

## Patient position and method:

Patient supine

## Guiding structures:

Lateral border of the sternocleidomastoid m., interscalenus groove  
The insertion site is at the level of the thyroid notch (approx. 2 cm above the level of the cricoid cartilage) at the posterior edge of the sternocleidomastoid muscle. The direction of insertion is along the interscalene groove (in a caudal and lateral direction) at an angle of approx. 30° to the skin. Stimulus response: Deltoid m., biceps m. Injection of the local anaesthetic when an adequate stimulus response of 0.3 mA/0.1 ms is reached.

## Comments on the technique:

- The aiming point is in the middle third of the clavícula
- The subclavian a. marks the caudal end of the interscalene groove.  
It can be identified by palpation or with the aid of a vascular doppler.

Notice the difference to the classical interscalene approach acc. to Winnie; the puncture site is 1 to 2 cm above (cranial) the puncture site of Winnie's interscalene block, the direction of the needle is lateral in contrast to Winnie's technique (medial, dorsal, caudal). You will come in contact with the plexus at easily a more tangential angle in contrast to the classical approach, where the needle approaches the plexus at a right angle. Meier's approach is suitable for continuous catheter techniques.

## Indications:

- Anaesthesia and analgesia of the shoulder and/or of the proximal upper arm region
- Mobilisation (e. g. frozen shoulder)
- Physiotherapy in the shoulder region (e. g. postoperative, following mobilisation)
- Therapy for pain syndromes
- Sympathicolysis

## Special contraindications:

- Contralateral phrenic paresis
- Contralateral recurrent paresis
- COPD (relative)

**Side effects, complications:** Horner s., ipsilateral phrenic block, recurrent block

## Local anaesthetics:

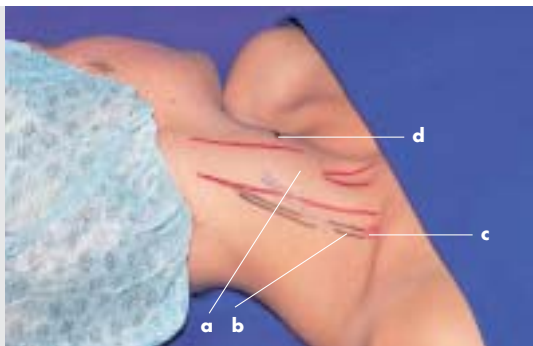
**Initial:** 30 – 40 ml lidocaine 1% or mepivacaine 1% or 30 ml ropivacaine 0.75%

**Continuous:** Ropivacaine 0.2 – 0.375% 6 ml/h (5 – 15 ml), max. 37.5 mg/h bolus (alternatively): 10 – 20 ml ropivacaine 0.2 – 0.375% (approx. every 6 hours)

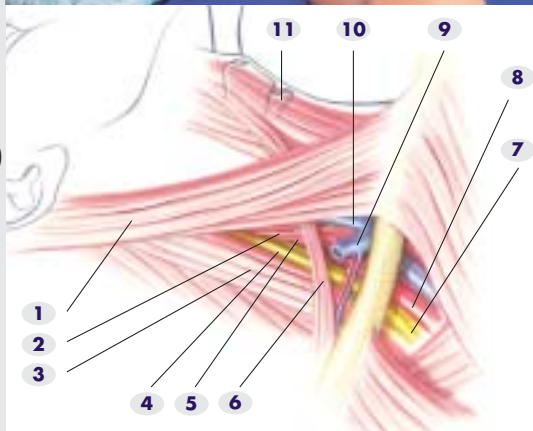
**Needle:** Single shot: Short-bevel unipolar 22 G x 4 – 6 cm needle

Continuous: E. g. 19.5 G x 6 cm (Plexolong B-Set®, Pajunk co., or Contiplex D®, B. Braun) with a 20 G catheter (advance catheter 4 cm beyond the tip of the cannula).

- a** sternocleidomastoid m.
- b** interscalene groove
- c** subclavian a.
- d** cricoid cartilage



- 1** sternocleidomastoid m.
- 2** phrenic n.
- 3** middle scalene m.
- 4** brachial plexus (supraclavicular part)
- 5** anterior scalene m.
- 6** omohyoid m.
- 7** brachial plexus (infraclavicular part)
- 8** subclavian a.
- 9** external jugular v.
- 10** internal jugular v.
- 11** cricoid cartilage



The direction of insertion is caudally and laterally along the interscalene groove, 30° angle to the skin.



VIB (= vertical infraclavicular block)  
(acc. to Kilka, Geiger and Mehrkens)

### Patient position:

Patient supine

Jugular notch, ventral acromial process of the scapula.

### Guiding structures:

The distance between the jugular notch and the ventral acromial process is bisected. The insertion site must be directly under the clavicle and take place in a strictly vertical direction. The plexus is reached after approx. 3 cm (max. 5 cm!). Flexion of the fingers at 0.3 mA/0.1 ms form the desired stimulus response.

### Comments on the technique:

Risk of pneumothorax

Therefore, **make absolutely sure to avoid:**

- Insertions too far medially
- Deviation from the sagittal (plumb bob) direction of insertion
- Advancing the needle > 6 cm

When the index finger is placed to have contact with the coracoid process laterally and the clavicle cranially ("Mohrenheim's fossa") the medial border of the finger marks the injection point/"**finger point**". Always perform this block using a nerve stimulator. A stimulus response only in the biceps m. yields poor results. Pull back the needle to a s.c. position, shift it slightly laterally and advance it again in a strictly sagittal direction. In comparison with the Raj/Borgeat technique (ref. to this) this technique does not require abduction of the arm.

### Indications and contraindications:

see infraclavicular plexus block, Raj technique (mod. by Borgeat)

**Side effects, complications:** Horner syndrome, pneumothorax, intravascular injection.

### Local anaesthetics:

#### Initial:

30 – 40 ml lidocaine 1% or mepivacaine 1% or  
30 ml ropivacaine 0.75%

#### Continuous:

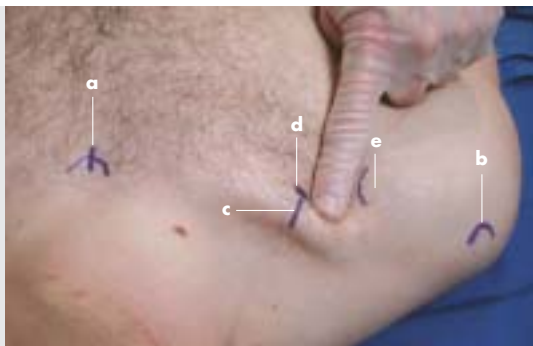
Ropivacaine 0.2 – 0.375% 6 ml/h (5 – 15 ml), max. 37.5 mg/h  
Bolus (alternatively): 20 ml ropivacaine 0.2 – 0.375% (approx. every 6 hours)

#### Needles:

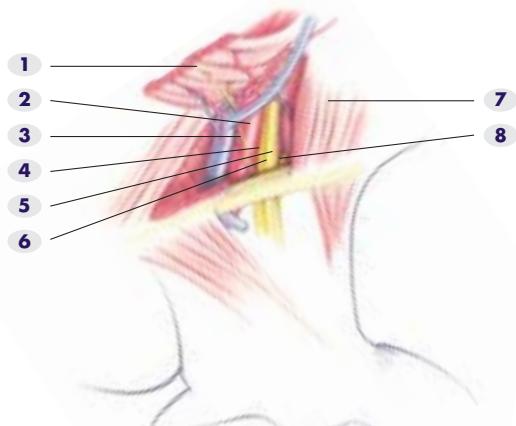
Single shot: Short-bevel 22 G x 4 – max. 6 cm.

Continuous: E. g. Contiplex D® 18 G x 5.5 cm (B. Braun) alternatively Plexolong A® 19.5 G x 5 cm with catheter (Pajunk co.). The catheter is advanced 3 – 4 cm beyond the tip of the cannula.

- a** jugular notch
- b** ventral acromial process
- c** 1/2 distance from a – b
- d** "finger point"
- e** coracoid process



- 1** major pectoral m.
- 2** subclavian a.
- 3** pectoral n.
- 4** medial cord
- 5** posterior cord
- 6** lateral cord
- 7** deltoid m.
- 8** suprascapular n.



Strictly vertical  
needle insertion  
(perpendicular to  
the underlying  
surface)



## Patient position:

Patient supine.

## Guiding structures:

Jugular notch, ventral acromial process of the scapula. The needle insertion site is located halfway between the anterior tip of the acromion and the jugular notch approx. 1 cm below the clavicle. For injection, the arm is abducted 90° and elevated 30°. The needle is directed laterally at an angle of approx. 45° – 60° towards the most proximal point at which the axillary artery can still be palpated in the axilla.

## Comments on the technique:

The risk of pneumothorax is low because of the lateral direction of the needle. Intravascular injection (usually venous, cephalic vein) has been observed. Between 3 – 8 cm there should be a motor response in the hand or fingers. Because of the tangential approach to the plexus, a catheter can be advanced readily.

## Indications:

- Anaesthesia and analgesia for surgery of the upper arm, lower arm and hand
- Treatment of pain syndromes
- Analgesia for physiotherapeutic treatment
- Sympathicolysis

## Contraindications:

- Thorax deformity
- Dislocated healed clavicular fracture
- Foreign bodies in the area of insertion (e.g. pacemaker, port etc.)
- Untreated coagulation disorder

**Side effects, complications:** intravascular injection, pneumothorax

## Local anaesthetics:

### Initial:

30 – 40 ml lidocaine 1% or mepivacaine 1% or 30 ml ropivacaine 0.75%

### Continuous:

Ropivacaine 0.2 – 0.375% 6 ml/h (5 – 15 ml), max. 37.5 mg/h bolus (alternatively): 20 ml ropivacaine 0.2 – 0.375% (approx. every 6 hours)

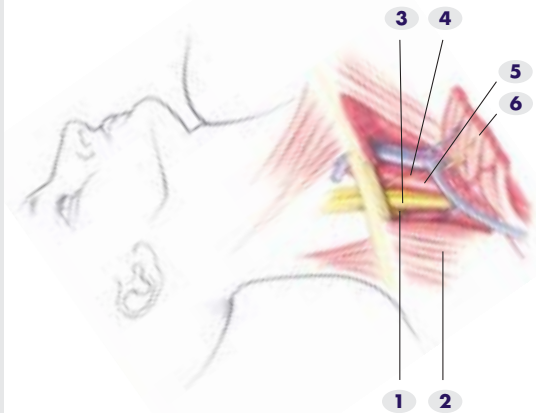
**Needle:** Single shot: unipolar 22 G x 6 – 10 cm needle

Continuous: E. g. 19.5 G x 10 cm Plexolong with catheter (Pajunk co.). The catheter is advanced 3 – 4 cm beyond the tip of the cannula.

- a** axillary a.,  
anatomical land-  
mark for establishing  
the needle insertion



- 1** suprascapular n.  
**2** deltoid m.  
**3** brachial pl.  
**4** pectoral n.  
**5** subclavian a.  
**6** major pectoral m.



Needle insertion  
site according to  
VIB anatomical  
landmarks (p. 16),  
direction towards  
the most proximal  
point of the  
axillary a., approx.  
45° – 60° angle.



### Patient position:

The patient is sitting.

### Guiding structures:

Scapular spine, posterior portion of the acromion, medial end of the scapular spine. The midpoint of the line between the lateral posterior portion of the acromion and the medial end of the scapular spine is marked. The insertion site is 2 cm cranial (above) and 2 cm medial of this point. The unipolar needle is advanced 3 – 5 cm laterocaudally and only slightly ventrally at an angle of approx. 30° (in the direction of the head of the humerus) until a correct needle position is indicated by a stimulus response in the infra- or the supraspinous muscles, or until the needle shows a pain-free "knocking" sensation in the shoulder after 3 – 5 cm.

### Comments on the technique:

There is no risk of pneumothorax if these guidelines are followed. Aspiration is necessary in order to avoid intravascular injection (suprascapular artery, extremely rare). The method can also be performed without nerve stimulation (bone contact) and be used with a continuous technique.

### Indications:

- Diagnostic: Shoulder pain of unclear origin
- Anaesthesia: Incomplete interscalene plexus block
- Pain therapy: Adhesive capsulitis (frozen shoulder), arthritis, rupture of the rotator cuff, etc.

### Special contraindications:

None

**Side effects:** Nothing specific

### Local anaesthetics:

#### Initial:

10 – 15 ml lidocaine 1% or mepivacaine 1% or ropivacaine 0.75%

#### Continuous:

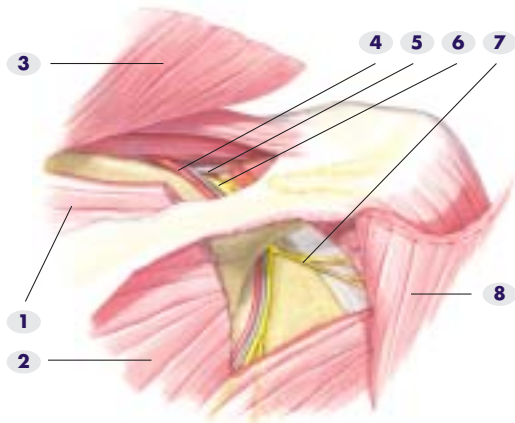
Ropivacaine 0.2 – 0.375% 6 ml/h (5 – 15 ml), max. 37.5 mg/h bolus (alternatively): 10 ml ropivacaine 0.2 – 0.375% (approx. every 6 hours)

**Needles:** Single shot: Unipolar needle 22 G x 6 – max. 8 cm long.  
Continuous: E. g. Plexolong B® 19.5 G x 6 cm (Pajunk co.) or Contiplex (B. Braun). The catheter is advanced approximately 3 cm beyond the tip of the cannula.

- a** middle point of the scapular spine
- b** needle insertion site:  
2 cm medial  
2 cm cranial to the  
middle point



- 1** supraspinatus m.
- 2** infraspinatus m.
- 3** trapezius m.
- 4** suprascapular a.
- 5** transverse scapular ligament
- 6** suprascapular n.
- 7** articular branches of the suprascapular n.
- 8** deltoid m.



Direction of needle:  
Laterocaudal,  
approx. 30° angle



### Patient position:

Patient supine, arm abducted 90°, externally rotated, elbow flexed approx. 90°.

### Guiding structures:

Axillary artery, coracobrachial muscle.

Palpate the gap between the axillary a. and the coracobrachial m.

Following pre-puncture of the skin, advance the needle parallel to and above the artery in a proximal direction at an angle of 30° – 45° to the skin ("click phenomenon" entering neurovascular sheath). Lower the distal end of the needle and advance it further. Check position with a nerve stimulator (not compulsory with this technique, but recommended).

### Comments on the technique:

A low-risk technique that can be performed without a nerve stimulator: A "click" as the neurovascular sheath is penetrated and easy advancement of the short bevel needle with cannula indicates a correct needle position. Not infrequently, anaesthesia in the radial nerve's area of distribution is insufficient. Supplementary selective block may be needed (see below).

### Indications:

- Operations in the arm (distal upper arm, lower arm, hand)
- (Continuous) analgesia
- Physiotherapy
- Pain syndrome
- Sympathicolysis

### Special contraindications:

None

**Side effects:** No special ones

### Local anaesthetics:

#### Initial:

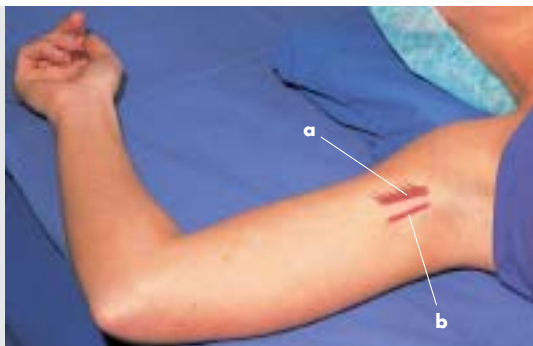
30 – 50 ml lidocaine 1% or mepivacaine 1% or  
40 ml ropivacaine 0.75%

#### Continuous:

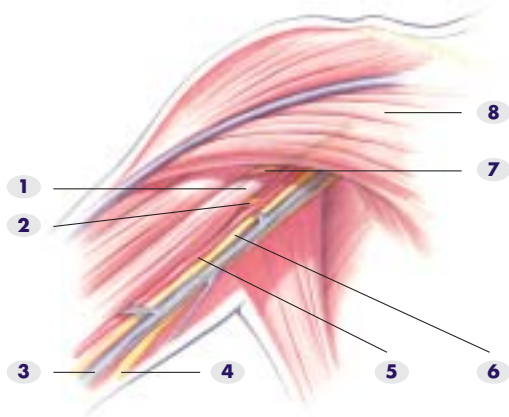
Ropivacaine 0.2 – 0.375% 6 ml/h (5 – 15 ml), max. 37.5 mg/h  
Bolus (alternatively): 20 ml ropivacaine 0.2 – 0.375% (approx. every 6 hours)

**Needles:** Single shot and/or continuous: Short-beveled needle through a plastic cannula (e. g. 18 G, 45° bevel, Pajunk co. or B. Braun). A flexible catheter can well be inserted through the 18 G cannula. The catheter is advanced 5 cm beyond the tip of the needle. Alternatively: Single shot unipolar needle 22 G x 4 cm.

- a** coracobrachial m.
- b** axillary a.



- 1** coracobrachial m.
- 2** radial n.
- 3** medial antebrachial cutaneous n.
- 4** ulnar n.
- 5** brachial a.
- 6** median n.
- 7** musculocutaneous n.
- 8** major pectoral m.



Direction of insertion: medially, above and parallel to the artery, 30° – 45° angle to the skin.

