
Funktionelle Anatomie

Vorlesung 376-0905-00, FS 2013

D. Obere Extremität

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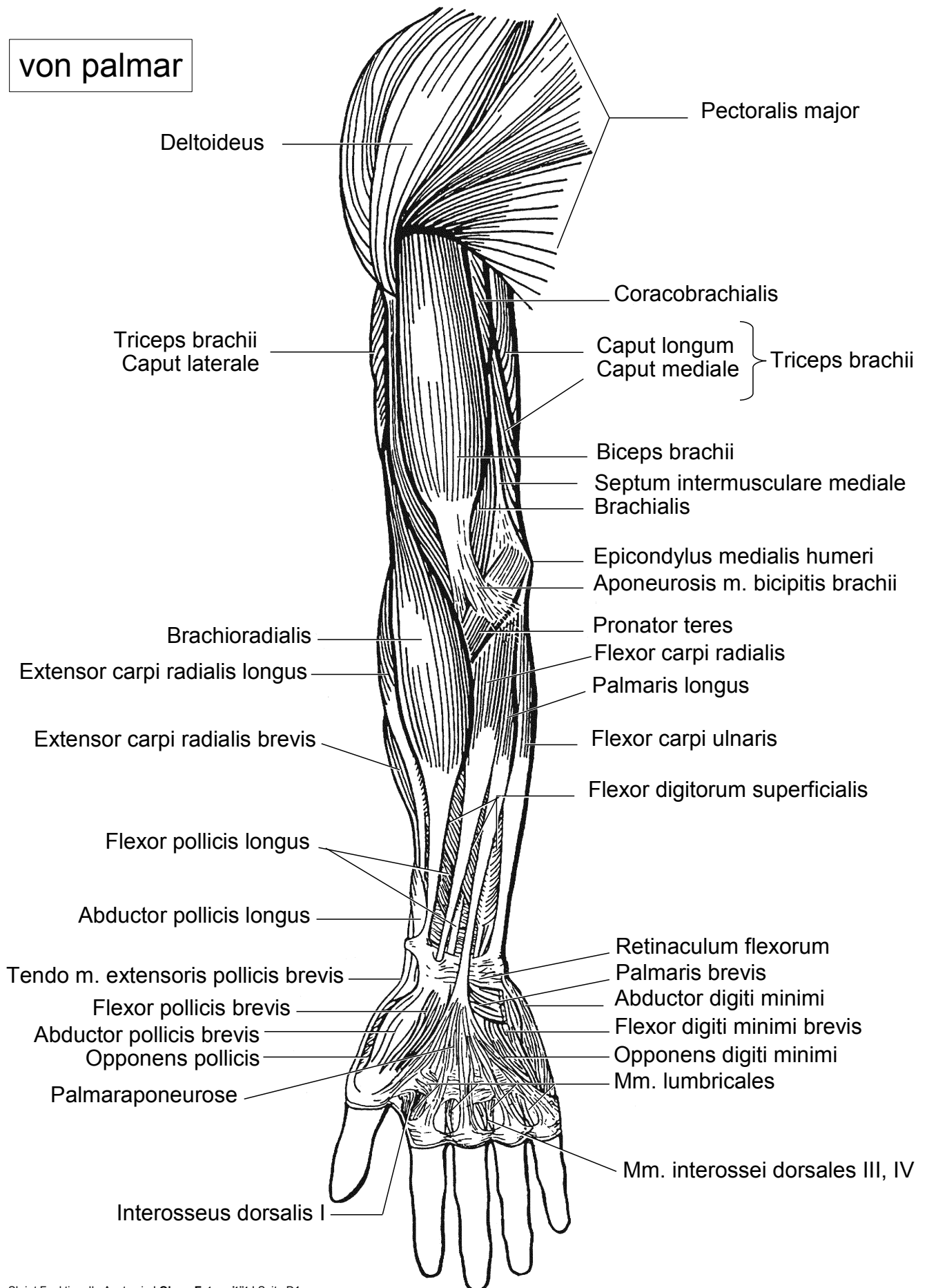
Bei den Zeichenvorlagen handelt es sich zum Teil um modifizierte Abbildungen aus Lehrbüchern. Sie dürfen deshalb nur zur Mitarbeit in der Vorlesung verwendet werden. Es ist nicht gestattet, die Vorlagen zu vervielfältigen.

| | |
|------------|----------------------|
| 14.05.2013 | Obere Extremität I |
| 21.05.2013 | Obere Extremität II |
| 28.05.2013 | Obere Extremität III |

Muskeln der oberen Extremität

Übersicht I

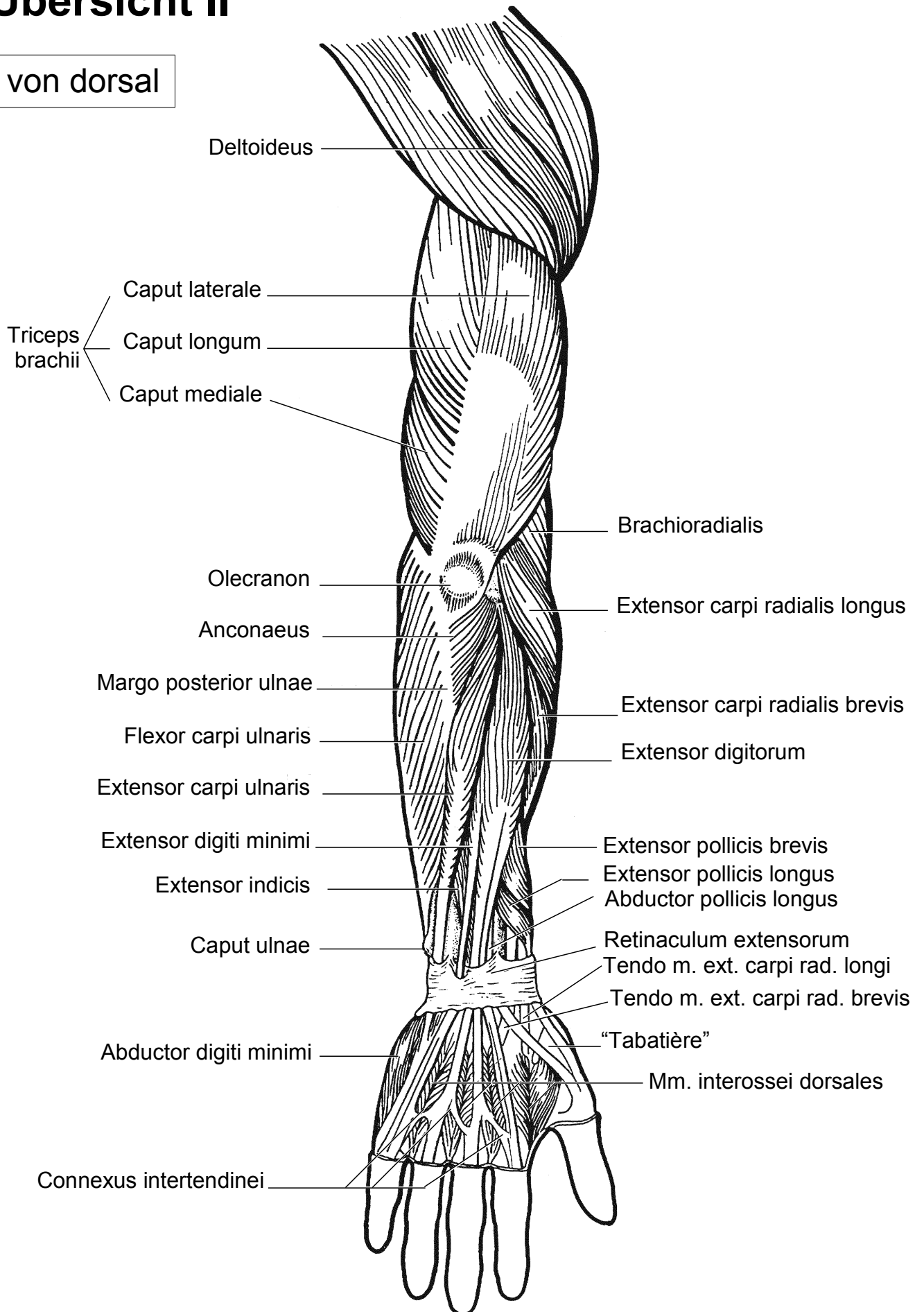
von palmar



Muskeln der oberen Extremität

Übersicht II

von dorsal

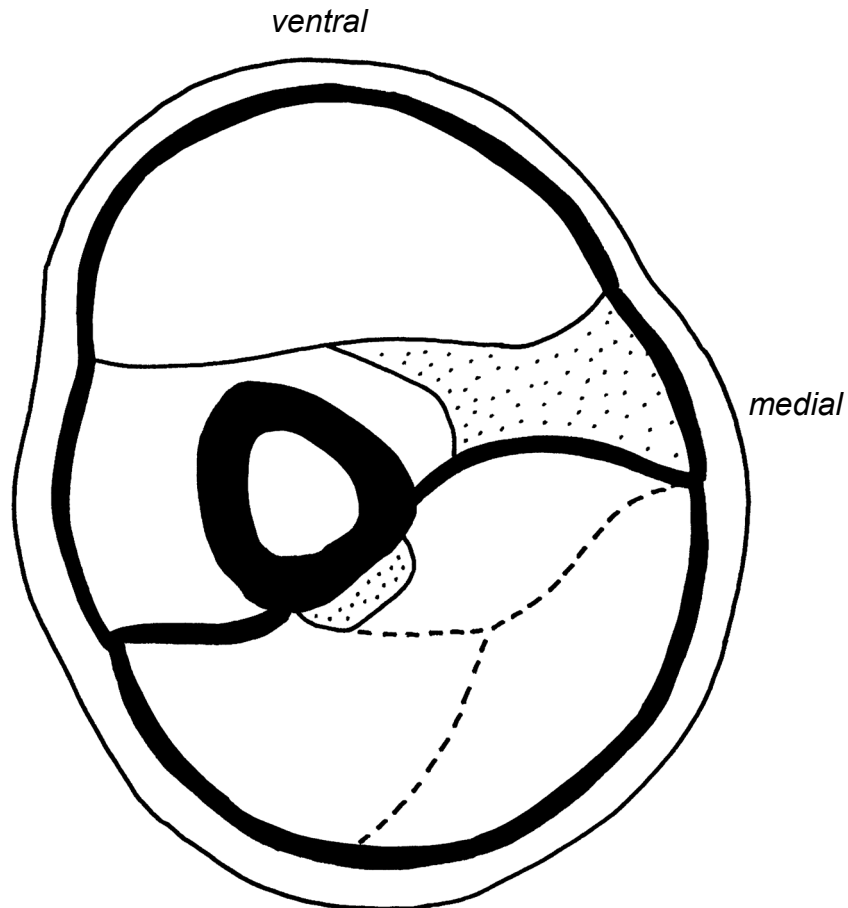


Querschnitt Oberarm

M. biceps brachii

M. brachialis

**Intermuskuläres
Septum**



*Oberarm rechts,
Ansicht von distal*

M. triceps brachii

Querschnitt Unterarm

M. pronator teres

M. flexor carpi radialis

M. palmaris longus

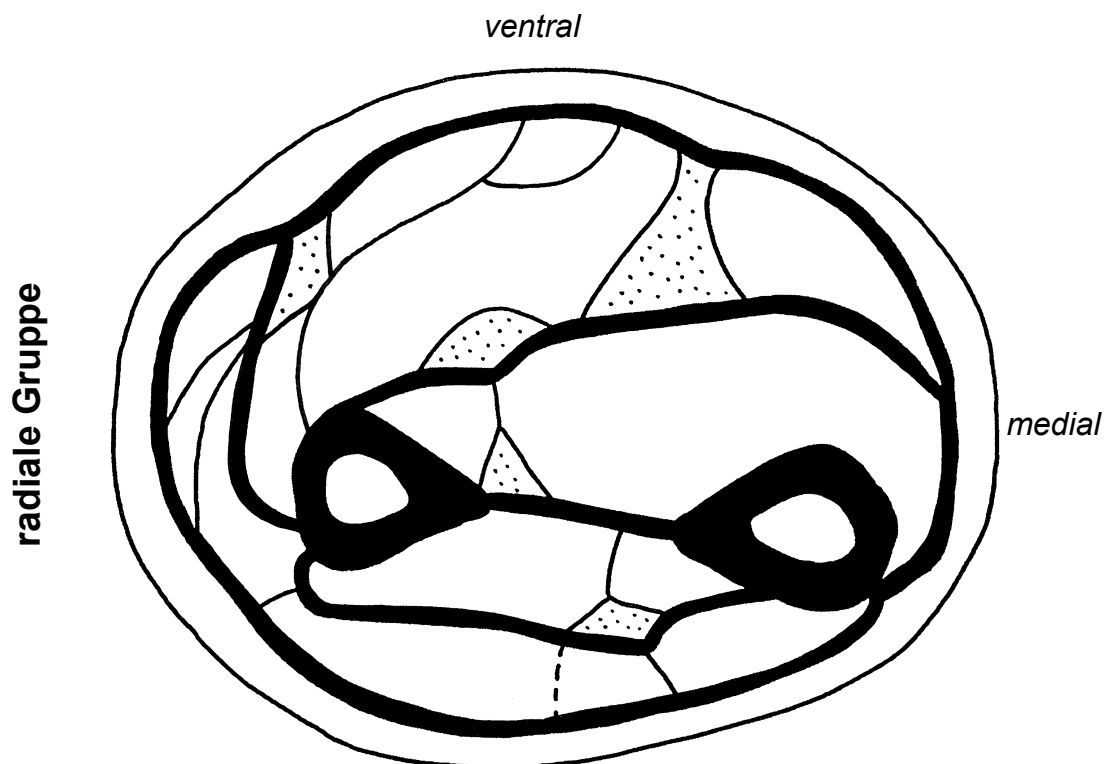
M. flexor digitorum superficialis

M. flexor carpi ulnaris

Membrana interossea

M. flexor pollicis longus

M. flexor digitorum profundus



*Unterarm rechts,
Ansicht von distal*

M. extensor digitorum

M. extensor digiti minimi

M. extensor carpi ulnaris

M. brachioradialis

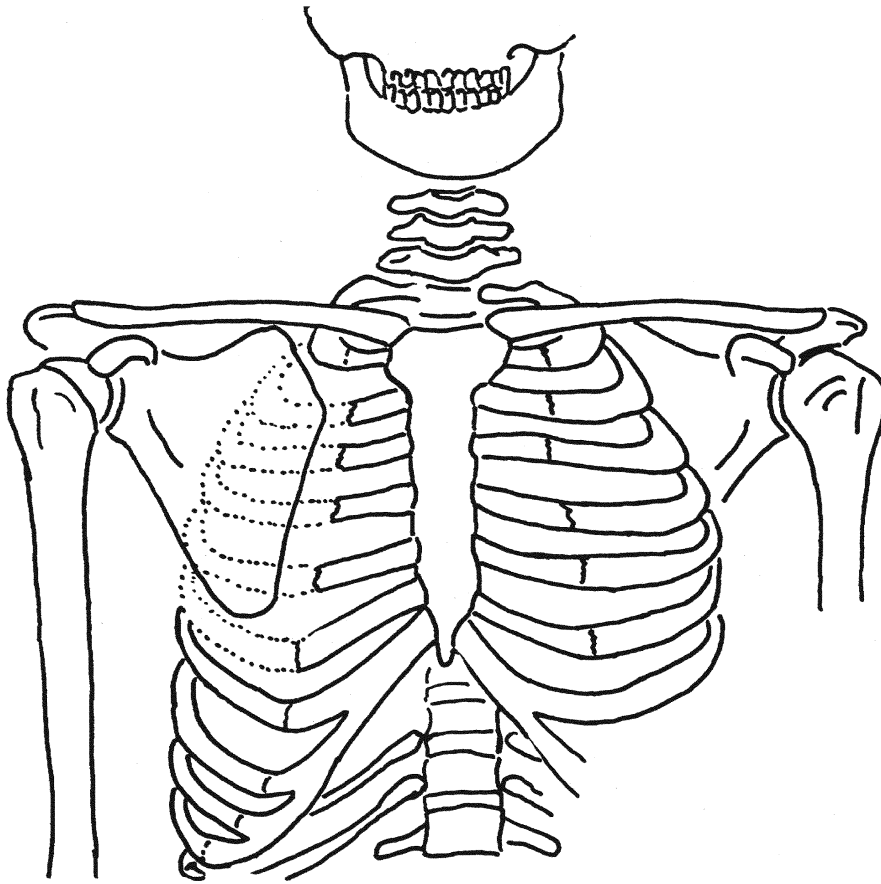
M. extensor carpi radialis longus

M. extensor carpi radialis brevis

M. abductor pollicis longus

M. extensor pollicis longus

Schultergürtel I



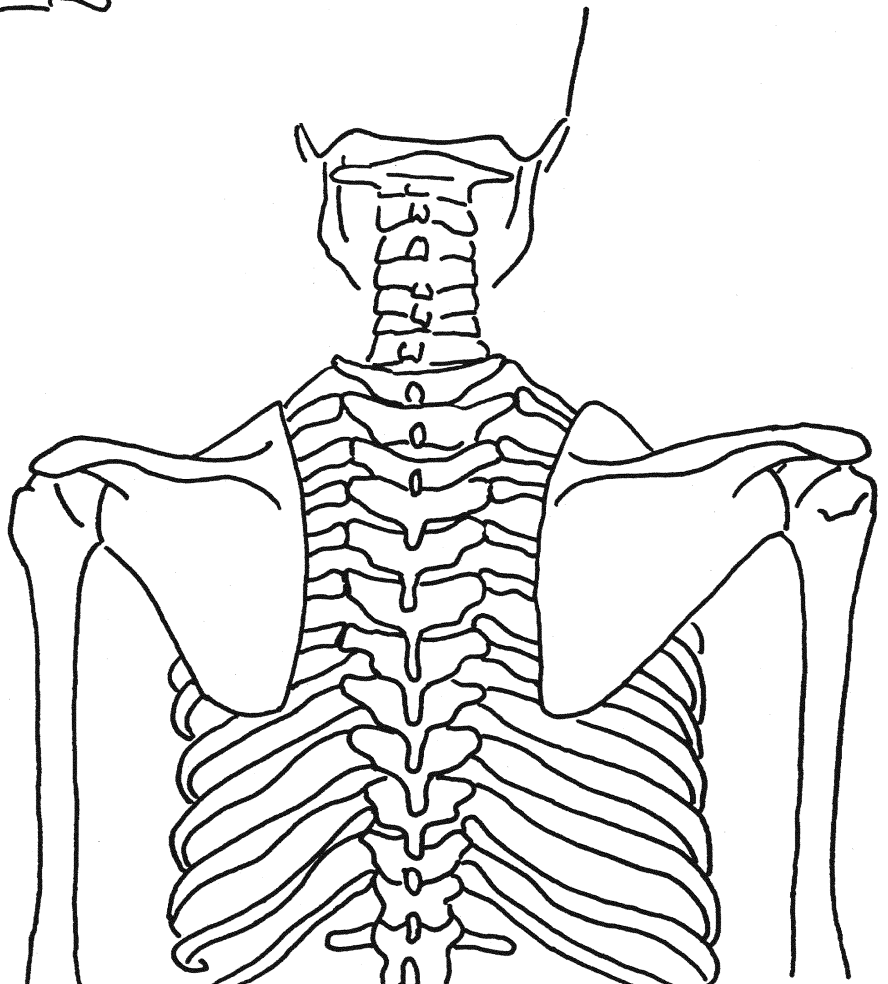
**M. pectoralis
minor**

M. serratus ant.

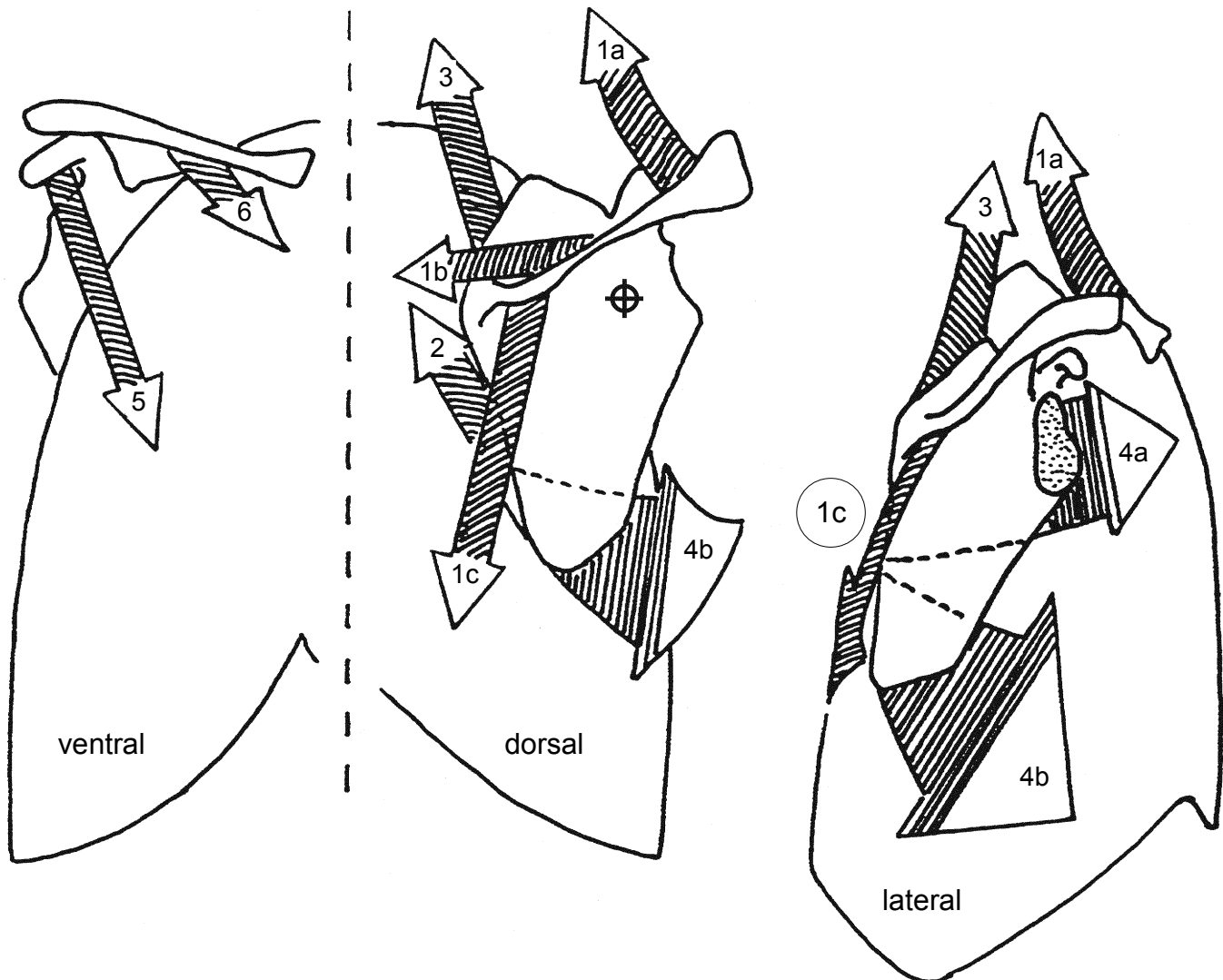
M. trapezius

M. levator scapulae

M. rhomboideus

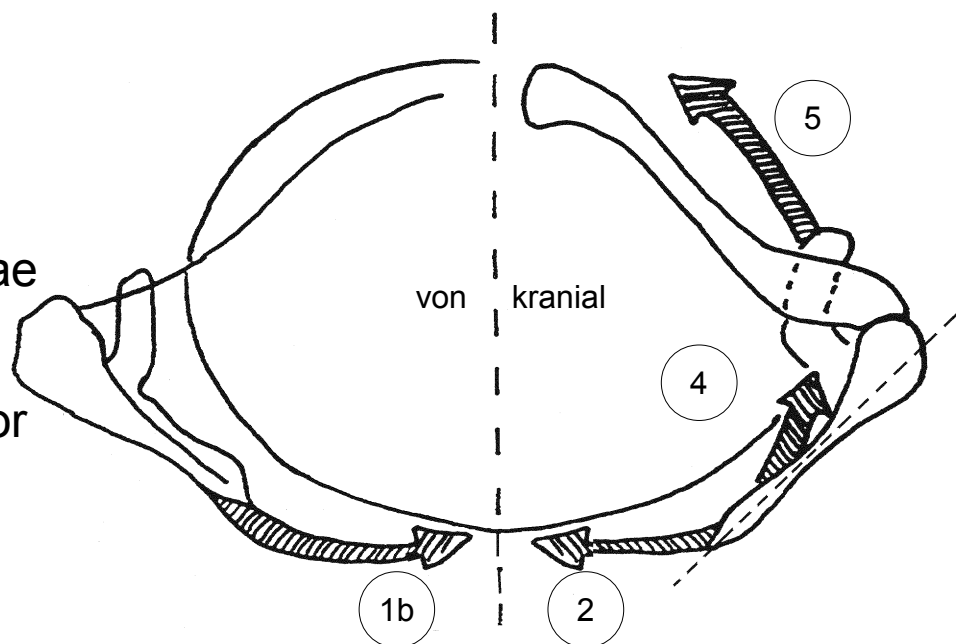


Schultergürtel II

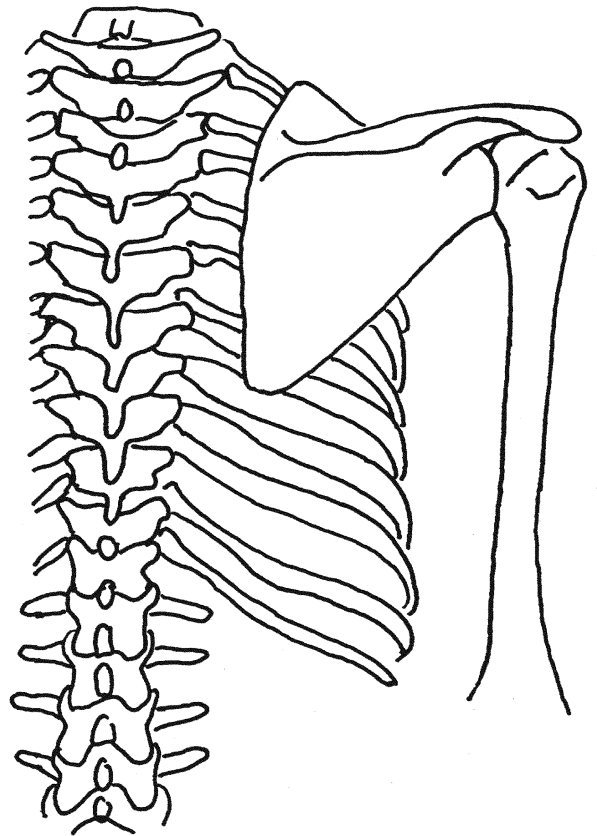
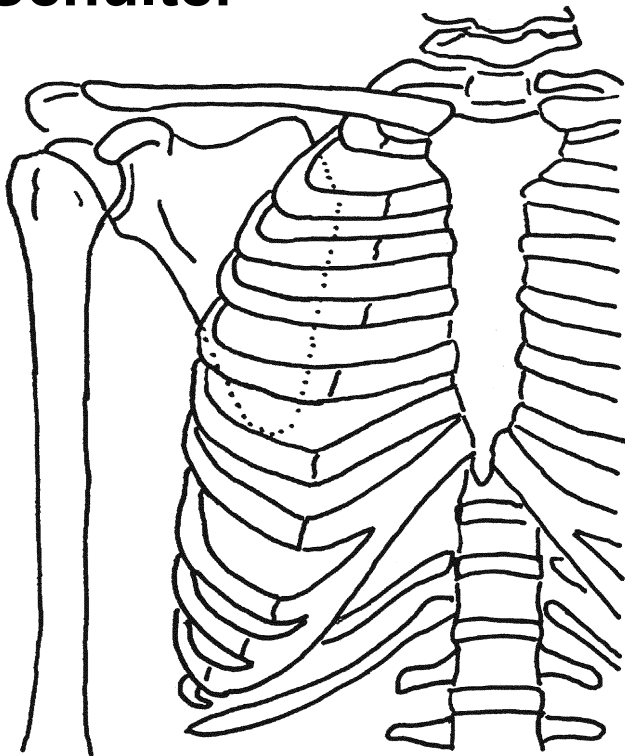


- 1 M. trapezius
- 2 M. rhomboideus
- 3 M. levator scapulae
- 4 M. serratus ant.
- 5 M. pectoralis minor
- (6 M. subclavius)

Skapularebene



Schulter



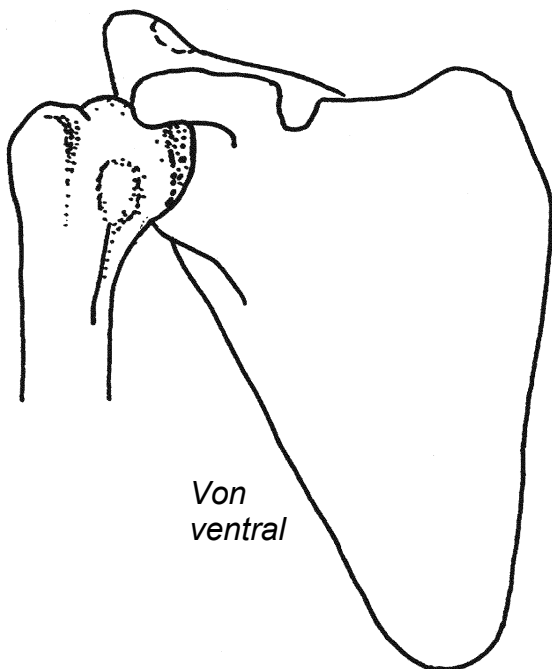
M. deltoideus
M. pectoralis major
M. latissimus dorsi

Acromioclaviculargelenk

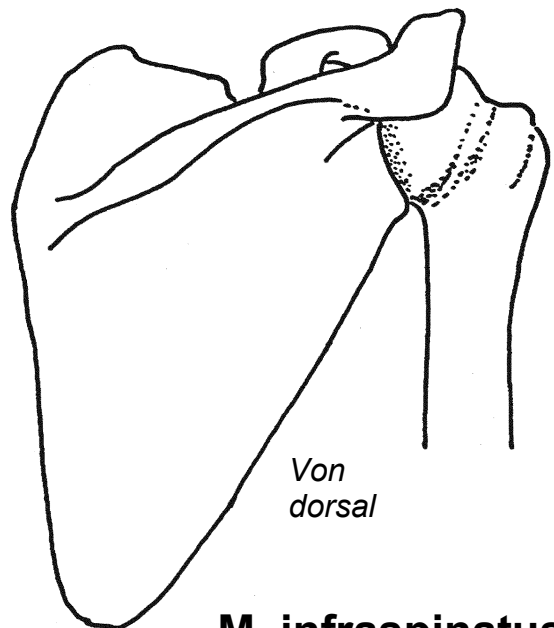
Sternoclaviculargelenk

Tuberculum majus / minus humeri

M. supraspinatus



*Von
ventral*

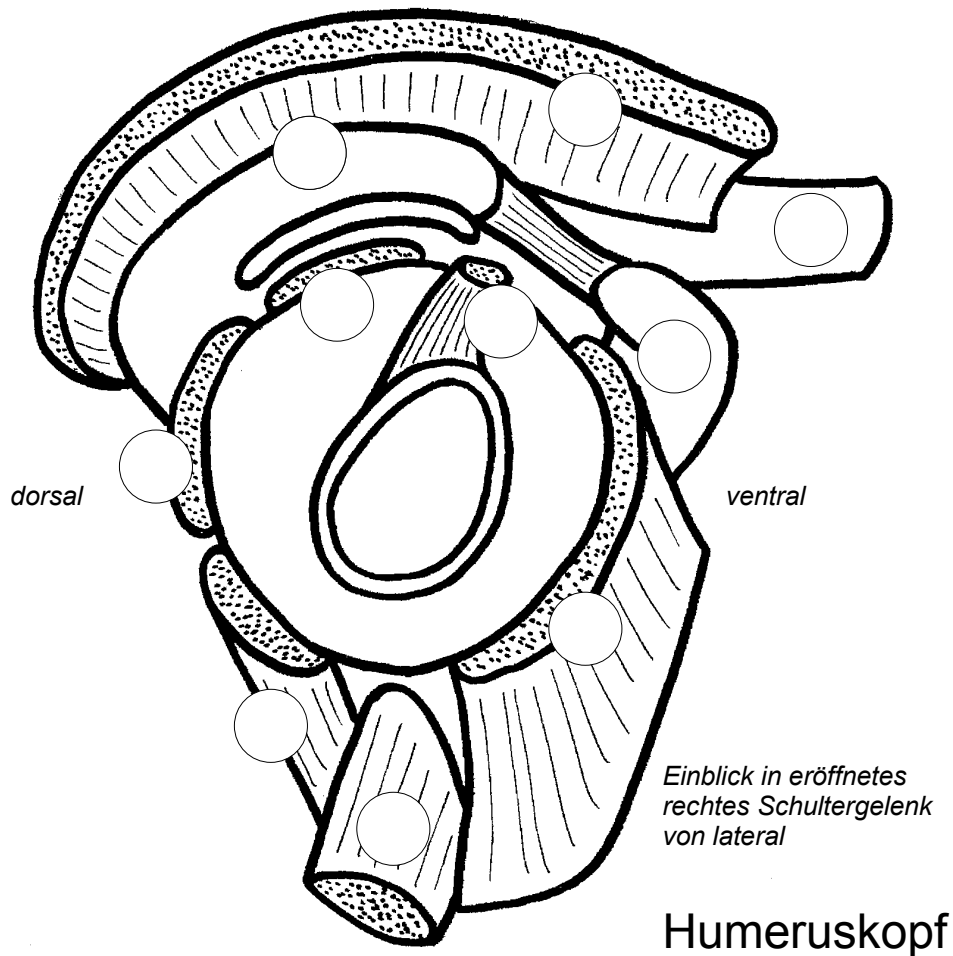


*Von
dorsal*

M. subscapularis
Rotatorenmanschette

M. infraspinatus
M. teres major
M. teres minor

Rotatorenmanschette



Proc. coracoideus
Lig. coracoacromiale
Acromion
Clavicula

} Schulterdach

Schulterpfanne
Gelenk-Lippe
Gelenkkapsel

M. subscapularis
M. supraspinatus
M. infraspinatus
M. teres min.

} Rotatoren-
Manschette

Fettkörper
Bursa subacromialis
(subakromiales
Nebengelenk)

M. deltoideus

M. biceps brachii, Caput longum
M. triceps brachii, Caput longum
M. biceps brachii, Caput breve
M. coracobrachialis

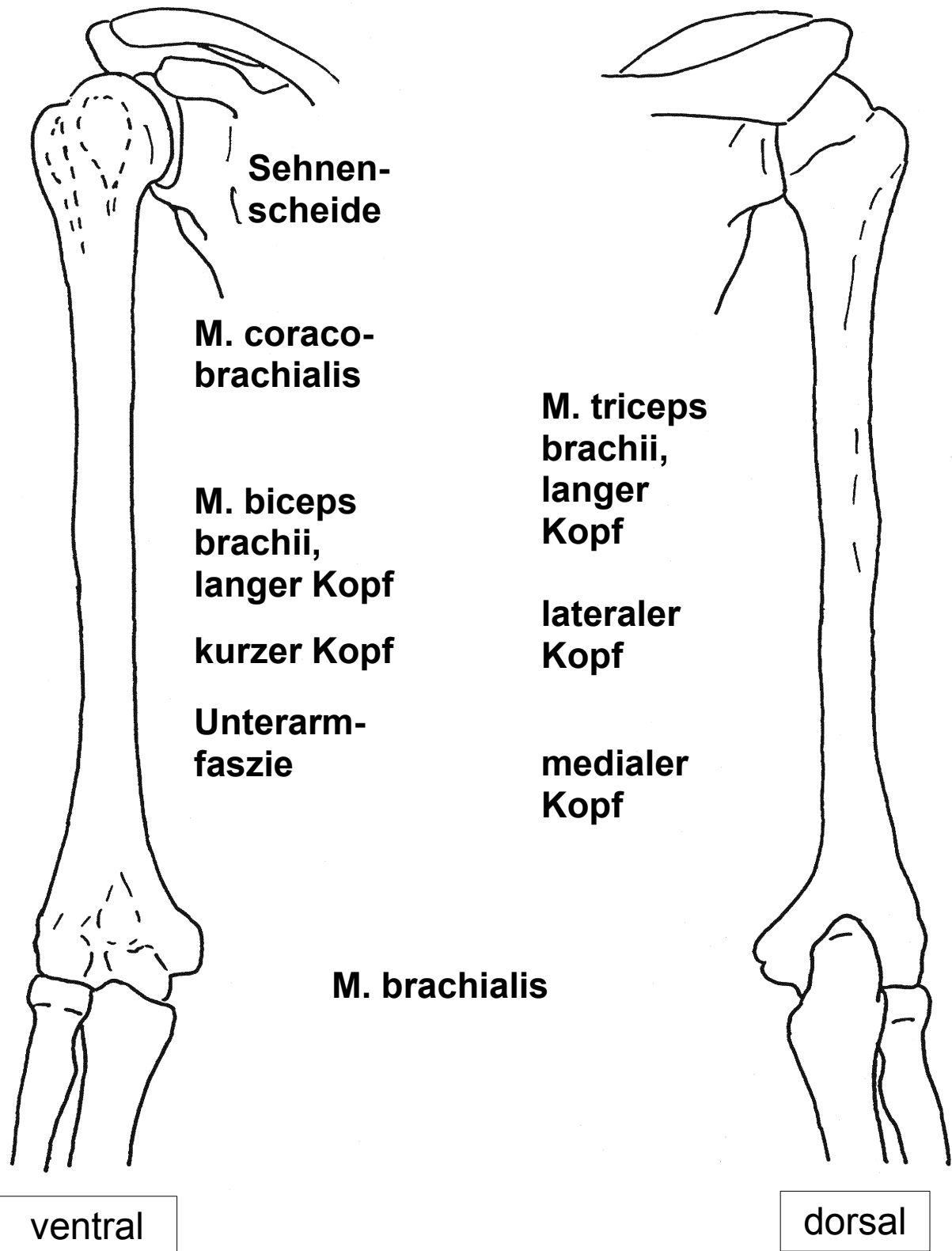
Muskelfunktionen am Schultergürtel

| | Heben | Senken | Vorführen | Rückführen | Schulterpfanne nach oben neigen ¹ | Schulterpfanne nach unten neigen ¹ |
|-------------------------|-------|--------|-----------|-----------------|---|--|
| M. trapezius | | | | | | |
| - absteigender Teil | ++ | | | + | ++ | |
| - querverlaufender Teil | | | | ++ ² | | |
| - aufsteigender Teil | | ++ | | + | + | |
| M. rhomboideus | ++ | | | ++ ² | | ++ |
| M. levator scapulae | ++ | | | | | ++ |
| M. pectoralis min. | | ++ | | ++ ² | | + |
| M. serratus ant. | | | | | | |
| - kranialer Teil | | | | ++ ² | | + |
| - kaudaler Teil | | ++ | | ++ ² | ++ | |
| M. pectoralis maj. | | | | | | |
| - kranialer Teil | | | | ++ ² | | |
| - abdominaler Teil | | ++ | | + | | + |
| M. latissimus dorsi | | ++ | | | | + |

¹ durch Drehung der Scapula in Skapularebene

² Vor- und Rückführer pressen zusammen Scapula an Thorax

Oberarm



Muskelfunktionen am Schultergelenk

| Mitbewegungen der Scapula: Rotation Rückführen Vorführen | Anteversion ⁶ | Retroversion | Aussenrotation Innenrotation | Abduktion ⁶ Adduktion |
|--|--------------------------|-----------------|---------------------------------|-------------------------------------|
| M. pectoralis maj. | ++ ¹ | ++ ² | ++ | ++ |
| M. latissimus dorsi | | ++ ² | ++ | ++ |
| M. coracobrachialis ³ | + | | | + |
| M. deltoideus | | | | |
| - klavikulärer Teil | ++ | | ++ | + ⁴ + |
| - akromialer Teil | | | | +++ |
| - spinaler Teil | | ++ | ++ | + ⁴ + |
| M. teres maj. | | ++ | + | ++ |
| M. subscapularis ⁵ | | | ++ | |
| M. teres min. ⁵ | | | ++ | |
| M. infraspinatus ⁵ | | | ++ | + ⁴ |
| M. supraspinatus ⁵ | | | | ++ |
| M. biceps brachii ³ | | | | |
| - Caput longum | + | | | + |
| - Caput breve | + | | | + |
| M. triceps brachii | | | | |
| - Caput longum ³ | | ++ | | + |

¹ des retrovertierten Arms

² kraftvolles Senken des erhobenen Arms: z.B. Werfen, Klimmzug

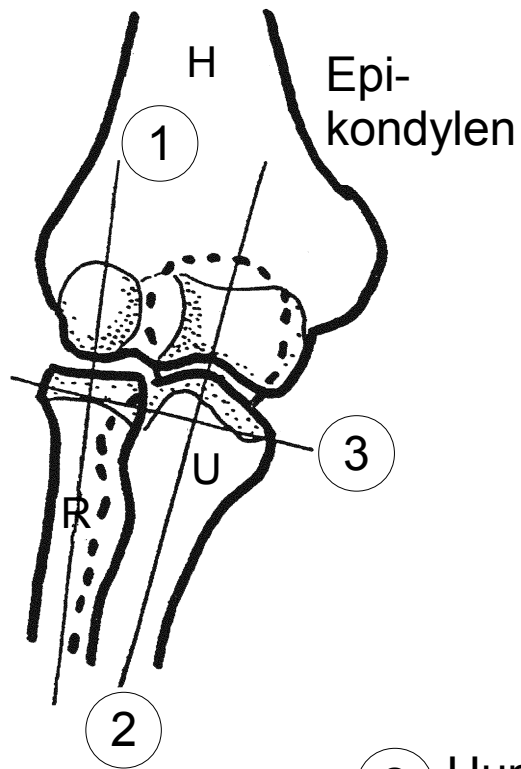
³ fixieren Humeruskopf im Schultergelenk

⁴ mit Abduktion zunehmend

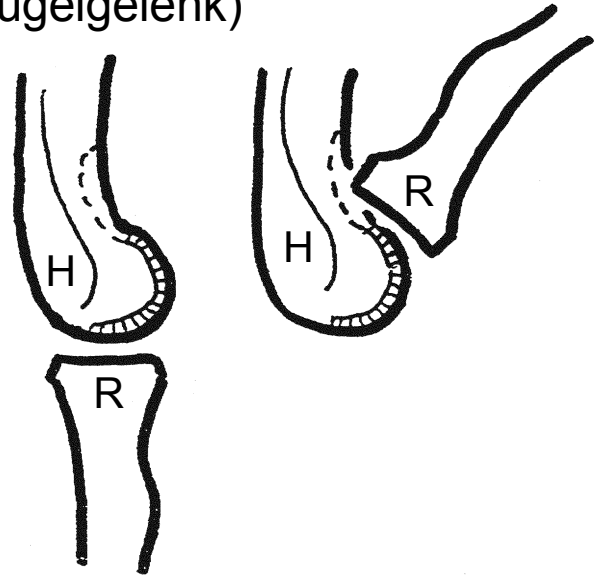
⁵ Rotatorenmanschette

⁶ über Horizontale = Elevation

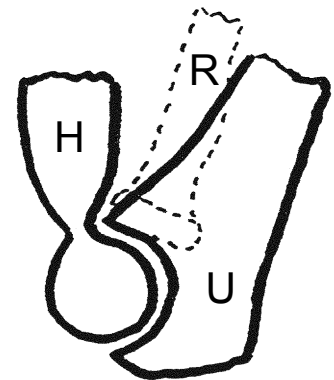
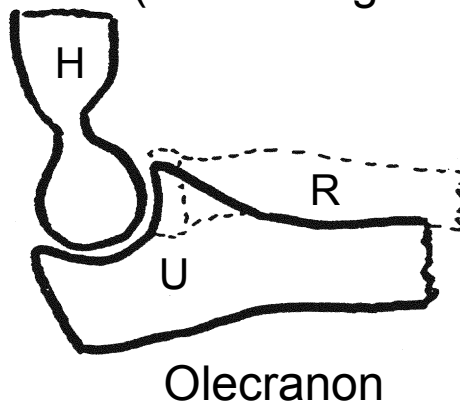
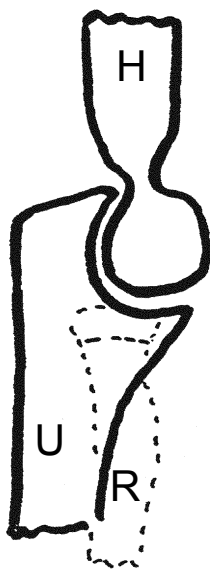
Ellbogengelenk



① Humero-radialgelenk (Kugelgelenk)

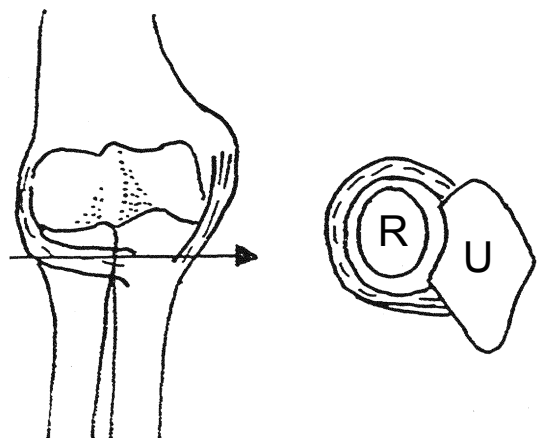


② Humeroulnargelenk (Scharniergelenk)



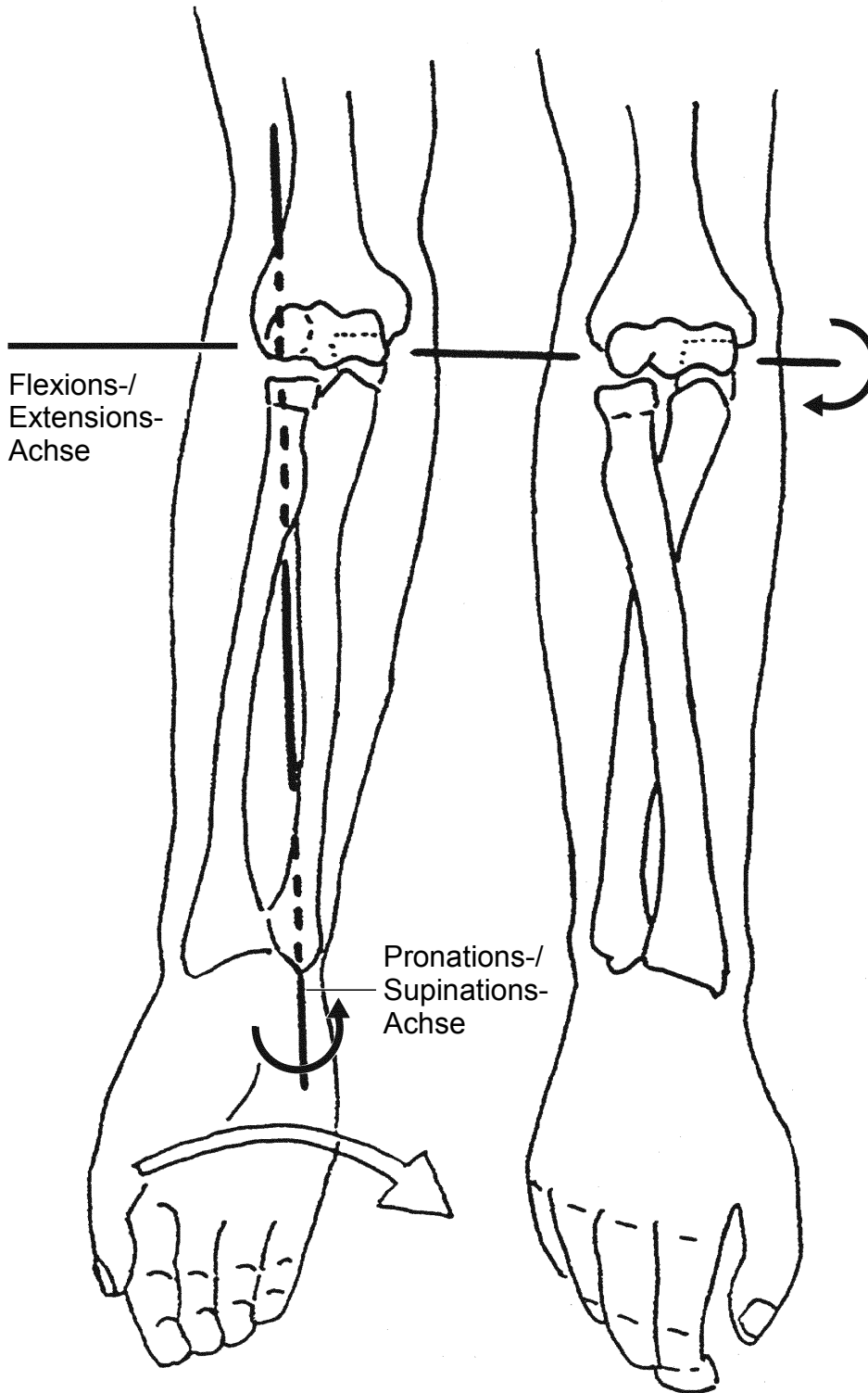
③ Proximales Radioulnargelenk (Radgelenk)

Ringband
Kollateralband



Umwendmuskeln

(Pronatoren, Supinatoren)



Supination

Pronation

- M. biceps brachii**
- M. supinator**
- M. pronator teres**

- M. brachioradialis**
- M. pronator quadratus**

- Membrana interossea**

- distales Radio-ulnargelenk**

Unterarm, oberflächliche Flexoren

**M. flexor
carpi ulnaris**

**M. flexor
carpi radialis**

**M. palmaris
longus**

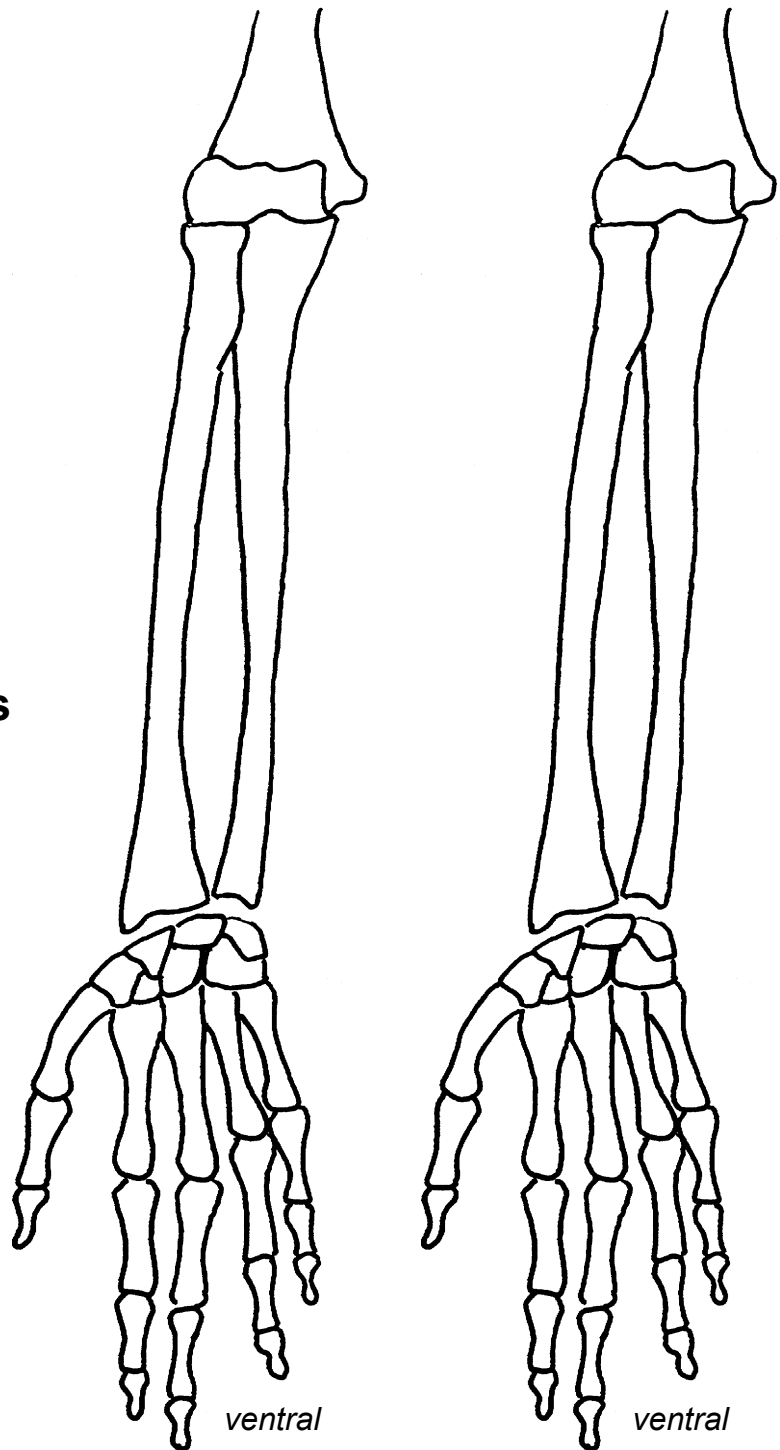
Palmaraponeurose

**M. flexor
digitorum superficialis**

**Retinaculum
flexorum**

Karpaltunnel

Sehnenscheiden



Unterarm, oberflächliche Extensoren

**M. extensor
carpi ulnaris**

**M. extensor
carpi radialis**

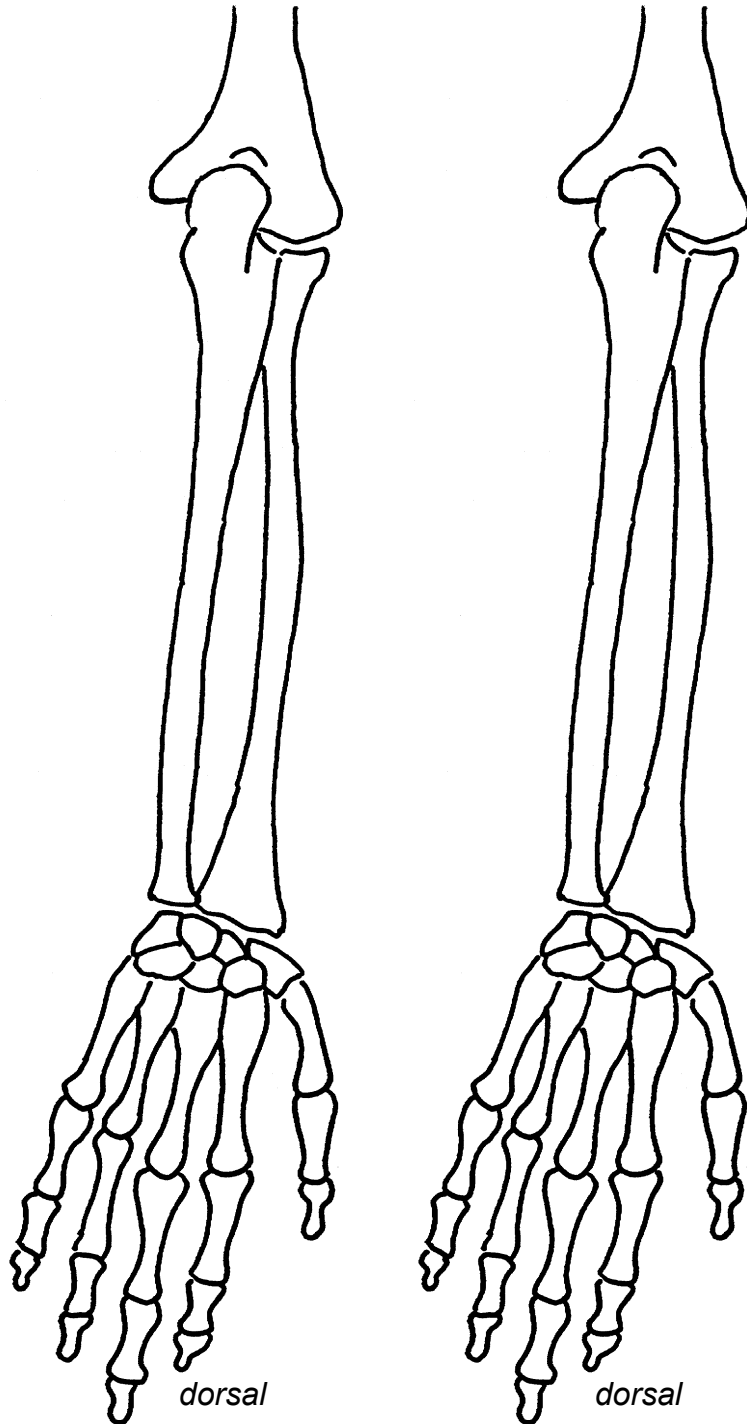
- brevis
- longus

**M. extensor
digitorum**

**M. extensor
digiti minimi**

**Retinaculum
extensorum**

Sehnenscheiden



Dorsalaponeurose

Muskelfunktionen am Ellbogengelenk

| | Flexion ¹ | Extension ¹ | Pronation ² | Supination ² |
|-----------------------------------|----------------------|------------------------|------------------------|-------------------------|
| M. biceps brachii | ++ | | | +++ ³ |
| M. triceps brachii | | +++ | | |
| M. brachialis | ++ | | | |
| M. supinator | | | | ++ |
| M. brachioradialis | ++ | | + ⁴ | + ⁴ |
| M. pronator teres | + | | ++ | |
| M. pronator quadratus | | | ++ | |
| M. flexor carpi radialis | + | | | |
| M. flexor carpi ulnaris | + | | | |
| M. flexor digitorum superficialis | + | | | |
| M. extensor carpi radialis brevis | + | | + ⁴ | + ⁴ |
| M. extensor carpi radialis longus | + | | + ⁴ | + ⁴ |
| M. extensor carpi ulnaris | | + | | |
| M. extensor digitorum | | + | | |

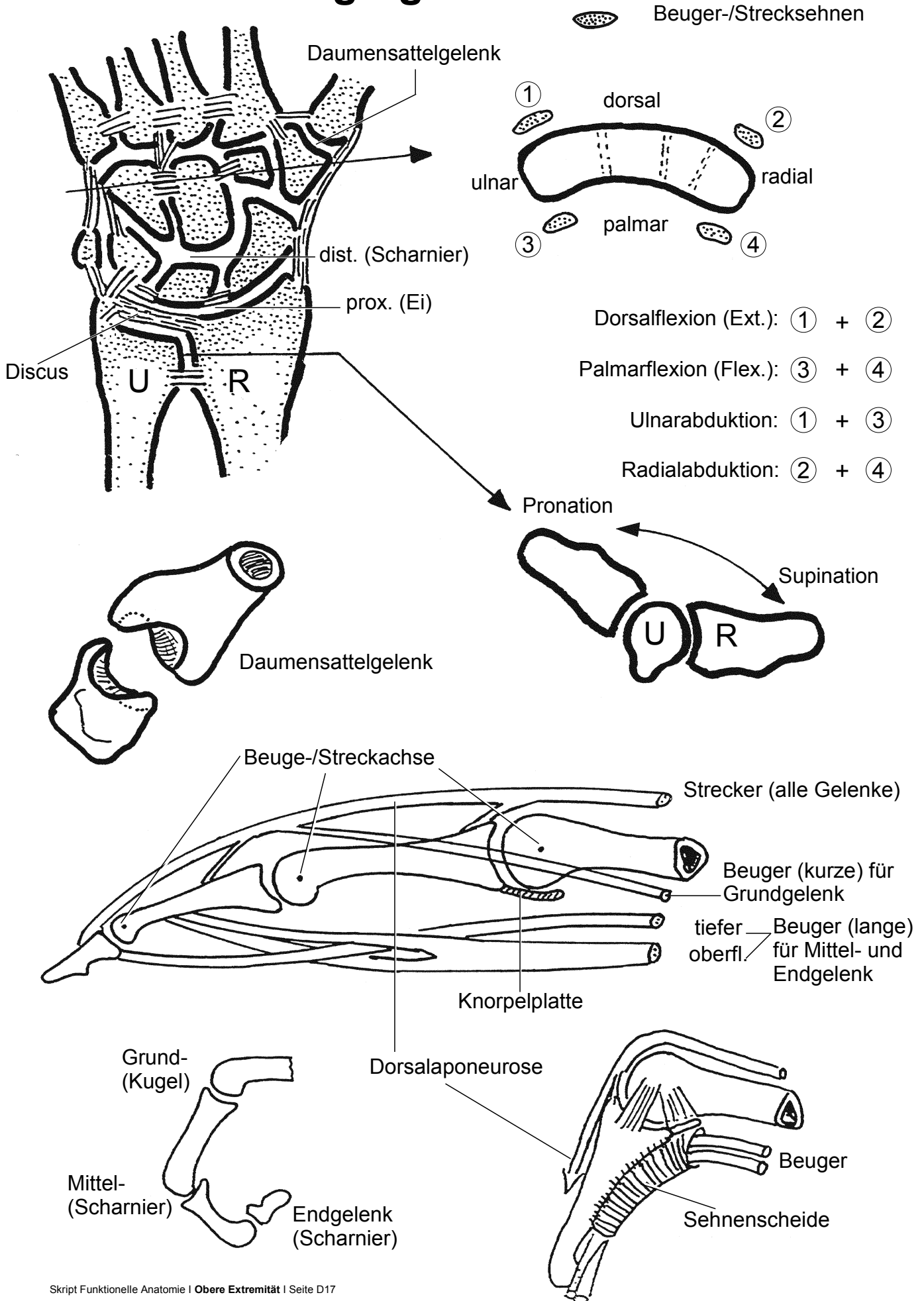
¹ Humeroulnar- und Humeroradialgelenk

² Humeroradialgelenk, proximales und distales Radioulnargelenk

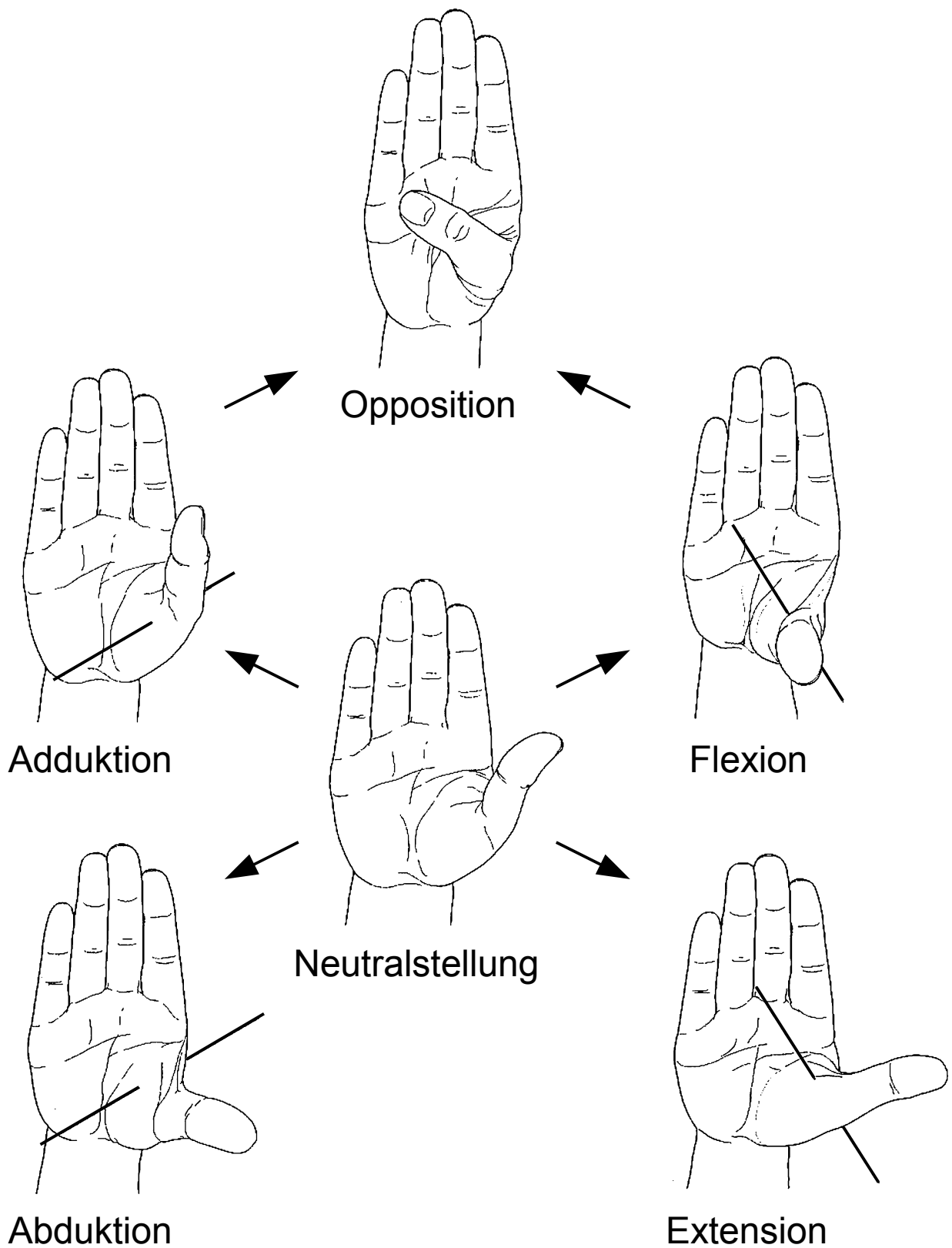
³ nur in Flexionsstellung

⁴ radiale Muskelgruppe: aus Pro- oder Supination zur Neutralstellung

Hand- und Fingergelenke



Bewegungen im Daumensattelgelenk



Unterarm, tiefe Flexoren und Extensoren

**M. flexor
digitorum profundus**

**M. flexor
pollicis longus**

Membrana interossea

**M. abductor
pollicis longus**

**M. extensor
pollicis
- brevis
- longus**

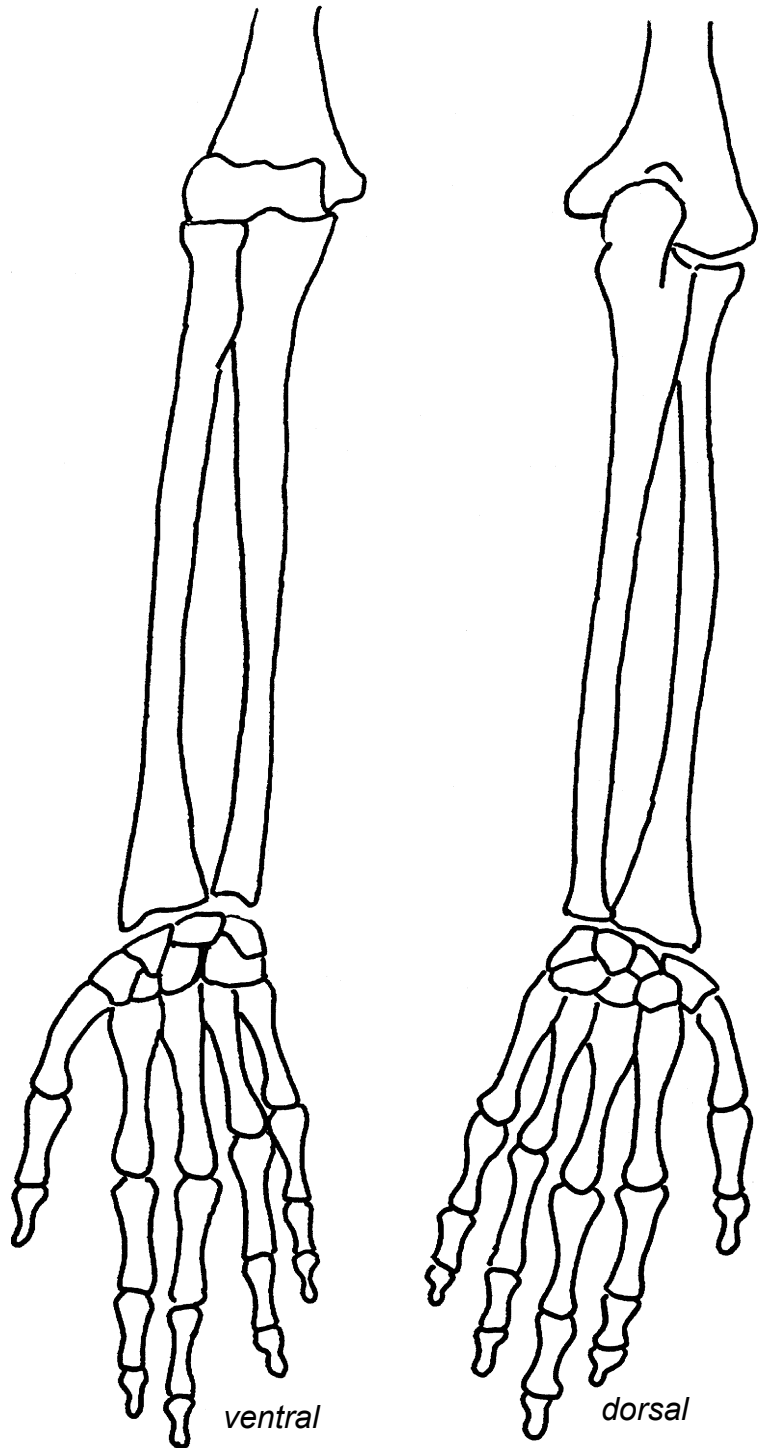
**M. extensor
indicis**

**Retinaculum
extensorum**

Karpaltunnel

Sehnenscheiden

Dorsalaponeurose

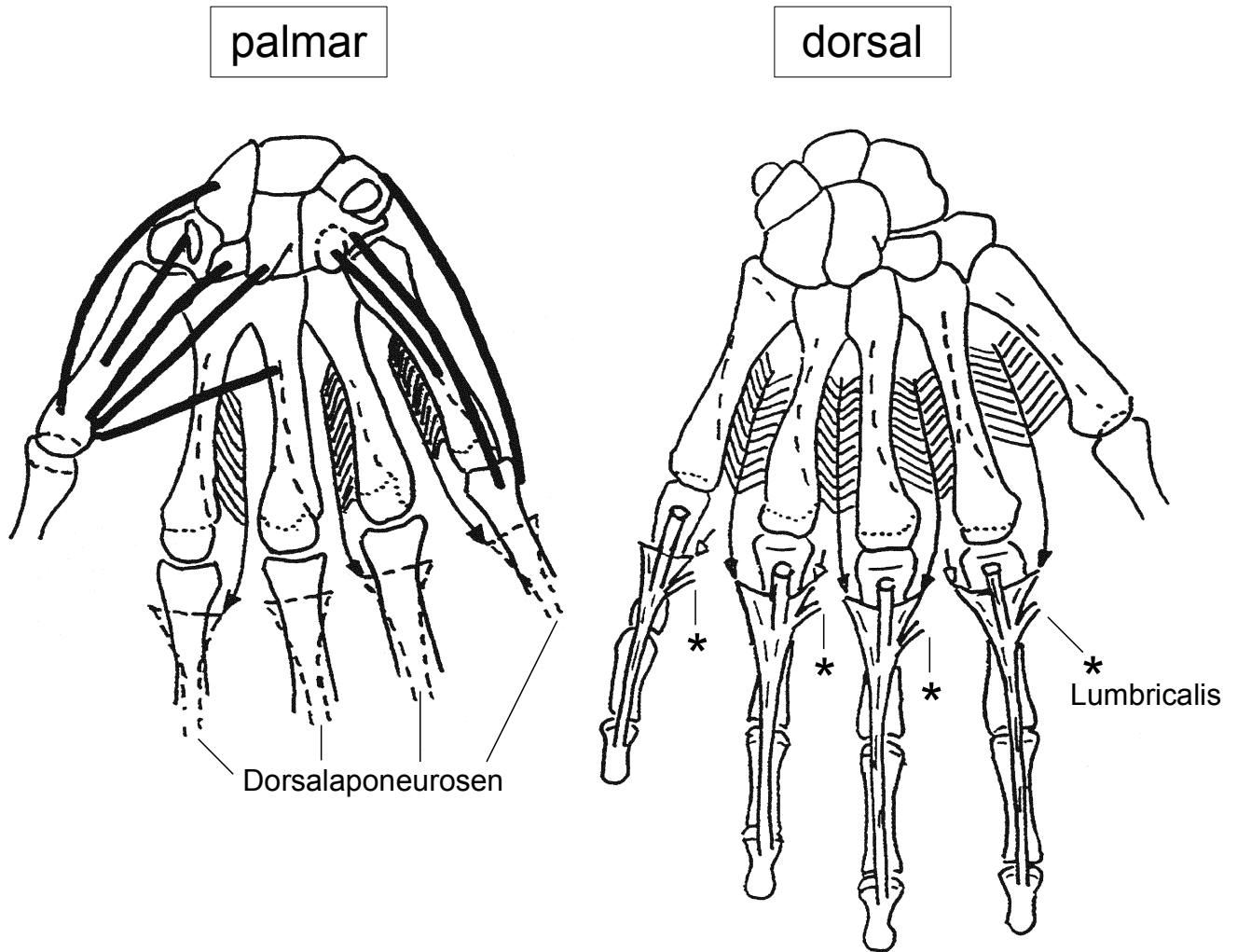


Muskelfunktionen am Handgelenk

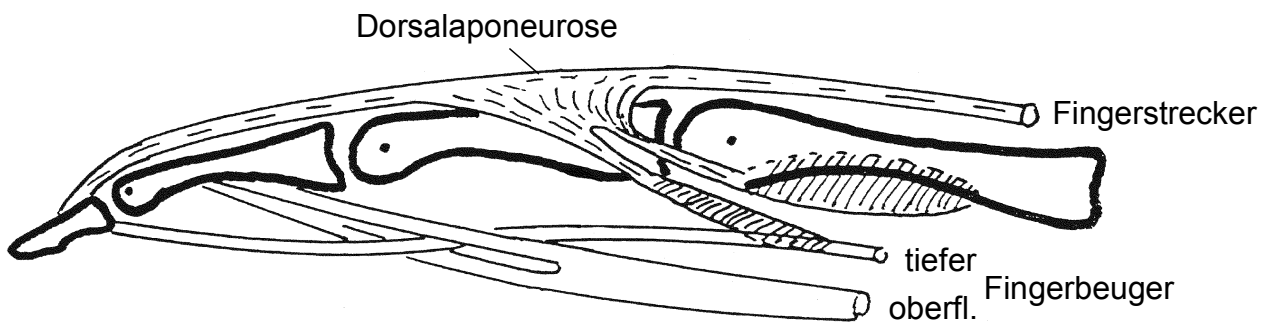
| | Palmarflexion | Dorsalextension | Ulnarabduktion | Radialabduktion |
|-----------------------------------|---------------|-----------------|----------------|-----------------|
| M. flexor carpi radialis | ++ | | | ++ |
| M. flexor carpi ulnaris | ++ | | ++ | |
| M. flexor digitorum superficialis | + | | | |
| M. extensor carpi radialis brevis | | ++ ¹ | | ++ |
| M. extensor carpi radialis longus | | ++ ¹ | | ++ |
| M. extensor carpi ulnaris | | ++ ¹ | ++ | |
| M. extensor digitorum | | + | | |
| M. flexor digitorum profundus | + | | | |
| M. flexor pollicis longus | + | | | + |
| M. abductor pollicis longus | | | | + |
| M. extensor pollicis brevis | | | | + |
| M. extensor pollicis longus | | + | | + |
| M. extensor indicis | | + | | |

¹ Faustschluss Helfer

Kurze Handmuskeln



| | | |
|------------|---|-------------------------------|
| Thenar | } | M. interossei palmares |
| Mesothenar | | M. interossei dorsales |
| Hypothenar | | Mm. lumbricales |



Muskelfunktionen an den Fingern

| | Flexion | | | | Extension | | | | Adduktion ³ (Finger schliessen) | Abduktion ³ (Finger spreizen) |
|--|---------------------------|-----------------------------|-------------------------------|---------------------------|---------------------------|-----------------------------|-------------------------------|---------------------------|--|--|
| | Sattelgelenk ^I | Grundgelenke ^{I-V} | Mittelgelenke ^{II-V} | Endgelenke ^{I-V} | Sattelgelenk ^I | Grundgelenke ^{I-V} | Mittelgelenke ^{II-V} | Endgelenke ^{I-V} | | |
| M. flexor digitorum superf. | | + ^{II-V} | ++ ^{II-V} | | | | | | | |
| M. extensor digitorum | | | | | | ++ ^{II-V} | ++ ^{II-V} | + ^{II-V} | | |
| M. flexor digitorum prof. | | + ^{II-V} | + ^{II-V} | ++ ^{II-V} | | | | | | |
| M. flexor pollicis longus ¹ | ++ ^I | ++ ^I | | ++ ^I | | | | | ++ ^I | |
| M. abductor pollicis longus | | | | | + ^I | | | | | ++ ^I |
| M. extensor pollicis brevis | | | | | ++ ^I | ++ ^I | | | | + ^I |
| M. extensor pollicis longus | | | | | | ++ ^I | | ++ ^I | + ^I | |
| M. extensor indicis | | | | | | ++ ^{II} | ++ ^{II} | + ^{II} | | |
| Mm. interossei dorsales ² | | ++ ^{II-V} | | | | | + ^{II-V} | ++ ^{II-V} | | ++ ^{II-IV} |
| Mm. interossei palmares ² | | ++ ^{II-V} | | | | | + ^{II-V} | ++ ^{II-V} | ++ ^{II-V} | |
| Mm. lumbricales ² | | ++ ^{II-V} | | | | | + ^{II-V} | ++ ^{II-V} | | |
| Thenarmuskeln ¹ | ++ ^I | ++ ^I | | | | | | | ++ ^I | ++ ^I |
| Hypothenarmuskeln | | ++ ^V | | | | | | | ++ ^V | ++ ^V |

¹ Opposition = Adduktion + Flexion + Innenrotation im Sattelgelenk

² Mittelhandmuskeln (Mesothenar)

³ Daumen im Sattelgelenk, übrige Finger im gestreckten Grundgelenk

I Daumen, II Zeigefinger, III Mittelfinger, IV Ringfinger, V Kleinfinger