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# ON THE PODIUM

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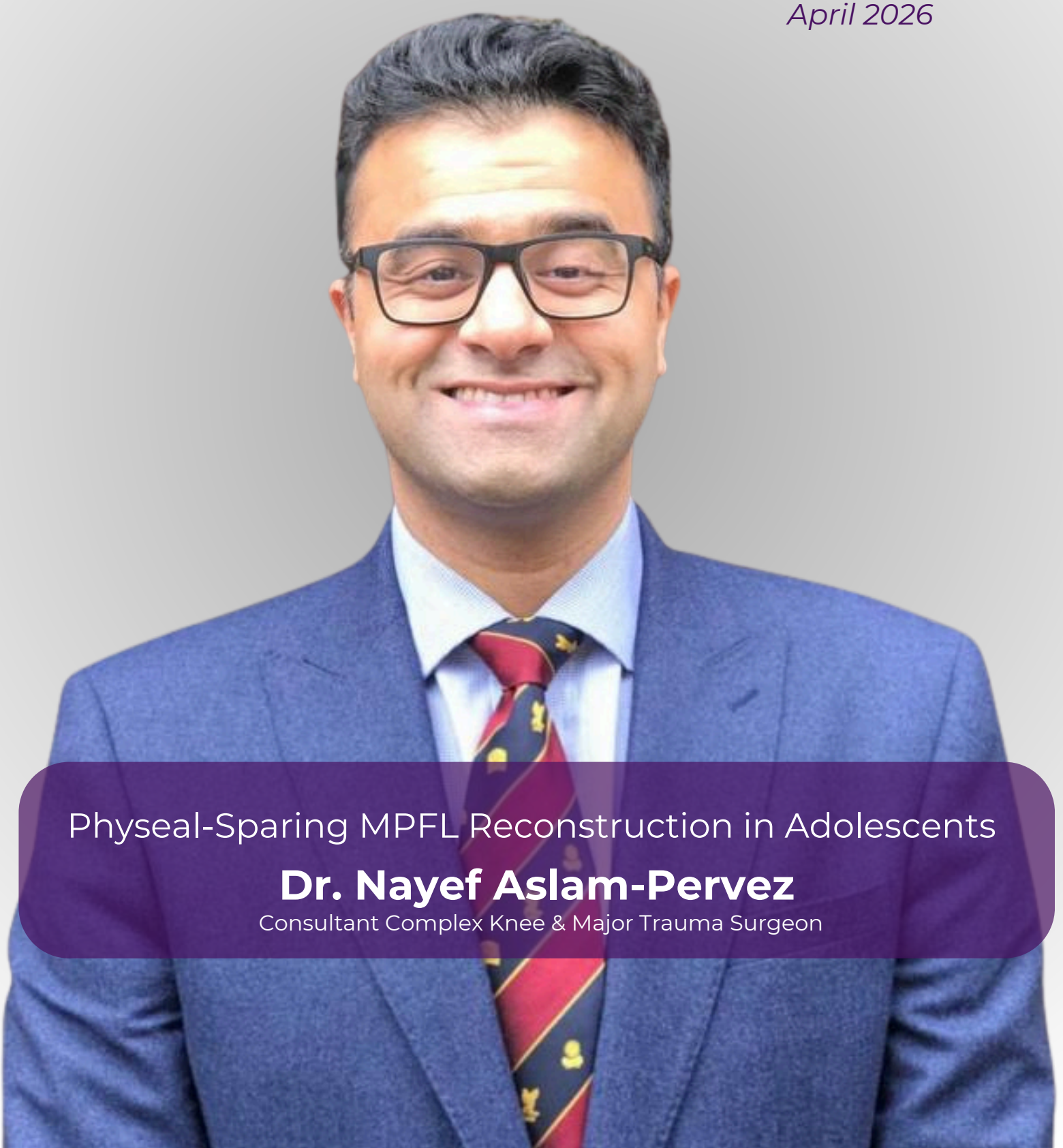


## Physeal-Sparing MPFL Reconstruction in Adolescents

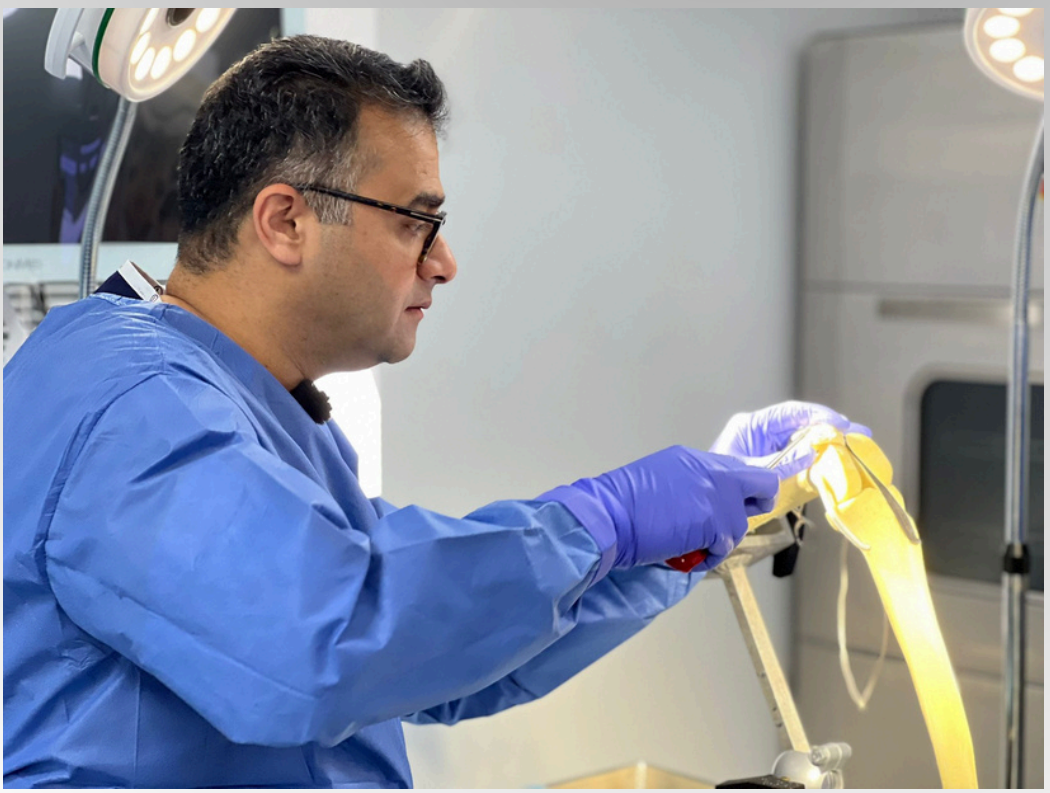
**Dr. Nayef Aslam-Pervez**
Consultant Complex Knee & Major Trauma Surgeon

**What led you to develop a physeal-sparing approach for MPFL reconstruction in younger patients? Was there a particular case or clinical gap that pushed you toward it?**

There wasn't a single defining case, but rather a progressive shift in my clinical practice. I became the primary referral surgeon for paediatric patellofemoral instability within my institution, managing approximately 50 such cases per year. With that volume, it became increasingly important to optimise outcomes in a group of patients who present unique anatomical and developmental considerations. Attending specialist meetings, including paediatric knee conferences such as the Kid Knee meeting in Sheffield, further highlighted the need to refine our approach. This led me to focus on developing a technique that addresses instability in an anatomical and reproducible way, while respecting the distal femoral physis and avoiding unnecessary donor site morbidity by preserving the hamstrings.

**In patients who are approaching skeletal maturity, what are the main technical or decision-making challenges when planning MPFL reconstruction?**

The main challenge lies in the variability of skeletal maturity in this age group. Chronological age does not always reflect skeletal maturity, and surgeons must carefully assess the relationship between the planned femoral fixation point and the distal femoral physis. Another important consideration is balancing stability with the risk of over-constraint. Adolescents may still undergo some degree of growth, so reconstruction must restore stability without excessively tightening the medial restraint of the patellofemoral joint. This becomes particularly relevant when using synthetic ligaments. At this stage of development, growth is predominantly longitudinal rather than radial, and overall knee dimensions are approaching adult morphology. As a result, the risk of progressive over-tensioning of a non-elastic synthetic MPFL construct is likely reduced compared to younger children.



**Can you walk us through how you use intraoperative fluoroscopy to protect the distal femoral physis, and what surgeons should be looking for in real time?**

Fluoroscopy plays a critical role in safely identifying the femoral insertion point while protecting the distal femoral physis. Research has highlighted that Schöttle's point is consistently located distal to the medial femoral physis, which aligns with my clinical experience.

Intraoperatively, I begin by obtaining a true lateral radiograph to identify Schöttle's point. On this view, the entry point may appear to overlap or even traverse the physis. However, this can be misleading due to the characteristic "W-shaped" morphology of the distal femoral physis. The medial limb of this "W" slopes proximally, creating the illusion that the entry point lies within the physis on the lateral projection.

For this reason, I always confirm positioning with an AP view before entering the bone. The AP radiograph reliably demonstrates that Schöttle's point is distal to the physis on the medial side. Once confirmed, the Beath pin is placed onto the periosteum and gently tapped into the epiphysis rather than drilled, minimising the risk of thermal injury.

The guidewire is directed slightly anteriorly and distally, ensuring that the femoral socket remains entirely within the epiphysis and away from the physis. A hand reaming technique is then used to create the socket, further reducing the risk of thermal damage.

Although some adult techniques rely on anatomical landmarks without fluoroscopy, I would strongly advocate routine use of image intensification in paediatric cases, where direct visualisation of the physis is essential to ensure safe and accurate tunnel placement.

**You've chosen a synthetic ligament for this technique. What was the rationale behind that choice, and what advantages do you feel it offers compared to autograft or allograft in this age group?**

In adolescent patients, avoiding donor-site morbidity is an important consideration. Harvesting hamstring tendons can lead to measurable strength deficits, and in younger patients the gracilis tendon is often relatively small, occasionally necessitating harvest of the semitendinosus to achieve an adequate graft. Preserving these structures is particularly valuable in active patients.

In addition, many patients presenting with patellofemoral instability in this age group demonstrate features of generalized ligamentous laxity. In such cases, autograft tissue may itself be relatively compliant, raising the possibility of graft elongation over time. A synthetic ligament offers a more consistent construct, which may be advantageous in this cohort.

There is also emerging clinical evidence supporting the use of synthetic ligaments in MPFL reconstruction. Work by Hersh Deo using the XIROS 5mm Infinity Lock tape has demonstrated excellent clinical outcomes with low failure rates, providing a strong foundation for further application in selected patients.

From a technical perspective, the XIROS Infinity Loop tape has a low-profile, flat configuration, which is well suited to the relatively superficial anatomy of the MPFL, particularly in paediatric patients. Its open-weave structure also allows for tissue ingrowth and biological integration over time.

In my early experience, patients have demonstrated a rapid recovery and high levels of satisfaction. While there is a theoretical risk of over-constraint with non-elastic constructs, careful patient selection and appropriate intraoperative tensioning are key. We are currently undertaking structured follow-up of our paediatric cohort and hope to report these outcomes in due course.

**What are the key technical points surgeons need to get right, particularly around patellar preparation and femoral fixation, to minimise complications?**

One of the key differences in this technique is that it reverses the traditional sequence of fixation. Rather than fixing on the patella first and tensioning on the femoral side, I perform femoral fixation initially using a blind-ending socket within the distal femoral epiphysis, and then tension the construct on the patellar side. This approach allows much more controlled assessment of patellar tracking. By passing the synthetic tape through two transverse patellar tunnels and temporarily securing it on the lateral side with a clamp, I can assess patellar stability dynamically through a full range of motion. This includes full extension, 30 degrees, and 60 degrees of flexion, while also evaluating lateral translation. It allows both hands to be free, facilitating a more accurate and reproducible assessment of appropriate tensioning.

On the patellar side, careful preparation is essential to minimise the risk of fracture. The use of small-diameter (2.4 mm) transverse tunnels creates a minimal bony footprint and reduces stress risers. Once appropriate tension is confirmed, final fixation is performed on the medial side using PEEK bone anchors, typically 3.5 mm or 4.75 mm depending on patellar size, which can be planned preoperatively using imaging. Importantly, only the medial portion of the patella requires preparation for anchor placement, rather than full-length drilling across the entire patella, further reducing risk.

Additional technical considerations include the use of a tap in patients with denser bone to facilitate anchor insertion and minimise stress on the patella. Early in the learning curve, an ACL guide can assist with accurate tunnel placement, although this becomes less necessary with experience.

Overall, careful attention to tunnel size, controlled tensioning, and dynamic assessment of patellar tracking are key to achieving a stable reconstruction while avoiding complications such as patellar fracture or over-constraint.

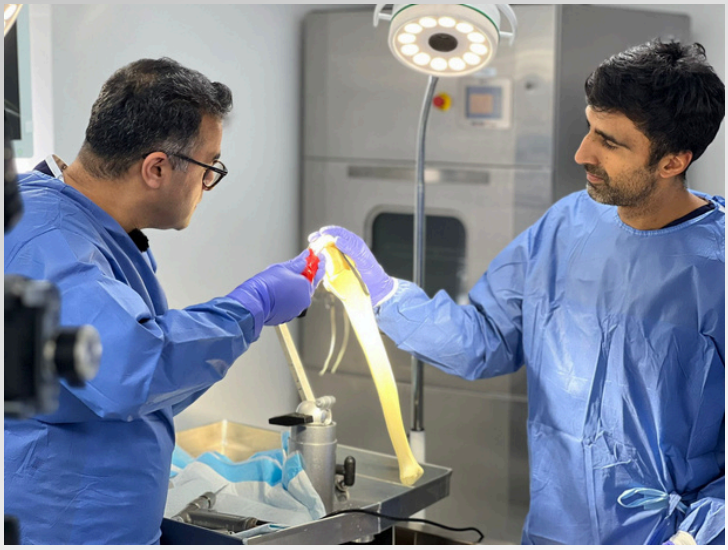
**At what degree of flexion are you fixing the graft, and how do you assess appropriate tension in these younger patients?**

The graft is typically fixed with the knee in approximately 30 degrees of flexion. At this position, the patella is beginning to engage the trochlea, allowing a reliable assessment of medial restraint.

In this technique, I tension the graft on the patellar side rather than the femoral side. By temporarily securing the synthetic tape on the lateral side of the patella with a clamp, I am able to assess patellar tracking dynamically using both hands. This allows evaluation of lateral translation and tracking through a range of motion, including full extension, 30 degrees, and 60 degrees of flexion.

In my experience, this provides a more controlled and reproducible method of assessing tension compared to femoral-side tensioning, where manual control can be more limited.

It is important that the graft functions as a check-rein rather than a rigid restraint. In particular, when using a synthetic ligament in this age group, it is preferable to err slightly on the side of a looser construct rather than risking over-constraint. Excessive tension should be avoided to minimise the risk of medial patellofemoral overload and altered joint mechanics.



**From your early cases, what have you observed in terms of stability, return to activity, and complication rates?**

In our early experience, patients have demonstrated excellent restoration of patellar stability following synthetic MPFL reconstruction. Recovery has been relatively rapid, which we attribute in part to avoiding hamstring harvest and therefore reducing overall surgical morbidity.

Patients have reported high levels of satisfaction and have been able to return to their previous activities, and in some cases exceed their pre-injury level of function.

Importantly, we have not observed any cases of over-constraint with the synthetic construct when appropriate tensioning principles are followed. Radiographic follow-up with long-leg alignment films has not demonstrated any change in coronal alignment, and we have not identified any evidence of physeal injury when femoral fixation is performed using a careful, fluoroscopy-guided technique.

We have also performed postoperative MRI assessments in our cohort, which have not demonstrated any evidence of patellar tilt or medial over-constraint. These imaging findings provide further reassurance that the reconstruction restores stability without adversely affecting patellofemoral mechanics.

Our early cohort has now been followed for at least one year, and complication rates to date have been very low. We are continuing structured follow-up, including comparison of pre- and postoperative MRI findings, to better understand how the synthetic ligament contributes to stability over time and how it behaves in relation to femoral growth as patients continue to develop. We hope to present and publish these results to further inform clinical practice.

**How do you see MPFL reconstruction evolving in paediatric and adolescent patients over the next five to ten years, and what role do you think synthetic reconstruction will play?**

There is an increasing recognition that patellofemoral instability is multifactorial, and not solely the result of MPFL insufficiency. Factors such as trochlear morphology, coronal and rotational alignment, and generalized ligamentous laxity all play an important role, and need to be considered when planning treatment. As a result, the future of MPFL reconstruction in paediatric and adolescent patients is likely to move toward a more individualised, anatomy-driven approach, where reconstruction is combined with correction of underlying risk factors when necessary.

In addition, there is growing interest in alternative medial stabilising structures such as the medial quadriceps tendon–femoral ligament (MQTFL), which attaches from the distal quadriceps tendon to the femur near Schöttle's point. This may offer another option for restoring medial restraint, particularly in patients where patellar fixation is less desirable.

We are also likely to see increasing comparative data on different graft choices, including hamstring autograft, quadriceps-based techniques, and synthetic ligaments. As this evidence evolves, it will allow for more tailored, patient-specific surgical decision-making.

Over the next five to ten years, we can expect more robust long-term outcome data to emerge, not only for isolated MPFL reconstruction but also for combined procedures addressing these contributing factors. This will allow us to better understand which patients benefit from additional interventions and how best to optimise long-term joint health.

From a clinical perspective, we are already seeing the long-term consequences of untreated instability, with patients presenting later in life with patellofemoral degeneration requiring joint replacement. Earlier and more comprehensive management of instability may help to preserve joint function and delay or prevent this progression.

Synthetic reconstruction is likely to play an increasing role in selected patients, particularly where preservation of native tissues is desirable. As further outcome data becomes available, its role will become more clearly defined within the broader management strategy for patellofemoral instability.

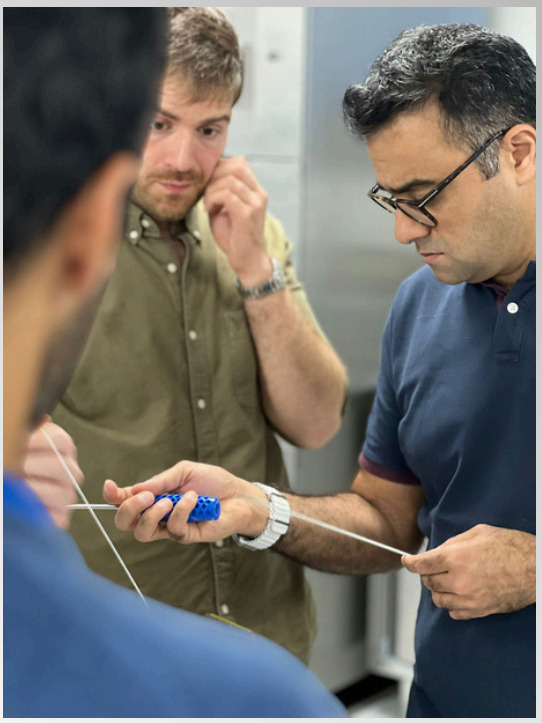
## About Dr. Nayef Aslam-Pervez

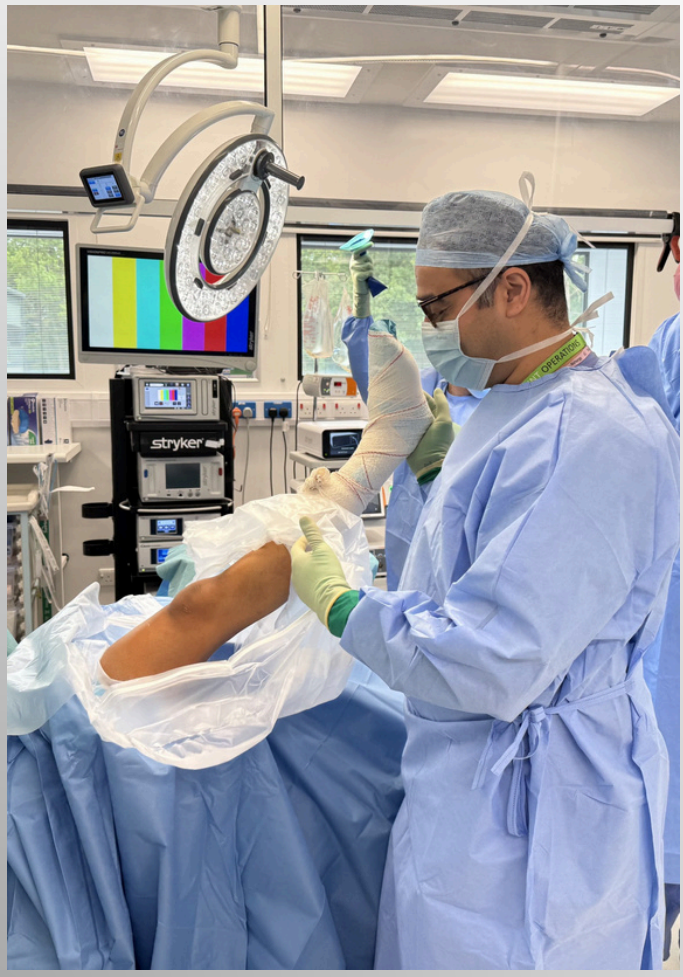
Mr. Aslam-Pervez is a distinguished Consultant Orthopaedic Surgeon based in Yorkshire. He works at a major trauma centre and tertiary referral hospital, treating highly complex cases with excellent outcomes.

The Knee Research Unit (KRUH) at Hull University Teaching Hospitals was established to lead and coordinate knee-related research within the Trust and as part of a regional MDT across Yorkshire. The unit is involved in multiple research projects, including the paediatric synthetic MPFL reconstruction study, with ongoing follow-up and further research being conducted under the umbrella of the KRUH.

As the Lead for Soft Tissue Knee Surgery and previously Clinical Governance Lead in both Hull and London, Mr. Aslam-Pervez has extensive experience in building and maintaining the highest quality of orthopaedic services.

His practice combines advanced surgical techniques with comprehensive patient care to deliver excellent outcomes, with a special interest in sports injuries and joint replacement surgery.



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