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Abstract

Introduction: Recurrent dislocation of patella can follow a violent initial dislocation but is mostly due to some underlying anatomical abnormality. Various modalities have been tried to prevent dislocation of patella ranging from conservative to operative interventions.

Case presentation: We present a case report of 30 year old male having recurrent dislocation of patella right side, post trauma, and was operated by doing medial patello-femoral ligament (MPFL) reconstruction using semitendinous graft by double transverse tunnel technique.

Conclusion: At 6 months follow up patient had no dislocation and knee range of motion is from 0 to 120 degree of flexion without any extension lag.

Keywords: Traumatic, Recurrent Patellar dislocation, Medial patella-femoral Ligament Reconstruction.
Patient was placed in supine position under spinal anesthesia with above knee tourniquet applied following administration of prophylactic antibiotic. Skin preparation and sterile draping was performed in a standard fashion. The graft semitendinosus was harvested from the same knee, debrided of all muscle tissue, whip stitched with ethibond no. 2 (non absorbable suture) on both ends, 4mm with cylindrical sizer, and stored within a moist gauze piece. A thorough arthroscopic examination was performed and from the superior-lateral portal the maltracking of patella with lateral dislocation was observed [Fig 4].

Patella's medial facet showed grade 3 chondral damage on the inferior aspect and the weight bearing surface of the lateral femoral condyle showed grade 2 chondral damage.

The patella was approached through a 4 cm medial parapatellar incision on the previous scar mark. The prepatellar fascia was elevated to allow the medial wall of the patella to be exposed. The inferior portion of the patella was stabilized using large forceps. Using sequential tunnel enlargement with appropriately sized drills, two transverse tunnels were made in the upper third of the patella to accommodate a single thickness of the graft. The tunnels were drilled parallel to one another and 1 cm apart [Fig 5].

Using a Beath pin, the graft was threaded through the two transverse tunnels from medial to lateral, and then from lateral to medial so that the graft passed the thinner end first (normally, the portion of the muscle-tendon junction) [Fig 6].

Curved blunt forceps were used to develop a plane between the second and third layers of the knee. The graft was passed through the plane between these layers. The medial epicondyle was palpated through the skin and exposed using a 2 cm incision. The Beath pin was then advanced along the transepicondylar axis laterally from the superior aspect of the medial epicondyle or approximately 1 centimeter distal and 5 millimeter posterior to the adductor tubercle. A medial blind tunnel, normally about 5 cm long, was drilled along the guide pin to accommodate a double thickness of graft to an adequate depth to allow optimal graft tension. The ethibond locking suture was then passed through the transepicondylar axis using the Beath pin, pulling the graft into the medial tunnel, and the patella was positioned in the femoral trochlea. The knee was cycled several times from full flexion to full extension with the graft under tension. In this way, the graft was prestretched to eliminate "give". Both ends of the graft were then secured within the medial epicondyle tunnel using a bioabsorbable interference fit screw with the knee flexed to 30° as in this position the graft is in maximum tension. Over tensioning of the graft should be avoided as that can lead to increased patella-femoral pressure, patella-femoral arthritis leading to pain and loss of flexion. The graft thus acted as a check rein ensuring that the patella was stabilized within the trochlea. The lateral and medial retinacula were sutured back to the patella using Vicryl, with further closure of subcutaneous tissues and skin. Routine dressings, bandages with posterior knee splint applied. Post operatively patient was allowed full weight bearing in long leg tube cast for one month followed by gradual mobilization of knee joint over 3 months.

At 6 months follow up patient is having knee bending from 0 degree to 120 degree without any episode of dislocation. Patient has mild pain in anterior knee joint mostly due to chondromalacia without any graft impingement pain. Patient is currently doing his activities of daily living as before the onset of trauma and is currently undergoing quadriceps strengthening physiotherapy programme.

Discussion

The stabilizing factors of patella are divided into static and dynamic. The vastus medialis obliquus acts as the dynamic stabilizer and the static factors, acting as the primary stabilizers include the shape of the patella and the femoral sulcus, a patellar tendon of appropriate length, and a
normal tensioned medial capsule reinforced by the patella femoral and patella tibial ligaments [5]. MPFL is a extrasynovial ligament [5] and 5 to 12 mm wide [6]. The MPFL is the major medial soft tissue restraint preventing lateral displacement of the distal knee extensor mechanism, contributing an average of 53% of the total force [11]. The MPFL is located within the second layer of the knee, and it may have a role in the prevention of lateral excursion of the patella [12]. The ligament has a mean tensile strength of 208 N [13]. The inferolateral to superomedial fibres of the MPFL only change in length by 1.1 mm during knee flexion from 0° to 90° [14]. Reconstruction techniques include primary repair, ligament imbrication and reconstruction using autogenous tissue or synthetic graft. Several different methods have been described to reconstruct the MPFL with hamstring graft, and variation also occurs between tunnel placement and graft fixation methods. The graft attachment points of the reconstructed of the MPFL are the superior patella for the lateral attachment and graft fixation methods. The graft attachment points have been described but an area between the medial epicondyle and adductor tubercle is considered optimal [5].

To try to optimize graft tension, it is recommended to cycle the knee through its range of motion prior to fixation with the knee flexed at 20°. This aims to remove ‘give’ from the graft prior to fixation. The graft was secured under adequate tension (qualitatively assessed) to act as a check reinf, preventing patella subluxation. In our method, the doubled graft should exert less stress on the femur during flexion because of increased area of contact during movement, thus minimizing unpleasant impingement symptoms. Another benefit is the reduction of a medial stabilizing force over a more natural thickness of tissue. Anatomical studies have shown the graft to be 5–12 mm wide. Single strand techniques utilise hamstrings of about 3.5 mm wide. This can be doubled over to give a thicker ligament, but may cause difficulty with the placement of a larger single tunnel within the patella. A larger patellar tunnel may increase the risk of joint penetration or patellar fracture. Our two tunnel technique allows a wide tendon graft but uses small tunnels, thus minimizing these potential complications. Also as the tunnels traverse the entire width of the patella this technique may influence patella tilt.

Conclusion

The double tunnel technique of medial patella femoral reconstruction allows a wider ligament comprising of a double thickness of hamstring to be reconstructed, minimizing graft impingement, without increasing the risks of patellar fracture compared to a single tunnel technique.

Clinical Message

Double tunnel technique is an isometric reconstruction of Medial Patello-femoral ligament & is more functionally anatomical than single tunnel technique as it has a wider insertion on patella. It has a low cost as no anchors are required in patella & this technique can be used with equal effectiveness in congenital as well as acquired deficiencies.

References