Medial Patellofemoral Ligament Reconstruction Using a LARS Ligament

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Abstract

The medial patellofemoral ligament (MPFL) is the primary restraint to lateral dislocation of the patella, and insufficiency of the MPFL is considered to be the pathognomonic lesion in recurrent patella dislocation. Surgical treatment includes primary repair, ligament imbrication, or reconstruction using autologous or synthetic grafts. We describe the successful use of an artificial ligament advancement reinforcement system ligament to reconstruct the MPFL in the setting of recurrent patella dislocation.

The medial patellofemoral ligament (MPFL) is the primary restraint to lateral displacement of the patella, and insufficiency of the MPFL is considered to be the most significant lesion in recurrent patella dislocations. Treatment of the lesion includes primary repair, ligament imbrication, or reconstruction using autologous or synthetic grafts. However, significant problems involving donor site morbidity, knee pain, and patella instability are associated with these methods.1,2 We describe the successful first time use of the synthetic ligament advancement reinforcement system (LARS Ligament; J.K. Orthomedic Ltd., Dollard-des-Ormeaux, Canada) for reconstruction of the MPFL using a previously described double tunnel technique.3
MATERIALS AND METHODS

A 13-year-old girl with a background of generalized hyperlaxity presented with recurrent dislocation of the right patella. Radiographs of the knee demonstrated trochlea hypoplasia and chondromalacia of the patella. The measured Q angle was 20 degrees and the patella was subluxed laterally. The Insall:Salvati ratio measured 1.55. Magnetic resonance imaging showed attenuated medial structures and a rupture of the MPFL (Fig. 1).

An MPFL reconstruction was carried out using a LARS ligament and a double tunnel technique similar to that described by Carmont and Maffulli. Under tourniquet control, the patella is approached through a 4-cm midline incision and the prepatella fascia elevated to expose the medial and lateral walls of the patella. Two 2.5 mm drill holes are made 1 cm apart in the upper third of the patella. A tumor LARS ligament (RO6×400) is trimmed to a strip with a diameter of 3 mm and prepared with Ethibond locking sutures at both ends and passed in a looped manner through the drill holes (Fig. 2). Blunt dissection is used to develop a plane beneath the second layer of the knee and the graft is passed through this layer. A 2-cm incision is made over the medial epicondyle and a Beath pin passed along the transepicondylar axis. A medial blind tunnel 3-cm long is drilled over the guide using a 5 mm drill bit. The locking sutures are passed through the femoral tunnel and the patella relocated over the femoral trochlea. The knee is cycled several times with the graft under tension to determine the isometric point. The graft is fixed with an 8 mm LARS ligament interference screw. The graft position is checked under image intensifier and the wounds closed in layers.

Immediate postoperative mobilization consists of nonweight bearing in a brace. At 2 weeks, full passive range of motion exercises are commenced and at 4 weeks active range of motion commenced. Quadriceps strengthening exercises are initiated at 6 weeks.

RESULTS

At 24 months postoperatively, the patient was pain free and had not experienced any further episode of instability. Clinically, patella tracking was normal and the Q angle measured 17 (Fig. 3). Her Lysholm score and Kujala score improved from 53 to 90 and from 43 to 88, respectively. She had restoration of her normal activities with full range of motion and was able to participate in sports.
DISCUSSION

The MPFL is the primary restraint to lateral subluxation and dislocation of the patella. It is approximately 55 mm and has a mean tensile strength of 208 N. Injury to the MPFL has been described as the dominant lesion in recurrent patella dislocation. Treatment of this lesion includes primary repair, ligament imbrication, or reconstruction using autologous or synthetic grafts. Hamstring tendons have been used frequently with good outcomes but have associated donor site morbidity that includes donor site pain, injury to local structures, and hamstring weakness. Synthetic biological grafts may be preferred with the advantage of avoiding donor site morbidity and allowing early mobilization due to their superior mechanical properties. Mesh-type synthetic polyester ligaments have also been used with good functional results. However, their shape necessitates staple fixation and a significant number of these patients experienced tenderness over the staple site. It is available in a variety of designs and its use is well established in cases of knee ligament, patella tendon, and rotator cuff reconstruction but until now its use has not yet been described for MPFL reconstruction. Its high permeability permits fibroblast and collagen fiber ingrowths and its mechanical properties make it extremely resistant to elongation over time. We have been able to contour a LARS ligament with relatively small dimensions requiring small drill holes in the patella, which remains mechanically robust, provides a stable fixation, and minimizes the risk of patella fracture.

CONCLUSIONS

We have presented our experience with the use of the LARS ligament for reconstruction of the MPFL. Biological grafts have produced good results but are associated with harvesting and donor site morbidity. The use of synthetic grafts has been generally pleasing, and the ideal mechanical properties of the LARS ligament and the variety of grafts available may make it a useful option for MPFL reconstruction in the setting of recurrent patellar instability.

REFERENCES