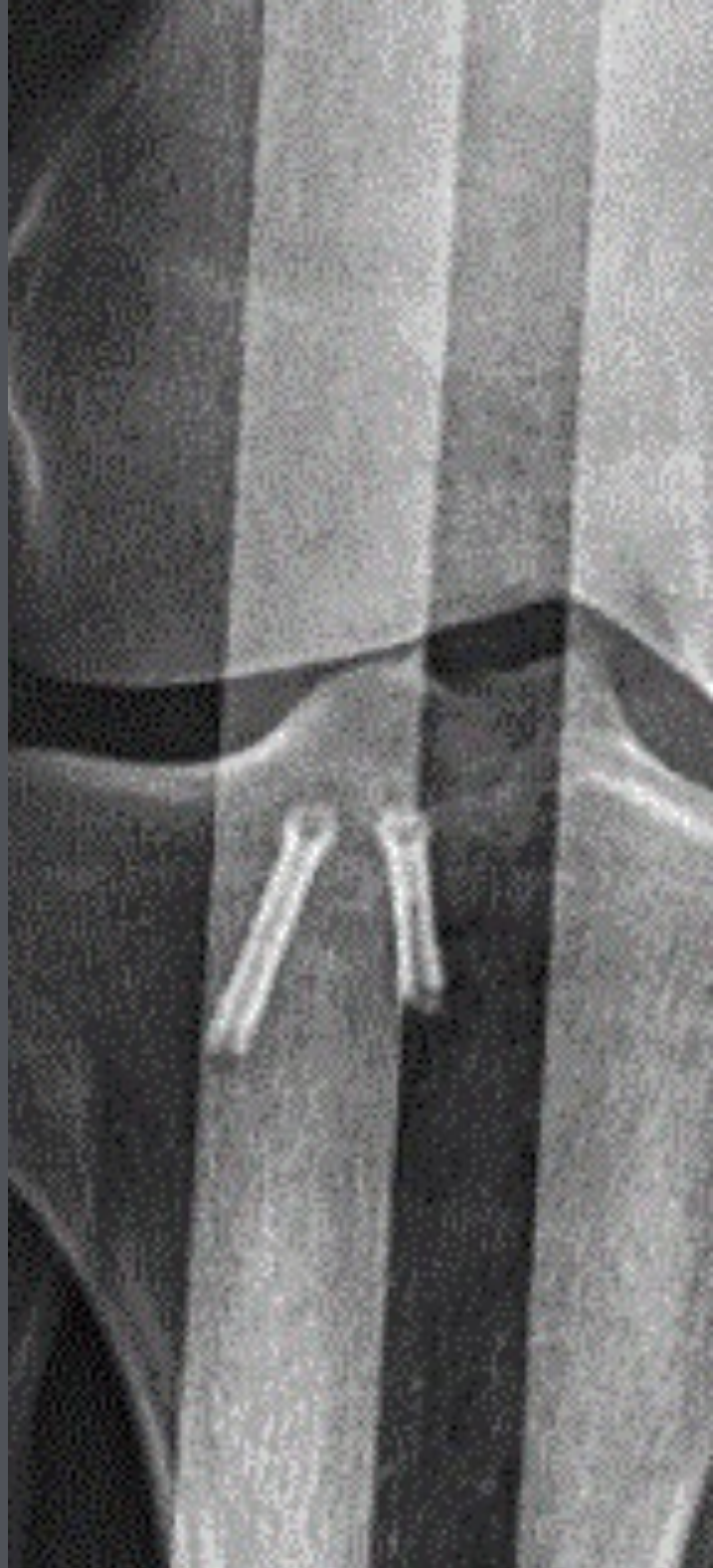


# mm. CaseStudy

Surgical management  
of posterior  
cruciate ligament  
avulsion fracture using  
mm.CS compression  
screws



**PD Dr. Clemens Kösters**

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FEBS Traumatology)



medical  
magnesium

# The Surgeon

## **PD Dr. Clemens Kösters**

PD Dr. Clemens Kösters, a highly skilled orthopedic surgeon specializing in general trauma and knee injuries, led the surgical intervention in this case. As the chief surgeon at Maria-Josef-Hospital Greven, a mid-size general hospital renowned for its comprehensive medical services, Dr. Kösters possesses vast experience and expertise in orthopedic surgery.

PD Dr. Kösters is an active member of several professional societies such as the DKG (German Knee society) among others. Before his position in Greven, he completed his medical studies and his training as an Orthopaedic Trauma Surgeon in Münster at one of the most renowned trauma centers in Germany, the University Clinics of Münster under the chair of Prof. Raschke. In 2011 PD Dr. Kösters completed a Fellowship at the Orthopaedic Trauma Service at Hospital for Special Surgery (HSS) New York under the Chair of Prof. David L. Helfet.

# The Case

## **Introduction**

This case study presents the surgical management of a posterior cruciate ligament avulsion fracture. PCL avulsion fractures occur when the ligament detaches from its bony attachment and are commonly caused by high-energy trauma, such as sports-related accidents or motor vehicle collisions. These injuries can significantly impair knee stability and joint function, necessitating surgical intervention to restore normal biomechanics and facilitate a successful recovery.

## **Patient Profile**

The patient, a 23-year-old female, sustained a posterior cruciate ligament avulsion fracture after a bicycle accident. The injury resulted in significant pain swelling, and instability in the affected knee. Recognizing the severity of the injury, emergency medical services were contacted, and the patient was transported by ambulance to Maria-Josef-Hospital Greven for immediate medical attention.

## **Surgical Technique**

Upon arrival at the hospital, the patient underwent a thorough evaluation, including a detailed medical history assessment and physical examination. To determine the extent of the injury and guide the surgical plan, preoperative imaging, specifically a 3D-CT scan including angiography, was performed. The CT scan revealed a large avulsion fracture fragment, indicating the complexity of the case and the need for surgical intervention.

Under general anesthesia, the patient was positioned supine on the operating table, with a thigh tourniquet applied. PD Dr. Kösters performed a minimal-invasive posterior approach according to Frosch et al. to access the fracture site. Through a incision, the detached PCL fragment, which was noted to be larger than anticipated on the preoperative CT scans, was identified. To ensure precise placement and stability of the fixation construct, two cannulated bioabsorbable magnesium mm.CS compression screws were implanted using fluoroscopic guidance. Prior to screw insertion, a k-wire was used to guide accurate positioning and maintain fracture reduction.



*Figure 1:* Left: Preoperative scan revealing the avulsion fracture Middle and right: Postoperative imaging and visualization of screw placement for rigid fixation

### **Postoperative analysis**

Following the surgery, the patient underwent a comprehensive rehabilitation program focused on restoring knee range of motion, strength, and stability. Regular postoperative evaluations were conducted, including radiographic assessments to monitor fracture healing and the degradation of the bioabsorbable screws. The patient reported significant improvements in pain, knee stability, and functional ability over the course of the rehabilitation period. At the final follow-up appointment, clinical examination and imaging revealed successful bony union and restoration of joint function.

### **Discussion**

The successful surgical management of the PCL avulsion fracture in this case, performed by PD Dr. Kösters, highlights the effectiveness of utilizing cannulated bioabsorbable magnesium compression screws. The posterior approach provided excellent visualization and access to the fracture site, allowing for precise reduction and fixation. The use of bioabsorbable magnesium compression screws offers several advantages, including stable fixation during the healing process and subsequent absorption, eliminating the need for implant removal. This approach minimizes the potential complications and complexities associated with hardware removal, particularly in cases where non-resorbable implants are used.

The utilization of preoperative CT scans played a crucial role in identifying the avulsion fracture and assessing the size of the fragment, which was found to be larger than anticipated. This information helped guide the surgical planning and technique, ensuring appropriate fracture reduction and stable fixation with the bioabsorbable magnesium compression screws.

This case study demonstrates that surgical intervention, utilizing the expertise of an experienced orthopedic surgeon and modern fixation techniques, can lead to favorable outcomes in PCL avulsion fractures. The utilization of bioabsorbable magnesium compression screws, coupled with the use of preoperative imaging, contributes to enhanced patient outcomes and improved quality of life.

Further research and longer-term follow-up studies are necessary to validate the efficacy and safety of this approach in a larger patient population. The continuous advancement of surgical techniques and implant materials will further enhance our ability to manage complex knee injuries and provide optimal patient care.

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