

Posterior Cruciate Ligament (PCL) Injuries in Children: Long Term Follow Up of 20 Cases of Reconstruction and Repair

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Summary:

Outcome study of long term follow-up of PCL reconstruction with Auto & Allograft in Children

Abstract:

PCL injuries in children are becoming more and more common. Usually they are brought late for treatment of their medial side pain, repeated synovitis, effusion & not able to perform daily activities due to tiredness. Except 2 cases of PCL tibial avulsion injury, all the patients came to us between 6 months to 9 years after their original injury. All of them had adequate conservative treatment that failed. Most of our patients came from poor socio-economical class. For all these patients, sitting on the ground in cross legged position (to eat and to do household activities) was most difficult. Literature regarding the treatment for posterior cruciate ligament (PCL) injuries in paediatric and adolescent patients is almost not available

We have treated 21 knees of PCL injuries in 20 knees. Out of these, only 2 cases are of PCL avulsion, rest all are of PCL reconstruction. Our youngest patient of PCL reconstruction is 3.5 years old who sustained flexion injury in home and came to us after almost 4 months of injury. Cricket & Football injury (Flexion or hyperextension) & Road accidents (Dashboard or flexion) had same number of patients. 4 patients injured themselves at home and 3 sustained fall in the school (no sports). All patients had posterior drawer test positive to grade 2 to 3. PLC injury of grade 1-2 was present in 7 patients but only in one patient we did PLC reconstruction with PCL reconstruction. 3 of them had previous surgery for PVNS, fracture fixation as well as biopsy for repeated synovitis. Stress X-rays were more reliable than MRI studies especially in prepubescent age group.

According to Tanner scoring our 4 patients are in Stage 1 (below 10 years), 4 in stage 2 (10-11 yrs.), 6 in Stage 3 (12-14 years), 2 in Stage 4 (13 -15 yrs.) and 5 are in Stage 5 (More than 16 yrs). So 'physes at risk' group makes 80% of our cases of PCL reconstruction.

We firmly believe that Tibial avulsion of PCL that can be seen at the joint level, should be tackled as irreducible fracture. We have done successful arthroscopy assisted tension band wiring in two patients (with 12 years and 8 years follow-up). We removed wire in one patient after 4 years of fully functional limb. All 3 prepubescent patients (3 reconstructions) had PCL reconstruction with Mother's SemiT graft. Follow up is of 7 years (2 pts.) and 3 years. None of these patients had any post op. problems. One of them had his opposite knee's PCL reconstruction by Semitendinosus grafts harvested from both limbs 3 years after first reconstruction with Mother's graft. Mothers and children both are fine. In 2 patients (Aged 16 and 17), PCL reconstruction was done using Bone-PT-Bone graft (with long tibial plug of approx 50 to 60 mm.) as they had hardly any growth left on their MRI study.. In one of these patients, simultaneous PLC reconstruction was done with SemiT with modified Larson's method. In all other patients PCL reconstruction was done using Single or double SemiT graft. We do not like to place any PCL graft that is thinner than 7-8 mm in children. If possible we try to preserve one of the original bundles of PCL. All reconstruction had extra-epiphyseal Tibial tunnel and trans-epiphyseal femoral tunnel. We were very careful & usually 'one shot' femoral tunnel was created. Variety of fixation devices was used. 6.5 mm screw and washer were deliberately used in children below 10 years, so that their parents will bring them back to us for implant removal and we shall get a good follow-up. If all other patients, the femoral fixation was done using Endobutton except cases of B-PT-B graft those were fixed by IF screws. All patients were given a specially designed locally made PCL brace for variable period.

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All were encouraged to do exercises for at least 2 months after surgery.

We have evaluated our results using Lachman's, VAS & IKDC-Pedi scoring systems. All scores improved significantly within 3 months in all patients. Out of 21 surgeries, 3 patients had restricted motion & underwent manipulation under anaesthesia. They regained their full ROM. Height has increased between 10 to 90 cms. or more. None of these patients have shown any growth disturbance or deformity which is always a fear on our mind when we do any surgery near the epiphyses.

For the first time in the history of ligament reconstruction, successful results of the PCL reconstruction is done by Mother's allograft. All these patients have resumed their normal activities and are taking part in sporting activities without any synovitis or repeated effusions for which they came to us. Our shortest follow-up of PCL reconstruction is of 3 years and the longest is 12 years.

We have reviewed literature for management of PCL injuries in prepubescent and pubescent age group and have not found any record of such extensive study. Our data shows that PCL reconstruction in children at any age if done in a proper manner, gives excellent results without any long-term side effects.