

# Hemiepiphysiodesis and Guided Growth as Treatment for Lateral Patellar Instability in Pediatric and Adolescent Patients

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## OBJECTIVES

**Genu valgum** is a known risk factor for **lateral patellar instability (LPI)**. In patients with growth remaining, **hemiepiphysiodesis**, or 'guided growth' techniques, with use of physeal tethering plate/screw constructs, can be used to correct genu valgum. The degree to which these interventions may contribute to patellar stabilization is not known.

The current study was designed to determine the safety and effectiveness of guided growth techniques used as treatment for patellar instability, either in isolation or in conjunction with other procedures, such as:

- Lateral release (LR)
- Medial retinacular reefing/plication (MRR),
- Medial patellofemoral ligament reconstruction (MPFLR)
- Roux-Goldthwaite procedure (RG)
- Galleazi tenodesis (GT).



## METHODS

Patients who underwent hemiepiphysiodesis at a single, tertiary care children's hospital for genu valgum in association with LPI were identified retrospectively using a departmental database query. Patient cohort included athletic patients as well as patients with congenital, chronic, or syndromic dislocations.

Clinical details regarding instability events, concomitant congenital deformities and comorbidities, concurrent stabilization procedures, recurrence of instability, removal of hardware procedures, and return to sports were recorded. Patients with less than 12 months of follow-up were excluded.

## RESULTS

41 knees in 29 patients (28F/13M; mean age 10.5 ±2.4y) were included. Patients with 25 of 41 knees were identified as athletes (61%). The cohort included various types of instability, including: dislocations (n=15, 37%), subluxations/ subjective instability (n=10, 24%), and chronic, congenital, habitual, or syndromic instability (n=16, 39%).

17 knees (41%) underwent 'isolated hemiepiphysiodesis', while 24 knees (59%) underwent concomitant patellar stabilization procedures at the time of hemiepiphysiodesis, including 20 cases of LR, 19 MRR, 11 MPFLR, 8 RG, 1 GT.

At last follow-up, 31 knees (82%) demonstrated full deformity correction or slight overcorrection, while 7 knees were improved from pre-operatively, but slightly under-corrected (and 3 had incomplete imaging).

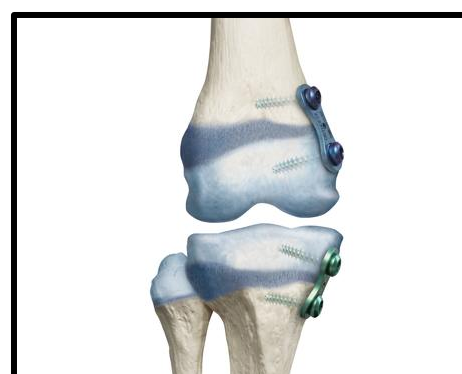
There were **no significant differences in terms of age, sex, or athletic status in the groups that did or did not undergo a concurrent patellar realignment/stabilization procedure.** Additionally, the presence of a concurrent patellar realignment/stabilization procedure to the guided growth procedure **did not effect a patient's timing of return to sports (Table 1).**

**Table 1. Demographic Comparison of Procedure Cohorts**

Characteristic	Concurrent (n=24)		No concurrent (n=17)		P
	Freq.	(%)	Freq.	(%)	
Age (years; mean ± SD)	11	2.31	9.9	2.55	0.19
Sex (% male)	8	± 0.33	5	± 0.29	1.00
Sports participant	16	(67%)	9	(53%)	0.52
Time to return to sports (weeks; median (IQR))	17.5	(16.4 to 42.1)	15.9	(15.4 to 20.5)	0.18

**Table 2. Alignment Comparison of Procedure Cohorts**

Genu valgum correction	Concurrent (n=23)		No concurrent (n=15)		P
	Freq.	(%)	Freq.	(%)	
Achieved neutral or slight varus alignment	19	(83%)	12	(80%)	1.00
Remained valgus (undercorrected)	4	(17%)	3	(20%)	



## RESULTS

18 knees experienced recurrence (43.9%, 95% CI = 28.8 to 60.1%). No association was found between recurrence and age (p=0.74), sex (p=0.65), sports (p=0.99) or alignment (p=0.38).

**Isolated hemiepiphysiodesis (without a concurrent procedure) had 19 times the odds of recurrence (OR=18.9; 95% CI = 4.4 to 103.5; p<0.001) compared to those with a concurrent realignment/stabilization procedure.**

Knees with a concurrent procedure had 95% lower odds of recurrence than those without one (OR=0.05; 95% CI = 0.01 to 0.22; p<0.001).

## CONCLUSIONS

In children and adolescents, lateral patellar instability remains a challenging problem, with high overall recurrence rates.

In cases of LPI associated with genu valgum and growth remaining, hemiepiphysiodesis may be effective as a concomitant procedure.

However, hemi-epiphysiodesis should rarely be used as an isolated treatment for LPI, based on recurrence rates up to 82%.