

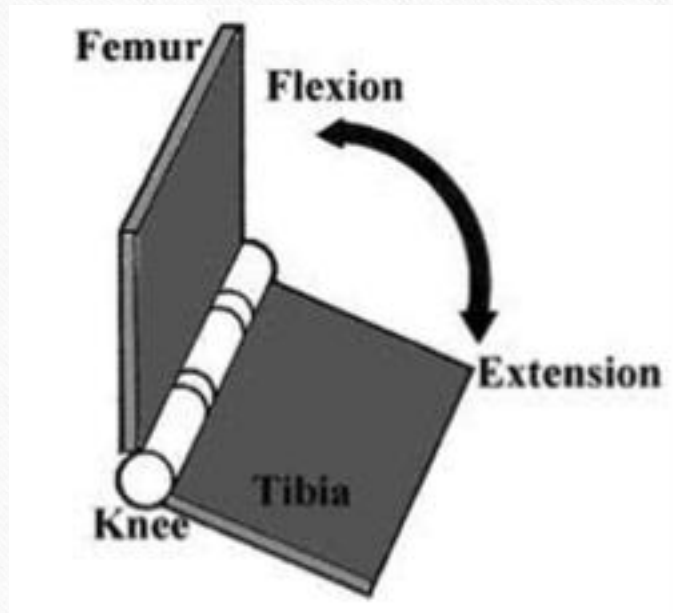
IMPLANT DESIGN

PS v/s CR

LHMC – DOA
KNEE ARTHROPLASTY COURSE 2023

DR. NISHIT BHATNAGAR

Knee = Hinge Joint ?



- Hinges
- **Rolls**
- Rotates

Stability

- Ligaments
- Bony anatomy
- Menisci
- Capsule
- Musculature

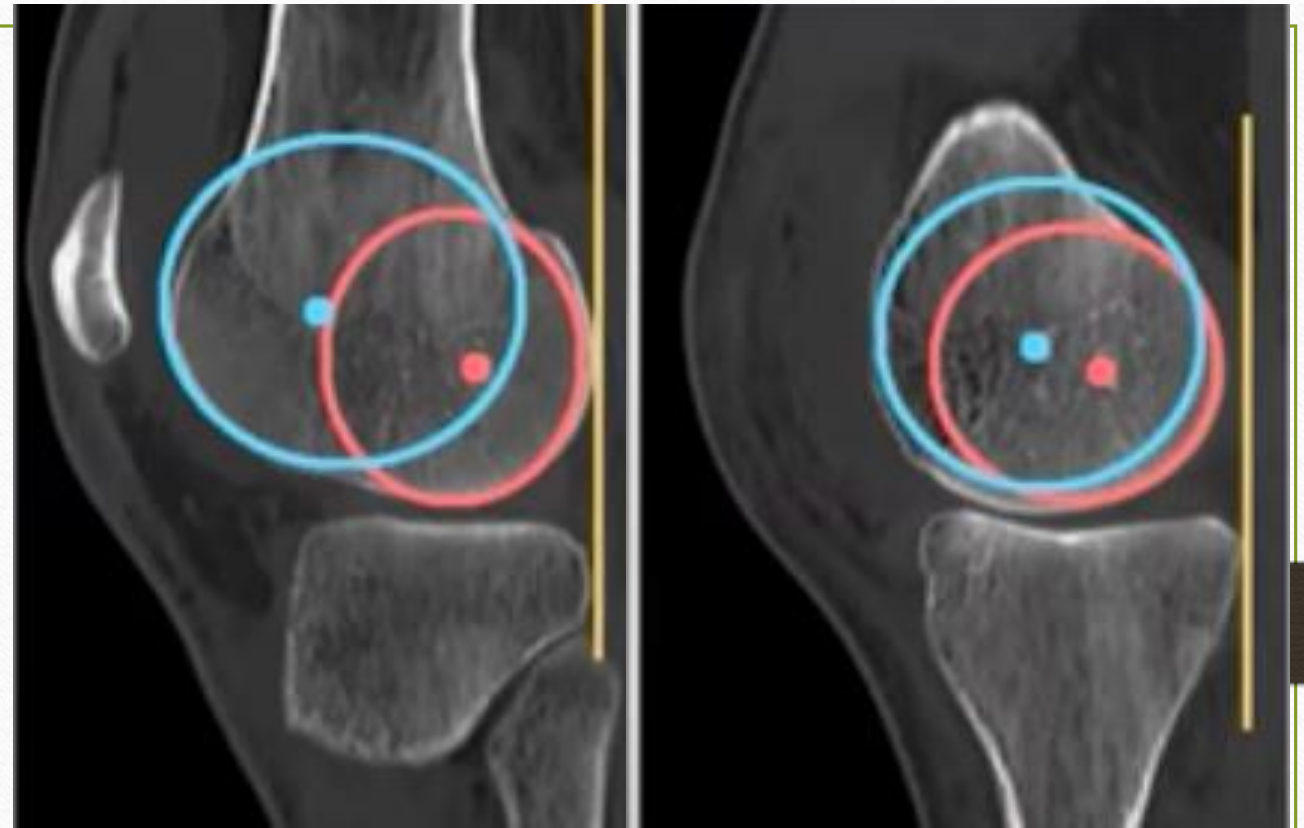
POSTERIOR FEMORAL ROLLBACK



Reason for Rollback

FOUR BAR LINKAGE

- ACL
- PCL



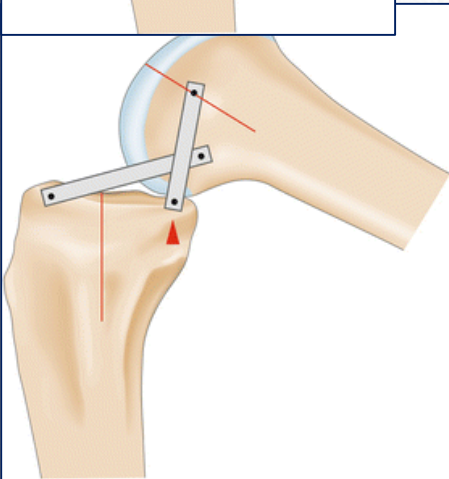
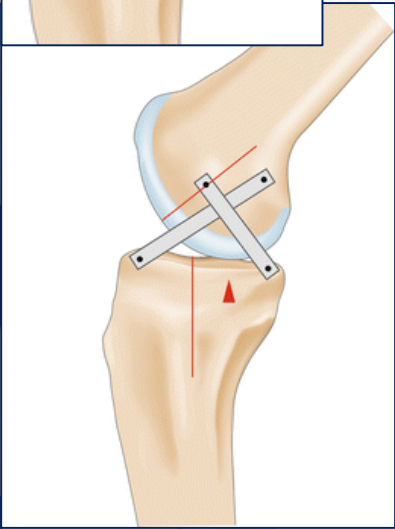
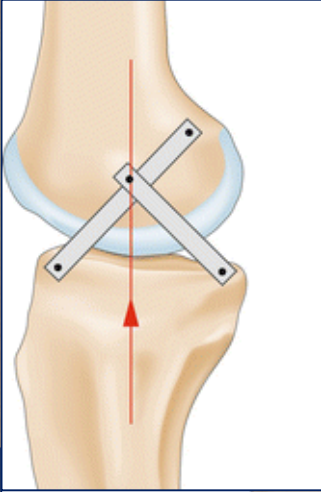
LAT FEM CONDYLE

MED FEM CONDYLE

CORA is wider apart

Drives the rollback

PS and CR are just ways to produce rollback



IMPLANT DESIGN

UNCONSTRAINED

SEMI - CONSTRAINED

CONSTRAINED

CONDYLAR CONSTRAINED

VARUS VALGUS CONSTRAINED

HINGE KNEE

CRUCIATE RETAINING

CRUCIATE SACRIFICING

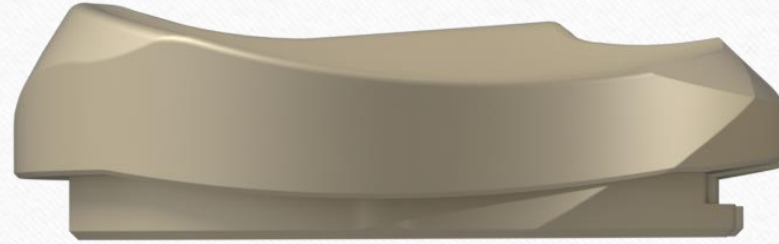
PCL SUBSTITUTING

POSTERIOR STABILIZED

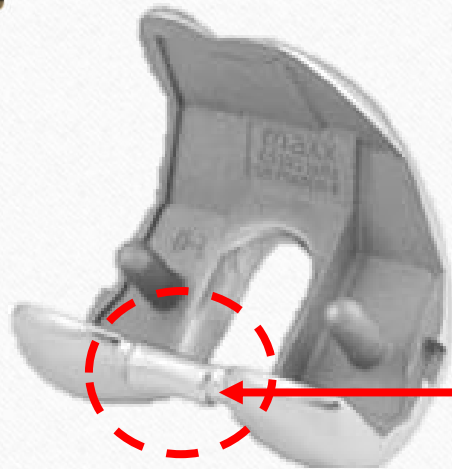
DEEP DISH
ULTRACONGRUENT

Based on degree of
stability built into the
implant design

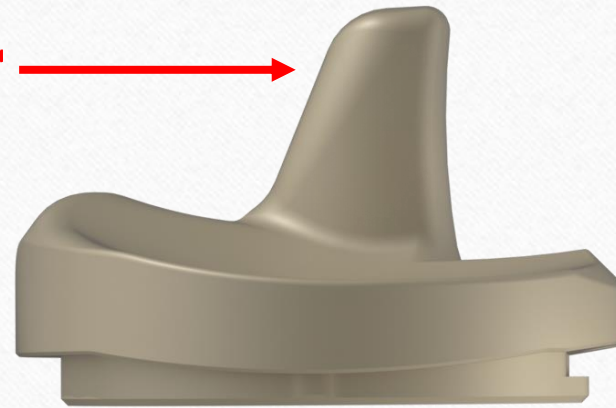
CRUCIATE RETAINING



POSTERIOR STABILIZED

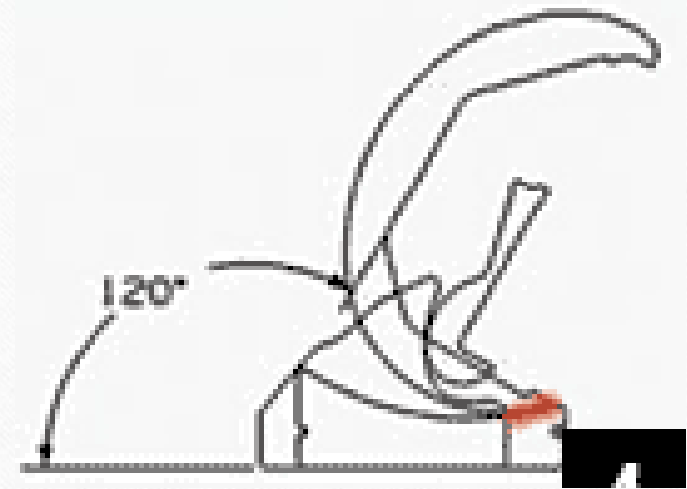
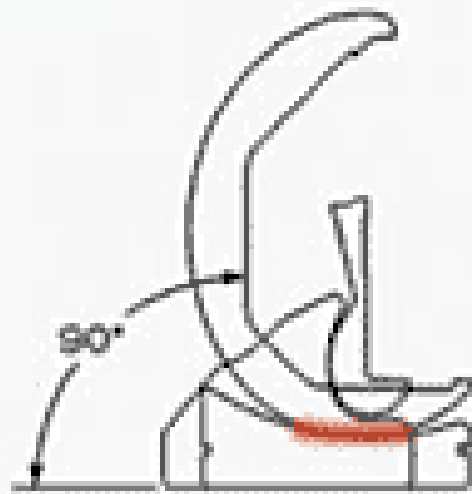
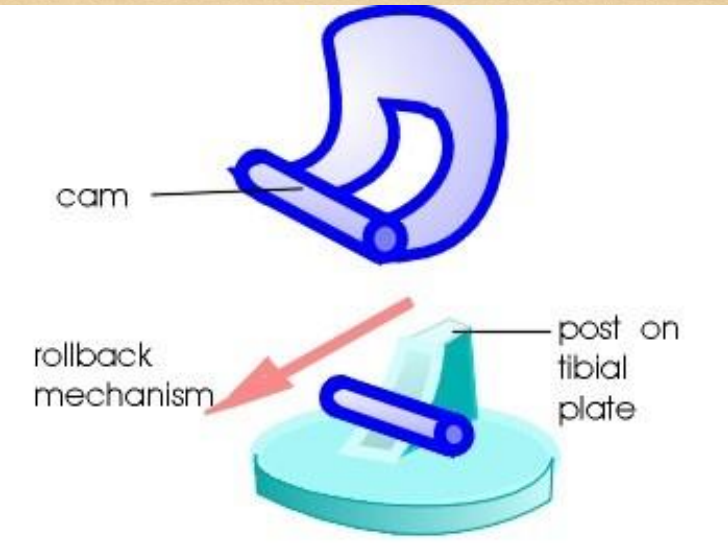


POST →



← CAM





PS KNEE

Advantage

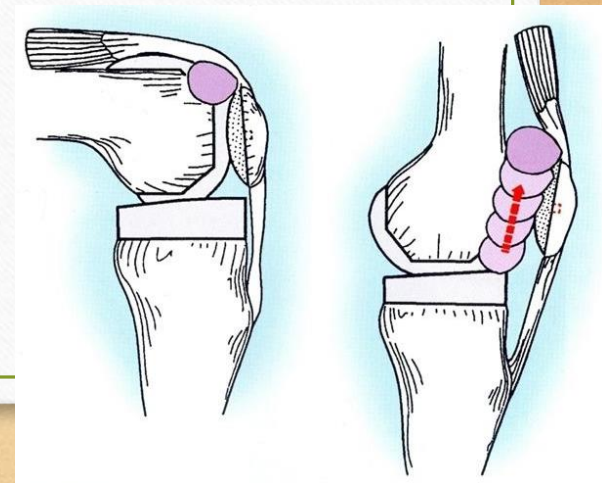
- Predictable rollback
- Forgiving implant
- Easier access to posterior space
- Severe deformities, patellectomy

Disadvantage

- Depletes bone stock
- Susceptible to peri-prosthetic fracture
- Patello-femoral crepitus / clunk
- Post wear / fracture



Incidence is lesser with modern designs



CR KNEE

Advantage

- Bone stock preserved
- Proprioception
- Natural kinematics

Disadvantage

- Technically demanding
- Severe deformities
- PCL rupture

Joint line accuracy

Review > Indian J Orthop. 2022 Sep 5;56(11):1858-1870. doi: 10.1007/s43465-022-00693-6.

eCollection 2022 Nov.

Posterior-Stabilized Versus Cruciate-Retaining Prostheses for Total Knee Arthroplasty: An Overview of Systematic Reviews and Risk of Bias Considerations

Fengyao Mei #^{1 2}, Jiaojiao Li #³, Liyi Zhang^{1 2}, Jiaxiang Gao^{1 2}, Hu Li^{1 2},

Comparable results

Review > Eur J Orthop Surg Traumatol. 2023 Mar 22. doi: 10.1007/s00590-023-03521-1.

Online ahead of print.

International primary knee arthroplasty registry review: findings from current reports

Arsh Sidhu¹, Gerard A Sheridan², Nelson V Greidanus¹, Michael E Neufeld¹, Lisa C Howard¹,

CR better than PS on most outcome measures

> J Arthroplasty. 2023 Jun 3;S0883-5403(23)00604-6. doi: 10.1016/j.arth.2023.05.064.

Online ahead of print.

Ultracongruent Designs Compared to Posterior-Stabilized and Cruciate-Retaining Tibial Inserts – What Does the Evidence Tell Us? A Systematic Review and Meta-Analysis

Alyssa N Wenzel¹, Syed A Hasan², Yash P Chaudhry³, Kevin L Mekkawy⁴, Julius K Oni¹,

Comparable results

PREVALANCE

Australian

CR > PS

Europe

CR >> PS

US

CR << PS

Acta Orthopaedica 2022; 93: 284–293

The effect of patient and prosthesis factors on revision rates after total knee replacement using a multi-registry meta-analytic approach

Peter L LEWIS ^{1,3}, Annette W-DAHL ^{2,3}, Otto ROBERTSSON ^{† 2,3}, Michelle LORIMER ¹, Heather A PRENTICE ⁴, Stephen E GRAVES ¹, and Elizabeth W PAXTON ⁴

TAKE HOME



PS

- Balancing is easier
- Forgiving implant
- Good outcome
- Better flexion

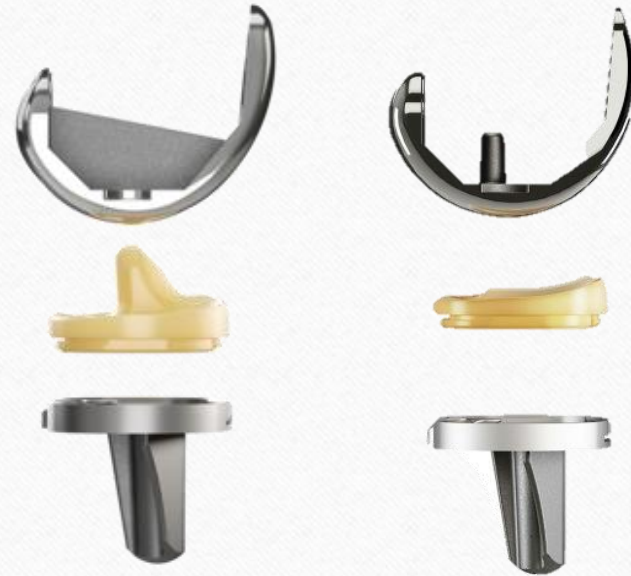
Training

CR

- Technically demanding
- Requires greater precision
- Perhaps better outcome
- Less patello-femoral complications

Experience

Personal choice



THANK YOU