DMS/DMS Intermediate

*The dynamic, angle-adjustable barrel plate system*
Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMS Product Features</td>
<td>4-7</td>
</tr>
<tr>
<td>Surgical Techniques</td>
<td></td>
</tr>
<tr>
<td>DMS Surgical Technique</td>
<td>8-17</td>
</tr>
<tr>
<td>DMS Intermediate Surgical Technique</td>
<td>18-29</td>
</tr>
<tr>
<td>DMS Product Range</td>
<td></td>
</tr>
<tr>
<td>Implants</td>
<td>30-31</td>
</tr>
<tr>
<td>Instruments</td>
<td>32-35</td>
</tr>
<tr>
<td>Storage Trays</td>
<td>36-37</td>
</tr>
<tr>
<td>DMS Intermediate Product Range</td>
<td></td>
</tr>
<tr>
<td>Implants</td>
<td>38-39</td>
</tr>
<tr>
<td>Instruments</td>
<td>40-43</td>
</tr>
<tr>
<td>Storage Trays</td>
<td>44-45</td>
</tr>
</tbody>
</table>
**DMS**

**Dynamic, angle-adjustable barrel plate system**

First acceptable results following femoral neck and pertrochanteric femur osteosynthesis were reported by Smith-Petersen (1931), using a 3-lamellae pin with three-star cross section. Further developments included the implants according to Thornton (1937), Jewett (1941) and McLaughlin (1947), which are rigidly connected to a plate applied laterally to the femur. Systematic further developments were the angle plates designed by Schneider and Müller (1957).

E. Pohl (1951) can claim credit for having developed the first non-interlocking connection between an intra-medullary force carrier and a lateral anchoring plate. The principle consists of a dynamic connection between a lag screw and a femoral "barrel plate" that allows self-compression (sliding barrel principle).

This brilliant idea made it possible to avoid many of the previous complications (head perforation, pseudarthrosis, secondary dislocation). Modified implants were introduced in the United States by Callender (1967) as “Sliding Hip Screws” and by Richards (1971) as “Compression Screws”. An optimized follow-up model was developed by the AO (1979) on the basis of Pohl’s system. While maintaining the „sliding barrel principle“, additional rotational stability is ensured by form-fit (i.e. by using a hexagonal screw instead of a round one and flattening the barrel on two sides to provide corresponding sliding surfaces).
Also based on Pohl’s system, we have now newly developed a dynamic, infinitely adjustable, variangle barrel plate for stabilizing proximal femoral fractures. If required, the KLS Martin implant (DMS) allows valgisation of the femoral head fragment after fixation of the fracture and before compressing the pertrochanteric fracture surfaces, particularly in the case of unstable fractures.

The greatest advantage of this implant lies in the fact that the required valgisation angle can be adjusted to the individual patient’s needs by means of a worm gear.

**K. K. DITTEL**

**DMS Intermediate**

The DMS Intermediate is a third smaller than the DMS standard plate and therefore better suited for the anatomy of children and short adults. At the same time, the advantages of intraoperative adjustment of the angle of the implant are fully retained.
The Dynamic Martin Screw (DMS) was specially designed to stabilize proximal femoral fractures. The dynamic, angle-adjustable barrel plate offers perfect shaft congruence for patient-specific adaptation. The “sliding barrel” principle of the implant enables full weight bearing at an early stage. And thanks to the universal applicability of the plate, stockkeeping needs and corresponding costs are significantly reduced.

Alternatively to the DMS standard plate there is available the DMS Intermediate which is well suited for the anatomy of the child and small adults as well.
### DMS – simple and dynamic!

<table>
<thead>
<tr>
<th>Plate</th>
<th>Features</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dynamic</td>
<td>Ideal shaft congruence</td>
</tr>
<tr>
<td></td>
<td>Infinitely adjustable</td>
<td>Patient-specific adaptation → low complication rates → increased safety</td>
</tr>
<tr>
<td></td>
<td>Angle-adjustable</td>
<td>Intraoperative flexibility</td>
</tr>
<tr>
<td></td>
<td>Can be inserted with maximum precision</td>
<td>Secondary varus or valgus correction possible</td>
</tr>
<tr>
<td></td>
<td>Optimal adaptation of the plate to the bone</td>
<td>Good biomechanical conditions</td>
</tr>
<tr>
<td></td>
<td>“Sliding barrel” principle</td>
<td>Excellent and reliable stability under load even in difficult cases</td>
</tr>
<tr>
<td></td>
<td>One barrel plate replaces up to 6 fixed-angle plates</td>
<td>Compression and reduction after plate fixation</td>
</tr>
<tr>
<td></td>
<td>Universal application</td>
<td>Fast restoration of full weight-bearing capacity</td>
</tr>
</tbody>
</table>

| Lag screw | DMS Intermediate: forward and backward cutting lag screw | Easy implantation and safe explantation |
**DMS indications**

- Medial femoral neck fractures
  - DMS 2-hole plate

- Pertrochanteric femoral fractures
  - DMS 4-hole plate

- Intertrochanteric reversed fractures
  - DMS 4-hole plate

- Subtrochanteric fractures
  - DMS 4-hole plate

**DMC indications**

- Condylar femoral fractures

- Supracondylar femoral fractures
Surgical technique

DMS surgical technique
Pertrochanteric femoral fracture

Pages 10-17
Surgical Technique: DMS

Preoperative X-ray

Positioning the patient

The patient is placed on a radiolucent operating table in dorsal decubitus position.
1. Lateral surgical approach acc. to Bauer

Starting two finger widths proximally to the tip of the trochanter major, a straight, lateral skin incision is made, length 15 cm.

2. Countersinking the cortex of the femur

The 4.5-mm drill bit is used to countersink the femoral cortex.
3. Positioning the guide wire

The guide wire is positioned using the aiming device, which can be adjusted between 135° and 150°.

4. Inserting the guide wire

The guide wire is then inserted under image intensifier control, making sure that it lies centrally in the mid-axis of the femoral head.

Notice:
Alternatively, the guide wire can be inserted free-hand using an appropriate soft-tissue sleeve.
5. Image intensifier control
Correct placement of the guide wire is checked with the image intensifier.

6. Determining guide wire length
Once the guide wire has been correctly positioned, its length can be conveniently read off the scale of the measuring sleeve.

Measuring sleeve
**SURGICAL TECHNIQUE: DMS**

7. **Drilling the hole**

After setting it to the measured value (-10 mm), the DMS combo reamer is drilled into the bone along the guide wire under image intensifier control until the cone of the third stage has fully entered the lateral cortex.

---

8. **Tapping**

Optionally using the centering sleeve and the T-handle, the tap is now screwed in to a point 10 mm away from the cortex.

The depth of the thread can be directly read off the mark on the centering sleeve.
9. Inserting the lag screw

The length of the lag screw is identical with the set drilling depth.

To insert the lag screw, it is first attached to the screwdriver and the connector before it is screwed in with the safety inserter, the 11-mm centering sleeve and the T-handle.

Notice: In hard bone, the lag screw is inserted up to the first mark, in osteoporotic bone up to the last mark.

10. Inserting the plate

Once the lag screw has been positioned correctly, the handle with the safety inserter and the centering sleeve can be removed.

Now a plate of correct length can be passed over the screwdriver onto the lag screw.

Notice:
If the plate is not parallel to the longitudinal axis of the femur, the T-handle can be applied again to fine-adjust the screw by turning it clockwise.
11. Adjusting the plate

Once the plate is in the correct position relative to the femoral axis, it is adjusted with the worm gear as required for proper valgus or varus correction.

Using the screwdriver, the worm gear is operated until the plate attaches perfectly to the femur.

To ensure a secure seat, the plate impactor is used to precision-adjust the DMS plate on the femur.

12. Fixing the plate

To fix the DMS plate in position on the femur, 4.5-mm cortical screws are used.

For the plate hole located directly underneath the worm gear, a 6.5-mm cancellous screw can also be used for fixation of the lesser trochanter.
13. Inserting the compression screw

In a last step, the fracture is compressed by inserting the DMS compression screw. In osteoporotic bone, compression paths of up to 6 mm can occur.

Following compression, the compression screw is removed.

Left picture: Fracture without compression
Right picture: Compressed fracture

Postoperative X-ray check

Screwdriver
DMS Intermediate – step by step to optimal fixation

DMS Intermediate indications
Proximal femoral fractures in short adults

Medial femoral neck fracture
DMS Intermediate 2-hole plate

Pertrochanteric femoral fracture
DMS Intermediate 4-hole plate

Intertrochanteric reversed fracture
DMS Intermediate 4-hole plate

Subtrochanteric fracture
DMS Intermediate 4-hole plate

Displacement osteotomy for coxa valga correction
preoperative
postoperative, correction approx. 10°
Fixation with DMS Intermediate

Displacement osteotomy for coxa vara correction
preoperative
postoperative, correction approx. 20°
Fixation with DMS Intermediate
Surgical technique

DMS Intermediate surgical technique

*Intertrochanteric varisation osteotomy*

with a correction angle of 20°

Prof. Meiß

Pages 20-29
Preoperative planning

As part of the preoperative planning, the scope of the varus correction needs to be determined with precision.

On this basis, the DMS Intermediate plate with the correct angulation is then selected.

Detailed planning requires a pelvic X-ray view or an AP X-ray of the hip.

Preoperative planning

A paper tracing is made from the X-ray image. The femur is then cut out and the desired correction set after dissection in the osteotomy region.

This can be done with or without wedge removal (i.e. lateral opening or medial closing).

In addition, the prospective position of the DMS Intermediate plate before and after “osteotomy” is sketched in as well, using an X-ray template.
Positioning the patient

The patient is placed in dorsal decubitus position on a radiolucent operating table. Both legs are covered so that they are easily movable.

Besides, it is advisable to place a radiolucent cushion or folded towel underneath the sacrum in order to lift the pelvis and thighs a little.

If pelvic osteotomy is additionally planned for the same session, the iliac crest is covered as well up to costal arch level.

1. Approach – opening

Surgical access is made by means of a lateral longitudinal thigh incision from a point slightly distally of the tip of the trochanter to the proximal shaft of the femur.

The fascia is split along the course of the fibers, with the leg kept in a slightly abducted position to reduce fascia tension.

Thereafter, the trochanteric bursa is opened and the tissue retracted ventrally and dorsally.
2. Approach – opening

The intertrochanteric femoral region must now be exposed.

Notice:
To ensure good orientation, subperiosteal exposure of the trochanter is recommended until the proximal end of the femoral neck is ventrally palpable or visible.

3. Placing the guide wire

To mark the femoral neck antetorsion, a 2-mm-thick Kirschner wire is inserted into the femoral neck as centrally as possible under image intensifier control.

Notice:
It is important to maintain the predetermined angle to the shaft. The entry point of the guide wire should be located approx. 1 cm distally of the trochanteric apophyseal growth plate.
4. Placing the guide wire

The angle to the shaft must be set so that the intended varus correction can be achieved with the selected DMS Intermediate plate by reducing the angulation.

The guide wire is not pushed up to the subchondral lamella of the femoral head, but to a point just short of the epiphyseal plate of the femoral head.

Notice:
Image intensifier control in two planes is essential!

5. Setting the drill

Once positioned correctly, the length of the guide wire inside the bone is determined with the measuring sleeve.

The (3-stage) combo reamer is then set to the measured value minus 5 mm.

Notice:
When loosening the knurled nut, please note that this is a left-hand thread (to be turned clockwise!) and that the nut must be removed completely.
6. Pre-drilling

Pre-drilling is done via the guide wire under irrigation until the cone of the third stage is fully immersed in the lateral cortex.

Notice:
In any case, it is important to do the pre-drilling under image intensifier control to prevent the guide wire from being inadvertently pushed forward into the growth plate.

7. Tapping

The tap is inserted to the true drilling depth. This can be checked via the scale marks at the level of the lateral cortex.

Notice:
When screwing in the tap, be sure not to overturn it, as stripping (destroying) the thread inside the bone would jeopardize proper lag screw anchorage.
8. Inserting the lag screw

The length of the selected lag screw must match the drilling depth set on the combo reamer.

Using the lag screw connector, the screw is first fitted with the lag screw inserter sleeve before it is finally screwed in with the safety inserter for lag screw inserters and the T-handle.

9. Trial insertion of the plate

Now the appropriate DMS Intermediate plate can be inserted for testing purposes. This is done by pushing the cylindrical (barrel) part of the plate over the lag screw inserter onto the lag screw and attaching the plate to the shaft of the femur.

Notice:
Due to the hexagonal design of the lag screw, the plate may initially be out of line with the femoral shaft. In this case, attach the T-handle with the safety inserter again and adjust the lag screw by rotating it a little forward or backward.
10. Adjusting the plate

The plate must now be adapted accurately to the femoral shaft. This is done by adjusting its angulation via the adjusting screw, using the 2.5-mm Allen screwdriver.

To perform the osteotomy, the barrel plate is removed again while leaving the angular position unchanged for the time being. The lag screw remains in its final position.

11. Osteotomy

To mark the rotation, or plan the rotational correction, two Kirschner wires with a thickness of approx. 2.5 mm are inserted into the femur ventrally or ventrolaterally, proximally and distally of the planned osteotomy.
12. Osteotomy

Starting just distally of the lag screw insertion hole, the osteotomy is performed towards medial in such a way that the largest part of the lesser trochanter is left in place.

Preplacement of a Kirschner wire that can be used as a guide for the distal saw cut has proved useful.

Completion of the saw cut is followed by a marked widening of the osteotomy gap using a bone spreader in order to release the soft tissues.

Then the fragments are put in position according to the planned varus correction.

13. Inserting the plate

Now the plate can be inserted. This may require slight correction with the plate impactor.

Thereafter, the compression screw is inserted and slightly tightened.

The angulation is reduced as appropriate by rotating the adjusting screw clockwise (1 turn = 7.5°).
14. Fixing the plate

The plate is finally fixed in place with self-tapping 3.5-mm cortical screws.

If possible, the first screw should be inserted into the proximal sliding hole in compression position so the fragments are impacted a little.

When performing an opening osteotomy, it is recommended to fill the lateral gap by using a spongiosaplasty.

The compression screw is usually removed again to achieve optimal dynamization.

Finally, the result is documented in two planes by image intensifier.

15. Wound closure

Thorough irrigation of the wound.

Good refixation of the vastus lateralis muscle if it has been detached by an L-shaped incision.

Then layer-by-layer wound closure with loose suturing of the trochanteric bursa. If necessary, use of 1 or 2 drains. Application of a long-leg (pelvis-leg-foot) spica cast is required only in exceptional cases, because correct implantation of the DMS Intermediate plate provides solid fixation allowing early range-of-motion exercises if not partial weight bearing.
Follow-up-treatment

On the 2\textsuperscript{nd} or 3\textsuperscript{rd} postoperative day, radiographic assessment:
AP pelvic view and axial view of the hip (Lauenstein position).

Begin with mobilization on about the 3\textsuperscript{rd} postoperative day with
range-of-motion exercises including use of a continuous passive
motion device and transfer in a wheelchair in recumbent position.
Alternatively, mobilization with a walking frame or forearm
criutches (as a rule with partial weight bearing).

Discharge on the 5\textsuperscript{th} to 7\textsuperscript{th} postoperative day.

After six weeks, radiographic follow-up and decision about
full weight bearing.

Implant removal after three to four months.
# DMS Product Range: Implants

<table>
<thead>
<tr>
<th>Holes</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25-181-01-05</td>
</tr>
<tr>
<td>2</td>
<td>25-181-02-05</td>
</tr>
<tr>
<td>4</td>
<td>25-181-04-05</td>
</tr>
<tr>
<td>5</td>
<td>25-181-05-05</td>
</tr>
<tr>
<td>6</td>
<td>25-181-06-05</td>
</tr>
<tr>
<td>8</td>
<td>25-181-08-05</td>
</tr>
<tr>
<td>10</td>
<td>25-181-10-05</td>
</tr>
<tr>
<td>12</td>
<td>25-181-12-05</td>
</tr>
<tr>
<td>14</td>
<td>25-181-14-05</td>
</tr>
<tr>
<td>16</td>
<td>25-181-16-05</td>
</tr>
<tr>
<td>18</td>
<td>25-181-18-05</td>
</tr>
</tbody>
</table>

**DMS plate**
- **Angulation**: 85°-145°
- **Barrel length**: 34 mm

<table>
<thead>
<tr>
<th>Holes</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>25-182-04-05</td>
</tr>
<tr>
<td>6</td>
<td>25-182-06-05</td>
</tr>
<tr>
<td>8</td>
<td>25-182-08-05</td>
</tr>
</tbody>
</table>

**DMS plate**
- **Angulation**: 85°-145°
- **Barrel length**: 24 mm

<table>
<thead>
<tr>
<th>Holes</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>25-183-02-05</td>
</tr>
<tr>
<td>4</td>
<td>25-183-04-05</td>
</tr>
<tr>
<td>6</td>
<td>25-183-06-05</td>
</tr>
<tr>
<td>8</td>
<td>25-183-08-05</td>
</tr>
<tr>
<td>10</td>
<td>25-183-10-05</td>
</tr>
<tr>
<td>12</td>
<td>25-183-12-05</td>
</tr>
<tr>
<td>14</td>
<td>25-183-14-05</td>
</tr>
<tr>
<td>16</td>
<td>25-183-16-05</td>
</tr>
</tbody>
</table>

**DMC plate**
- **Angulation**: 95°-115°
- **Barrel length**: 24 mm

The products with boldfaced item numbers are included in the set.
The products with boldfaced item numbers are included in the set.

### Lag screws

<table>
<thead>
<tr>
<th>Ø 12.7 mm</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mm</td>
<td>25-180-50-05</td>
</tr>
<tr>
<td>55 mm</td>
<td>25-180-55-05</td>
</tr>
<tr>
<td>60 mm</td>
<td>25-180-60-05</td>
</tr>
<tr>
<td>65 mm</td>
<td>25-180-65-05</td>
</tr>
<tr>
<td>70 mm</td>
<td>25-180-70-05</td>
</tr>
<tr>
<td>75 mm</td>
<td>25-180-75-05</td>
</tr>
<tr>
<td>80 mm</td>
<td>25-180-80-05</td>
</tr>
<tr>
<td>85 mm</td>
<td>25-180-85-05</td>
</tr>
<tr>
<td>90 mm</td>
<td>25-180-90-05</td>
</tr>
<tr>
<td>95 mm</td>
<td>25-180-95-05</td>
</tr>
<tr>
<td>100 mm</td>
<td>25-180-00-05</td>
</tr>
<tr>
<td>105 mm</td>
<td>25-180-05-05</td>
</tr>
<tr>
<td>110 mm</td>
<td>25-180-10-05</td>
</tr>
<tr>
<td>115 mm</td>
<td>25-180-15-05</td>
</tr>
<tr>
<td>120 mm</td>
<td>25-180-20-05</td>
</tr>
</tbody>
</table>

### Cortical screws

<table>
<thead>
<tr>
<th>Ø 4.5 mm</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 mm</td>
<td>25-114-30-05</td>
</tr>
<tr>
<td>32 mm</td>
<td>25-114-32-05</td>
</tr>
<tr>
<td>34 mm</td>
<td>25-114-34-05</td>
</tr>
<tr>
<td>36 mm</td>
<td>25-114-36-05</td>
</tr>
<tr>
<td>38 mm</td>
<td>25-114-38-05</td>
</tr>
<tr>
<td>40 mm</td>
<td>25-114-40-05</td>
</tr>
<tr>
<td>42 mm</td>
<td>25-114-42-05</td>
</tr>
<tr>
<td>44 mm</td>
<td>25-114-44-05</td>
</tr>
<tr>
<td>46 mm</td>
<td>25-114-46-05</td>
</tr>
<tr>
<td>48 mm</td>
<td>25-114-48-05</td>
</tr>
<tr>
<td>50 mm</td>
<td>25-114-50-05</td>
</tr>
<tr>
<td>52 mm</td>
<td>25-114-52-05</td>
</tr>
<tr>
<td>56 mm</td>
<td>25-114-56-05</td>
</tr>
<tr>
<td>60 mm</td>
<td>25-114-60-05</td>
</tr>
<tr>
<td>64 mm</td>
<td>25-114-64-05</td>
</tr>
<tr>
<td>70 mm</td>
<td>25-114-70-05</td>
</tr>
</tbody>
</table>

### Compression screw

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Ø 4.5 mm</th>
<th>Lag screws 37 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-180-99-05</td>
<td>8.0 mm</td>
<td>3.5 mm</td>
</tr>
</tbody>
</table>

Icon explanations:
- Steel
- Packaging unit
- Hexagon head
DMS product range

Instruments

- **25-238-00-05**
  Guide wire
  22.5 cm / 8 7/8"
  Ø 2.5 mm

- **25-238-05-07**
  Measuring sleeve
  20.5 cm / 8 1/8"

- **25-238-12-07**
  Combo reamer
  for lag screw and 24-mm barrel
  22 cm / 8 5/8"

- **25-238-13-07**
  Combo reamer
  for lag screw and 34-mm barrel
  22 cm / 8 5/8"

- **25-238-18-04**
  Centering sleeve
  (11 mm) for 25-238-21-07
  11 cm / 4 3/8"

- **25-238-19-04**
  Centering sleeve
  for 25-238-06-07

The products with boldfaced item numbers are included in the set.
The products with boldfaced item numbers are included in the set.
DMS product range
Instruments

25-268-35-07
Screwdriver
25 cm / 9 ⅞"
for worm gears and for 4.5-mm cortical screws and 6.5-mm cancellous screws

25-238-14-07
Plate impactor
20 cm / 7 ⅞"

25-238-08-07
T-handle
6.5 cm / 2 ⅜"

25-238-25-04
Spare part, alone

25-212-45-07
Soft tissue sleeve
14.5 cm / 5 ⅜"
135°-150°

90-651-51-21
X-ray template for preoperative planning

Icon explanations
- Steel
- Packaging unit
- Hexagon head

For Ø 3.2-mm drill bits

25-238-01-07
Aiming device

25-210-30-07
Drill bit
Ø 3.2 mm
with AO attachment
for 4.5-mm cortical screws

25-219-05-07
Depth gauge

25-222-44-01
Drill bit guide
16.5 cm / 6 ½"
for 3.2-mm drill bits
The instrument set described as follows represents the basic equipment needed for implanting DMS plates.
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-400-00-04</td>
<td></td>
<td>KLS Martin DMS Set</td>
</tr>
<tr>
<td>25-180-60-05</td>
<td>1</td>
<td>Lag screw, 60 mm</td>
</tr>
<tr>
<td>25-180-70-05</td>
<td>1</td>
<td>Lag screw, 70 mm</td>
</tr>
<tr>
<td>25-180-80-05</td>
<td>1</td>
<td>Lag screw, 80 mm</td>
</tr>
<tr>
<td>25-180-85-05</td>
<td>1</td>
<td>Lag screw, 85 mm</td>
</tr>
<tr>
<td>25-180-90-05</td>
<td>1</td>
<td>Lag screw, 90 mm</td>
</tr>
<tr>
<td>25-180-95-05</td>
<td>1</td>
<td>Lag screw, 95 mm</td>
</tr>
<tr>
<td>25-180-00-05</td>
<td>1</td>
<td>Lag screw, 100 mm</td>
</tr>
<tr>
<td>25-180-10-05</td>
<td>1</td>
<td>Lag screw, 110 mm</td>
</tr>
<tr>
<td>25-180-99-05</td>
<td>3</td>
<td>Compression screws</td>
</tr>
<tr>
<td>25-181-02-05</td>
<td>1</td>
<td>Plate, 2-hole</td>
</tr>
<tr>
<td>25-181-04-05</td>
<td>1</td>
<td>Plate, 4-hole</td>
</tr>
<tr>
<td>25-181-05-05</td>
<td>1</td>
<td>Plate, 5-hole</td>
</tr>
<tr>
<td>25-181-06-05</td>
<td>1</td>
<td>Plate, 6-hole</td>
</tr>
<tr>
<td>25-238-00-05</td>
<td>1</td>
<td>Guide wire, 5 pcs.</td>
</tr>
<tr>
<td>25-238-05-07</td>
<td>1</td>
<td>Measuring sleeve</td>
</tr>
<tr>
<td>25-238-06-07</td>
<td>1</td>
<td>Lag screw inserter</td>
</tr>
<tr>
<td>25-238-08-07</td>
<td>1</td>
<td>T-handle</td>
</tr>
<tr>
<td>25-238-13-07</td>
<td>1</td>
<td>Combo reamer</td>
</tr>
<tr>
<td>25-238-14-07</td>
<td>1</td>
<td>Plate impactor</td>
</tr>
<tr>
<td>25-238-17-07</td>
<td>1</td>
<td>Tap</td>
</tr>
<tr>
<td>25-238-18-04</td>
<td>1</td>
<td>Centering sleeve (11 mm) 25-238-21-07</td>
</tr>
<tr>
<td>25-238-20-07</td>
<td>1</td>
<td>Lag screw connector</td>
</tr>
<tr>
<td>25-238-21-07</td>
<td>1</td>
<td>Safety inserter for lag screw inserter</td>
</tr>
<tr>
<td>22-368-35-07</td>
<td>1</td>
<td>Screwdriver, 3.5 mm, Allen</td>
</tr>
<tr>
<td>55-550-60-01</td>
<td>1</td>
<td>Perforated tray for implants</td>
</tr>
<tr>
<td>55-555-61-04</td>
<td>1</td>
<td>Perforated tray for instruments</td>
</tr>
<tr>
<td>55-443-22-04</td>
<td>2</td>
<td>Coding labels, lettered, w/o hole</td>
</tr>
<tr>
<td>55-443-12-04</td>
<td>2</td>
<td>Logistics framelets, red</td>
</tr>
<tr>
<td>55-442-13-04</td>
<td>1</td>
<td>Container, 600 x 300 x 140 mm</td>
</tr>
</tbody>
</table>
**DMS Intermediate product range**

**Implants**

**DMS Intermediate plate**
- Angulation: 80°-110°
- 19 mm Barrel length

<table>
<thead>
<tr>
<th>Holes</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>25-178-03-05</td>
</tr>
<tr>
<td>4</td>
<td>25-178-04-05</td>
</tr>
<tr>
<td>6</td>
<td>25-178-06-05</td>
</tr>
<tr>
<td>8</td>
<td>25-178-08-05</td>
</tr>
</tbody>
</table>

**DMS Intermediate plate**
- Angulation: 110°-145°
- 19 mm Barrel length

<table>
<thead>
<tr>
<th>Holes</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>25-179-03-05</td>
</tr>
<tr>
<td>4</td>
<td>25-179-04-05</td>
</tr>
<tr>
<td>6</td>
<td>25-179-06-05</td>
</tr>
<tr>
<td>8</td>
<td>25-179-08-05</td>
</tr>
</tbody>
</table>

The products with boldfaced item numbers are included in the set.
The products with boldfaced item numbers are included in the set.
DMS Intermediate product range

Instruments

- **25-210-25-07**
  - Drill bit
  - Ø 2.5 mm
  - for 3.5-mm cortical screws

- **25-219-04-07**
  - Depth gauge
  - 16 cm / 6 ⅜"

- **25-222-32-01**
  - Drill bit guide for neutral and eccentric holes
  - 14 cm / 5 ⅜"

- **25-228-00-05**
  - DMS Intermediate guide wire
  - 18 cm / 7"
  - Ø 2.0 mm

The products with boldfaced item numbers are included in the set.
The products with boldfaced item numbers are included in the set.
DMS Intermediate product range

Instruments

- **25-228-12-07**
  - **DMS Intermediate combo reamer**
  - 16 cm / 6 2/3" (~25 mm)

- **25-228-14-07**
  - **DMS Intermediate plate impactor**
  - 15 cm / 6" (~15 cm)

- **25-228-17-07**
  - **DMS Intermediate tap**
  - 15 cm / 6" (~15 cm)

The products with boldfaced item numbers are included in the set.
The products with boldfaced item numbers are included in the set.

---

25-238-08-07
**DMS T-handle**
12 cm / 4 ⅜"

---

22-368-24-07
**Screwdriver, Allen**
24 cm / 9 ⅜"
for worm gears and for cortical screws Ø 3.5 mm and cancellous screws Ø 4.0 mm

---

25-238-01-07
**X-ray template for preoperative planning**

---

**Icon explanations**
- Steel
- Packaging unit
- Hexagon head
The instrument set described as follows represents the basic equipment needed for implanting DMS Intermediate plates.
Notice:
The DMS Intermediate plates, lag screws and – if needed – compression screws must be ordered separately for each patient.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-170-00-01</td>
<td>1</td>
<td>DMS Intermediate Set</td>
</tr>
<tr>
<td>25-103-16-05</td>
<td>1</td>
<td>Cortical screw, 3.5 x 16-40 mm, self-tapping</td>
</tr>
<tr>
<td>25-103-40-05</td>
<td>1</td>
<td>DMS Intermediate guide wire</td>
</tr>
<tr>
<td>25-219-04-07</td>
<td>1</td>
<td>Depth gauge, small, 16 cm</td>
</tr>
<tr>
<td>25-210-25-07</td>
<td>1</td>
<td>Drill bit, 2.5 mm</td>
</tr>
<tr>
<td>25-228-00-05</td>
<td>1</td>
<td>DMS Intermediate measuring sleeve</td>
</tr>
<tr>
<td>25-228-06-07</td>
<td>1</td>
<td>DMS Intermediate lag screw inserter</td>
</tr>
<tr>
<td>25-228-12-07</td>
<td>1</td>
<td>DMS Intermediate combo reamer</td>
</tr>
<tr>
<td>25-228-14-07</td>
<td>1</td>
<td>DMS Intermediate plate impactor</td>
</tr>
<tr>
<td>25-228-17-07</td>
<td>1</td>
<td>DMS Intermediate tap</td>
</tr>
<tr>
<td>25-228-20-07</td>
<td>1</td>
<td>DMS Intermediate lag screw connector</td>
</tr>
<tr>
<td>25-228-21-07</td>
<td>1</td>
<td>DMS Intermediate safety inserter for screwdriver</td>
</tr>
<tr>
<td>25-228-32-01</td>
<td>1</td>
<td>Drill bit guide for 3.5-mm screws</td>
</tr>
<tr>
<td>25-238-08-07</td>
<td>1</td>
<td>DMS T-handle</td>
</tr>
<tr>
<td>55-550-50-01</td>
<td>1</td>
<td>DMS Intermediate storage tray for instruments and implants</td>
</tr>
</tbody>
</table>
References

- Dittel KK
  Die Osteosynthese pertrochantärer Oberschenkelfrakturen
  mit einer neuen winkeladaptierbaren dynamischen Gleitlasche
  57. Jahrestagung der Deutschen Gesellschaft für Unfallchirurgie e.V., Berlin
  Abstract-Band (1993) 66

- Dittel KK
  Dynamische Osteosynthese pertrochantärer Oberschenkelfrakturen mit einer winkeladaptierten Laschenplatte
  Kongressband Osteosynthese International Erlangen 1993
  Druckhaus Mayer Verlag Erlangen (1994) 95-102

- Dittel KK
  An Innovative Method for Stabilization of Proximal Femur Fractures

- Dittel KK
  Ein innovatives Stabilisierungsverfahren für proximale Femurfrakturen
  Osteosynthese International (Kongressband), Leuven University Press Verlag (1995) 193 - 198

- Dittel KK, Rapp M
  Ein neues Prinzip zur Stabilisierung proximaler Femurfrakturen
  Osteosynthese International (1995) 1, 46-54

- Dittel KK, Schier H, Rapp M
  Actual results after fracture management at the proximal femur using a new dynamic angle-adaptable device
  Osteosynthesis International (Kongressband) Oulu (1995) 319 - 324

- Dittel KK, Schier H
  DMS: Un principio estabilizador innovador para fracturas proximales de fémur

- Dittel KK, Felenda MR
  Operative Behandlung der Gelenk- und Schaftfrakturen

- Dittel KK, Felenda MR
  Spezielle Indikationsstellung zur Osteosynthese suprakondylärer Femurfrakturen mit der DMS in
  Wiederherstellungschirurgie des Kniegelenkes –
  Wandel in der Osteosynthesetechnik

- Dittel KK, Reinecke M
  Erste klinische Erfahrungen mit einer zementfreien, extra metaphysär orientierten Schenkelhalsprothese
  Hefte zu „Der Unfallchirurg“, Springer Verlag (1998) 718 - 719

- Rapp M, Dittel KK, Eberhard HJ, Miller WO
  Eine innovative Methode zur Stabilisierung instabiler
  intertrochantärer Umkehrfrakturen des proximalen Femurs (31 A 3.3)
  12. Internationaler Kongress „Osteosynthese International“
  des Gerhard-Kuntscher-Kreises e.V. Stuttgart
  Abstract-Band 70 (1998)

- Rapp M, Dittel KK, Schier H
  A new dynamic angle-adapted device – an innovative method
  for stabilizing proximal fractures of the femur

- Dittel KK, Schier H, Rapp M
  Actual results after fracture management at the proximal femur using a new dynamic angle-adaptable device
  Osteosynthesis International (Kongressband) Oulu (1996) 319 - 324

- Molinar Min AM, Moselli M
  La vite-placca DMS nell’ osteosintesi delle fratture
  pertrocanteriche di femore
Rapp M, Miller WO, Dittel KK, Abendschein W
The variable angle compression hip system
12. Internationaler Kongress „Osteosynthese International“
des Gerhard-Küntscher-Kreises e.V., Stuttgart
Abstract-Band 156 (1998)

Dittel KK, Felenda MR
Erste klinische Erfahrungen mit einer zementfreien extra metaphysär orientierten Schenkelhalsprothese
Osteosynthese International (1999) Suppl. 2, 7, 164 - 167

Rapp M, Eberhard HJ, Dittel KK, Miller WO
Eine innovative Methode zur Stabilisierung instabiler intertrochantärer Umkehrfrakturen des proximalen Femurs (31 A 3.3)
Jubiläumskongress „Osteosynthese International 1998“ des Gerhard-Küntscher-Kreises e.V., Stuttgart
Osteosynthese International (1999) 7 Suppl. 2, 47-51

Ateschrang A
Die Prognose der medialen Schenkelhalsfraktur bei kopferhaltender Osteosynthese
Inauguraldissertation Universität Tübingen (2000)

Rapp M, Dittel KK, Felenda MR
Die Dynamische KLS-Martin-Schraube (D.M.S.) als Implantatalternative zur Stabilisierung suprakondylärer Femurfbrakturen
35. Jahrestagung der Österreichischen Gesellschaft für Unfallchirurgie, Salzburg/Österreich
Acta Chirurgica Austriaca (2000) 32, [Suppl. 161], 71 - 75

Hajinpar MA
The Vari Angle Compression Hip System: A New Device for the Treatment of Hip Fractures
Preliminary report of 114 cases
Journal of Trauma: (2001) 56 - 65

Chaim SH et al
A Biomechanical Study of Femoral Neck Fracture Fixation with the VHS Vari-Angle Hip Fixation System

Dittel KK, Weise K
Komplikationsmanagement in der Traumatologie

Dittel KK, Rapp M
10 years of experience with the DMS (Dynamic KLS Martin Screw) in the treatment of proximal and distal femoral fractures.

Dittel KK, Rapp M
Winkelstabile Implants am proximalen Femur.
Akt Traumatol. (2005) 35, 155-162

Ateschrang A, Dittel KK
The Dynamic KLS Martin Screw: an Alternative for Intracapsular Femoral Neck Fractures?

Mishra Anil Kumra
Management of Intertrochanteric Fractures by using Dynamic Hip Screw / Dynamic KLS Martin Screw
J. Orthopaedics (2007) 4 (2) e 40

Dittel KK, Rapp M
The Double Dynamic KLS Martin Screw (DMS)