

Potential pitfalls in arthroscopic replacement of ACL deficient knees using interference screws

M. Fellinger⁽¹⁾, J. M. Passler⁽²⁾, R. Wildburger⁽³⁾, G. Schippinger⁽⁴⁾

Ön çapraz bağ yırtığı olan dizlerde interferans vidalar kullanılarak yapılan artroskopik tamirde karşılaşılabilecek zorluklar

Bu çalışmada, patellar tendon grefti ile artroskopik girişim uygulanan 170 üzerindeki tecrübemizin ışığında olan hata kaynaklarının analizini yaptık ve bunun kliniğimizde vida yerleştirme tekniğinde getirdiği değişikliği izah ettik.

Anahtar kelimeler: Ön çapraz bağ tamiri

In this study, as a result of our experiences of over 170 arthroscopic procedures with a patellar tendon graft, we analyzed possible sources of error resulted in a modification in the screw insertion technique at our clinic.

Key word: ACL reconstruction

One of the precondition for a solely arthroscopic procedure for reconstruction of the ACL was the development of a respective technique for fixation in combination with a suitable instrumentation. This did not require an additional lateral incision.

Our experiences based on over 170 arthroscopic procedures with a free patellar tendon graft. Possible sources of error were as follows.

- Faulty positioning of the drill canal in the tibia and femur
- Inadequate location of the interference screws in the tibial and femoral condyles
- Incorrect screw length
- Malpositioning of the graft in the osseous canals
- Transplant translocation in the corresponding predrilled canals (risk of incorrect isomechanical graft positioning)

The faulty positioning of the drill canals in the tibia and femur

In the search for exact corresponding isometric points for the implantation of the ACL the choice of the tibial canal allows for more way then the femoral component.

We prefer a slightly steeper pathway of the tibial drill canal. This tolerates a more exact graft leading in the chosen point of the exit. The determination of the femoral drill canal is based on the principles of the isometric measurements employing the corresponding techniques.

Malpositioning of the interference screws in the drill canals

Of paramount importance is the placement of the tibial interference screws for anchoring the osseal block in the ventral position of the bony canal.

This generally facilitates the arthroscopic checking of the screw length.

The screws which overlook the tibial plateau result in a kinking and thus mechanical irritation of the graft with the possible farreaching damage.

On the other hand if one applies the interference screw through the medial portal for the purpose of fixation the possibility of mismatch of screw positioning arises. The interference screw does not fix the osseous component of the graft in its entire length. The flexion of the knee joint over 90 degree or fixation of the interference screw allows for approximation of the screw axis to the femoral drill. However one risks increased damage to the graft through the intraarticular introduction of the interference screw.

Faulty screw length

The screw should be positioned quite tightly to the wall of the intercondylar notch. A notch plasty is a prerequisite to avoid irritation of the graft. Screw which overlook the wall of the notchplasty result in a high mechanical irritation of the graft.

Furthermore an overhanging of the ventral tibial edge through the introduced screw should likewise

(1) University Clinic of Surgery Department of Trauma Surgery

(2) University Clinic of Surgery Department of Trauma Surgery

(3) University Clinic of Surgery Department of Trauma Surgery

(4) University Clinic of Surgery Department of Trauma Surgery

be avoided. The distal fixation of the graft can in certain cases be performed via staples in a tibial groove.

Faulty transplant length in the bony canal

The femoral osseal block must close the intercondylar notch in a tight matter.

This prevents additional stress to the graft through mechanical irritation on the edge of the drill canal. Likewise the prominence of the osseal block into the articular space should be avoided at all costs.

Transplant translocation in the chosen drill tunnel

Upon introduction of the IS between the bony tunnel wall and the osseal block of the transplant a costly error can occur.

The transplant which primarily was introduced properly centered, via the screw is slightly misguided on the opposite side. This could lead in extreme cases to the risk of incorrect isometric placement of the transplant.

The effect of the translocation however can purposely be used to guide the transplant in a certain direction into the osseal canal. This is performed in certain cases to remove the transplant from the lip of the lateral condyle due to either non optimal isometric conditions or very tight notch plasties.

The analysis of the illustrated problems and possible sources of error has resulted in a modification in the screw insertion technique at our clinic.

To facilitate the introduction of the graft as well as the guide positioning in the femoral drill canal, the leading osseal bone block is attached with a K-wire.

Another K-wire is slightly bent and guides the IS into the appropriate position: The cannulated IS is introduced via a flexible screw driver through the medial portal into the knee joint. It fixes the transplant in the previously determined position in the femoral drill canal. Simultaneously the correct positioning of the screw in the osseal canal occurs, which is parallel to the tunnel axis. It thus guarantees a tight grip of the osseal block over the entire distance.

Conclusion

The knowledge of possible sources of error as well as the usage of a modified insertion technique allows the arthroscopically experienced surgeon a secure and relatively simple method of transplant fixation employing IS in an entirely arthroscopic manner.

*Authors address
Dr. Michael Fellingner
University Clinic of Surgery
Auenbruggerplatz 1
8036 Graz, Austria*