

# Rebound PCL Case Study

39 year old male with grade II-III PCL tear, non-surgical treatment  
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## Indication

A 39-year-old male patient reported to our emergency department after a fall during soccer practice. The reported trauma mechanism was similar to the aforementioned patient, including a forced posterior tibial translation of the flexed knee.

## Diagnostics

Physical examination revealed mild-to moderate joint effusion with a limited active and passive knee flexion. Localized swelling and tenderness were noted on the proximal aspect of his tibia as well as in the popliteal fossa. Lachman's test and anterior drawer, Varus and Valgus test as well as examination of the posterolateral corner were all negative. However, the posterior drawer test revealed a moderate laxity comparing the affected and uninjured knee. Based on these findings we established the diagnosis of a grade II-III PCL tear.

Conventional radiographs did not show any relevant pathological findings. We performed a MRI to detect concomitant injuries (MRIs have been shown to have a high accuracy in the assessment of acute PCL injuries). We have abandoned performing stress radiographs in the acute setting to avoid additional strain on the healing ligament.

## Treatment Overview / Treatment Goal

Conservative treatment is often recommended if the PCL is injured in isolation. Unlike its anterior counterpart, the PCL has been shown to have a high intrinsic healing potential in numerous studies. For patients with grade I or grade II injuries, conservative treatment is reported to result in satisfactory outcomes, with the majority of patients returning to their level of pre-injury activity. Contrary, patients with grade III injuries recover comparably slower.



## Non-Surgical Treatment–Rehabilitation

Similar to the postoperative treatment, we immobilized the patient in a knee immobilizer with posterior tibial support for four weeks during day- and nighttime. This was done to counteract posterior tibial translation caused by gravity and hamstring traction. After four weeks the Rebound PCL brace was fitted on the patient and ROM was increased to 90° knee flexion. The primary goal of rehabilitation was to achieve near to normal quadriceps strength, which typically spans 6–9 months. Physical therapy was performed as follows:

ITEM	PHASE I (week 1 – 4)	PHASE II (week 5-6)	PHASE III (7-12 week)	PHASE IV (week 13-52)	PHASE V (week 53 -)
<b>Orthosis</b>	Straight knee immobilizer with posterior pad (day and night)	Rebound PCL in the day, straight immobilizer with posterior pad at night		—	—
<b>Weight bearing</b>	PWB (15 kg)	PWB to FWB	FWB		
<b>ROM</b>	0 -0- 60 passive, prone	0 -0- 90 passive	0-0-120 passive 0-0-90 active	0 -0- free active	
<b>Physio</b>	PRICE Muscle activation straight leg raises no hamstring contraction EMS				dynamic stabilization hamstring activation muscle building neuromuscular practices

The rehabilitation protocol included immobilization for six weeks in a straight knee immobilizer with posterior tibial support, which performed an anteriorly directed force on the proximal tibia in order to counteract posterior tibial translation. The patient was encouraged to start isometric contraction of the quadriceps immediately after surgery. Partial weight bearing and gradual passive mobilization in prone position were performed during this period. After four weeks, the knee immobilizer with posterior pad was changed to the custom-made Rebound PCL and full weight bearing was gradually established. Return to sport is allowed if 85% of the muscular strength compared to the uninjured side is achieved. Swimming and jogging is usually allowed from the 6th month onwards. Contact or pivoting sports can be resumed after 12 month.

### Reasons To Use The Rebound PCL Brace

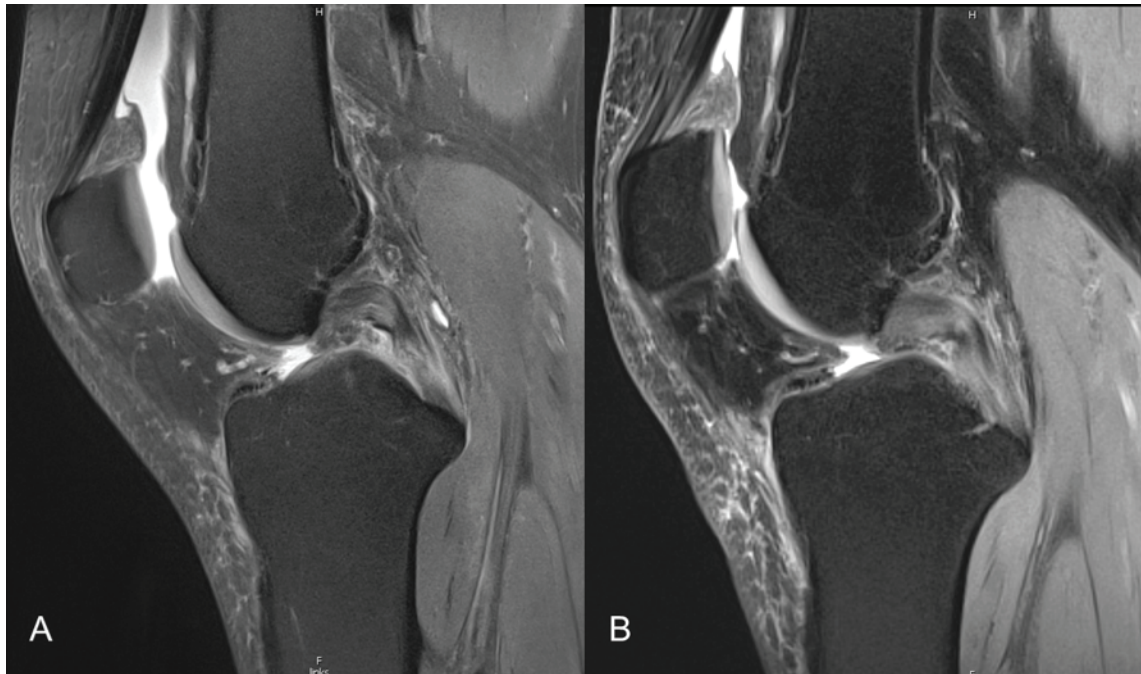
The posterior cruciate ligament is composed of two bundles, the larger anterolateral and smaller posteromedial bundle. Both bundles function in a codominant and synergistic fashion as the primary restraint of posterior tibial translation during higher grades of knee flexion. Dr. Robert LaPrade and colleagues (LaPrade et al., *Knee Surg Sports Traumatol Arthrosc* (2015) 23:3070–3076) were able to demonstrate that the Rebound PCL brace applies increasing anterior forces to the proximal tibia at higher flexion angles, thus the physiological loading profile of the PCL is respected.

Furthermore, it has been advocated that a slow and rather conservative rehabilitation following PCL injury or reconstruction is mandatory to a successful clinical outcome. However, we deliberately decreased the interval of partial weight bearing from six to four weeks after PCL injury/ reconstruction, taking the aforementioned results into account.



## Clinical Outcome

The follow-up stress radiographs revealed a remaining posterior tibial translation (SSD) of 2mm at the 12 month follow-up. The patient gradually went back to sports and continued playing soccer 14 month after injury.



Three month post injury, the patient returned for a follow-up MRI scan. Pictured: Midsubstance tear of the PCL in the MRI post injury (A); healing ligament three month after injury (B).

## Conclusion

Treatment algorithms for injuries of the posterior cruciate ligament continue to cause considerable controversies. Even though the posterior tibial translation can be successfully reduced by current surgical techniques, there is still little consensus on the ideal rehabilitation after PCL injury or reconstruction. Dynamic braces—which closely mimic the physiological loading of the PCL—might further contribute to improve outcome parameters.

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