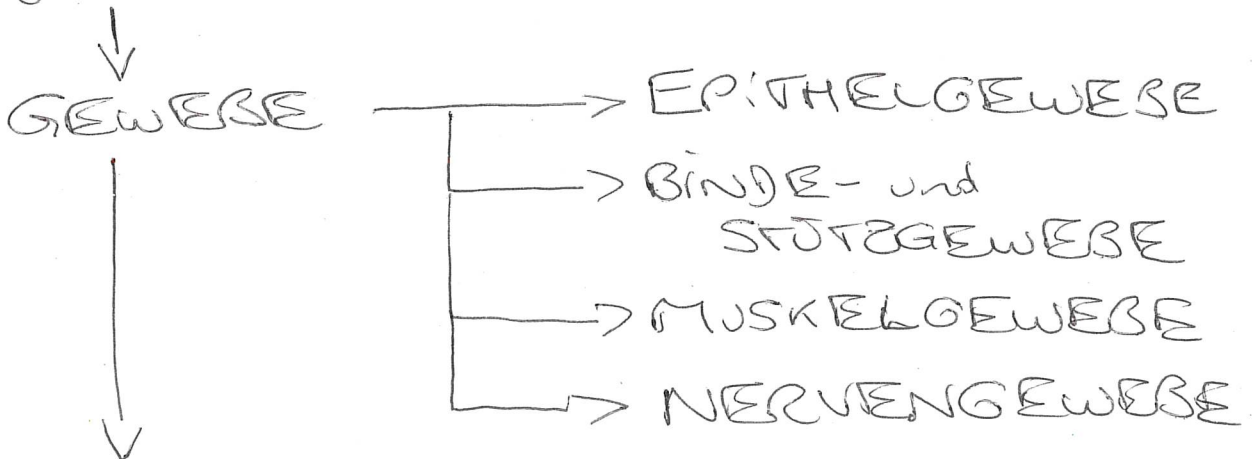
-LICH WILLKOMMEN

ANATOMIE

- ①
- MAKROSKOPISCHE ANATOMIE
 - MIKROSKOPISCHE ANAT. → HISTOLOGIE
 - SUBMIKROSKOPISCHE ANAT.

- ②
- SYSTEMATISCHE ANAT.
 - TOPOGRAPHISCHE ANAT.
 - KLINISCHE ANAT.

ZELLE → SPEZIELLE FUNKT.



ORGANE

SYSTEM, APPARAT, TRAKT

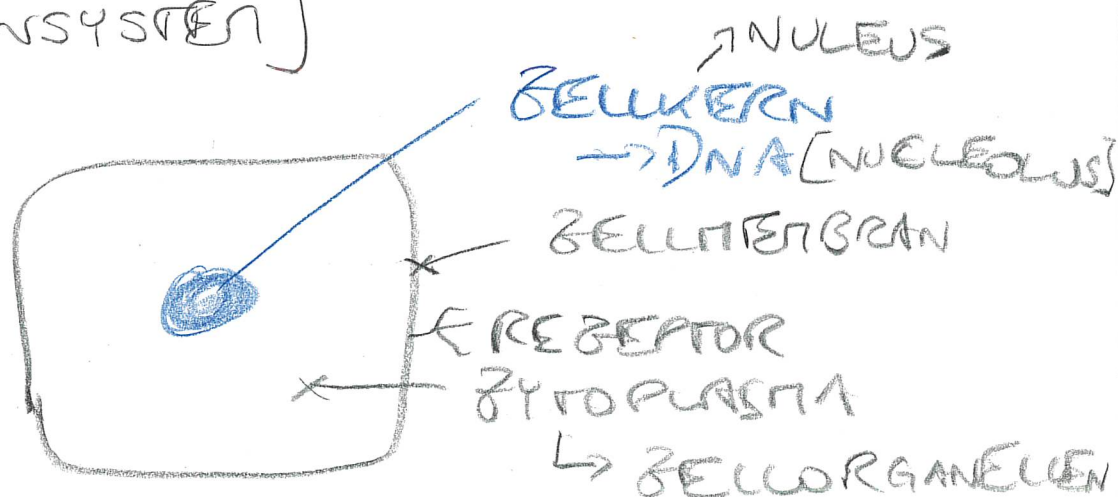
HOMO SAPIENS

SYSTEME:

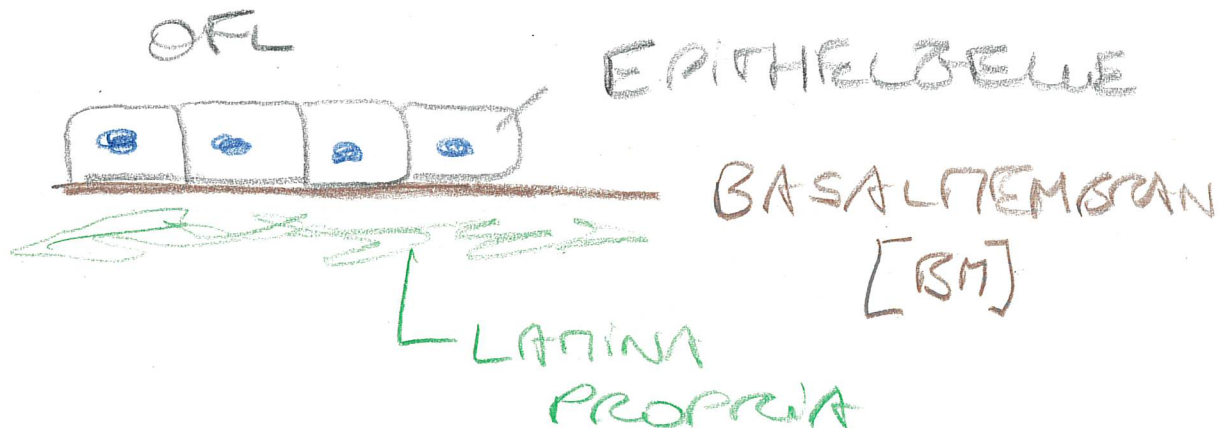
- * HERZ - KREISLAUFSYSTEM
- * ATENSTRAKT
- * VERDAUUNGSTRAKT
- * BEWEGUNGSAPPARAT
 - ↳ PASSIV
 - ↳ AKTIV
- * UROGENITALTRAKT:
 - ↳ HARNTRAKT
 - ↳ GESCHLECHTSAPP.
 - ↳ ♀
 - ↳ ♂

- * NERVENSYSTEM
- * HORMONSYSTEM
- * SINNESSYSTEM
- [* IMMUNSYSTEM]

ZELLE:



1) EPITHELGEWEBE:



A) PLATTENEPITHELIEN:

1) EINSCHICHTIG:

a) PLATT:

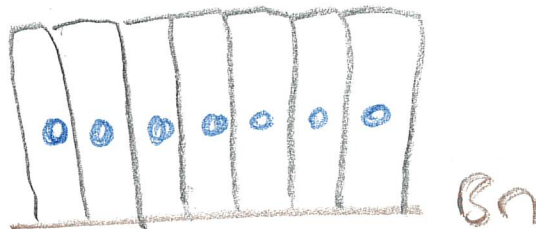


VK: [VORKOMMEN]: ENDOTHEL,
ALVEOLAREPITHEL, MESOTHEL

b) ISOPRISMATISCH = KUBISCH:

VK: DRÜSEN

c) HOCHPRISMATISCH:



VK:
MAGEN-DARM-
TRAKT

2) MEHRSCHICHTIG:

a) UNVERHORNT:



VK: CAVITAS ORIS
PHARYNX,
VAGINA,
URETHRA

b) VERHORNT:

VK: CUTIS
→ EPIDERMIS

3) MEHRREIHIG:

VK: FLIMMEREPITHEL im
AENTRAUT

B) ÜBERGANGSEPITHEL = UROTHEL

↳ VK: TRACTUS URINARIUS

C) SONDERFORMEN: DRÜSEN EPITHEL

* ART der SEKRETION:

— EKKRIN
— MEROKRIN
(APOKRIN)
— HOLOKRIN

* ABGABEORT:

↳ EXOKRIN:

↳ ENDOKRIN: → BLUT

HORMON-
DRÜSEN

* ART d. SEKRETS:

↳ SERÖS
↳ MUKÖS
↳ SEROMUKÖS

II) BINDE- und STÜTZGEWEBE

ZELLE

↳ INTERZELLULARSUBSTANZ

↳ GRUNDSTANZ

↳ FASERN:

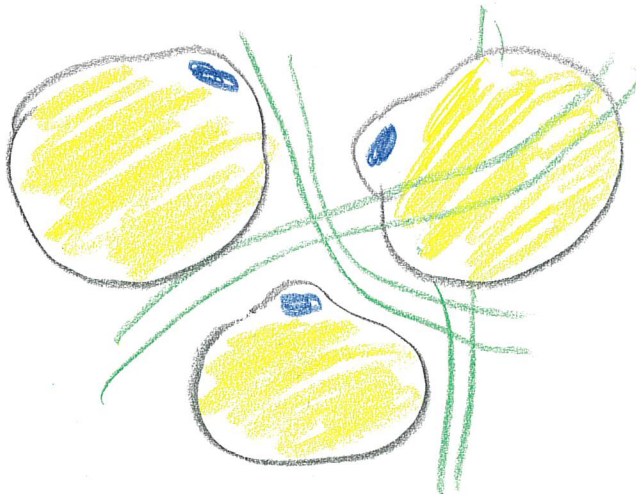
↳ KOLLAGEN: }
 ↳ ELASTISCH }
 ↳ RETIKULÄRE

A) ZELLREICH

1) EMBRYONALE GEWEBE

2) FETTGEWEBE: LIPOCYT

a) GELBES FETT: UNIVAKUOLÄR



→ SPEICHERFETT:

VK: SUBKUTIS

"PANNICULUS
 ADIPOSUS"

OMENTUM MAJUS

→ BAUFETT: CORPUS
 ADIPOSUM

b) BRAUNES FETT

(B) FASERREICH: echte BINDEGEW.

- 1) LOCKERES BDGW.: BINDE-
"WATTEARTIG" GEWEBEZELLE
- 2) STRAFFES BDGW.: = FIBROCYT
- a) PARAWELTFASRIG:

VK: LIGAMENTUM (= BAND)
TENDO

- 2) GEFLECHTARTIG:

VK: KAPSELN
FASZIEN

c) GRUNDSUBSTANZREICH
= STÜTZGEWEBE

- # 1) KNORPELGEWEBE

- ## 2) KNOCHENGeweBE

ad 1) CARTILAGO [LAT.]

CHONDROS [GR.]

CHONDROCYTE [IN RUMEN]

CHONDROBLAST: AKTIV

↳ GRUNDST. (HONDROID)

CHONDROCLAST: FRISST!

BAUEINHEIT: CHONDRON

→ TUMOR

a) HYALINER KNORPEL:

- DRUCK
- VERFORMBAR
- BRECHBAR

ERNÄHRUNG
durch
DIFFUSION

VK: GELENKNORPEL
NASENKNORPEL

LARYNX

b) FASERNORPEL:

- DRUCK
- ZUG

VK: DISCUS INTERVERTEBRALIS
MENISCUS

c) ELASTISCHE KNORPEL

- BIEGUNGSELASTISCH
- ZUGELASTISCH

VK: CARTILAGO EPIGLOTTICA
AURICULA

2) KNOCHENGeweBE: HARTSUBSTANZ

↳ KALZIUM, MAGNESIUM
 SULFATE, PHOSPHATE

OS, OSSIS

OSTEOCYT; OSTEOBLAST → OSTEOID

OSTEOKLAST

"OSTEON"

OS LONGUM = RÖHRENKNOCHEN

CARTILAGO ARTICULARIS

EXTREMITAS
 PROXIMALIS/
 EPIPHYSE

EPIPHYSENFUGE (EF)

↳ HYALINER KNORPEL

CORPUS/
 DIAPHYSE

SUBSTANTIA COMPACTA
 = "CORTICALIS"

DIAPHYSE

FORAMEN NUTRITIVUM

→ CANALIS NUTRITIVUS

CAVITAS MEDULLARIS

↳ MEDULLA OSSIIUM

FLAVA

EXTREMITAS
 DISTALIS/
 EPIPHYSE

SUBSTANTIA
 SPONGIOSA

MEDULLA OSSIIUM

RUBRA

↳ BLUTBELLECK

* METAPHYSE

EF → LINEA EPIPHYSIALIS

P PERIOST: → STR. OSTEOGENICUM(i)
 → STRATUM FIBROSUM

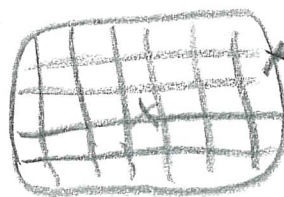


KNOCHENTYPEN:

1) OS LONGUM:

VK: FEMUR, HUMERUS, RADIUS,
FIBULA, ULNA,
PHALANX PROXIMALIS,
PHALANX DISTALIS

2) OS BREVE:



SUBST. COMPACTA
SUBST. SPONG.

VK.: CARPUS, TARSUS

3) OS PLANUM:



TABULA EXT.
} DIPLOE
TABULA INT.

VK.: OS PARIETALE, OS ~~ZYGOMATICUM~~
ZYGOMATICUM
OS COXAE, SCAPULA, STERNUM

4) OS PNEUMATICUM:



SUBST. COMP.

LUFT

VK.: MAXILLA,
OS FRONTALIS,
OS SPHENOIDALE,
OS TEMPORALE

5) OS IRREGULARE:

VK.: VERTEBRA

III) MUSKELGEWEBE:

KONTRAKTIVE ELEMENTE

→ O₂ VERBRUCH

A) QUERGESTREIFTE MUSKEL:
= SKELETTMUSKEL

- ↳ SCHNELLE KONTRAKTION
- ↳ WILLKÜRICH
- ↳ ERNÜDDET

B) GLATTE MUSK. = EINGEWEIDENUSK

- ↳ LANGSAME KONTR.
- ↳ UNWILLKÜRICH
- ↳ UNERNÜDICH

VK: DARMPHHR

C) HERZMUSKULATUR:

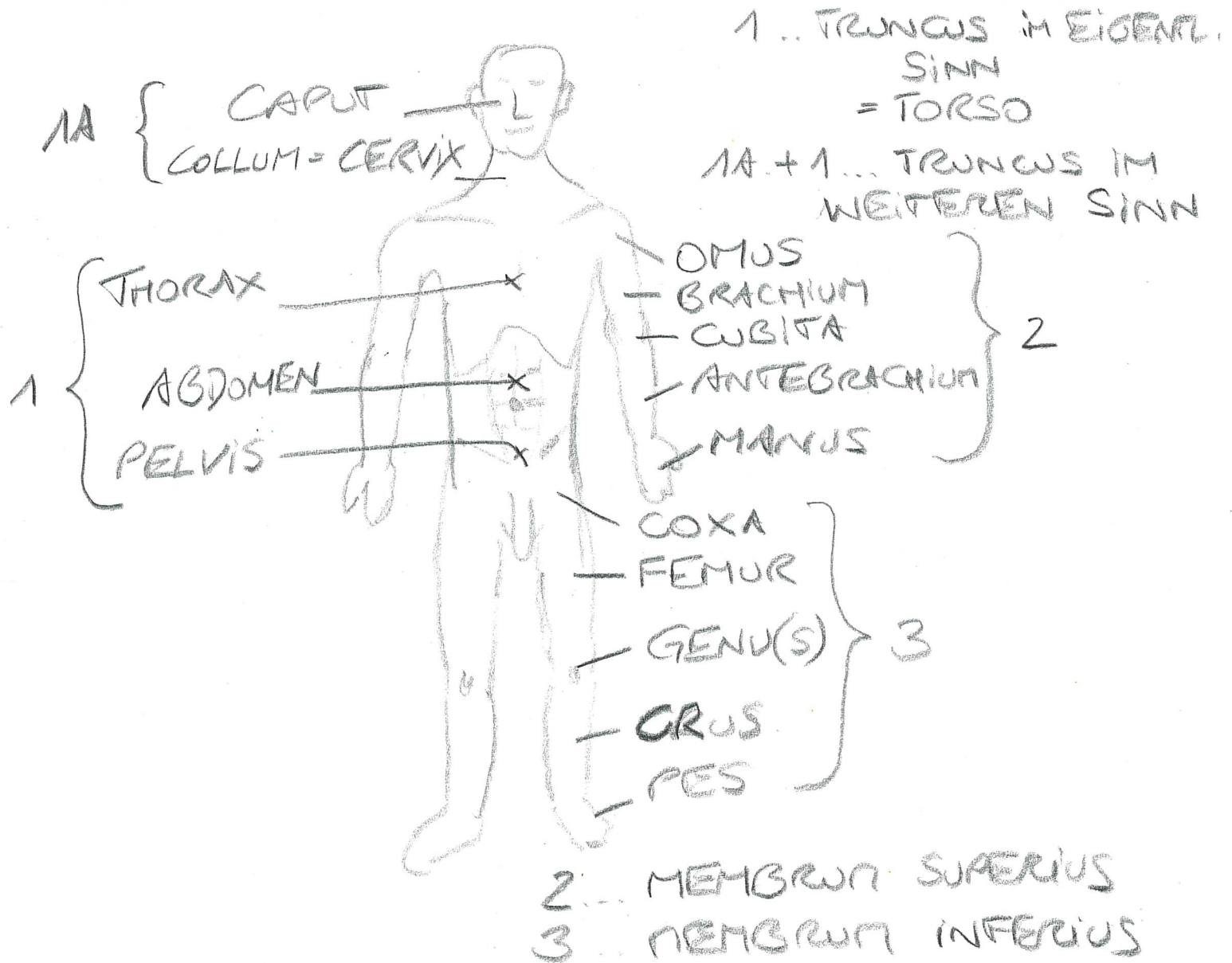
- ↳ SCHNELLE KONTR.
- ↳ UNWILLKÜRICH
- ↳ UNERNÜDICH

IV) NERVENGEWEBE

↳ SIEHE NERVENSYSTEM

ORIENTIERUNG:

* KÖRPERTEILE:



* AXEN + EBENEN:

1) EBENEN:

→ SAGITALEBENE
SF: SYMMETRIEBENE
= MEDIANEBENE

2) HORIZONTAL EBENE:

3) FRONTALEBENE:

= CORONALEBENE

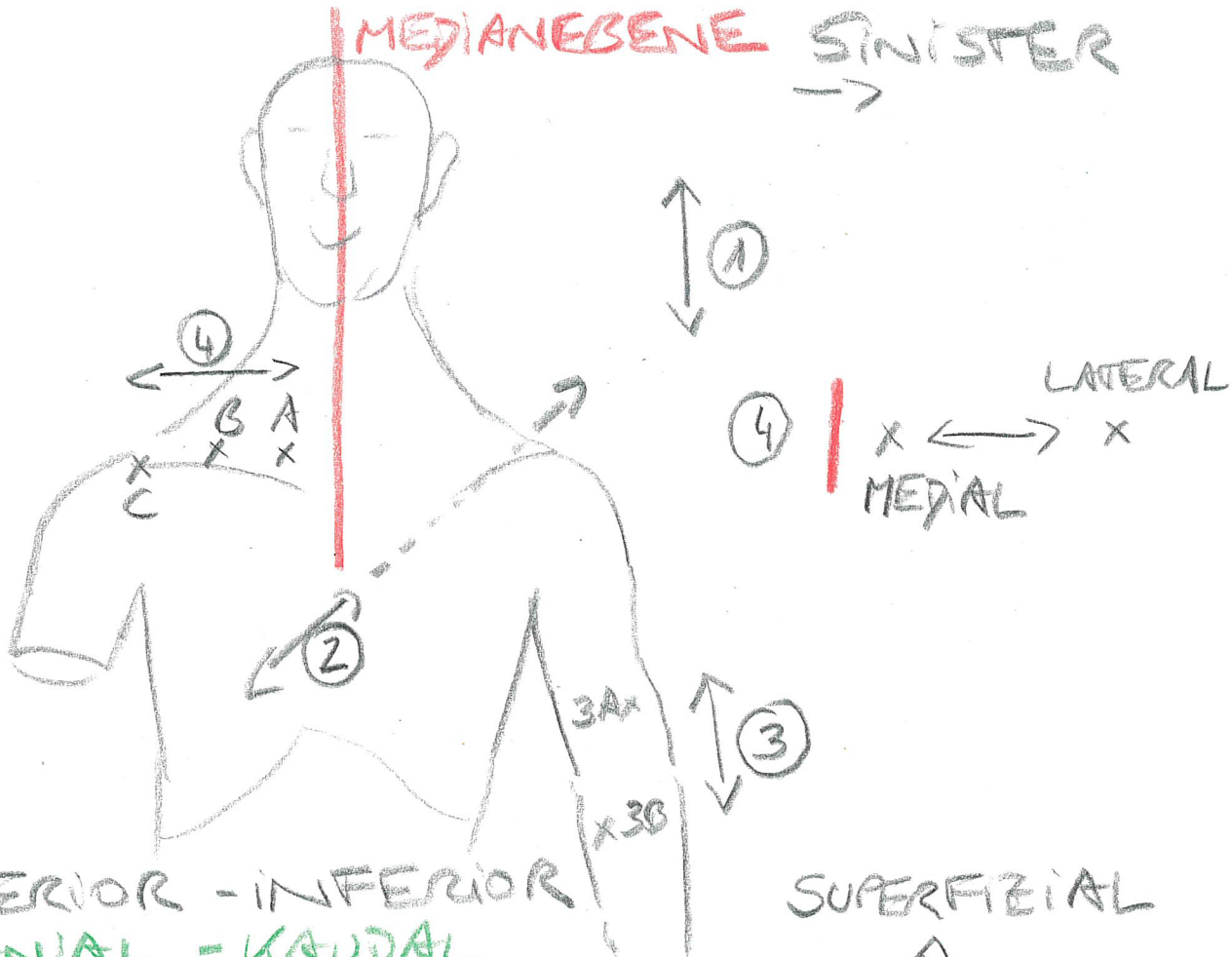
B) AXEN:

- SAGITTALE Achse: VO $\leftrightarrow$ HI
- TRANSVERSALE Achse: QUER
RE $\leftrightarrow$ LI
- LONGITUDINALE = VERTIKALE A.
OBEN $\leftrightarrow$ UNTEN

* RICHTUNGSBEREICHNUNGEN.

DEXTER
←

MEDIANEBENE
→ SINISTER



① SUPERIOR - INFERIOR
KRANIAL - KAUDAL

② ANTERIOR - POSTERIOR
VENTRAL - DORSAL

③ PROXIMAL - DISTAL
3A $\leftrightarrow$ 3B

SUPERFIZIAL



PROFUND

BEWEGUNGSAPPARAT:

ALLGEMEINE GEWENKLEHRE:
= ARTHROLOGIE

ARTHROS = ARTICULATIO = GEWENK

I) SYNARTHROSEN = KONTINUIERLICHE GEL.
= UNECHTE GEL. = JUNCTURAE
= HAFT

II) DIARTHROSEN = DISKONTINUIERL. GEL.
= ECHTE GEL. = ARTICULATIO

13.10.2025

ad I) 2 KNOCHEN + BINDERITTEL

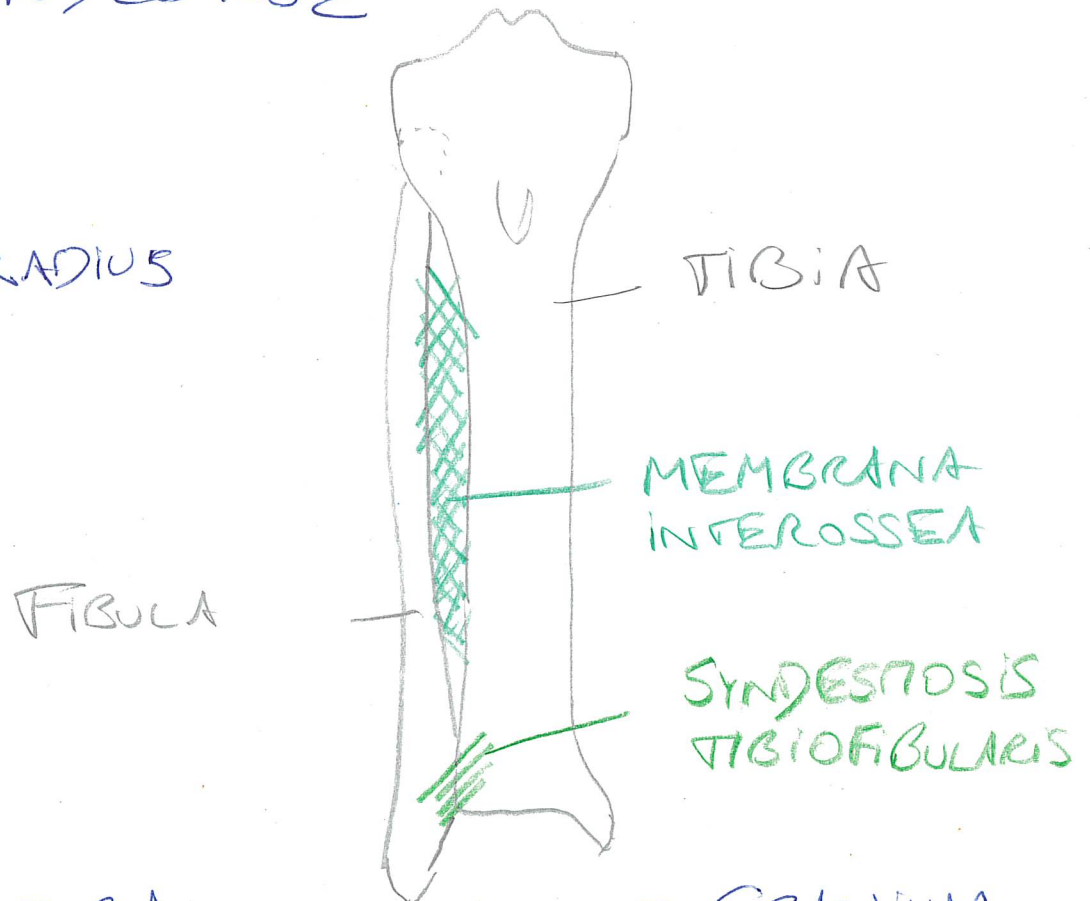
- A) JUNCTURA FIBROSA
- (B) JUNCTURA CARTILAGINEA
- C) JUNCT. OSSEA

ad ~~A~~

1) SYNDESMOSE

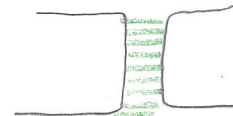
VK:

ULNA + RADIUS



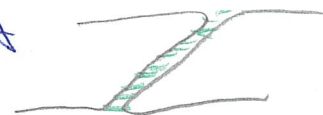
2) SUTURA: "NAHT" → CRANIUM

a) SUT. PLANA:



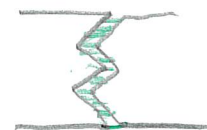
→ VISCERO CRANIUM

b) SUT. SQUAMOSA



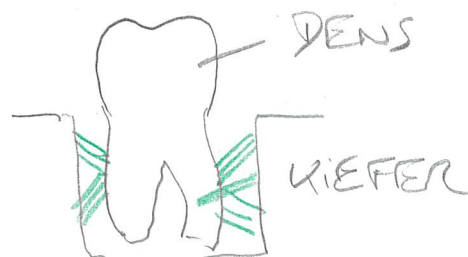
→ BASIS CRANI

c) SUT. SERRATA



→ CALVARIA

3) GONPHOSIS



B) 1) **SYNCHONDROSE: HYALIN**

VK: SYNCHONDROSIS STERNOCOSTALIS
 "EPIPHYSENFUGE"

2) **SYMPHYSE**: VK: SYMPHYSIS PUBICA
 SYMPHYSIS INTERVERTEBRALIS

C) → A+B ~~VERKÜNDERT~~

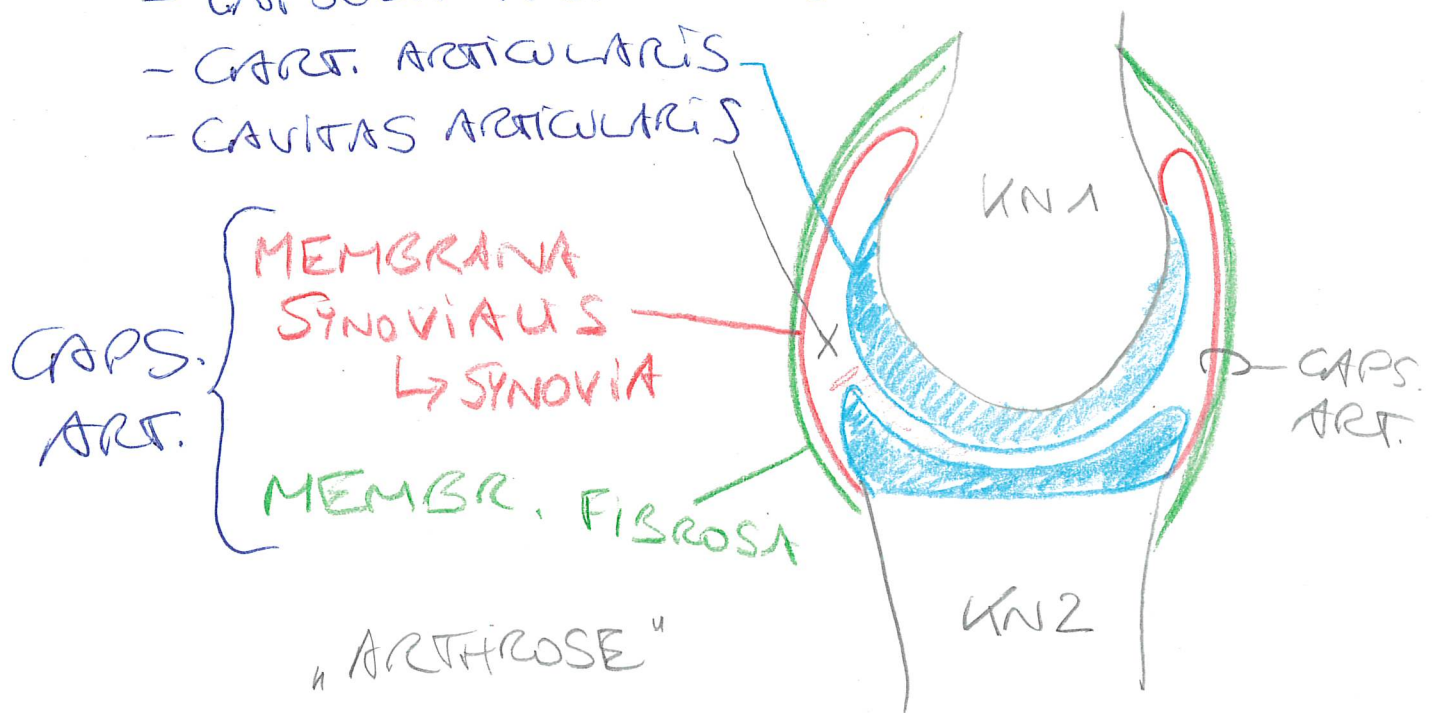
ad II) **DIARTHROSEN:**

OBLIGATORISCHE GELENKEINRICHTUNGEN

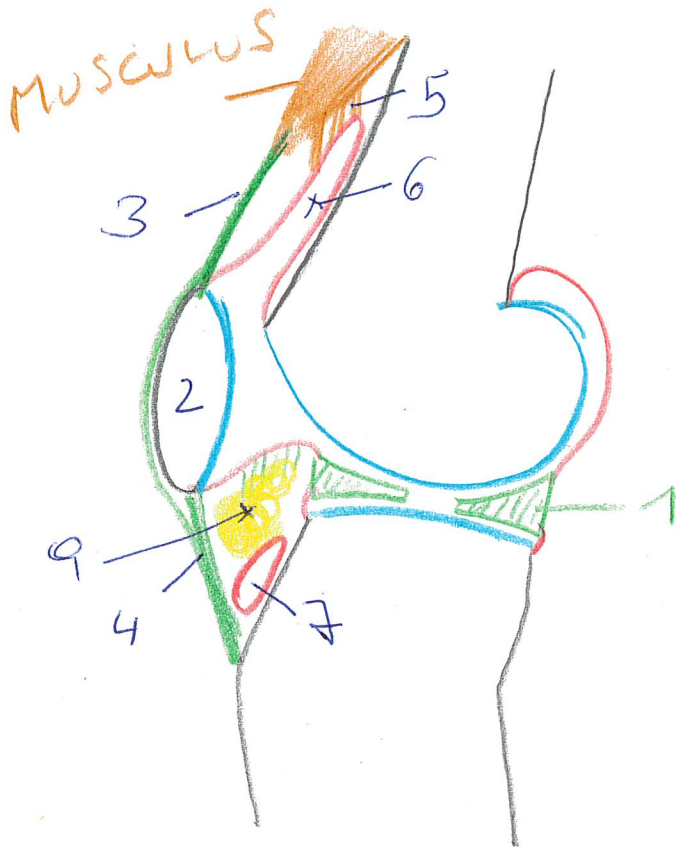
- MIND. 2 KNOCHEN: $n = 2$: ARTICULATIO SIMPLEX

$n > 2$: ART. COMPOSITA

- CAPSULA ARTICULARIS
- CART. ARTICULARIS
- CAVITAS ARTICULARIS



HILFSEINRICHTUNGEN



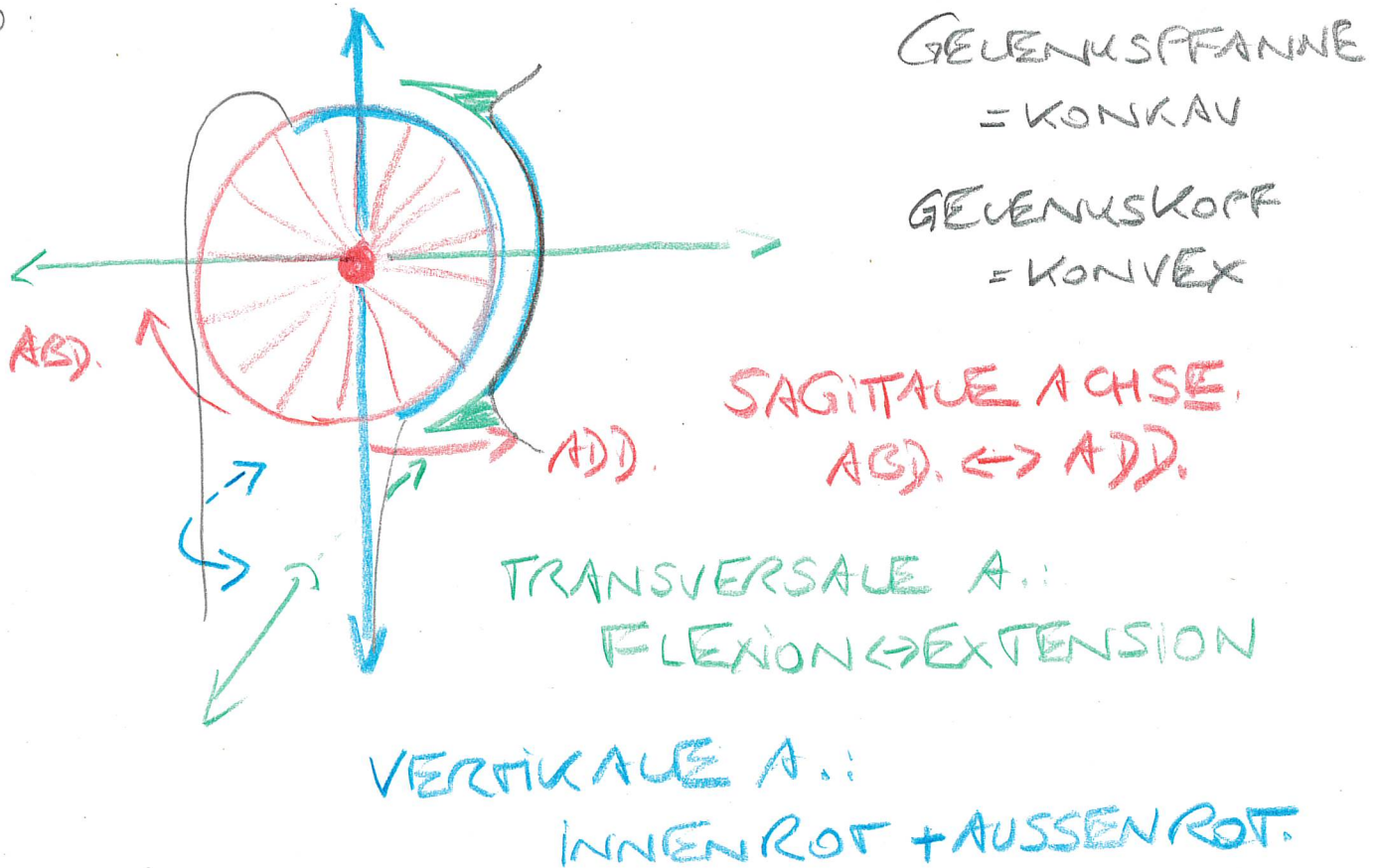
- 1... MENISCUS
- 2... OS SESAMOIDEUM
BSP.: PATELLA
- 3... TENDO
- 4... LIGAMENTUM
- 5... P. ARTICULARIS
- 6... RECESSUS
- 7... BURSA [SYNOVIA]
 ↳ KOMMUNIZIEREND
 ↳ NICHT KOMMUNIZIEREND
- 8... PLICAE SYNOVIALES
- 9... CORPUS ADIPOSUM
- 10... LABRUM ARTICULARE
 VK. ART. HUMERI,
 ART. COXAE
- 11... VAGINA SYNOVIALIS
 TENDINIS
- 12... DISCUS
 ↳ ART. TEMPORO-
 MANDIBULARIS

EINTEILUNG d. DIARTHROSEN:

A) 3-ACHSIGE GELENKE:

1) ART. SPHEROIDEA = KUGELGELENK

V.V.O.:



CIRCUMDUKTION = KREISEN

Vk.: ART. HUMERI
ART. COXAE

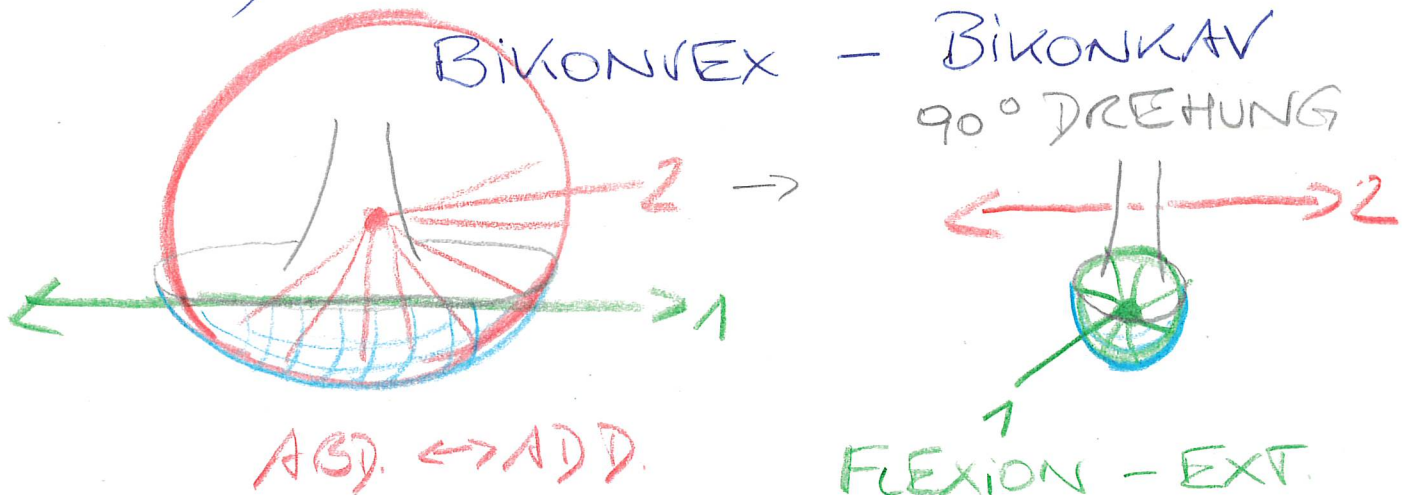
ART. HUMERORADIALIS
ART. METACARPOPHALANXIAE II-V
= GRUNDGELENKE d. FINGER

2) ART. PLANA:

Vk.: ART. ZYGAPOPHYSIAUS
= FACETTENGELLENK

B) 2-ACHSIGE GEL.:

1) ART. ELLIPSOIDEA : ART. OVOIDEA

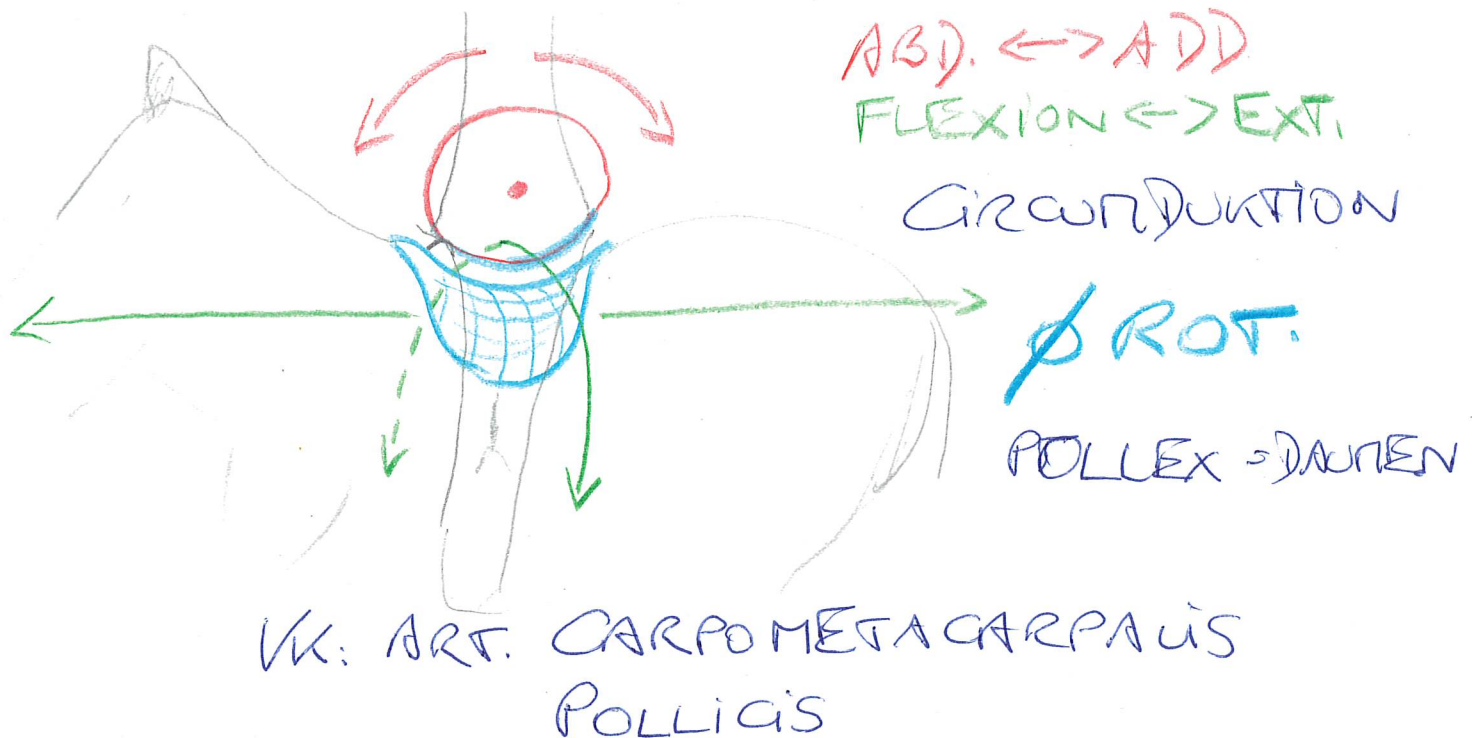


CIRCUMDUKTION

VK: ART. RADIOCARPAUS = "HANDGELENK"

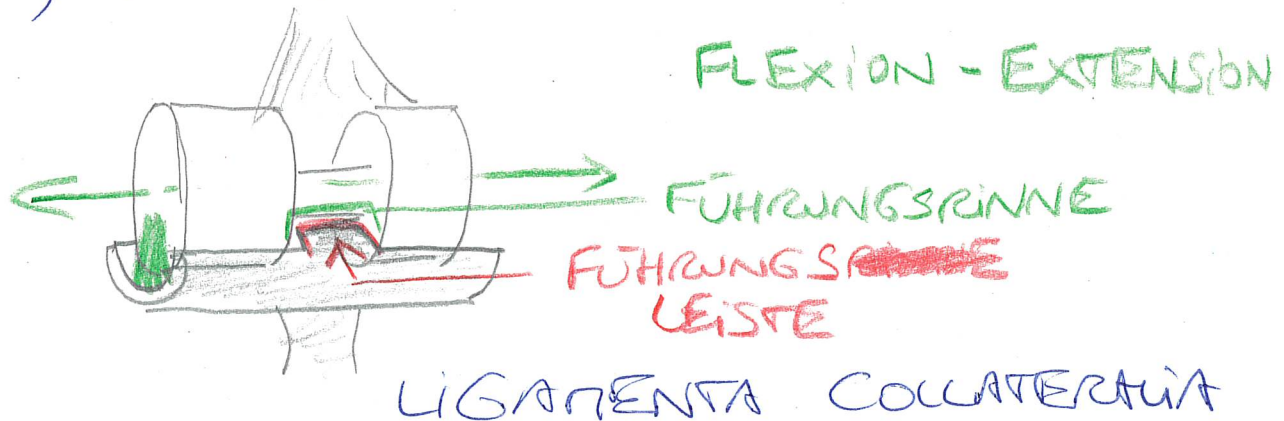
SF: BICONDYLENGELENK: ART. ATLANTO-OCCIPITALIS

2) ART. SELLARIS: JEDER KNOCHEN IST KONVEXKONKAV



C) EINACHSIGE GEL: ZYLINDERGELENKE

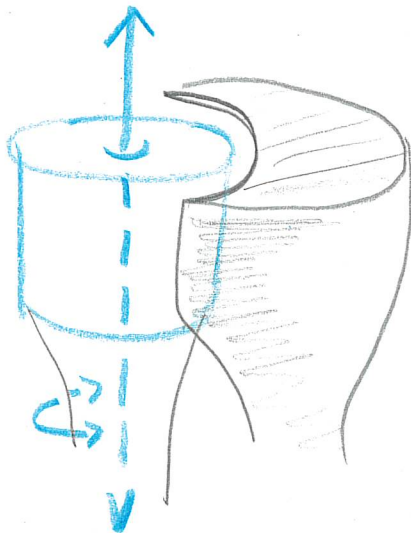
1) GINGLYMUS: = SCHARNIERGELENK



VK: ART. HUMEROULNARIS

ART. INTERPHALANEA PROX. ET
DISTALIS II - V

2) ART. TROCHOIDEA: RAD-/ZAPFENGEL.



INNEN ↔ AUSSENROT

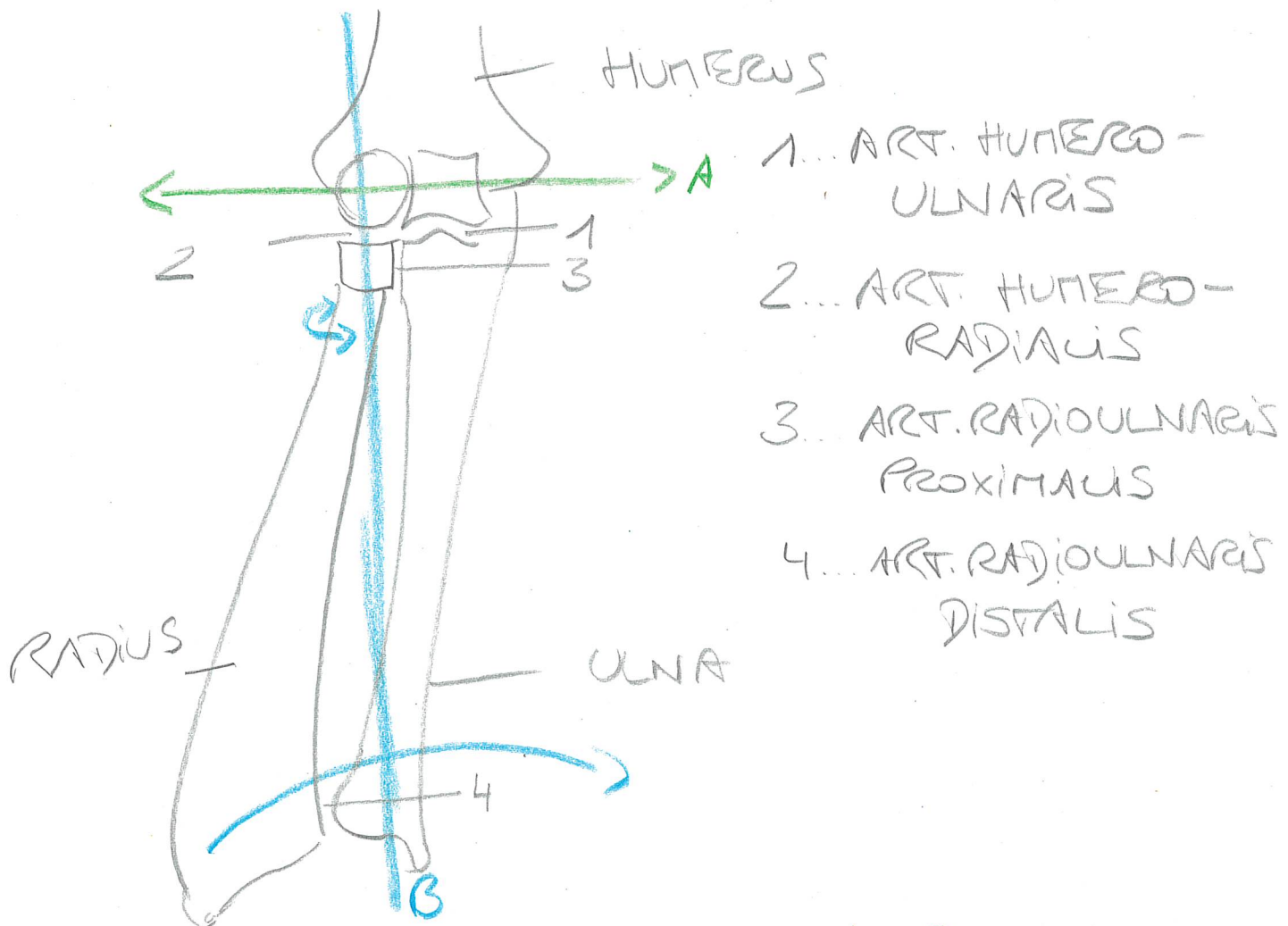
VK: ART. RADIOULNARIS
PROXIMALIS ET. DISTALIS

SONDERFORM:

* AMPHIARTHROSE: PLANES GEL.
MIT STRAFFEN BÄNDER

VK: ART. SACROILIACA

FUNKTIONELLE EINHEIT



1... ART. HUMERO-ULNARIS

2... ART. HUMERO-RADIALIS

3... ART. RADIOULNARIS PROXIMALIS

4... ART. RADIOULNARIS DISTALIS

A... TRANSVERSALE A: 1+2

B... LONGITUDINALE A: 2+3+4

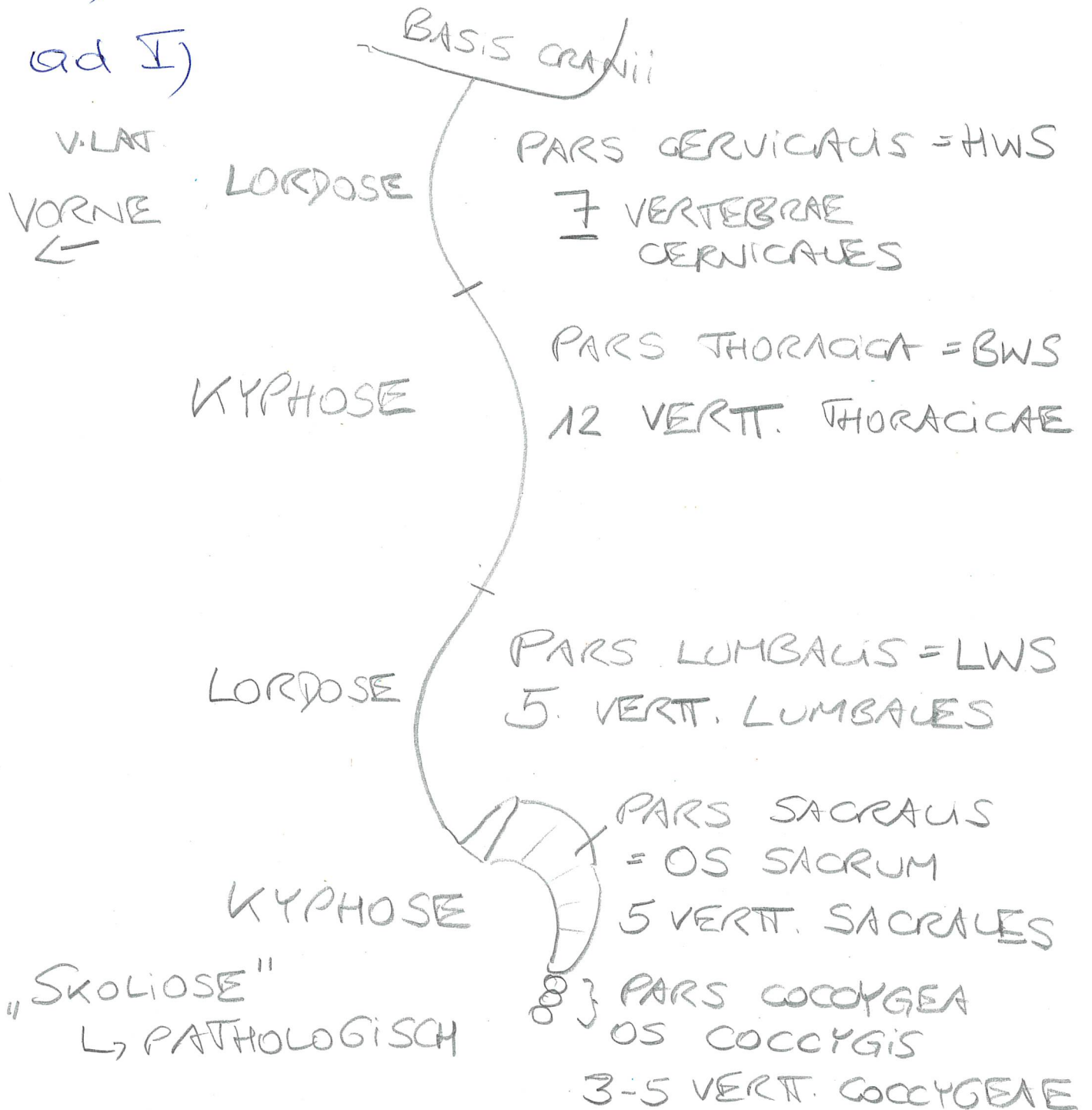
SPEZIELLE OSTEOLOGIE, und ARTHROLOGIE

ACHSENSKELETT:

I) COLUMNA VERTEBRATIS

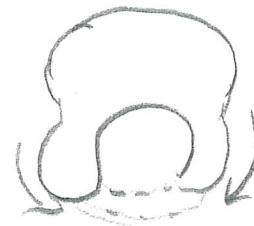
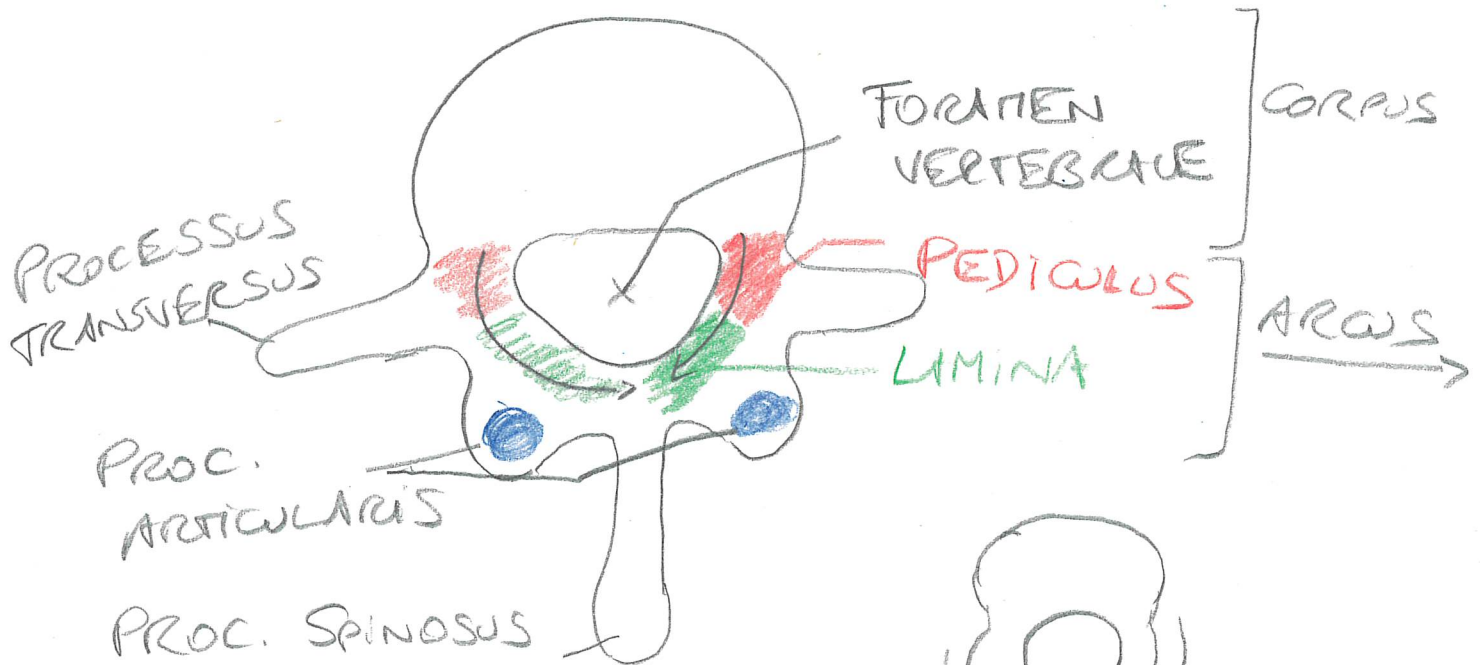
II) CRANIUM

ad I)



VERTEBRA v. KRANIAL

VENTRAL
 ↑



FORAMINA VERTEBRALIA

↳ CANALIS VERTEBRALIS

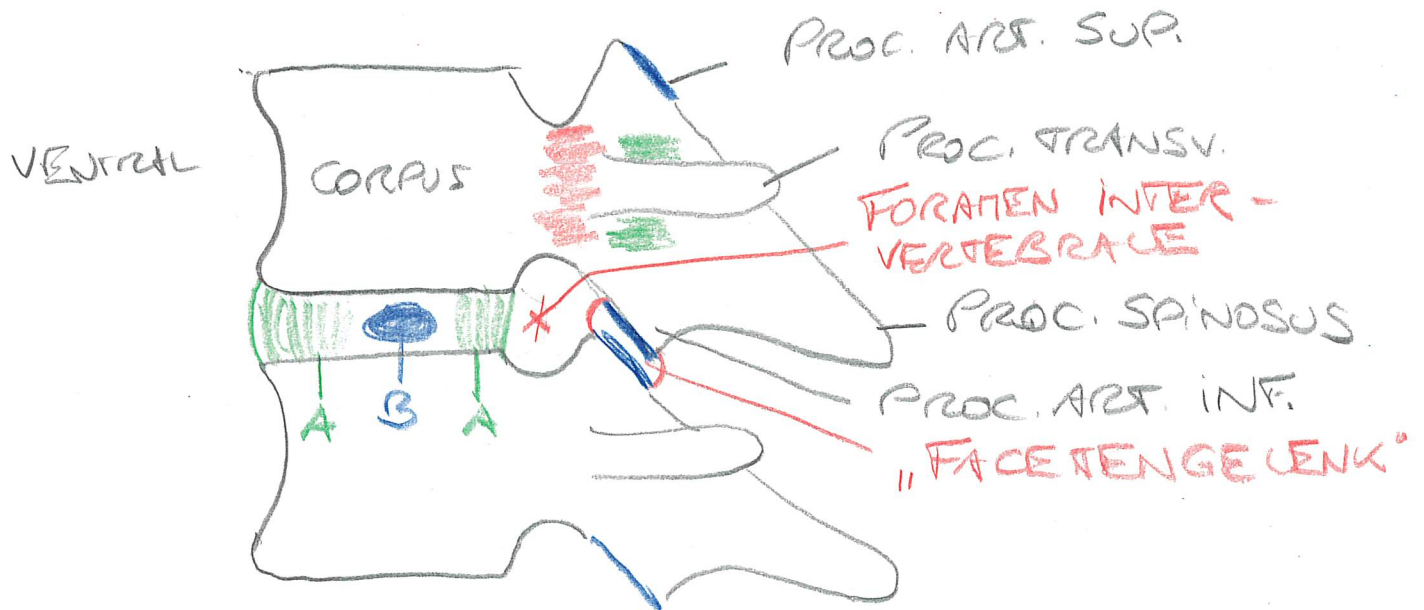
[INHALT: MEDULLA SPINALIS]

SPINA
 BIFIDA

ANFANG: FORAMEN MAGNUM

ENDE [KAUDAL], HIATUS SACRALIS

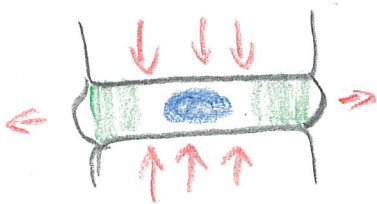
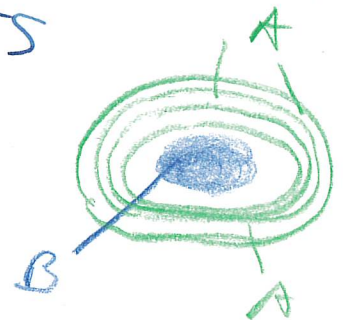
2 VERTEBRÆ V. LAT.



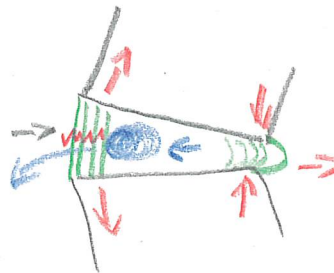
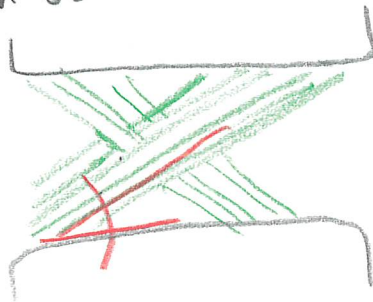
* N. SPINALIS; BLUTGEFÄSSE

DISCUS INTERVERTEBRATUS

- ↳ ANULUS FIBROSUS
- ↳ NUCLEUS PULPOSUS
- ↳ FASERKNORPEL

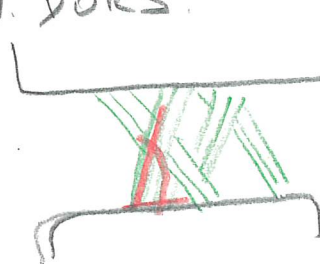


V. VO



"PROTRUSION"
"PROLAPS"

V. DORS



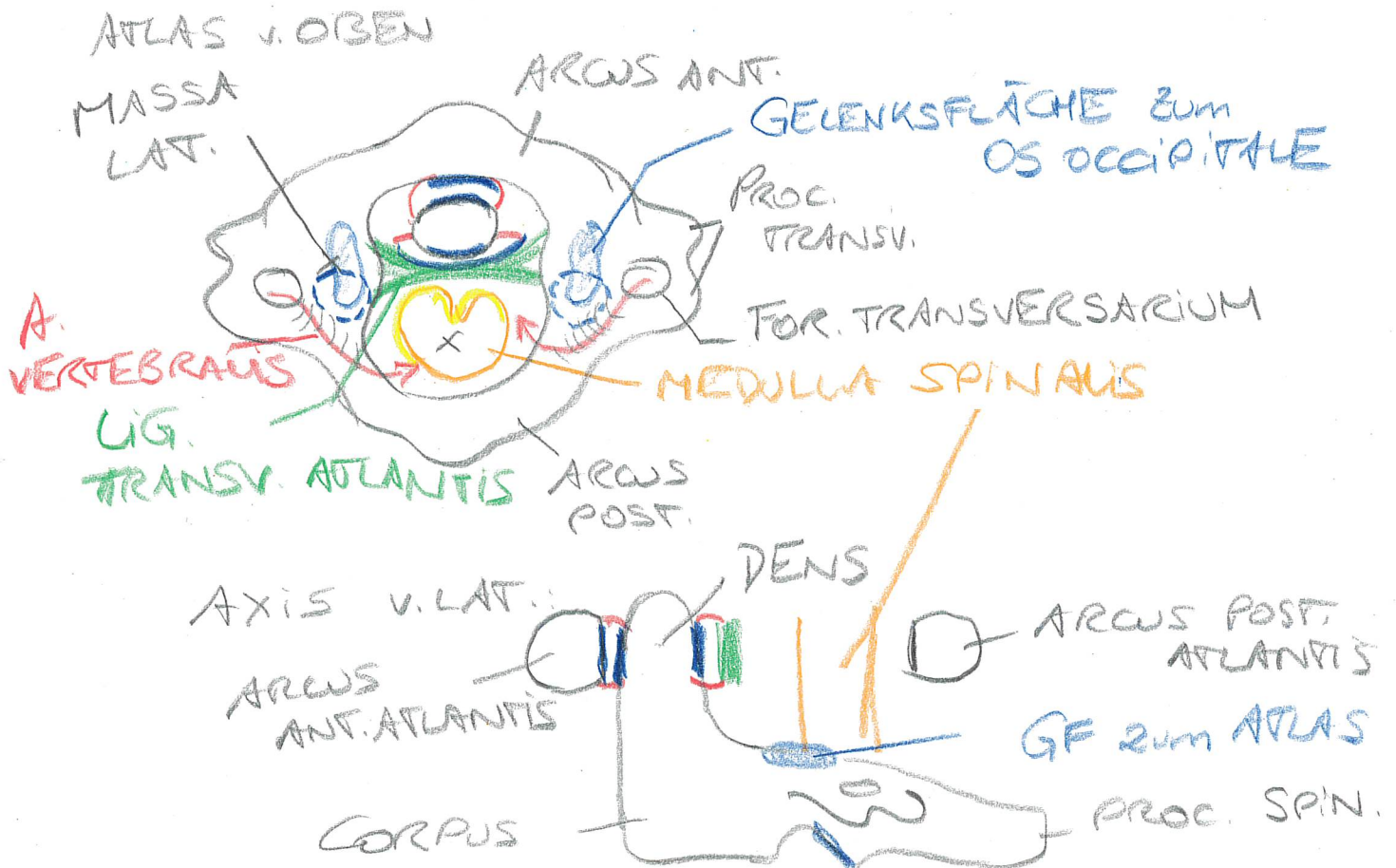
LWS

BESONDERHEITEN:

* HWS ..

1. HW: ATLAS

2. HW: AXIS



KOPFGELENKE:

I) ART. ATLANTOOCIPITALIS
 = oberes Kopfgeelenk

INKLINATION - REKLINATION
 LATEROPOSITION

II) ARTICULATIONES ATLANTOAXIALES
 MEDIANA et LATERALES
 = untere Kopfgeelenk.

ROTATION

HWS:

- PROC. UNQUINATUS | UNCUS
- PROC. TRANSVERSUS



 - TUBERCULUM ANT. / ehem. RIPPE
 - TUBERC. POST.
- FOR. TRANSVERSARIUM: A. VERTEBRALIS
- PROC. SPINOSUS: ~~zwei~~ ZWEIFGETEILT
 $C_2 - C_6$

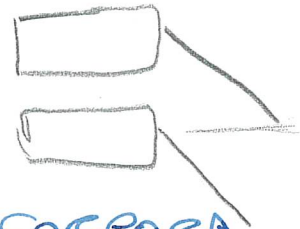
- PROC. SPIN. C_7 :  "VERTEBRA PROMINENS"

* BWS:



- GELENKVERBINDUNG ZU DEN RIPPEN
- $TH_3 - TH_7$: STEIL ABFALLENDE PROCC. SPINOSI

ART. sg.	A. sg.	V. sg.
ARTT. pe.	At. pe.	Vv. pe.



* LWS:

- MÄCHTIGE QUEROVALE CORPORA
- FLÄCHENFÖRMIGE PROC. SPINOSI
- PROC. TRANSV.: DEGENERIERT
- PROC. COSTALIS: RIPPEN RUDIMENT
- PROCC. ARTICULARES: SAGITALGESTELT

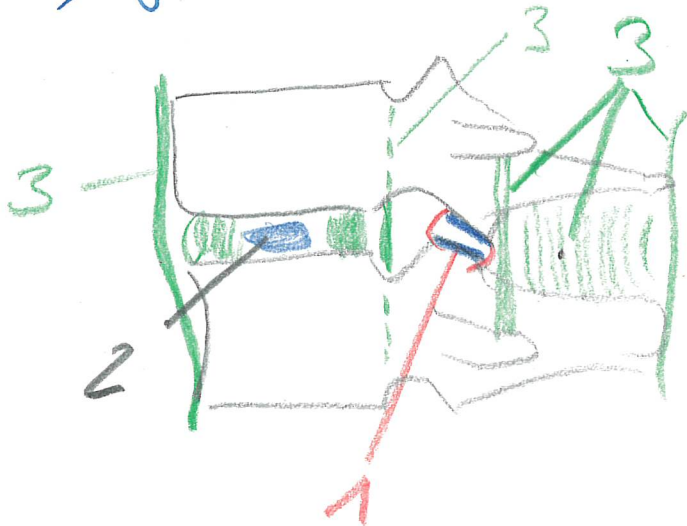
BEWEGUNGEN d. WS:

	FLEX. - EXT.	LATERO - POSITION	ROTATION
HWS	++(+)	++	+++
BWS	++	+	+(+)
LWS	+++	+	- 5°

↓
 (BAND) SCHEIBE

Gelenke an der WS:

- 1) ECHTE GEL.: ART. SYNGAPOPHYSIALES
- 2) SYMPHYSE [func. cartil.]: DISCUS INTERV.
- 3) FUNCTIONELLE FIBROSÄE: "SYNDESMOSEN"



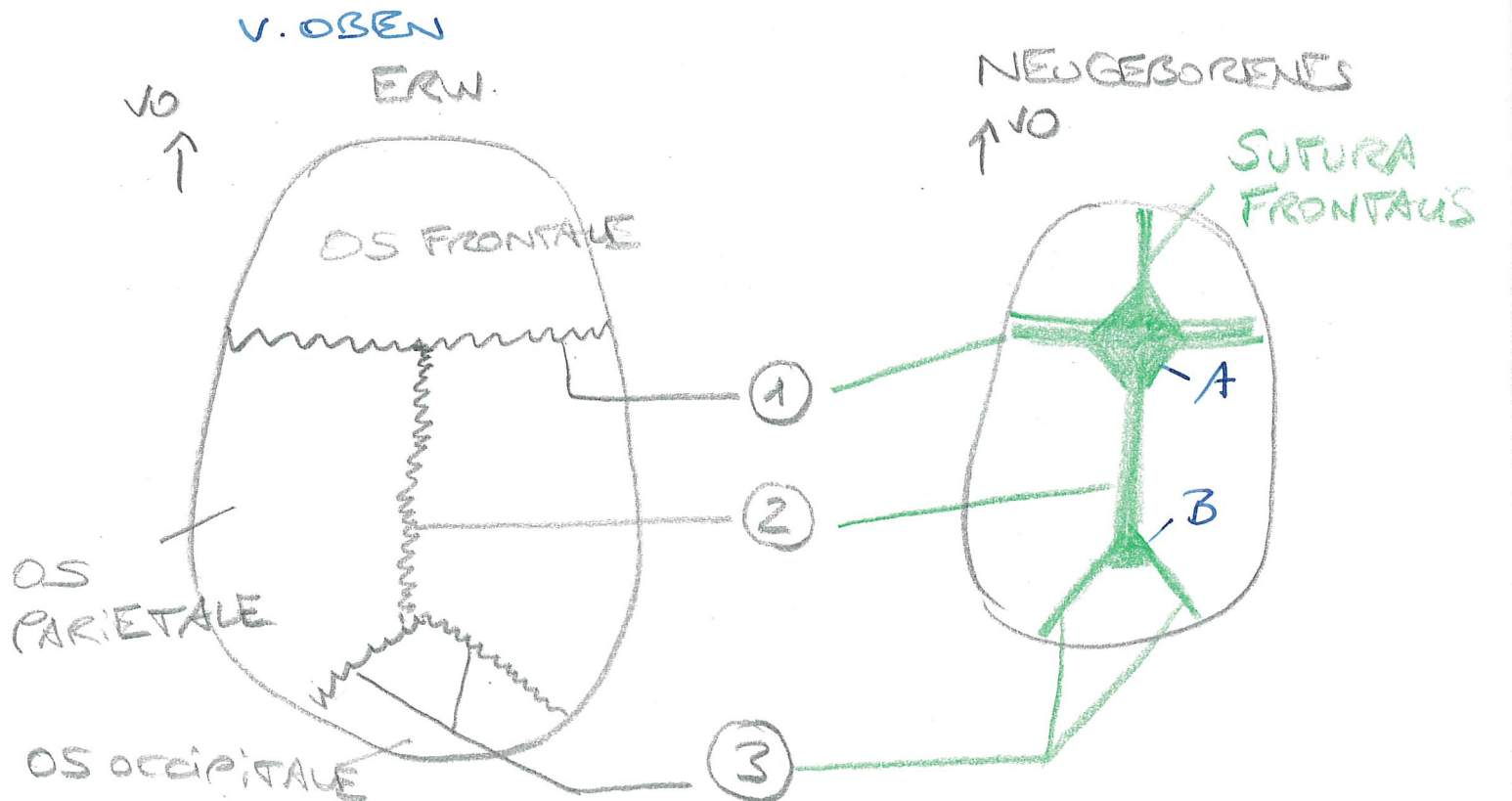
CRANIUM: SCHÄDEL

A) NEUROCRANIUM

- ↳ 1) CALVARIA
- ↳ 2) BASIS CRANII

B) VISCEROCRANIUM: GESICHTSSCHÄDEL

~~CRANIO~~ CALVARIA



1... SUTURA CORONALIS

2... SUT. SAGITTALIS

3... SUT. LAMBDOIDEA

A... FONTANELLA /
 FONTICULUS MAIOR /
◇ 3.-4 J. ANF.

B... FONTANELLA /
 FONTICULUS MINOR /
△ 3.-4. LM POST.

SCHÄDELKNOCHEN

Neurocranium

Calvaria (Schädeldach)

Basis cranii (Schädelbasis)

Viscerocranium

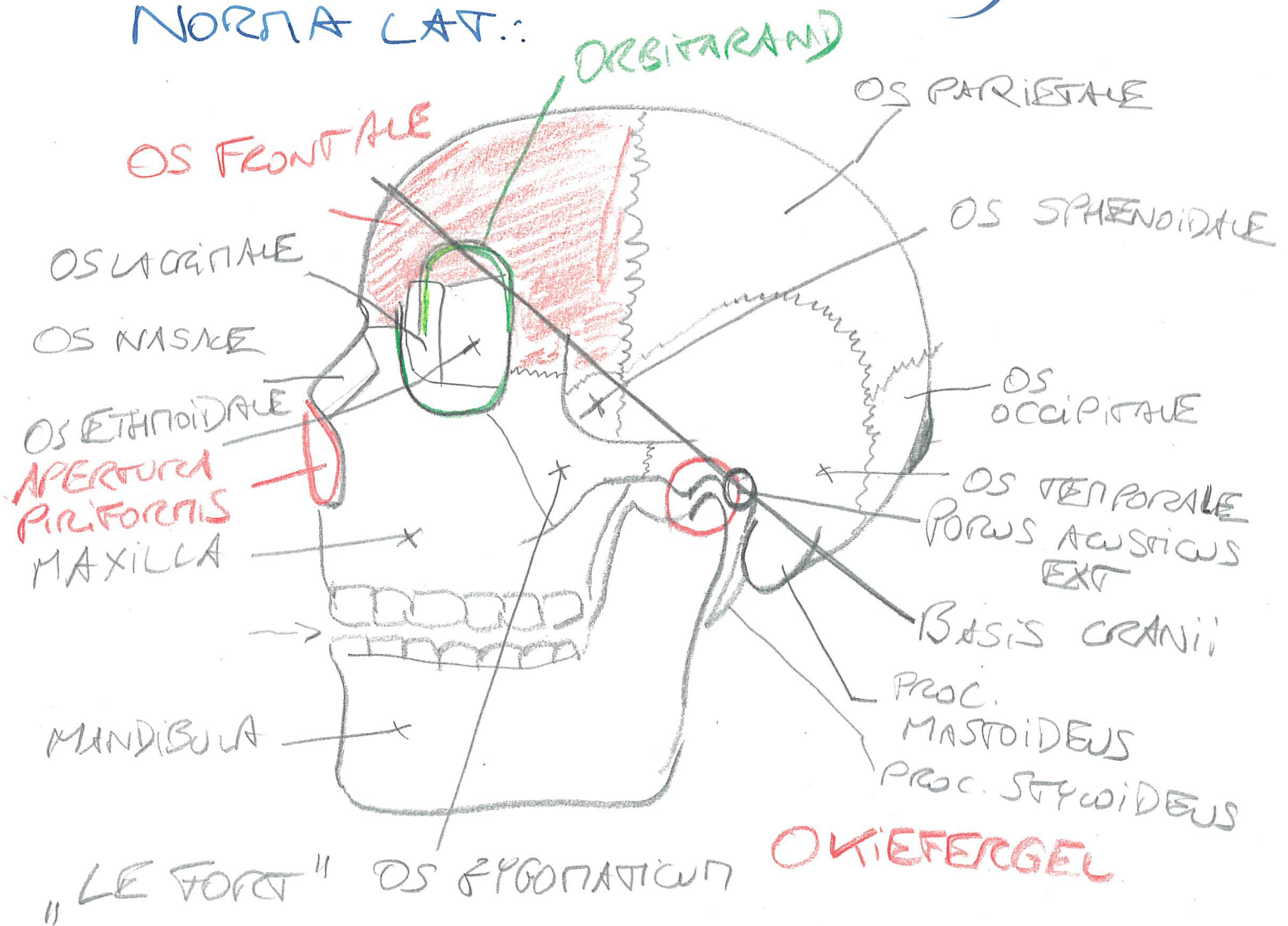
1) Neurocranium (Hirnschädel)

- a. Os frontale (Stirnbein)
- b. Os parietale (Scheitelbein)
- c. Os temporale (Schläfenbein)
- d. Os occipitale (Hinterhauptsbein)
- e. Os sphenoidale (Keilbein)

2) Viszerocranium (Eingeweideschädel)

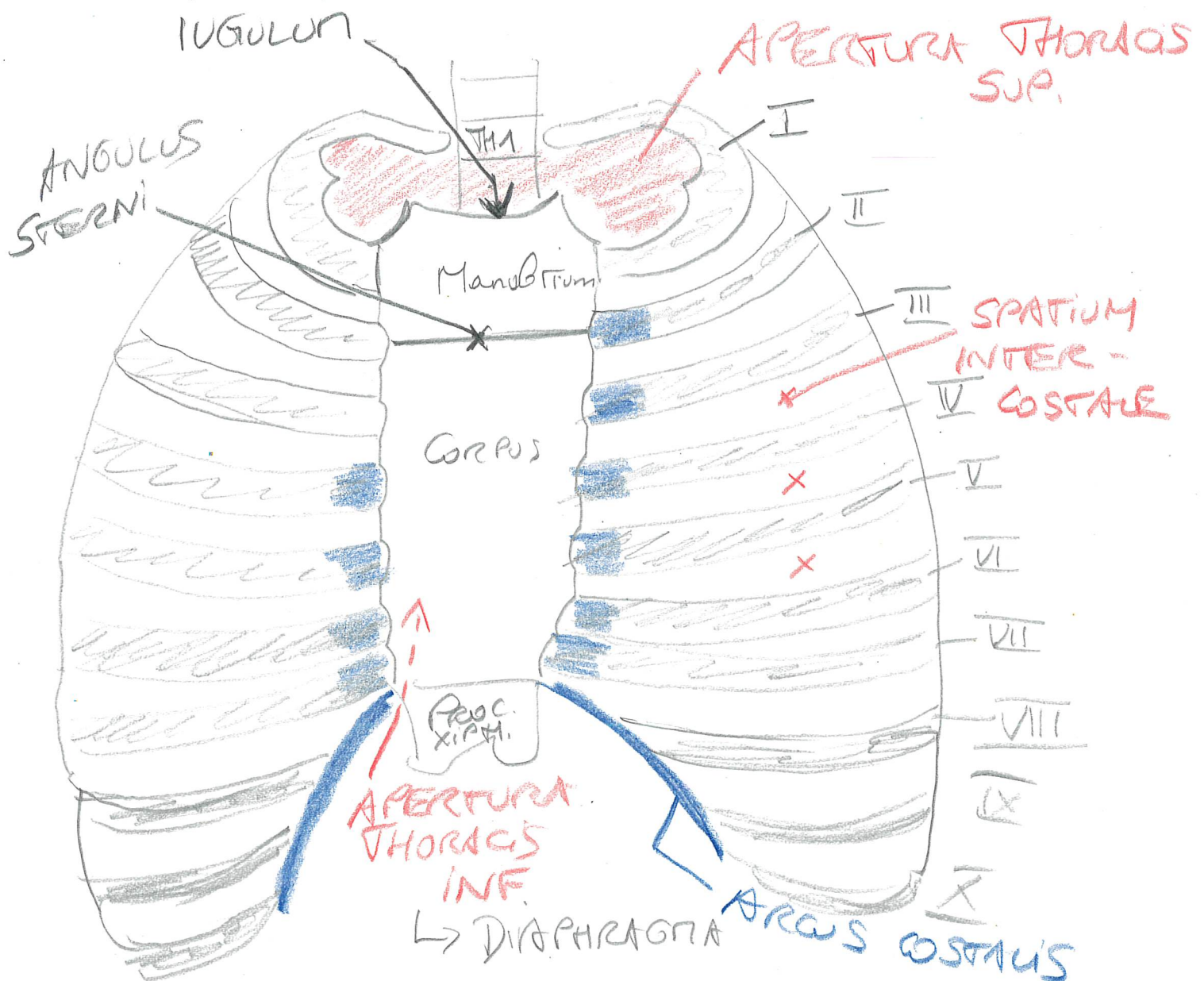
- a. Os ethmoidale (Siebbein)
- b. Os nasale (Nasenbein)
- c. Os lacrimale (Tränenbein)
- d. Concha nasalis inferior (untere Nasenmuschel)
- e. Vomer (Pflugscharbein)
- f. Os zygomaticum (Jochbein)
- g. Os palatinum (Gaumenbein)
- h. Maxilla (Oberkiefer)
- i. Mandibula (Unterkeifer)
- j. Ossicula auditiva (Gehörknöchelchen)

NORMA LAT.:



THORAX, BRUSTKORB

- I) 12 VERT. THORACICAE
- II) COSTAE: 12 RIPPENPAARE
 - A) COSTAE VERAE: 7
 - B) COSTAE SPURIAE: 3
 - C) COSTAE FLUITANTES: 2
- III) STERNUM:
 - A) MANUBRIUM
 - B) CORPUS
 - C) PROC. XIPHOIDEUS



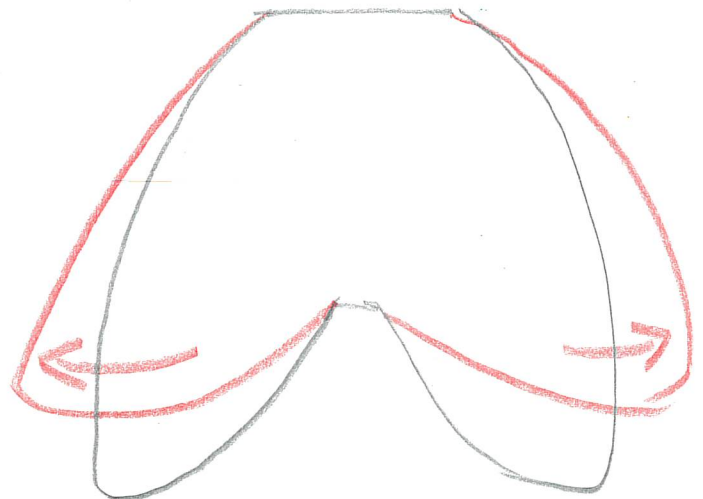
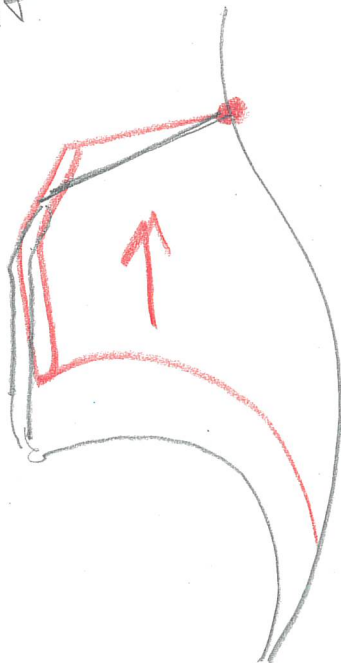
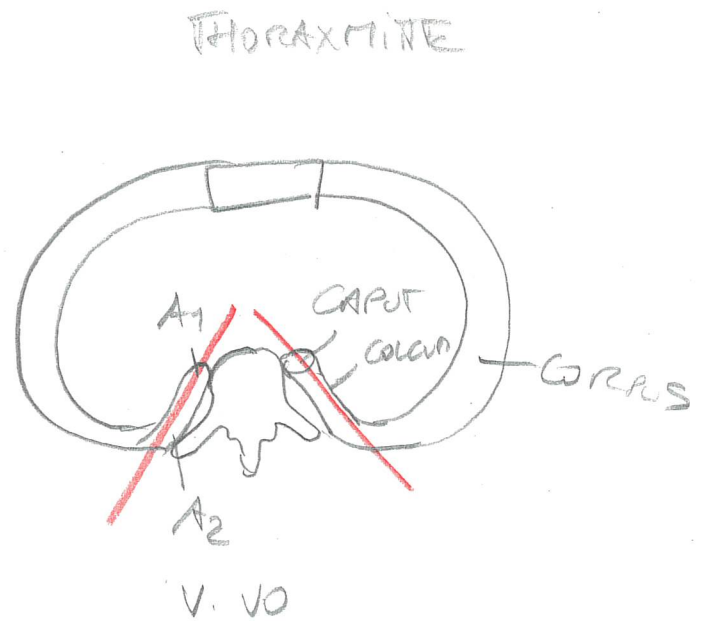
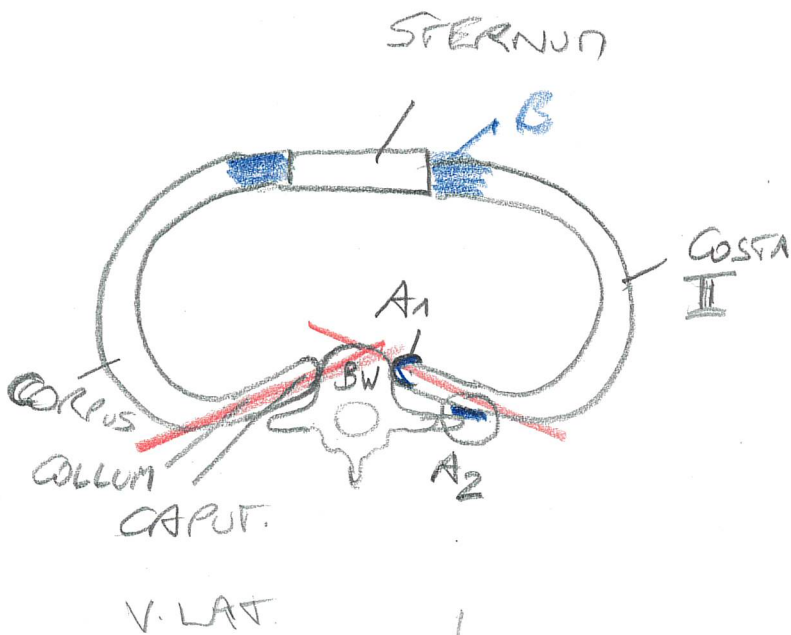
GELENKE:

A) COSTOVERTEBRALGELENKE

1) ART. CAPITI COSTAE

2) ART. COSTOTRANSVERSALIS

B) SYNCHONDROSIS STERNOCOSTALIS

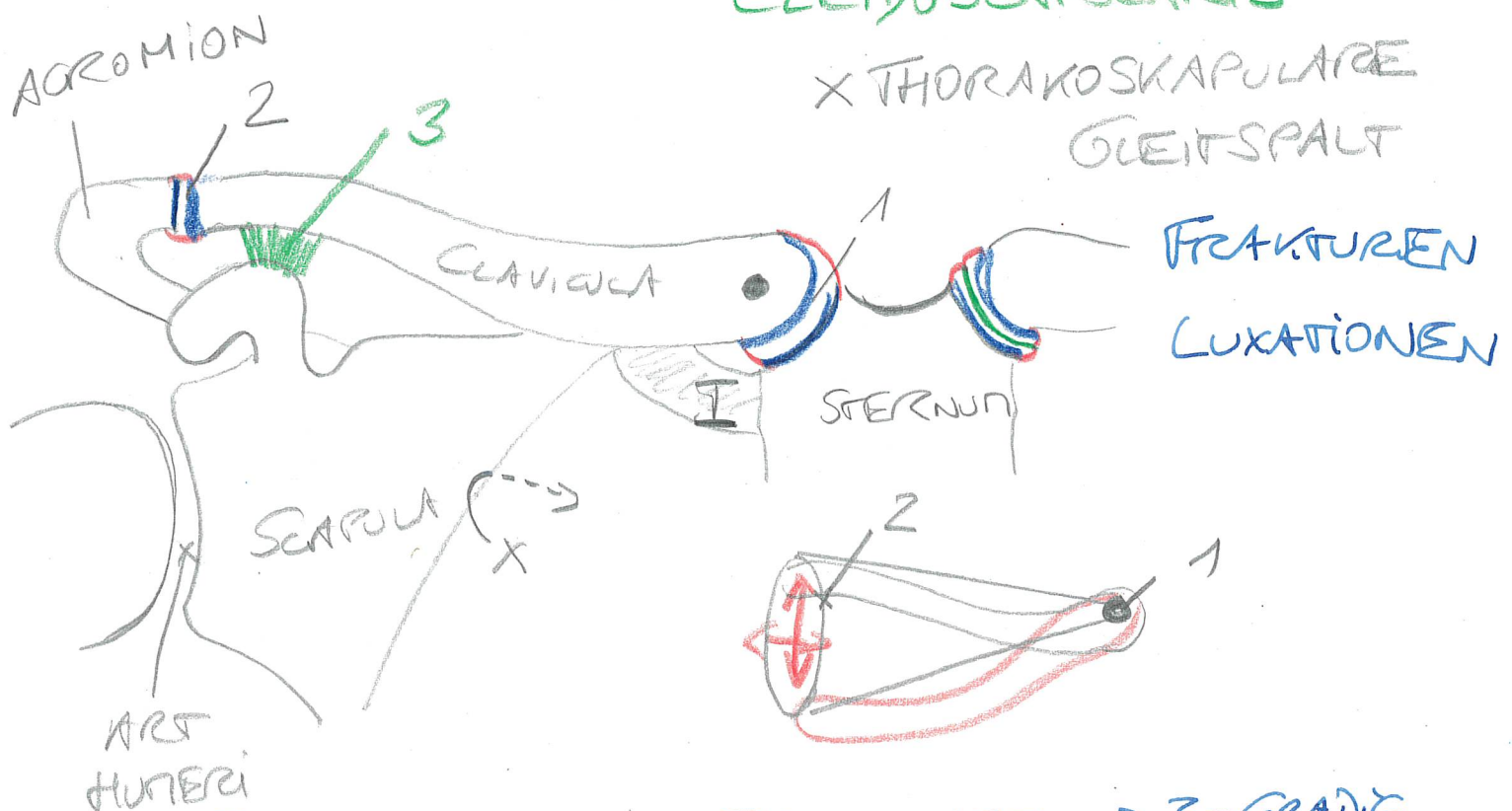


CINGULUM MEMBRI SUPERIORIS = SCHULTERGÜRTEL

CLAVICULA → GEWENNE:

SCAPULA

- 1) ART. STERNOCLAVICULARIS
- 2) ART. ACROMIOCLAVICULARIS
- 3) SYNDESMOSIS
CLEIDOSCAPULARIS



- ① SATTELGEL.; → DISCUS ART. → 3-GRADIG
- ② ART. PLANA

BEWEGUNG: * HEBEN ↔ SENKEN

- * VOR- und ZURÜCK
- * PASSIVE ROTATION
- * CIRCUMDUKTION

SONDERBEW.:

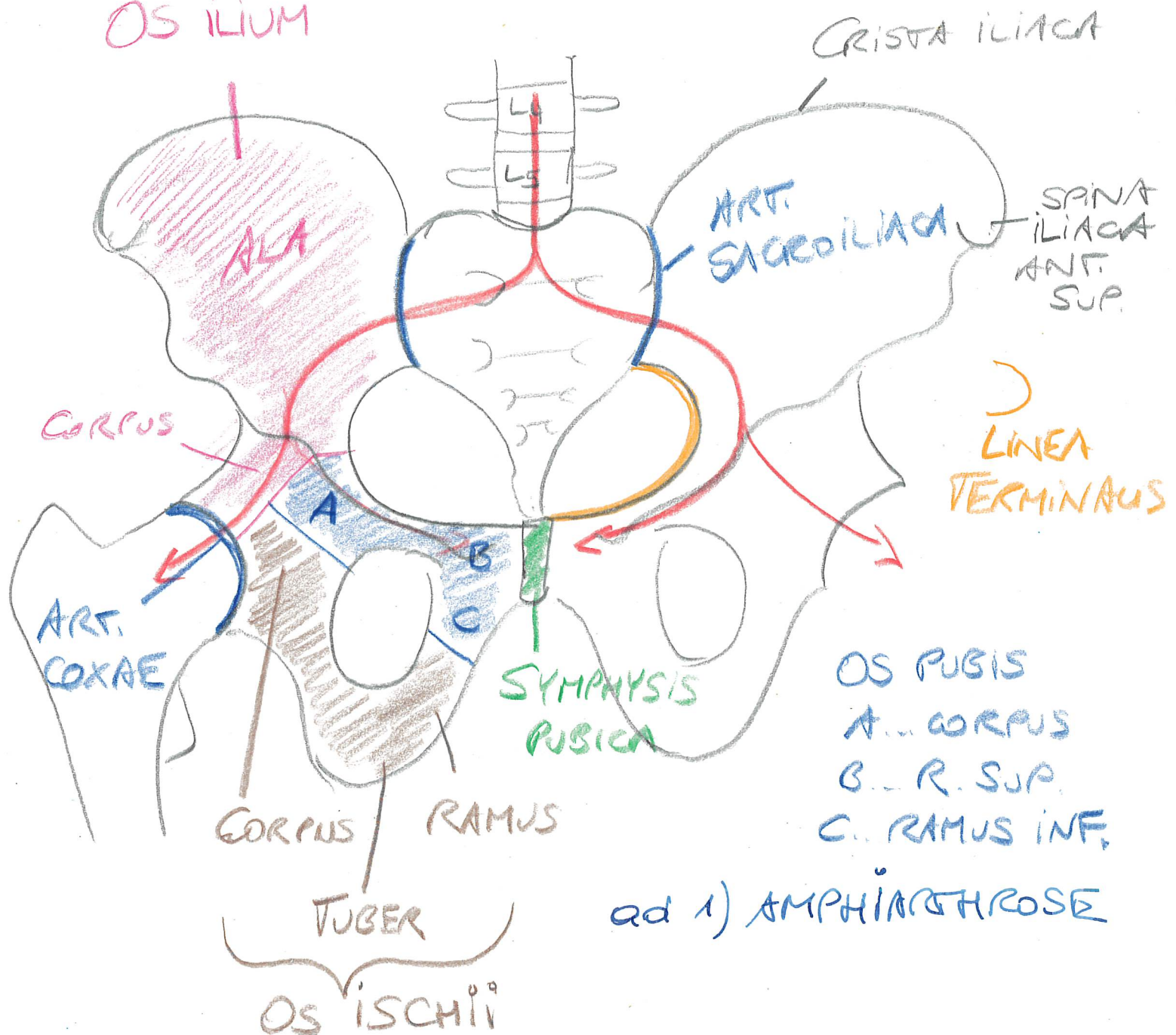
- ELEVATION

CINGULUM PELVIS:

- OS SACRUM
- OS COXAE DEXTRUM et SINISTRUM

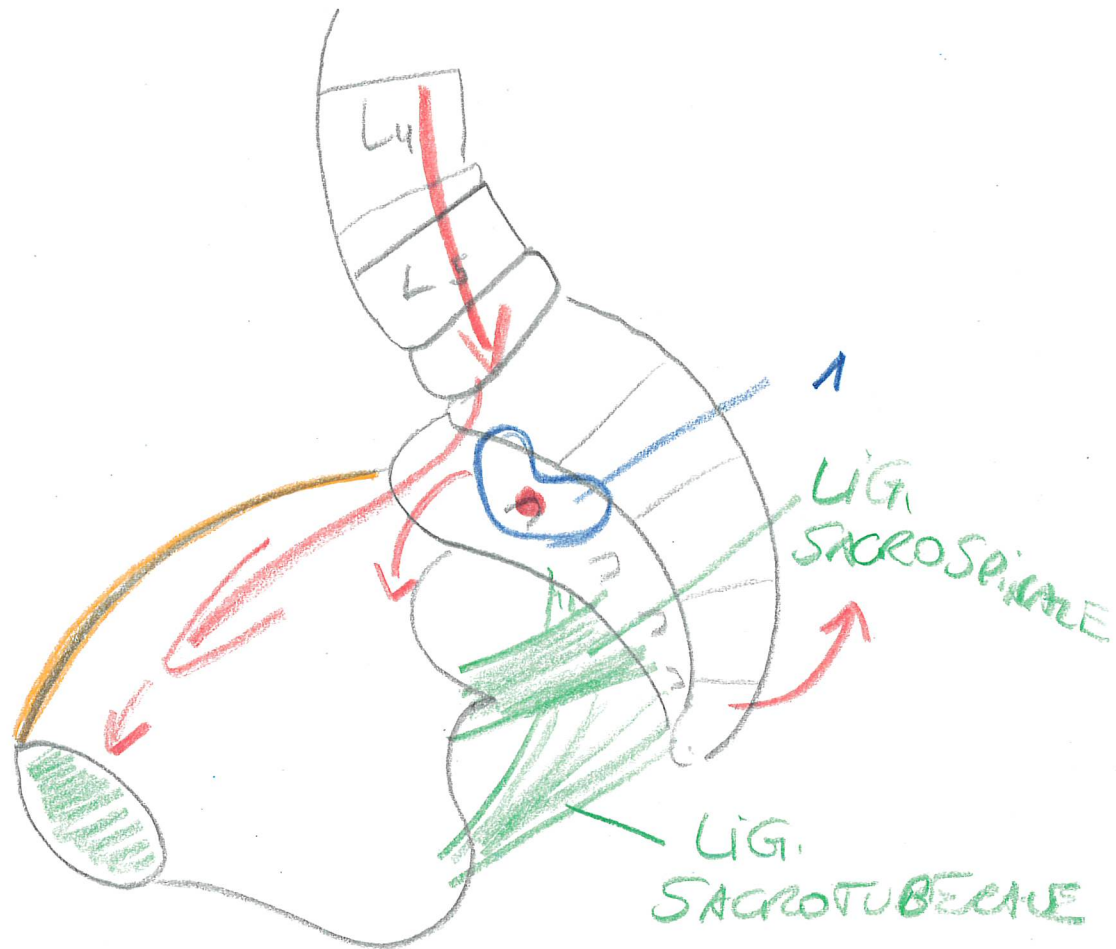
GELENKE: 1) ART. SACROILIACA [ISG]
2) SYMPHYSIS PUBICA

OS ILIUM

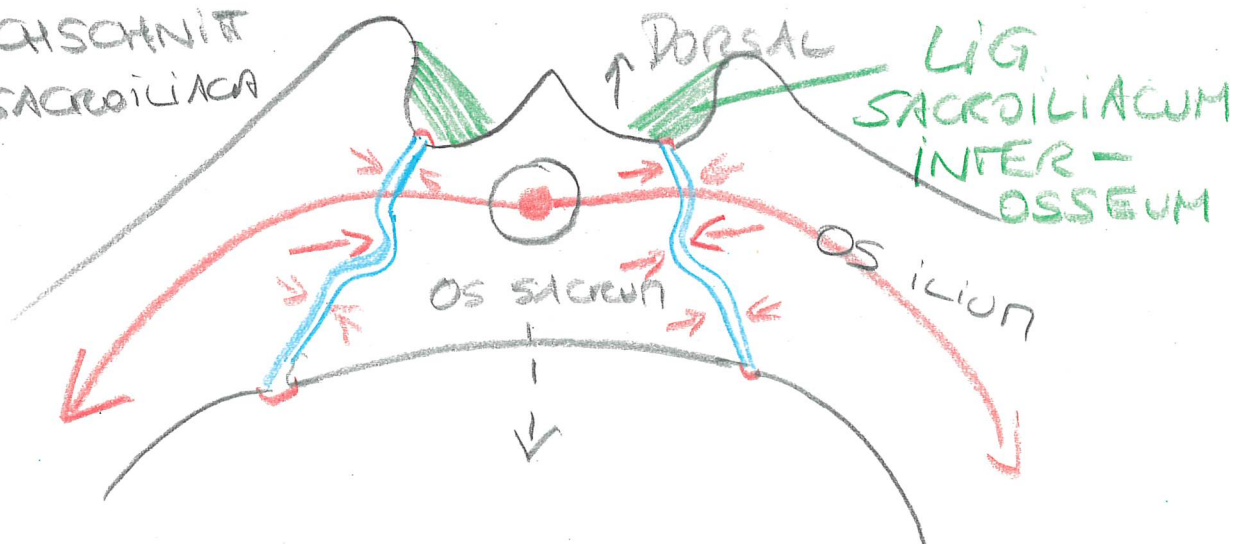


ad 1) AMPHIARTHROSE

MEDIAN SAGITTAL SCHNITT:



FLACHSCHNITT
ART. SACROILIACA



HERZ - KREISLAUFSYSTEM

I) COR

II) GEFÄSSSYSTEM

- A) ARTERIEN 20%
- B) VENEN 80%
- C) LYMPHGEFÄSSE

