Preoperative Hip X-rays : Templating

Dr. (Prof.) Anil Arora
MS (Ortho)  DNB (Ortho)  Dip SIROT (USA)
FAPOA (Korea), FIGOF (Germany), FJOA (Japan)
Commonwealth Fellow Joint Replacement
(Royal National Orthopaedic Hospital, London, UK)

Senior Knee and Hip Replacement Surgeon
Associate Director
Department of Orthopaedics and Joint Replacement
Max Superspeciality Hospital, Patparganj, Delhi (India)
E-mail :
anilarora@delhiorthojournal.com
CAUTION!

"HEAVY ERECTION UNDER PROGRESS"
Purposes of Templating

Preoperative planning

– Forces surgeon to think in 3 dimensions
– Assists surgical team in preparing instruments
– Ensures adequate inventory of implants
– May help predict complications during surgery and needs that might arise
Why Template?

• Facilitates the surgical goals of restoration of hip biomechanics in terms of

  - Limb length
  - Offset
  - Center of rotation
Advantages of Templating

- Match the opposite side > Unilateral hip disease

- In contralateral THR match the previous

- Marked discrepancy from template indicates component malpositioning, malsizing or an iatrogenic occult fracture.
FOUR STEPS of Templating

• Evaluating the Quality of Radiograph

• Identifying Anatomical Landmarks

• Defining Mechanical References

• Choice and Positioning of Implants
Magnification of the film shall match the desired magnification, as mentioned on the template!
To Template an Xray (for THR)

- Have the desired magnification.
- Reference for Measurements
Limb length Discrepancy

Acetabular Templating

Femoral Templating

Offset

Centre of rotation (COR)
Radiologic Limb length Discrepancy

Fixed point on Pelvis to a fixed point on Femur

Inter tear drop line to fixed point on the Lesser Trochanter.

Look for:
True Discrepancy
Apparent LLD
Acetabular Templating

- Component size
- Position
- Centre of rotation

- Mark the Centre of Rotation
Acetabular Templating

45°
ACETABULAR TEMPLATING

AP View Pelvis

• Acetabular Size
• Center of Rotation
What is Femoral Offset?

Perpendicular distance between the "center of the femoral head" and a "line drawn down the center of the femoral shaft"
Femoral Offset Measurement

Anatomically is distance between Long axis of Femur and Center of Head

• **Tip of Greater Trochanter to Centre of femoral head.**

  or

• **Saddle to Centre of femoral head.**
Choose OFFSET

• Aim is to match it with the opposite side.

• Centre of femoral head should match Centre of rotation of hip after relocation

• Has immense clinical importance
Femoral component

• Should template the opposite side also

• Template Femoral canal for Size

• Choose Neck Length to reproduce Femoral Offset and Leg Length.

• Mark Centre of Femoral Head

• Determine the Level of neck osteotomy
Canal Type (Calcar to Canal Ratio)
Canal Type

Calcar To Canal Ratio

- Type A  <0.5
- Type B  0.5-0.75
- Type C  >0.75

FIG. 15. Measurement of the calcar-to-canal ratio.
Cementless stem

Proximal Coating

Adjust template sizes until optimal contact between the lateral and medial endosteal cortex of the proximal femur is achieved.
- **Fully Coated Cementless**
  
  Look for throughout fill down upto medullary canal

- **Cemented stem**

  Adjust template sizes to allow for an adequate cement mantle of 2-3mm
FEMORAL TEMPLATING

- Stem Size
- Offset
- Neck length
- Neck Resection level
Adjustments

• Limb Length Discrepancy

• Offset

• Neck Length
Full Profile in both views
• Mark osteophytes

• Mark cysts

• Observe protrusio acetabuli—to lateralize the cup for better biomechanics and reduce impingement.
• Predicts more than 80% of intraoperative difficulties

• **Acetabular size** predictability > femoral side predictability

• Accuracy lower for uncemented implants
OFFSET

• **Coxa vara** - lower the neck cut and increase offset

• Opposite for coxa valga

• Doubtful cases cut the neck longer and than adjust
Mental Templating
THANKS
Thank You