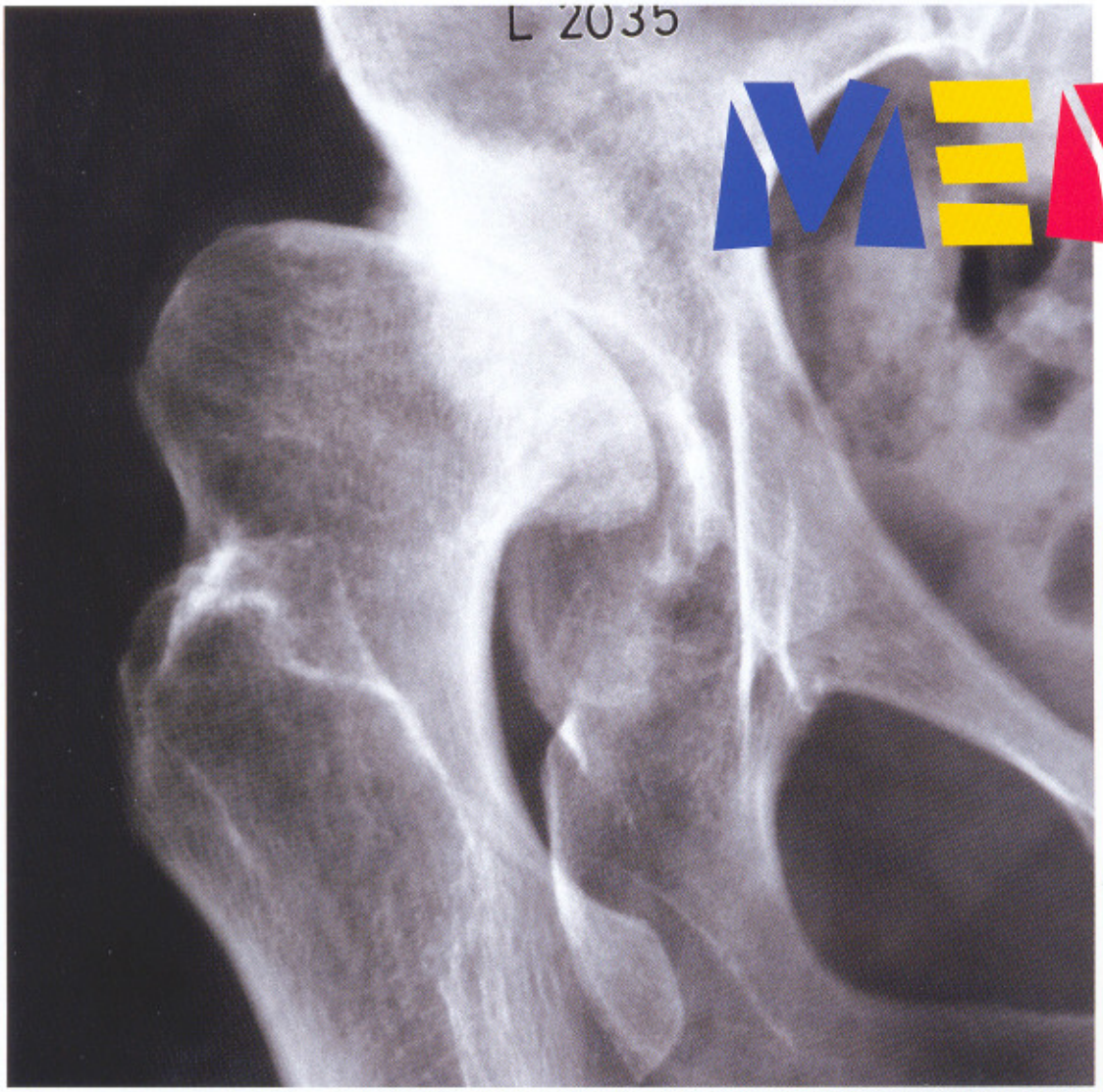

Operative planning

Preoperative planning of total hip replacement
according to M.E. Müller

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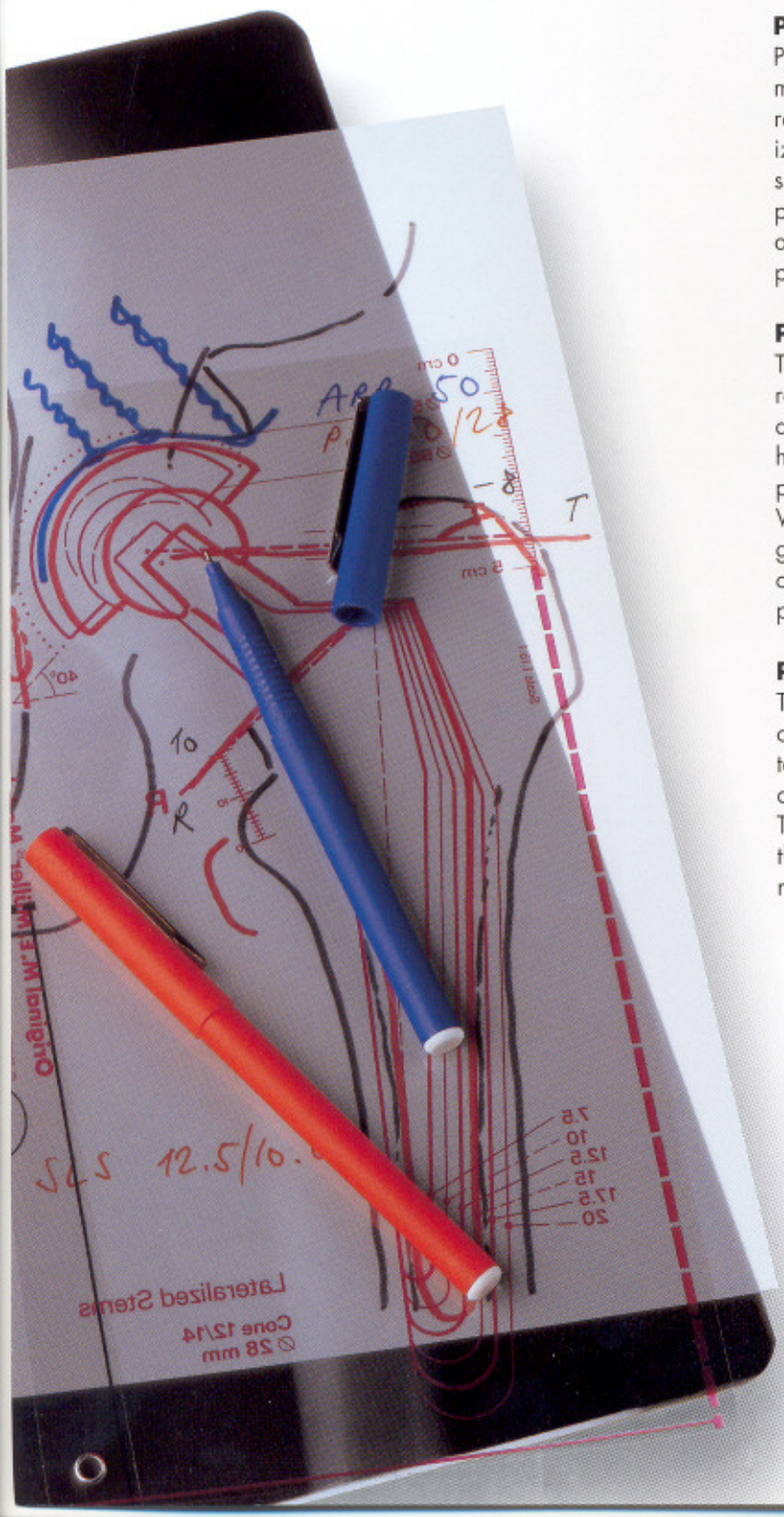


M.E. Müller's planning idea

The concept of preoperative planning goes back to Maurice E. Müller who was one of the pioneers of joint replacement and has made an impression on arthroplasty like hardly anyone else. Preoperative planning signifies the graphic planning of hip prosthesis implantation. This technique of preparing thoroughly for hip joint operations and carrying them out precisely was developed as far back as the 1960s by M.E. Müller. Preoperative planning has been used successfully worldwide for decades as a simple but effective aid for optimizing orthopaedic procedures.

Planning concept

Preoperatively, the right size of hip prosthesis can be determined without drawing it by using the template directly on the radiograph. The correct position for obtaining exact equalization of leg length is guaranteed only by a careful planning sketch. With the graphic anticipation of the operation, possible peroperative problems are also recognized in advance so that possible solutions can be considered and prepared before the operation.

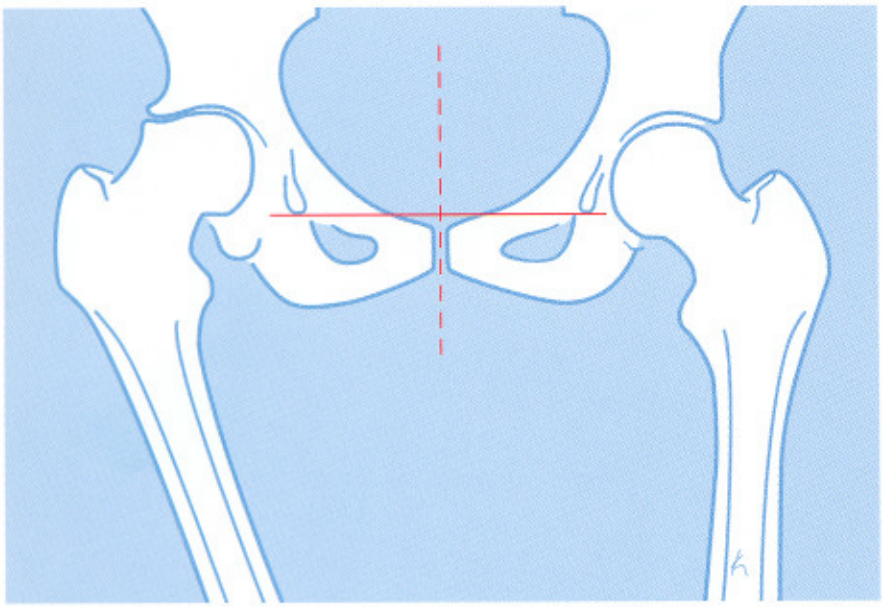
Prosthetic system

The original M.E. Müller Straight Stem System permits restoration of the normal hip axis. The prosthetic design (constant distance from the medial stem outline to the centre of the head) and fixation principle make it easier to prepare the preoperative planning sketch.
When making a decision, stable fixation of the cup is of greater importance than anatomical reconstruction of the centre of the cup; this is also taken into account in the planning.

Planning template

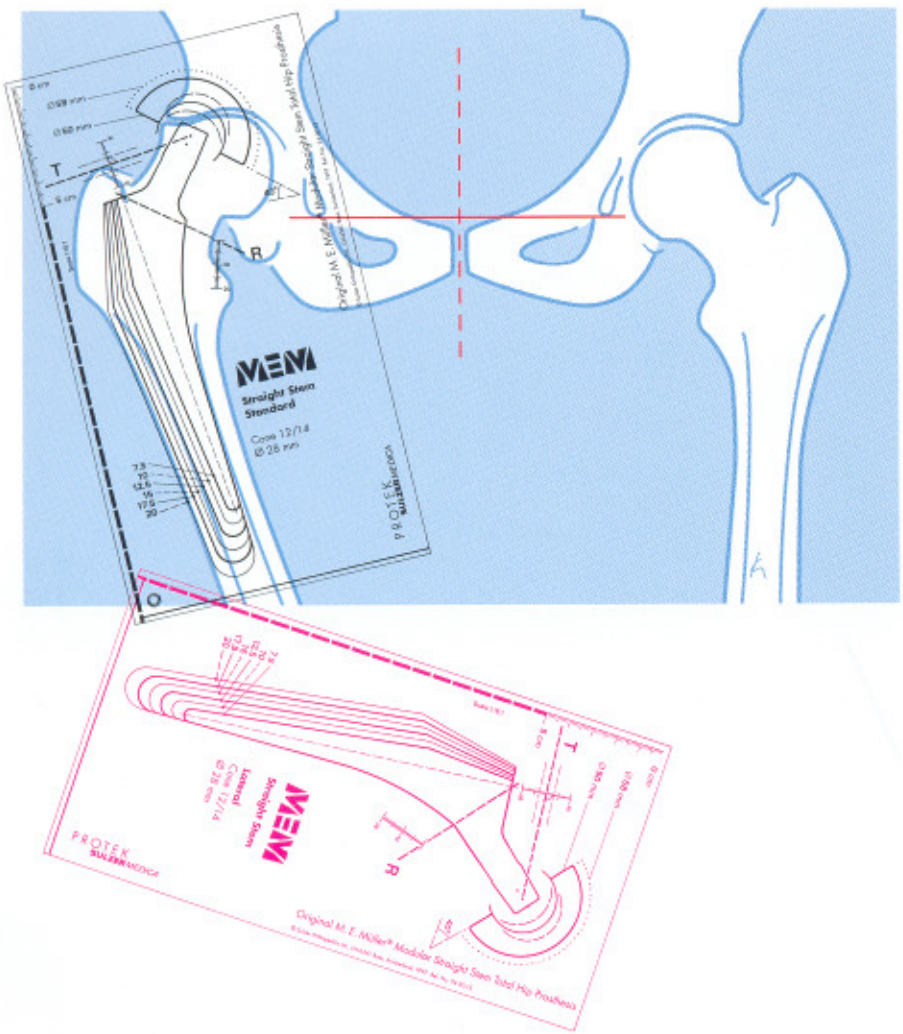
The prosthetic stem at a physiological axis of 7° and the cup component in the desired inclination of 40° are found on the template designed by M.E. Müller so that the hip joint appears in neutral position on the planning sketch.
The required reference lines for the resection level (R line) and the centre of the head (T line) are also drawn in, as are measurement scales in the X-ray magnification of 15%.

Planning step by step



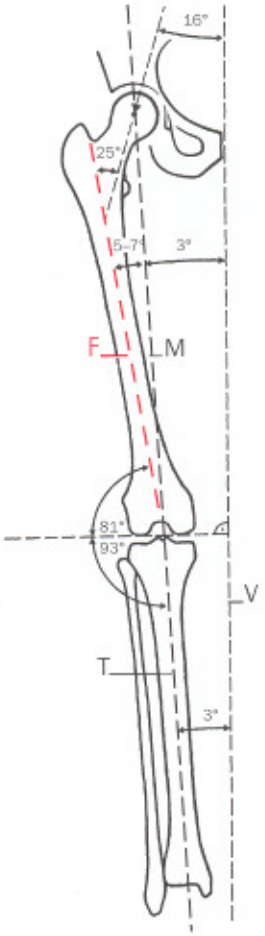
First the **long axis of the body** is drawn in on the radiograph as a perpendicular to the teardrop figure line.

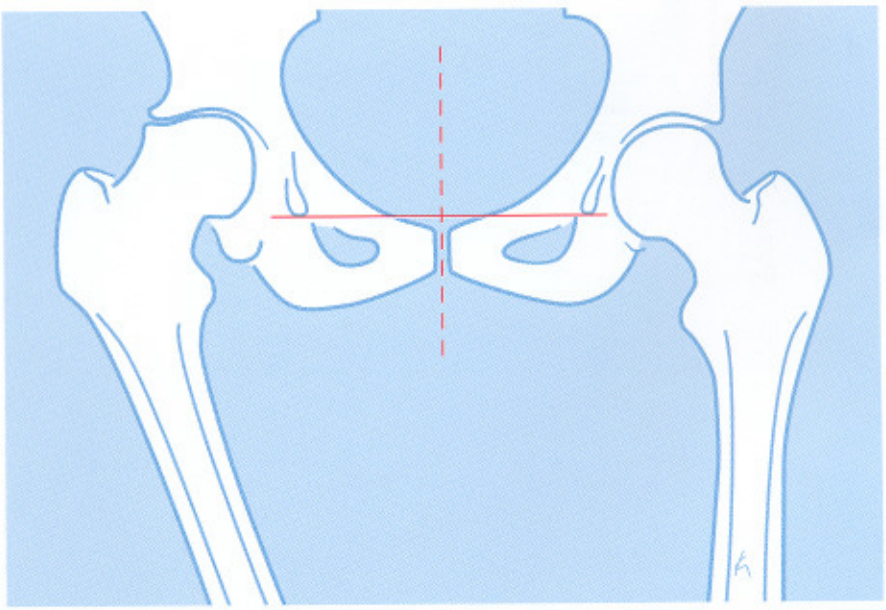
The preoperative planning is done on a standardised X-ray of the pelvis centred one finger's breadth above the symphysis.



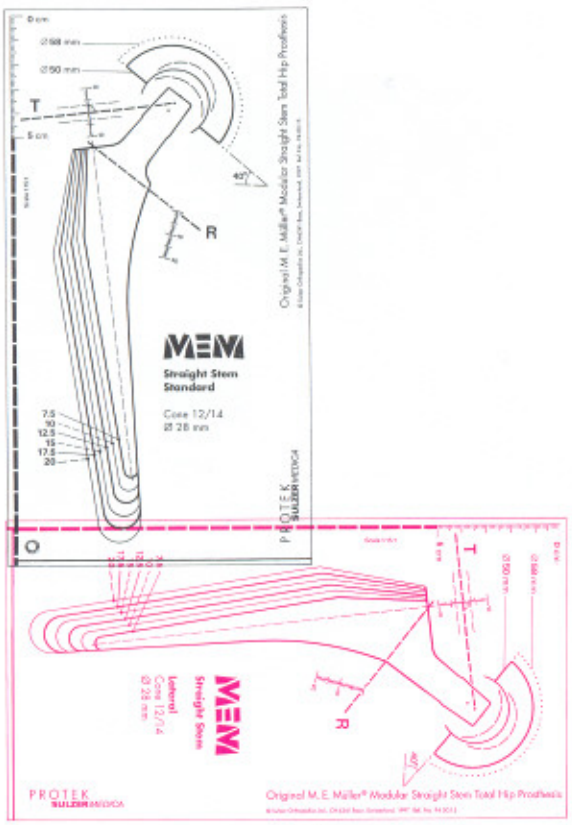
To determine the probable **stem size**, the prosthesis is fitted into the medullary cavity in such a way that the centre of the head comes to lie provisionally at the level of the tip of the greater trochanter and the centred prosthetic stem touches the medial and lateral cortex.

The probable **cup size** is determined with the concentric cup outlines of the template. The cup should be fitted into the acetabulum at the desired inclination and thus be brought in contact with the subchondral sclerosis of the roof and be sufficiently deeply in the base of the acetabulum.


16°
25°
5–7°
3°
F
LM
81°
93°
V
T
3°



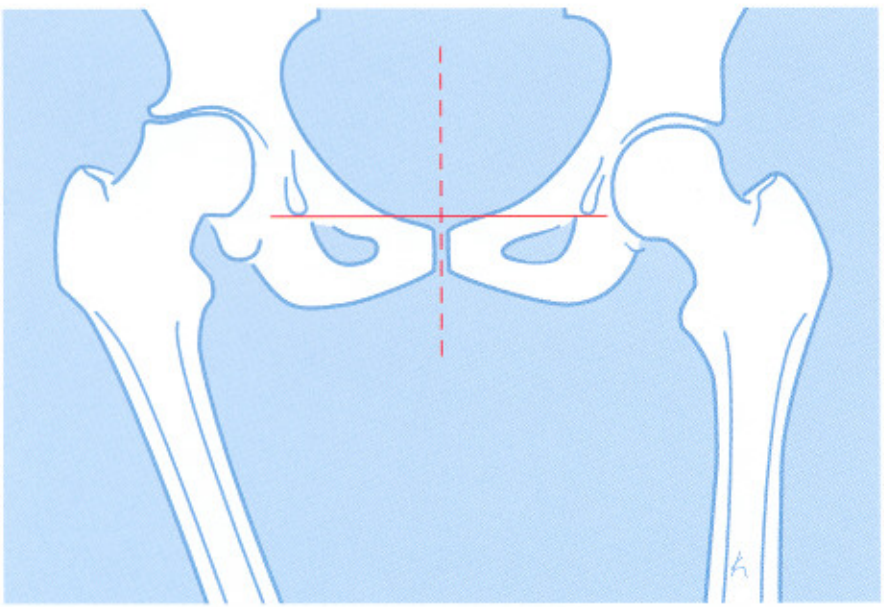
Step 1



The appropriate **hip prosthesis** is now copied onto a sheet of tracing paper which is laid parallel over the template (see illustration).

When you lay the tracing paper on the opposite side, you see that a physiological femoral axis of 7° is taken into account when drawing the prosthetic stem; this corresponds to the mid position of the leg on X-ray.

Step 2



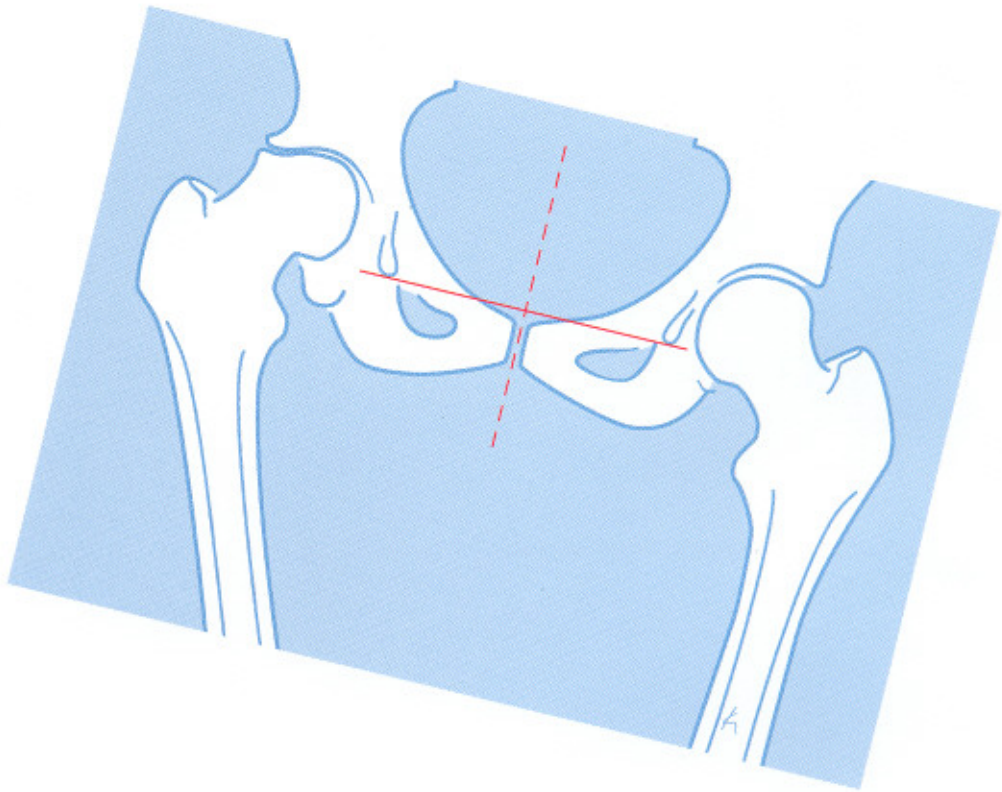
Place the tracing paper on page 5

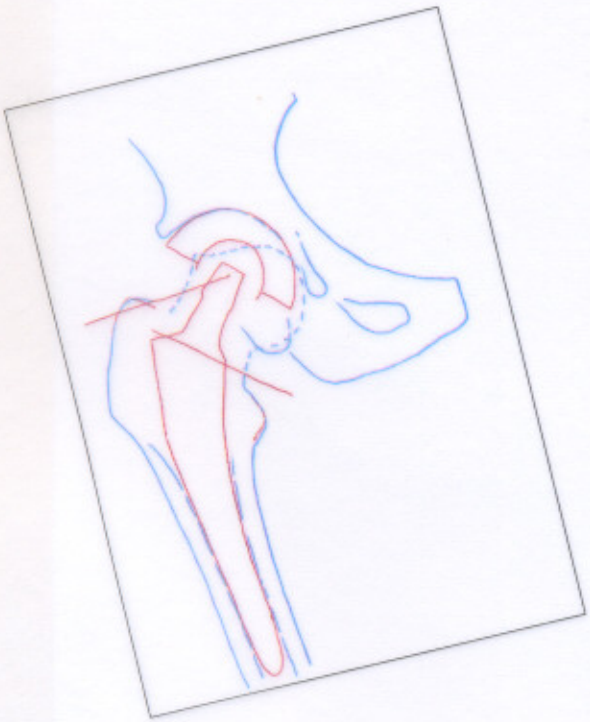
When fitting the cup into the acetabulum, the tracing paper is held parallel to the long axis of the body in order to obtain the planned cup inclination and stem direction. The outlines of the **hemipelvis** are then entered in the sketch.

The target equivalent leg length is obtained by laying the sketch over the opposite side and taking over its reference points.

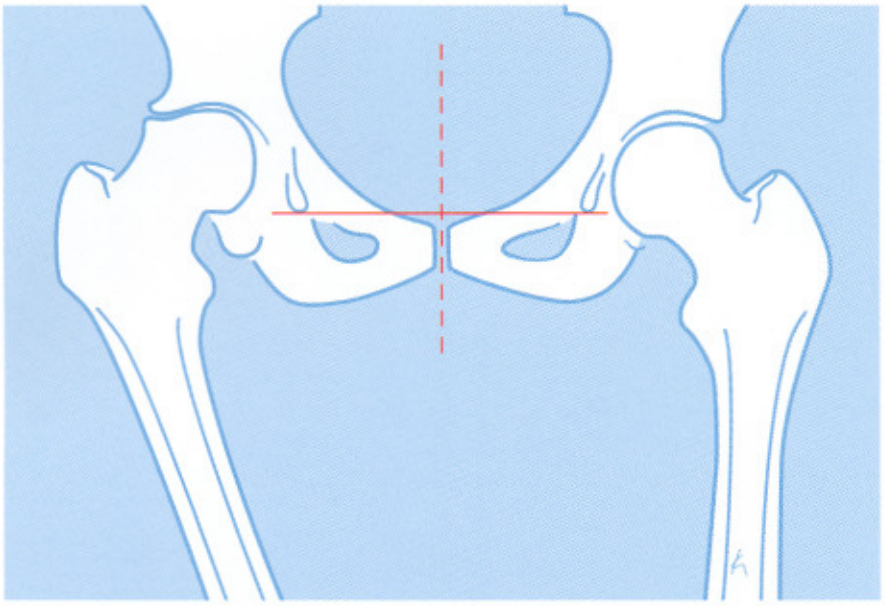
Place the tracing paper on the opposite side

The hemipelves are brought into line.





Step 3



Place the tracing paper on page 7

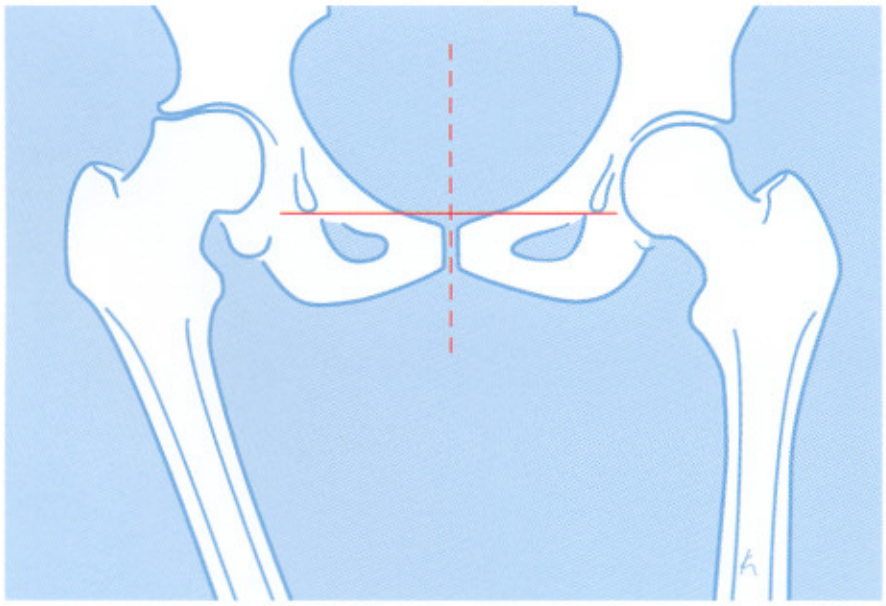
While maintaining the height of the acetabulum, the prosthetic stem is then rotated around the centre of the head in the femoral medullary cavity. With the stem now centred, the **tips of the greater and lesser trochanters** are drawn in as reference points.

The drawing is then placed again over the side to be operated.

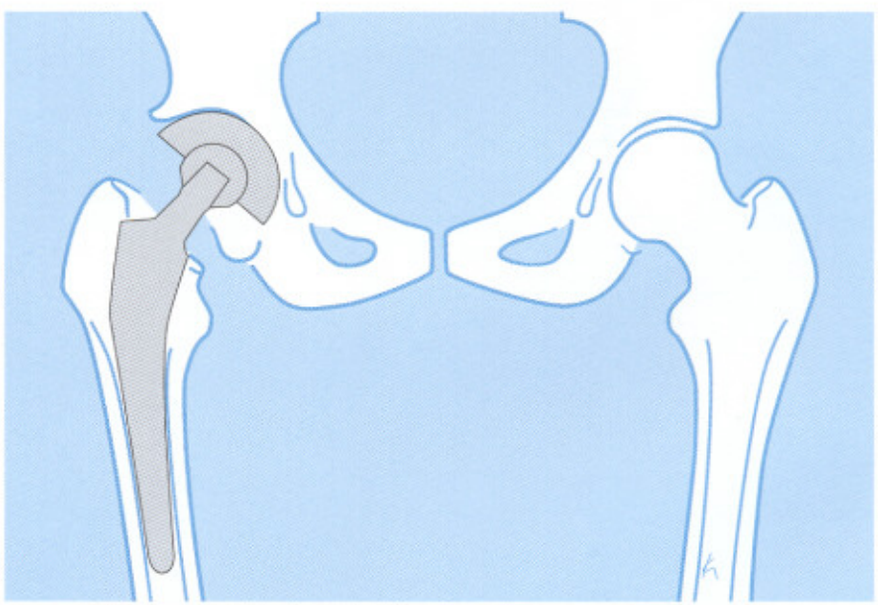
Place the tracing paper on the opposite side

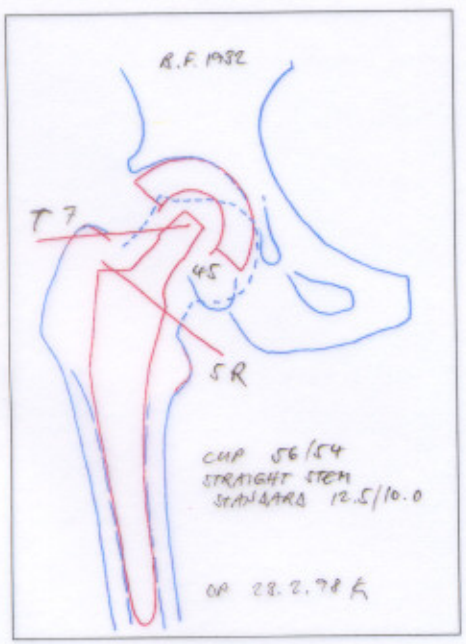
when the prosthetic stem is fitted into the medullary cavity and the trochanters which have been drawn in are brought into line with the trochanters of the side to be operated.

Step 4



The prosthetic stem is now in its definitive position; the outlines of the **femur** are transferred to the drawing. The stem size, i.e. the contact of the prosthetic stem with the lateral cortex is checked again.




R.F. 1982
T 7
45
5 R
CUP 56/54
STRAIGHT STEM
STANDARD 12.5/10.0
OP 28.2.78 K

Writing on the planning sketch

R.F. 1932

T 7

45

5 R

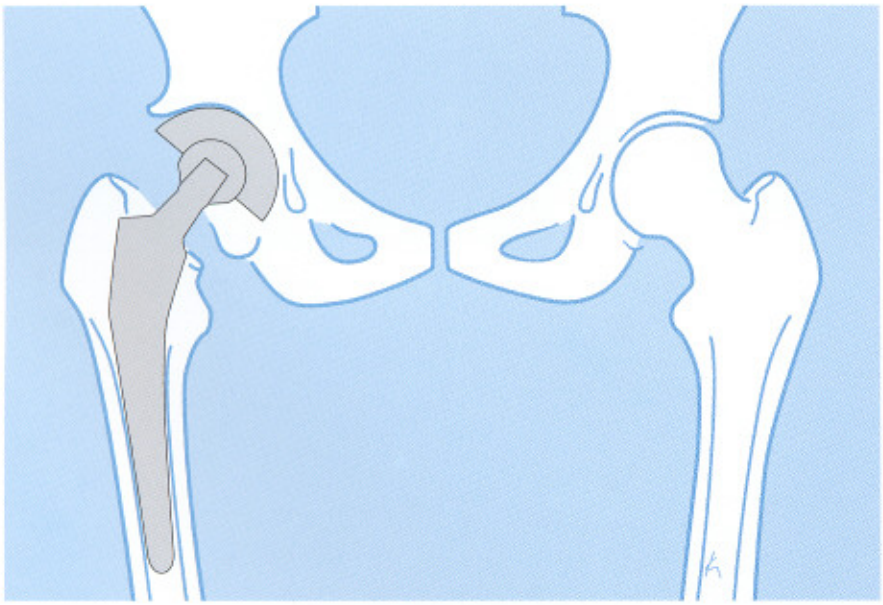
CUP 56/54
STRAIGHT STEM
STANDARD 12.5/10.0

OP 28.2.98 K

Finally, the planning sketch is completed with the **information necessary** for the operation. The distance of the T line from the tip of the trochanter and the distance from the lesser trochanter to the end of the cone respectively define the centre of the head.

The distance from the outline of the femoral head to the roof of the acetabulum corresponds to the anatomical leg lengthening.

Planning result



Place the tracing paper on page 9

The planning sketch coincides with the outlines of the **postoperative radiograph** which shows the hip joints in neutral position.

Place the tracing paper on the opposite side

Checking the **opposite side** confirms that both sides are the same and that leg lengths are equivalent.

The advantages of the M.E. Müller planning technique

Only one template is required for the operative planning of the M. E. Müller Straight Stem System.

The planning is done in four simple sketching steps:

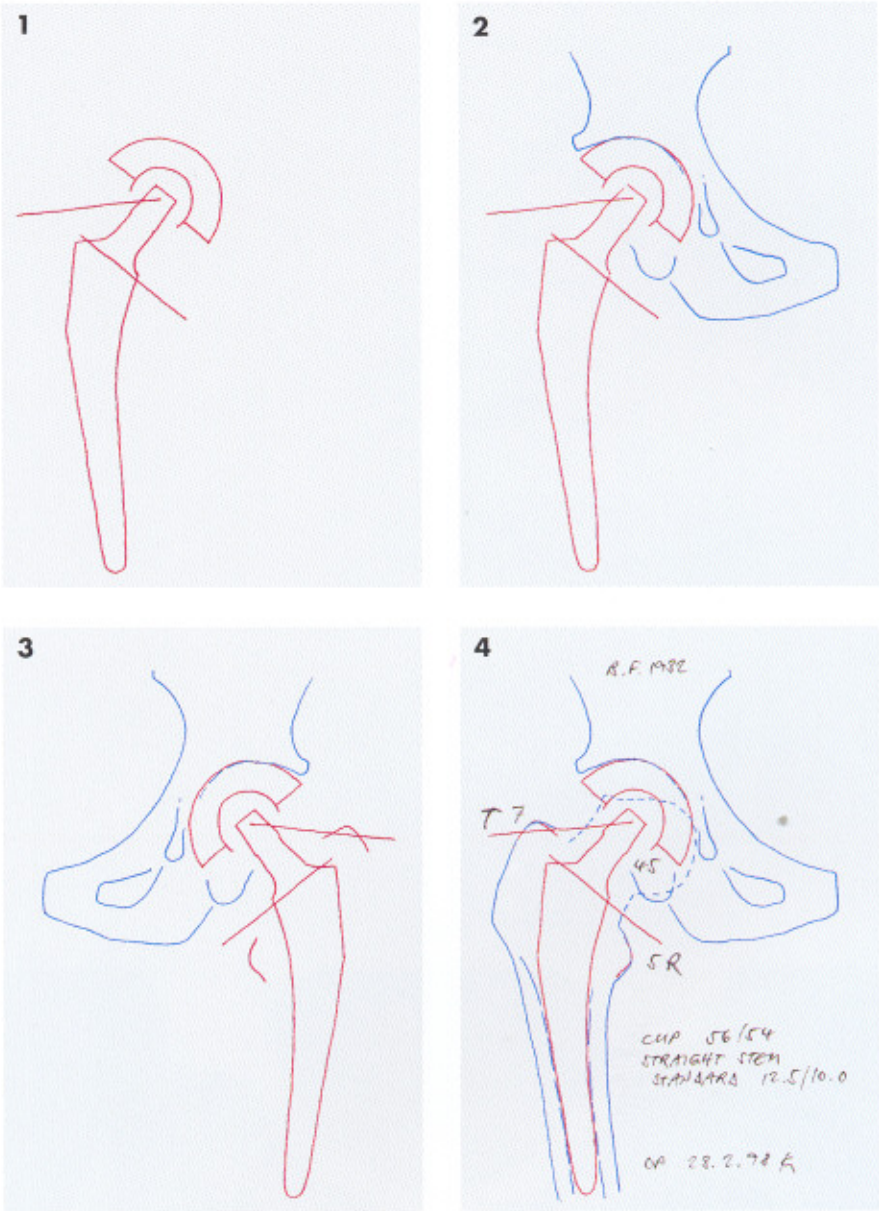
1 Prosthesis with reference lines T and R
2 Pelvis
3 Tips of trochanters of the opposite side
4 Femur with written details

The course of planning for stem and cup components is completed on only one drawing.

Functional or effective leg shortening is automatically corrected by comparison with the opposite hip.

The planning sketch shows the hip joint in neutral position and so can be compared directly with the postoperative radiograph.

The final drawing contains all the information needed for the operation.



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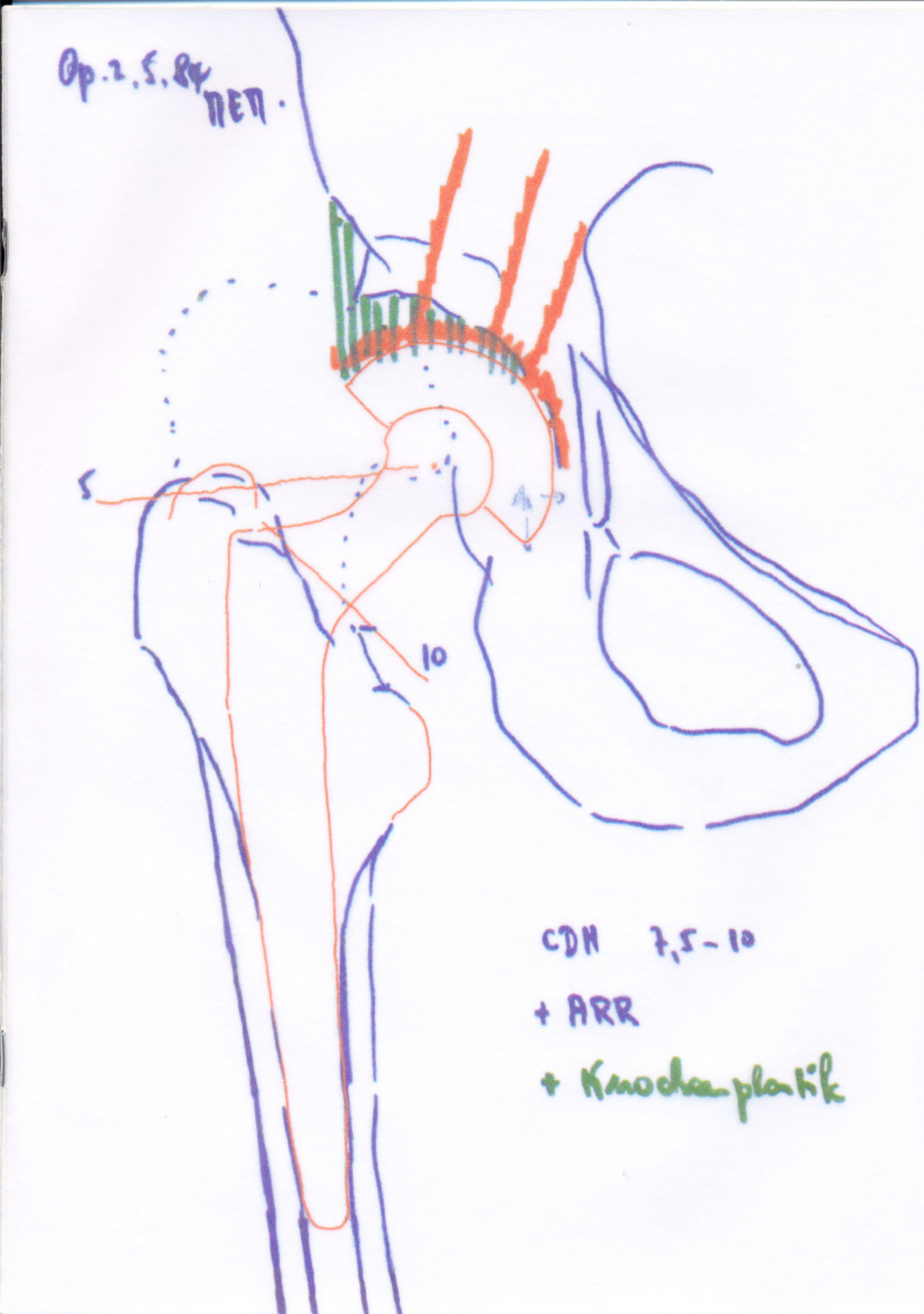
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