Modified Periosteal Stripping and Division for Pediatric Leg Length Discrepancy: A Case Series

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Introduction

- Periosteal stripping and division (PSPD) is a growth modulation technique for correcting limb length discrepancy (LLD) in skeletally immature patients
- Multiple case series have demonstrated the effectiveness of PSPD for LLD
- By releasing the periosteum circumferentially and dividing it transversely, PSPD stimulates longitudinal bone growth in the shorter limb without sacrificing height
- Most techniques utilize a large open incision spanning a substantial portion of the bone length
- We report results on a modified PSPD technique using a mini-open incision

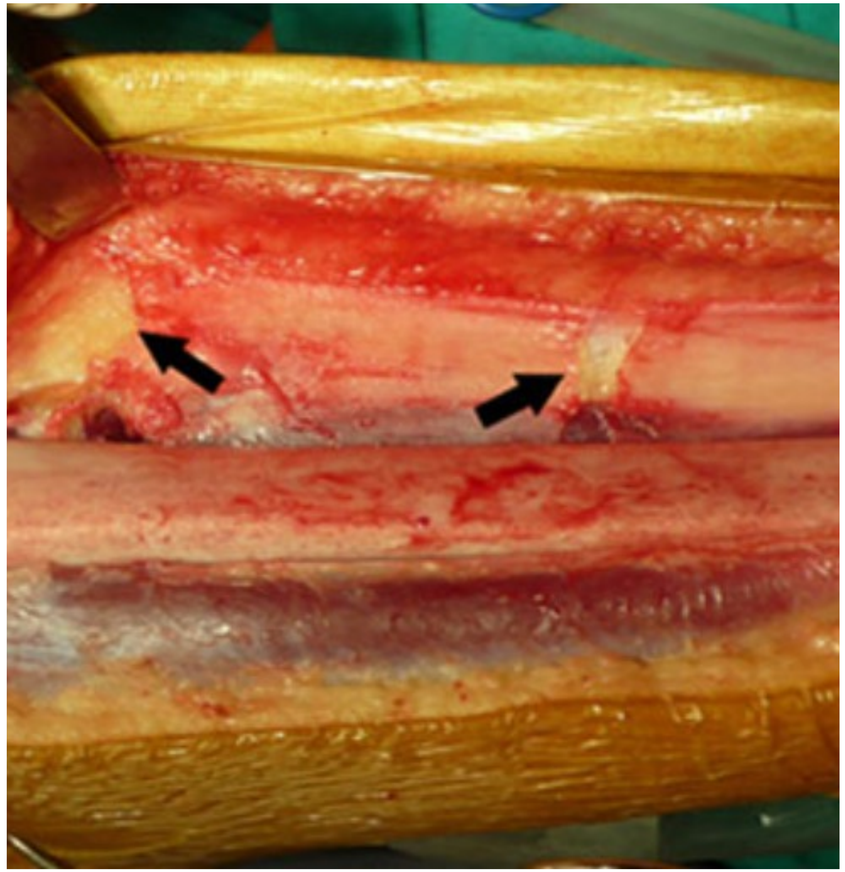
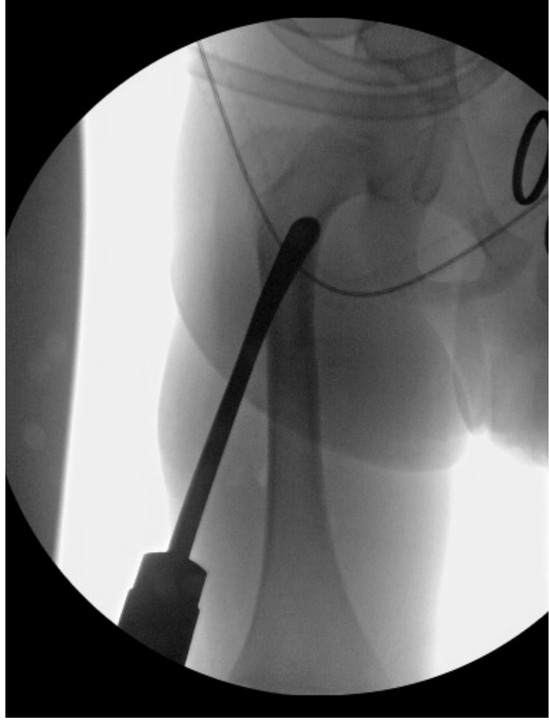


Photo from Limpaphayom, CORR 2011

Methods

- Retrospective review of consecutive pediatric patients undergoing modified PSPD for LLD between 2020 and 2025
- Surgical technique:
  - Mini-open (3 cm) incision with circumferential exposure around the bone supra-periosteally.
  - Transverse division of periosteum with 15 and 12 blade
  - Longitudinal subperiosteal elevation proximally and distally with Cobb elevator
- Imaging: pre-operative and serial post-operative full-length standing radiographs obtained at approximately 3–6 month intervals
- Measurements: Femoral length, tibial length, total leg length, and standing LLD
- Outcome assessment: LLD and growth velocity of the stripped versus contralateral side compared across follow-up intervals
- Study approved by the Institutional Review Board



Results

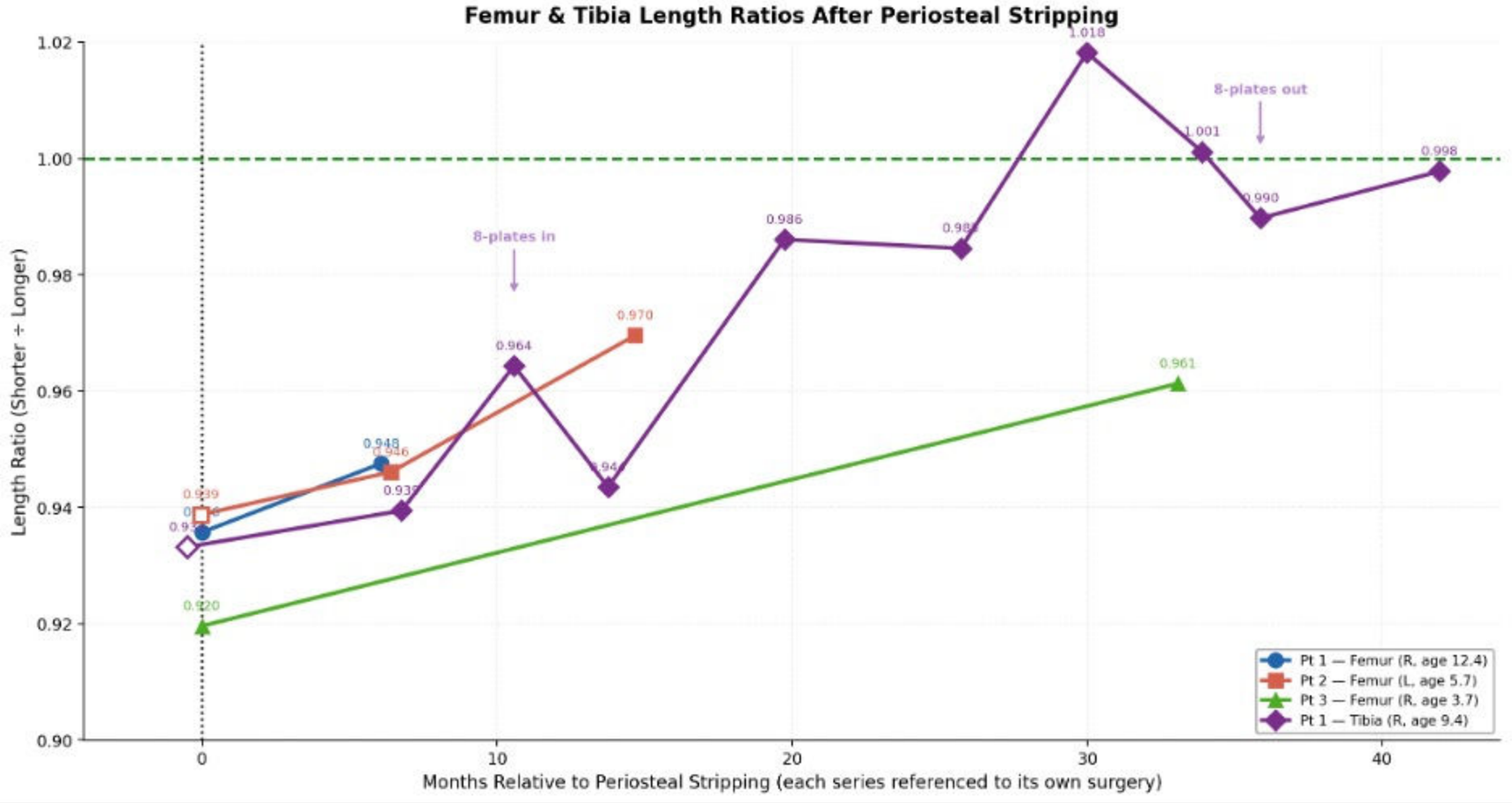
Three patients (2 male, 1 female; mean age 7.8 years, range 3.7–12.4) underwent four PSPD procedures (femur n=3, tibia n=1)

Mean follow-up 30 months (range 15–42mo)

Mean LLD decreased from 32.4 mm (range 15.9–62.5) to 22.3 mm (range 10.3–45.0) at latest follow-up

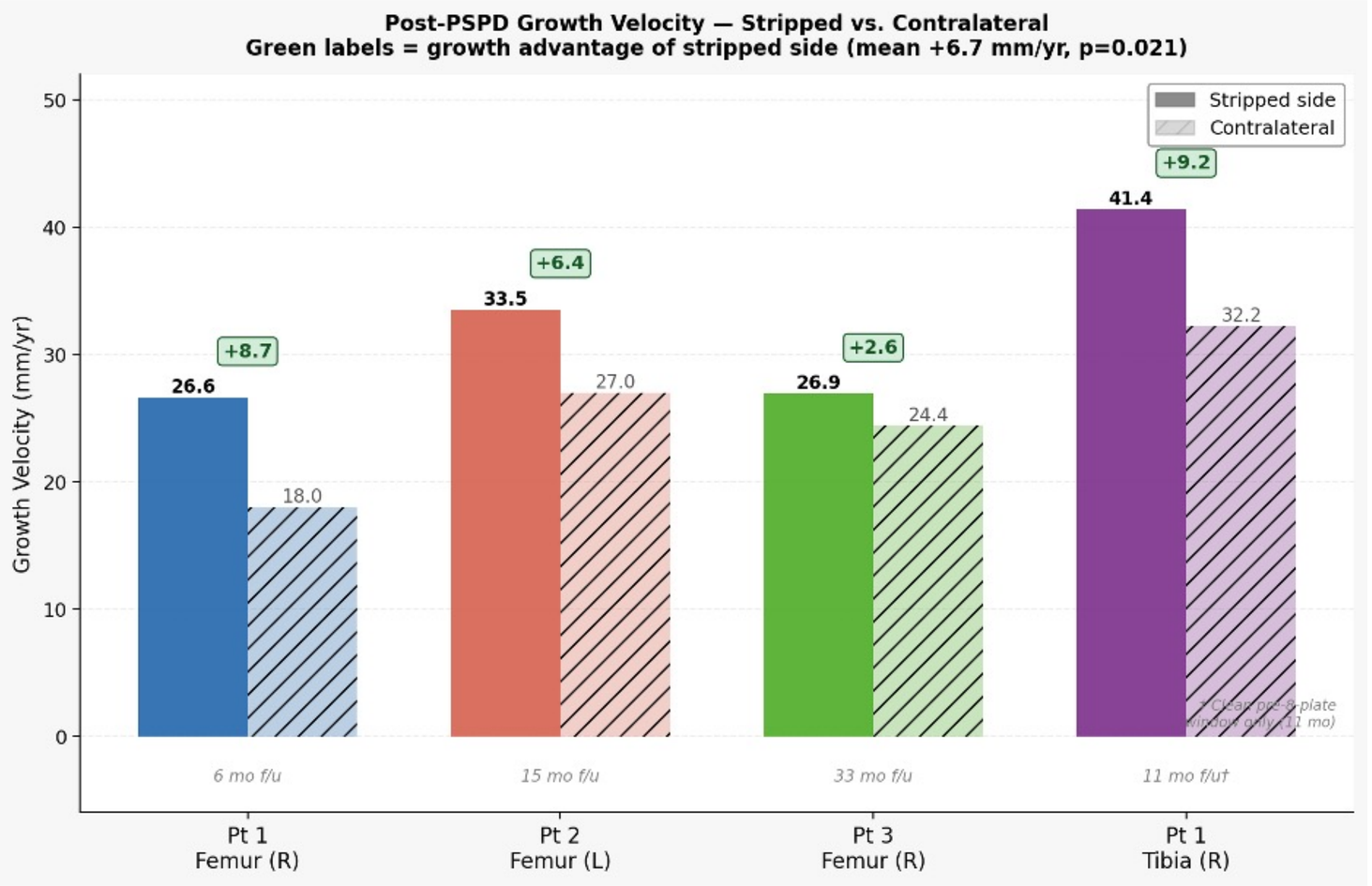
Bone length ratio (stripped : normal) improved in all procedures

- Mean change 2.9 ± 1.2% (range 1.2–4.2, p=0.019)



Results

- Growth velocity of the stripped bone exceeded the contralateral side
- Mean difference 6.7 ± 3.0 mm/year (range 2.6–9.2, p=0.021)
- No major complications or pathologic fractures were observed



Discussion

- Small pilot study to prove efficacy
- Need larger cohorts to validate efficacy and reproducibility
- Longer-term follow-up to assess durability of growth acceleration and final LLD correction
- Comparative studies evaluating mini-open versus traditional extensile PSPD techniques
- Further investigation into optimal patient selection and timing of intervention
- Adjunct surgery vs. Primary procedure to address LLD

Conclusion

- Modified mini-open PSPD demonstrated consistent radiographic evidence of growth acceleration in the treated limb
- Significant reduction in LLD was observed across all patients
- The technique achieved measurable growth stimulation without major complications
- The mini-open approach may reduce surgical morbidity compared to extensile techniques while maintaining effectiveness

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