NEWSLETTER

OF

ASIA PACIFIC ARTHROPLASTY SOCIETY

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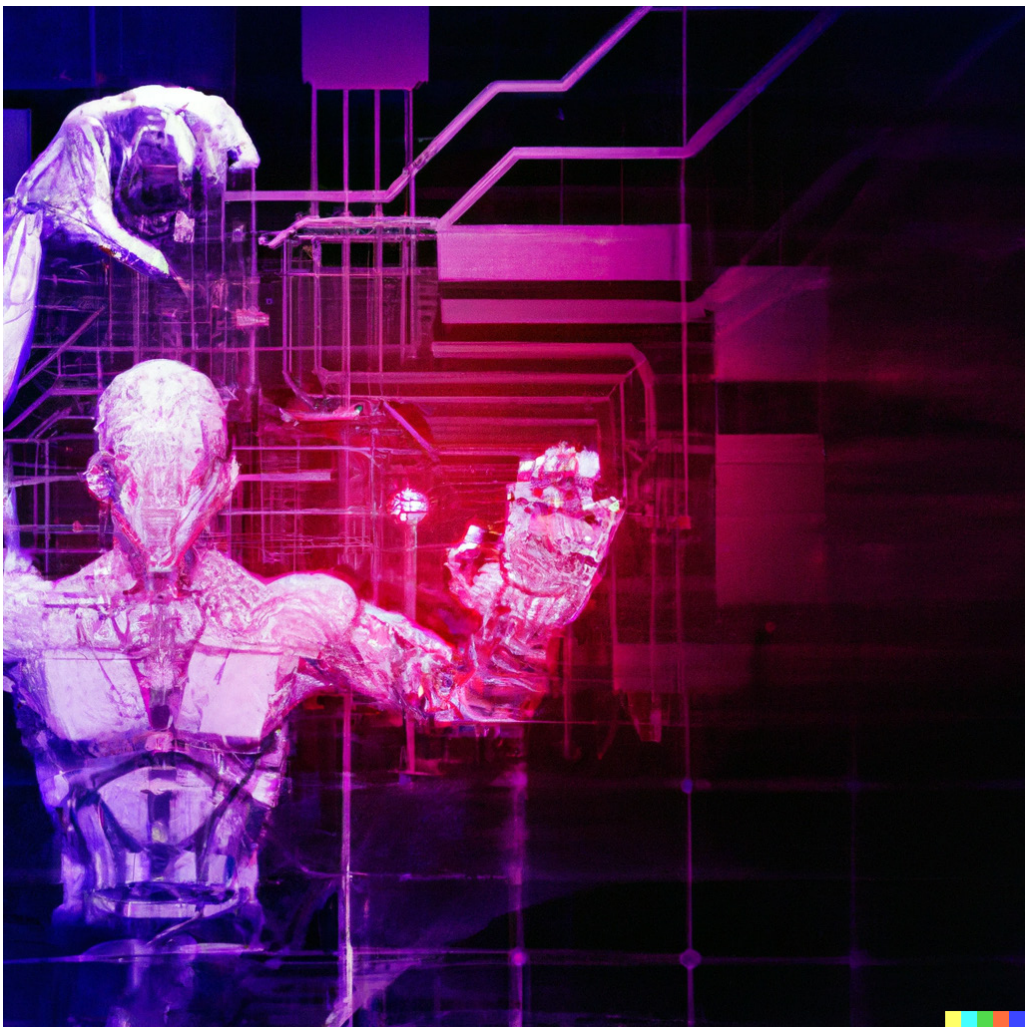
CONTENTS

THE DOCTOR'S VISIT OF THE FUTURE: LESS TOUCHING, MORE TECH

Introduction:

Advancements in technology and the integration of artificial intelligence (AI) have revolutionized various industries, and healthcare is no exception. In the not-so-distant future, the traditional doctor's visit may undergo a significant transformation, with a greater emphasis on technology and reduced physical contact. This article explores the use of technology and AI in healthcare, highlighting their advantages and disadvantages, ethical considerations, and the need for appropriate regulations.



Advantages of AI in Healthcare:

Artificial intelligence has the potential to enhance healthcare in numerous ways:

Efficient Diagnosis: AI algorithms can analyse vast amounts of medical data, including patient records, lab results, and medical imaging, to assist in the diagnosis of diseases. By detecting patterns and anomalies that may elude human observation, AI can improve diagnostic accuracy and speed, leading to earlier interventions and improved patient outcomes.

Personalized Treatment: AI can utilize patient-specific data to develop personalized treatment plans. By considering individual variations in genetics, lifestyle, and medical history, AI can suggest tailored interventions and medications, ensuring that patients receive the most appropriate care.

Remote Monitoring: With the help of wearable devices and remote sensors, AI can continuously monitor patients' vital signs and detect deviations from normal values. This technology enables timely interventions and early detection of complications, particularly for patients with chronic conditions.

Streamlined Administrative Processes: AI-powered tools can automate administrative tasks, such as scheduling appointments, managing medical records, and processing insurance claims. By reducing administrative burdens, healthcare professionals can devote more time to direct patient care.

Disadvantages and Challenges:

While AI holds great promise, there are several challenges and concerns associated with its implementation in healthcare:

Data Privacy and Security: The use of AI in healthcare requires vast amounts of sensitive patient data. Ensuring robust data protection measures and strict adherence to privacy regulations are essential to safeguard patient confidentiality and prevent unauthorized access.

Lack of Human Touch: The increasing reliance on technology in healthcare may lead to a diminished sense of human connection between patients and healthcare providers. Empathy and emotional support are crucial aspects of patient care that technology cannot fully replace.

Algorithm Bias: AI algorithms are only as good as the data they are trained on. If the training data contains biases, such as racial or gender disparities, the AI system may perpetuate and amplify these biases, leading to inequitable healthcare outcomes.

Ethical Considerations: The use of AI in healthcare raises important ethical dilemmas. For example, decisions made by AI algorithms may impact patient care, but accountability and transparency in these decisions can be challenging . Balancing the benefits of AI with patient autonomy, consent, and the human judgment of healthcare professionals requires careful consideration.

The Way Forward: Regulations and Guidelines:

To ensure the responsible and ethical integration of AI in healthcare, it is crucial to establish clear regulations and guidelines:

Data Governance: Robust data governance frameworks should be in place to protect patient privacy, ensure data security, and address issues related to data ownership, access, and consent.

Algorithm Transparency: Developers and healthcare institutions should strive for transparency in AI algorithms, ensuring they can be audited, validated, and understood by healthcare professionals and patients alike. Clear documentation of the data sources, training processes, and decision-making criteria is essential.

Regular Auditing and Monitoring: Independent audits and monitoring of AI systems should be conducted to detect and rectify algorithmic biases, ensure patient safety, and maintain the highest standards of care.

Collaborative Research and Development: Collaboration between healthcare professionals, researchers, policymakers, and technology developers is vital to establish a shared understanding of AI's potential, limitations, and ethical boundaries. Multidisciplinary discussions can help shape regulations that strike a balance between innovation and patient welfare.

Conclusion:

The integration of AI in healthcare delivery is a rapidly evolving field with the potential to transform the doctor's visit in the near future. While AI offers significant advantages in terms of efficient diagnosis, personalized treatment, remote monitoring, and streamlined administrative processes, it is important to address the challenges and ethical

considerations associated with its implementation.

In terms of timeline, we are already witnessing the initial stages of AI integration in healthcare. AI algorithms are being used to analyse medical data and assist in diagnosis, particularly in fields like radiology and pathology. Wearable devices and remote monitoring systems are being employed to collect real-time patient data, enabling proactive and personalized care.

As AI continues to advance, we can expect further integration across various aspects of healthcare delivery. For instance, natural language processing and voice recognition technologies could enhance communication between patients and AI-powered chatbots, providing immediate medical advice and triage support. Virtual reality and augmented reality may be utilized to improve medical training and patient education, allowing for immersive simulations and enhanced understanding of complex medical procedures.

However, it is important to note that the full integration of AI into healthcare will likely be a gradual process. Ensuring regulatory frameworks, data governance, and algorithm transparency will take time to establish and refine. Additionally, there will be a need for ongoing research and collaboration between healthcare professionals, policymakers, and technology developers to address emerging challenges and ethical dilemmas.

The ultimate goal of integrating AI into healthcare delivery is to enhance patient care while maintaining the essential human touch. The doctor-patient relationship, built on empathy, trust, and personalized attention, should remain at the core of healthcare practice. AI should be seen as a tool that augments and supports healthcare professionals, allowing them to make more informed decisions and deliver personalized care in a more efficient and effective manner.

In conclusion, the doctor's visit of the future will indeed involve less physical contact and more reliance on technology and AI. However, it is crucial to approach this integration thoughtfully, ensuring that patient privacy is protected, algorithmic biases are addressed, and ethical considerations are prioritized. By doing so, we can unlock the full potential of AI in healthcare while preserving the human connection that is vital to compassionate and comprehensive patient care.

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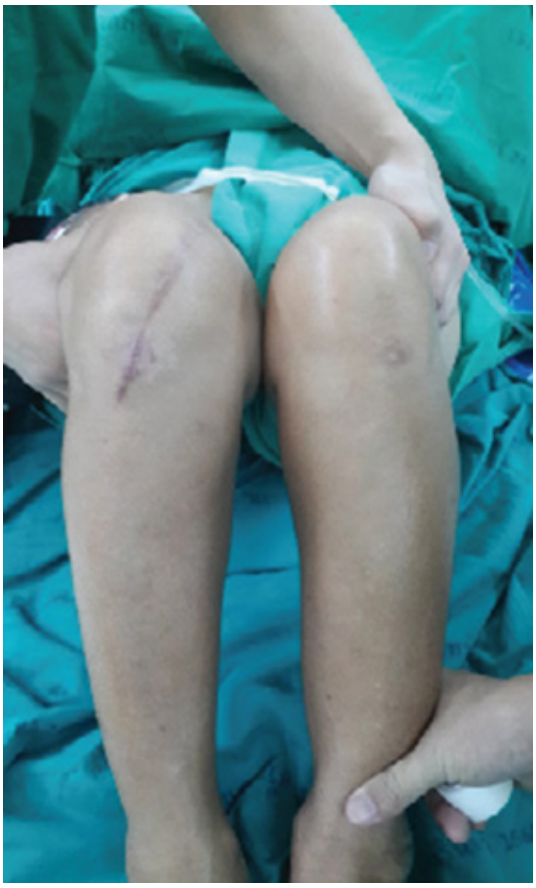
Dr. Kshitij Mody
Welcare Hospital, Vadodara, India

CLINICAL CASE - 1



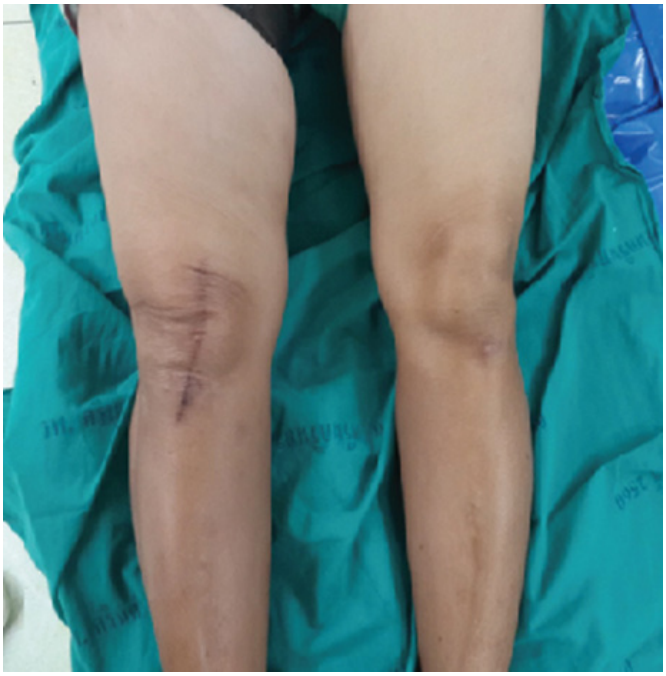
History & Symptoms

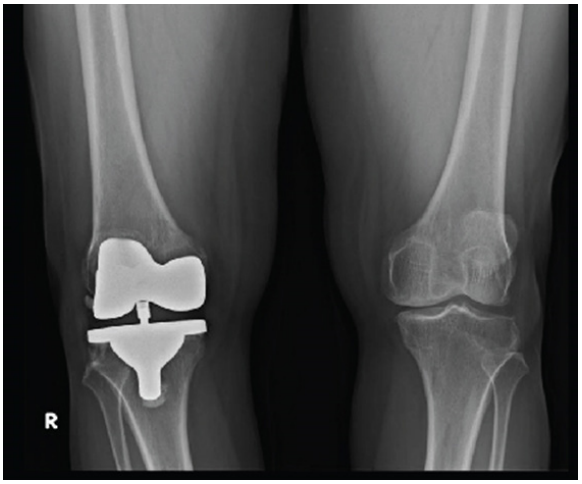
- Dr. Rit Apinyankul

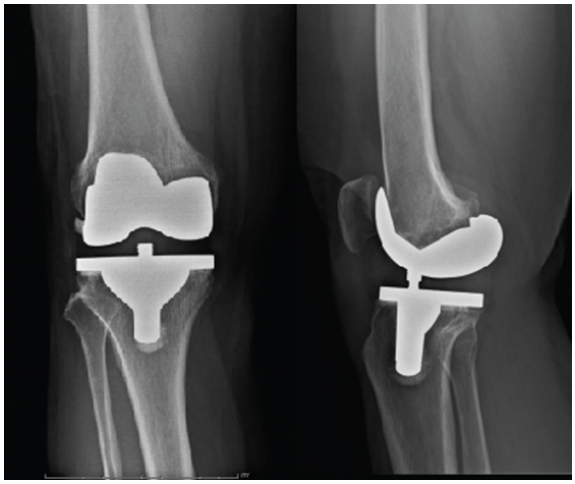
- 54 y/o woman
- Right TKA done 8 months ago
- Presented with persistent right knee pain
- Lateral-sided pain while walking and discomfort during deep flexion
- Delayed rehabilitation (especially knee flexion), supportive device was used for 2 months
- Pain & occasional feeling of tightness around the knee at night

Examination findings

- Limping +
- No tender point over the knee
- Knee well aligned
- Surgical site – oblique surgical scar, well healed, no discharge
- No effusion, No local warmth over knee
- Good patellar tracking
- ROM - Flex/Ext : 125/0o
- AP/Sagittal plane laxity 2+
- No coronal plane laxity



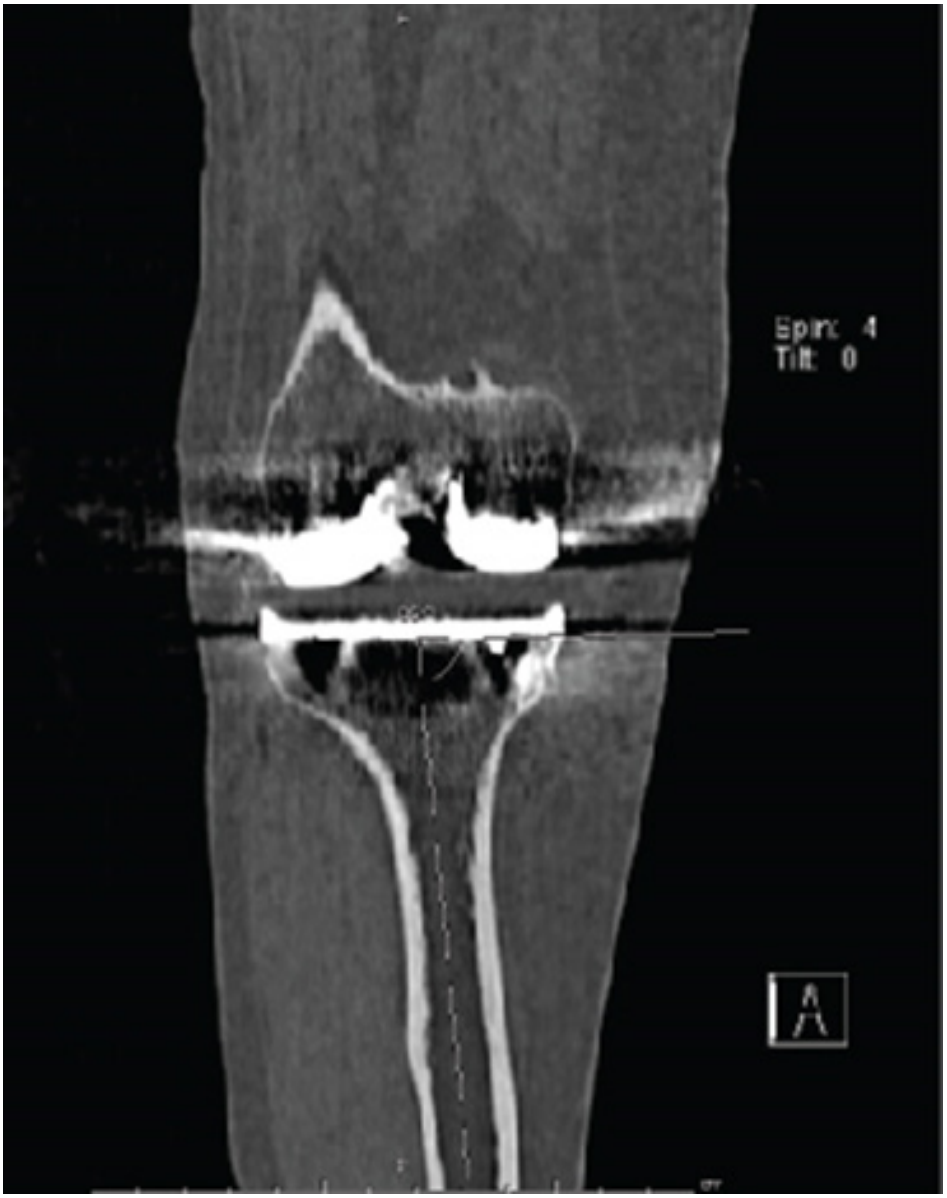


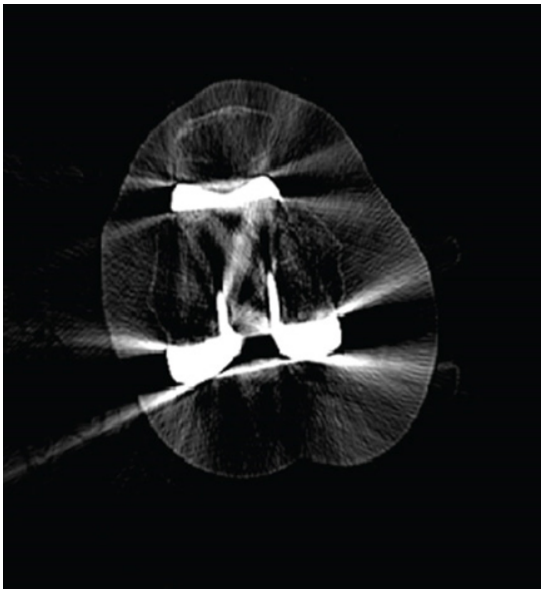


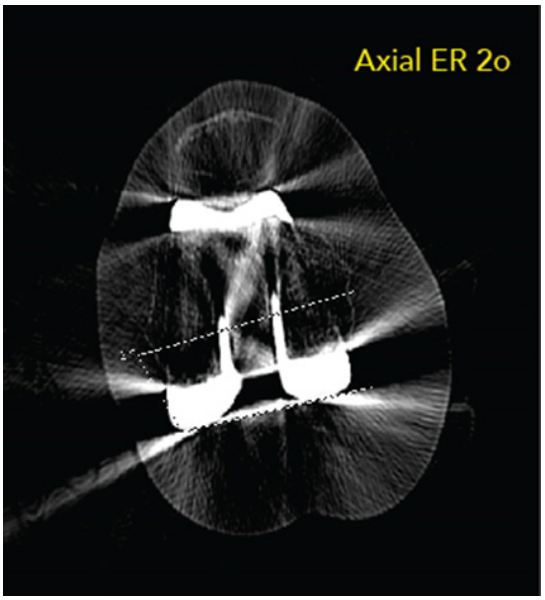
Investigations

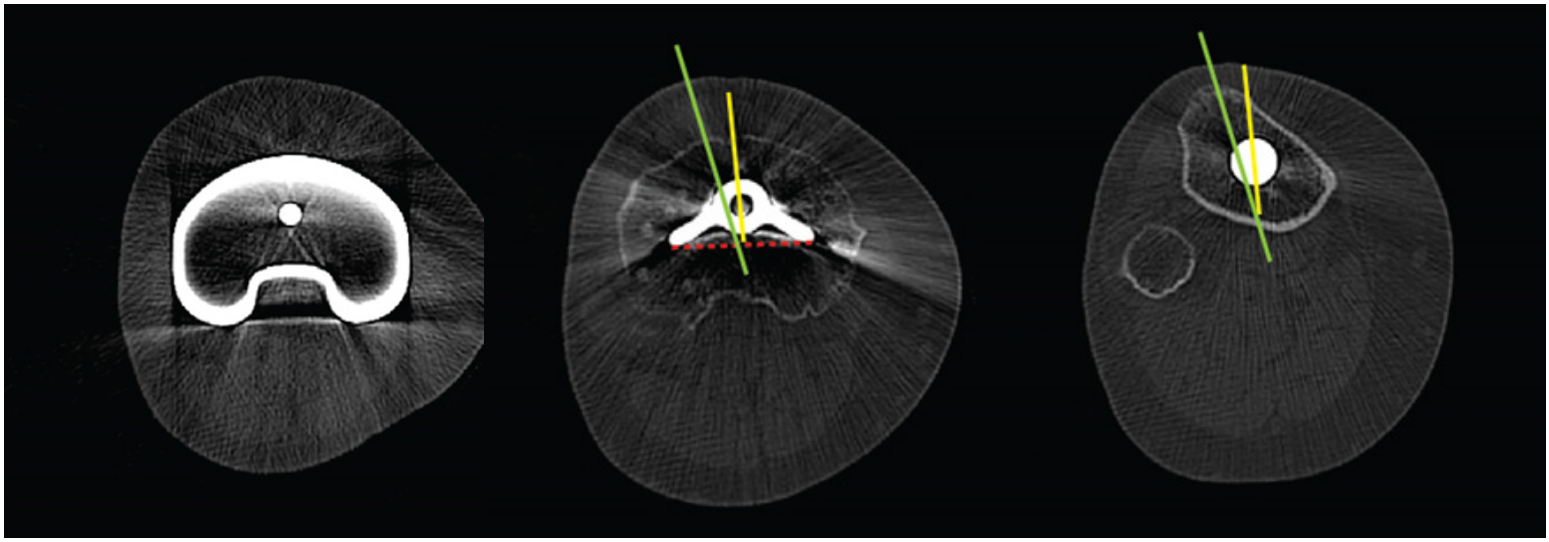
- CBC: WBC - 7090, N - 50%, L - 39%, HCT - 33.9
- ESR - 36, CRP - 3.5
- On aspiration – no fluid extracted

CT Scan images



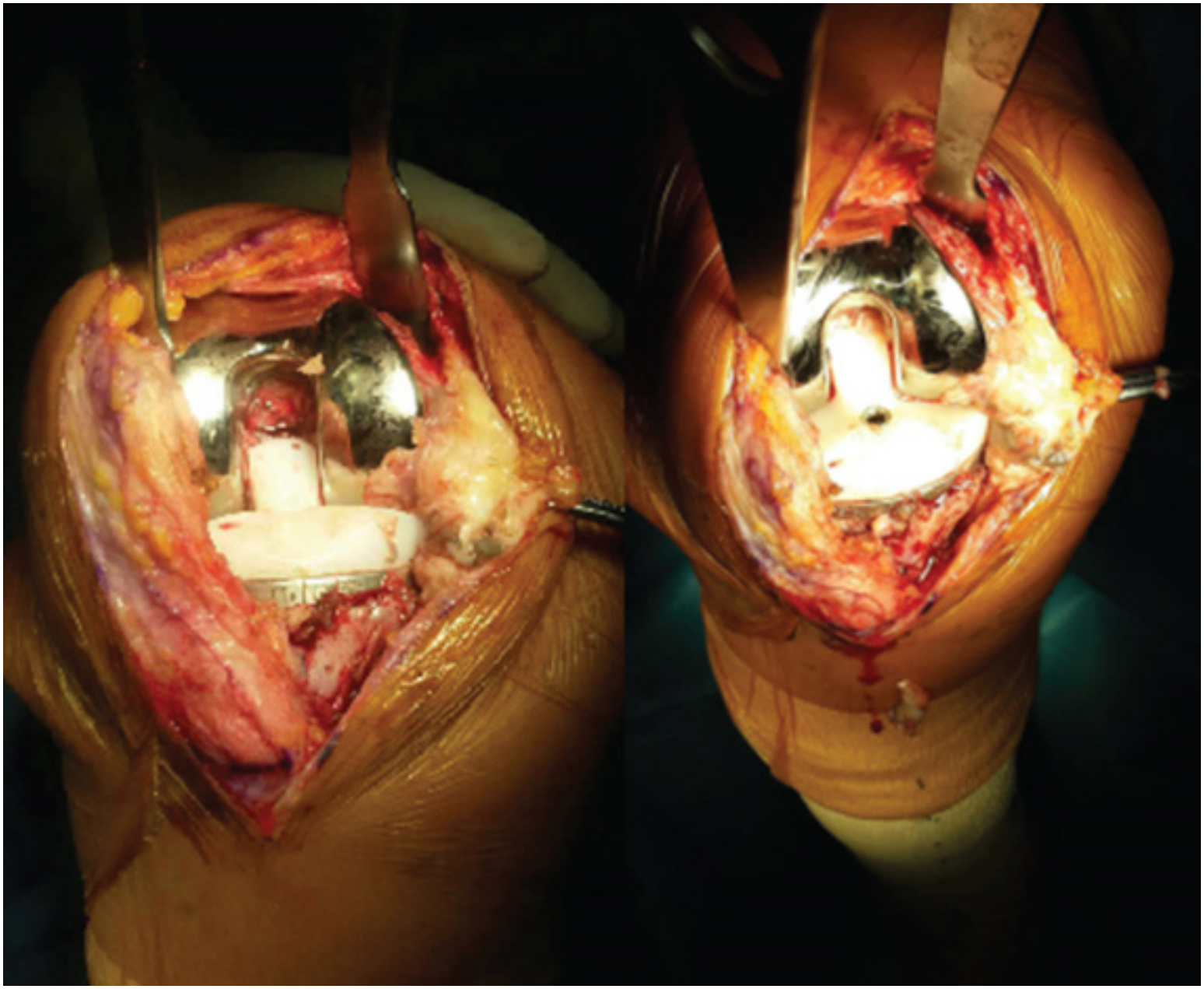






Intra-op findings

- Internal mal-rotated tibial tray



Want to find out how this case was managed? Visit https://apasonline.org/member_login.aspx for the full clinical case!

CLINICAL CASE - 2

BILATERAL DDH WITH DEGENERATIVE LUMBAR SCOLIOSIS

- Dr. Abhay Elhence
- Dr. Saurabh Gupta

History & Examination

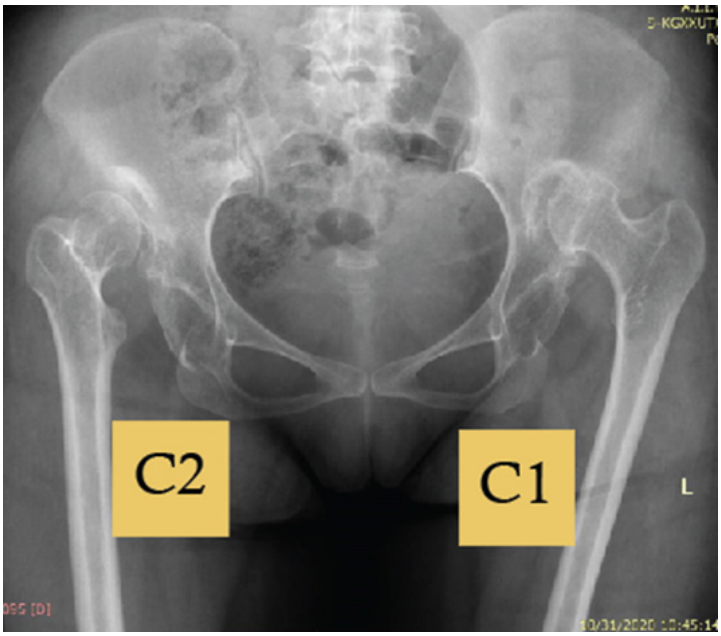
- 37 y/o woman
- Pain in Both Hips Left > Right x 18 months
- Associated difficulty in walking without support and mostly bed ridden
- C/O Limp since childhood
- No back pain / First born female child
- HHS - 26.5
- Medical illness - NAD
- ESR and CRP - Normal

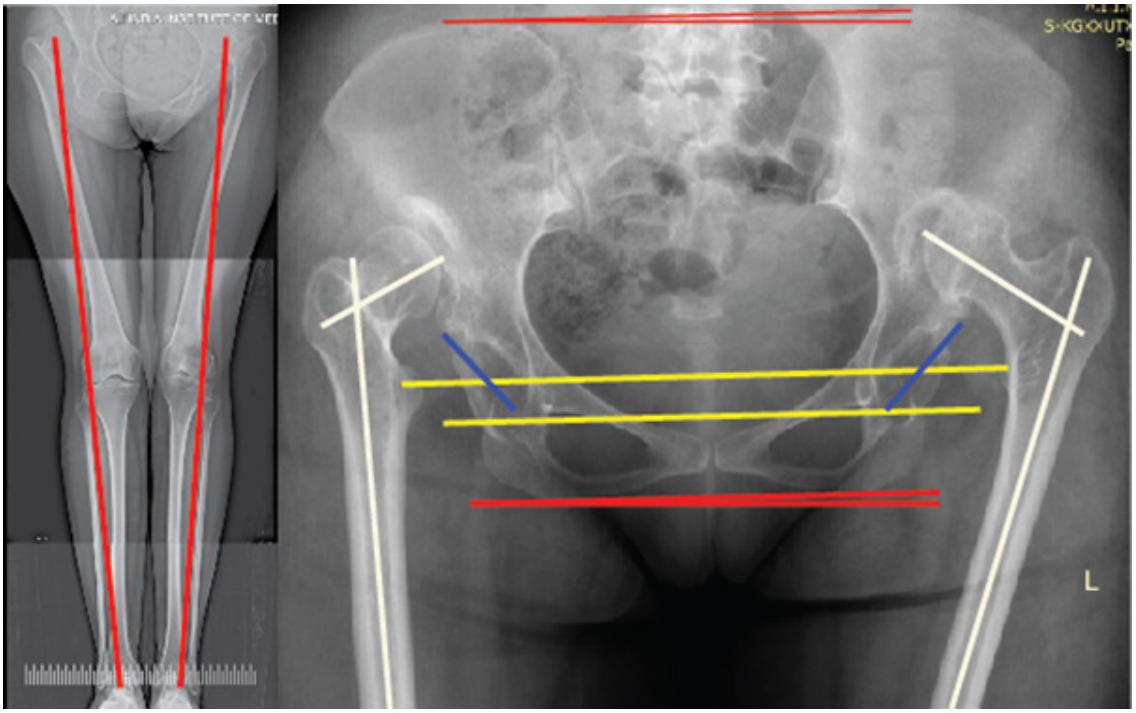
	LEFT	RIGHT
Skin	Normal	Normal
Swelling	NA	NA
Tenderness	+++ (ANTERIOR JOINT LINE)	++
Temperature	Normal	Normal
Deformity	No	No
ROM	Ext 0; Flexion 80; FFD 15	Ext 0; Flexion 90; FFD 10
DNVD	N	N

Pre-op evaluation

Hartofilakidis classification :
RIGHT Type C2 v/s LEFT Type C1

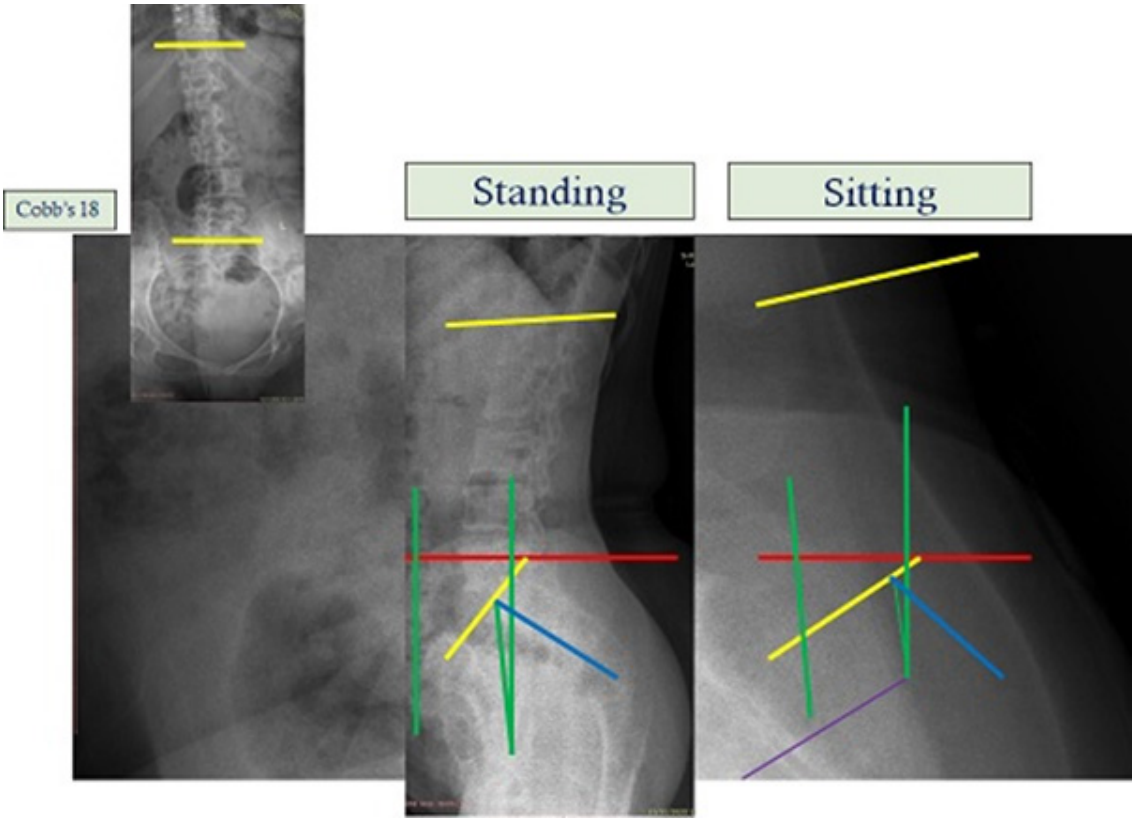
- No False Acetabulum
- Lower Neck Shaft Angle
- Short Femur Neck with excessive ante version
- Large Medial Cortical Inclination
- High GT position
- Narrow Femur
- Small Canal Flare Index
- Significantly Small ML to AP Ratio of Proximal Femo ral Medullary Canal





- Pelvic Obliquity +
- HKA axis – Altered
- Malhotra R, Gautam D. An algorithmic approach to total hip arthroplasty in patient with post-polio paralysis and fixed pelvic obliquity. Bone Jt Open. 2021
- Perry KI, Berry DJ. Femoral considerations for total hip replacement in hip dysplasia. Orthop Clin North Am. 2012

Degenerative Lumbar Scoliosis



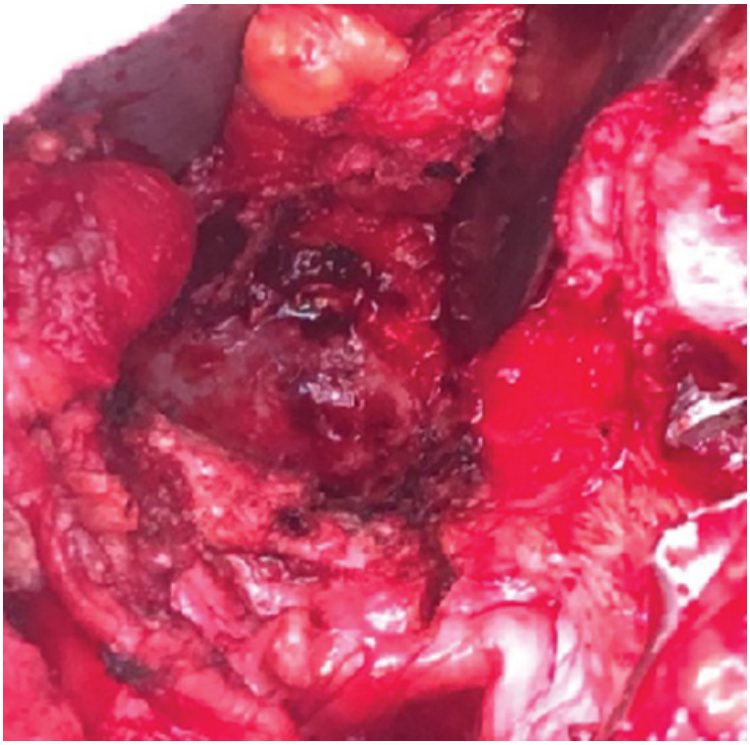
- Malhotra et al. Hip-spine relationship in total hip arthroplasty - Simplifying the concepts. J Clin Orthop Trauma. 2022 Apr

Challenges

- Bilateral Crowe 4/ Hartofilakidis High Dislocation type C
- Pelvic obliquity
- Anatomic center of rotation
- Staged vs same sitting surgery?
- Cemented vs Uncemented?
- LLD since C2 femurs requires a longer length of shortening osteotomies*

*Wang et al. Int Orthop. 2020

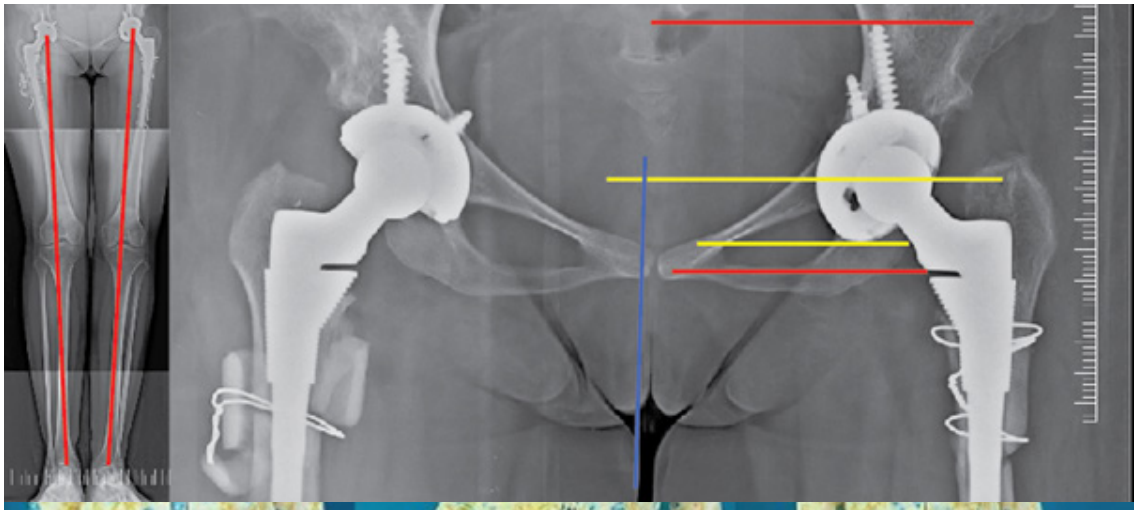
Intra-op evaluation



- Thin femoral stem with Modularity and more non-sprouted sleeves - SROM stem - Right 6; Left 8
- Shallow acetabulum - Bantam cup with controlled protrusio

Dysplastic acetabulum

1 year Follow-up



ARTHROPLASTY QUIZ

We are thrilled to announce the winner of the APAS Global Newsletter Quiz! With an outstanding performance and a deep understanding of Arthroplasty, Dr Sandesh Madi from Kasturba Medical College, Manipal has emerged as the deserving champion!

The quiz attracted numerous passionate participants from across the world, but Dr Sandesh demonstrated exceptional knowledge, dedication, and enthusiasm for our field.

We applaud Dr Sandesh for their commitment to staying updated with the latest advancements in Arthroplasty. Their achievement reflects the hard work and perseverance required to excel in our ever-evolving field. Hearty congratulations!

Dr Sandesh Madi

ANSWER KEY

All the questions in last edition's quiz along with their answers are shown below.

1. Ultra- high molecular weight polyethylene is defined as polyethylene with an average molecular weight greater than __ million g/mol :

- 1
- 10
- ***3***
- 7

The microstructure of ultra-high molecular weight polyethylene is a two- phase viscoplastic solid consisting of crystalline domains embedded within an amorphous matrix. The ultra-high molecular weight polyethylene currently used in orthopaedic applications has a molecular weight of 3 to 6 million g/mol, a melting point of 125°C to 145°C, and a density of 0.930 to 0.945 g/cm.

2. What is true while doing anterior referencing for femoral cuts

- Flexion gap is constant but there is danger of notching the anterior femoral cortex
- ***Size of the component is based on the amount of femoral condyles that is removed***
- Under resection will cause flexion instability
- Over resection will lead to loose extension gap

3. All of the following are considered high risk factors for dislocation in THR except:

- Impingement of prosthetic neck on the acetabular component.
- Fracture Neck Femur as the primary pathology
- Use of 22mm heads.
- Posterior surgical exposure
- ***AVN as primary pathology***

4. When comparing total knee replacement (TKR) with Unicompartmental Knee Replacement which of the following statement is untrue?

- Tibial resection made at right angles to the mechanical axis of the tibia, similar to that of total knee arthroplasty, is rarely suitable for UKA due to the intra- articular obliquities of the medial compartment.
- ***Longevity of UKR is equal to TKR.***
- UKA surgical procedure can correct alignment only within the joint
- UKA differs from TKA in that alignment can be corrected only to the normal tension of the knee ligaments.

An important principle is resection of the proximal tibia at an appropriate varus/valgus angle. Cartier has shown that a tibial resection made at right angles to the mechanical axis of the tibia, similar to that of total knee arthroplasty, is rarely suitable for UKA due to the intra- articular obliquities of the medial compartment. UKA differs from TKA in that alignment can be corrected only to the normal tension of the knee ligaments. Thus the UKA surgical procedure can correct alignment only within the joint. Attempts to correct lower limb alignment by exceeding normal ligamentous length have resulted in failure. Thus the proximal tibia must be resected along its epiphyseal plane. This has to be assessed individually for each joint but generally dictates a varus alignment of components in the sagittal plane and a 3°-5° posterior slope.

5. Which of the statements regarding Total Hip Arthroplasty in young patients is false:?

- Higher patient activity results in higher wear rates
- Studies of young patients have demonstrated a relationship between the amount of wear and the age of the patient, the revision rate, osteolysis and aseptic loosening.
- The survival rate of artificial joints in patients younger than fifty years of age is approximately 80% after ten years or more, regardless of the fixation technique and bearing combination
- ***In chronological order, the categorical factors limiting the function and longevity of a total hip prosthesis are the osteolysis (often associated with wear of the bearing), , fixation of the implant to the bone, surgical technique, fatigue failure of the fatigue failure of the implants, and long-term skeletal re-modelling.***

6. According to Paprosky classification for femoral defects a defect characterized by extensive loss of metaphyseal bone with a completely intact diaphysis will be classified as:

- IIIB
- IIIA
- I
- ***II***

A Type II defect is characterized by extensive loss of metaphyseal bone with a completely intact diaphysis. This is among the more common types of deficiencies encountered and is seen when a cemented or cement-less femoral component is in the earlier stages of loosening. Because the cancellous bone of the metaphysis is deficient, cemented femoral component fixation is not recommended. Since, the metaphysis is somewhat supportive, a proximally coated, non-cemented implant with diaphyseal stabilization can be used or distal fixation can be achieved with an extensively porous coated implant.

7. The most commonly approach used for revision hip Arthroplasty is:

- Anterolateral
- Watson Jones Approach
- ***Posterior***
- Anterior

A posterior approach to the hip is most commonly used for revision THA because it is extensile proximally (to obtain improved acetabular exposure including the posterior column if needed) and distally. In addition, it allows for a trochanteric osteotomy or one of its variants if required. In general, ex- tensile exposures are preferred and prior skin incisions should be incorporated into the exposure if possible. The exposure should allow for the safe removal of existing implants while allowing the surgeon to address bone stock deficiencies and adequately implant revision components

8. What is not true regarding difficult exposure of the knee?

- When mobilizing the patella it is important to perform the lateral release and improve the external rotation of the tibia so that the patella can be subluxated laterally rather than everted
- In extremely high BMI patients, everting the patella becomes easier if space is created by making a pocket in the subcutaneous fat lateral to the patella
- When exposing the stiff or ankylosed knee there is a higher risk of avulsing the patellar ligament attached to the tibial tubercle
- ***During lateral dissection, often the popliteus insertion and fibular collateral ligaments need to be released at their insertion.***

The lateral dissection makes room for the patella, but it should stay clear off the popliteal tendon insertion and fibular collateral ligament.

9. Which of the following is not a relative indication for preferentially using PS (Posterior Substitut ing) type of knee over CR (Cruciate Retaining) Knees

- Patients suffering from RA
- Posterior instability
- Post patellectomy patients.
- ***Fixed varus deformity greater than 10 degrees***

Barring a few conditions in which PS type of knee have been shown to be more suitable viz: History of rheumatoid arthritis, prior patellectomy, fixed valgus deformity greater than or equal to 15°, or prior posterior knee instability are relative indications for use of a posterior cruciate substituting prosthesis in total knee Arthroplasty, neither posterior cruciate preserving nor substituting designs has any definitive advantage over each other.

10. Which of the following statements regarding the valgus knee is false?

- In valgus knees lateral soft tissue structures including LCL, ITB and lateral capsule contract while medial tissues become stretched
- ***While balancing a valgus knee, most of the release is performed from the lateral tibial condyle.***
- Lateral femoral condyle has often been shown to be dysplastic in valgus deformities.
- Most of the bony deficits occurs on the femoral side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