

Bilateral Cosmetic Tibial Lengthening with the Intramedullary Skeletal Kinetic Distractor (ISKD)

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Introduction

Cosmetic tibial lengthening is controversial, in part due to the high rate of associated complications. We used the Intramedullary Skeletal Kinetic Distractor (ISKD) to perform bilateral tibial lengthening in patients with short stature and analyzed the results.

Materials and Methods

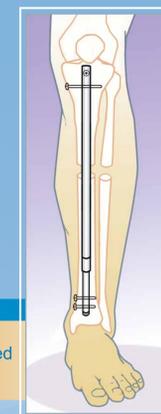
- 10 patients (20 tibiae)
- 8 males, 2 females
- Average age: 31 years (range, 19–45 years)
- Patients entered only after passing an 8-hour evaluation by a licensed clinical psychologist
- Average preoperative height: 153 cm (range, 142–165 cm)
- Length obtained: 5 cm (6 tibiae); 8 cm (14 tibiae)
- Average duration of follow-up: 49 months (range, 14–63 months)

Question

Is it safe and effective to use the ISKD to lengthen the tibiae bilaterally for cosmetic purposes?

Results

- Average length obtained: 6.7 cm (range, 5–8 cm)
- Average duration of hospital stay: 3.4 days (range, 3–5 days)
- Average distraction rate: 0.96 mm/day
- Enneking function scores: Preoperative average, 25 points; Postoperative average, 25 points
- Complications: 1.1 complications/limb (range, 0–3 complications/limb)



ISKD inserted in the tibia.

Results

Table 1. Complications observed during lengthening and consolidation

Problems (n=2)	Resolution
Stuck nail (n = 1)	Manipulation in clinic (n = 1)
Equinus contracture (n = 1)	Resolved with physical therapy (n = 1)
Obstacles (n = 19)	Resolution
Equinus contractures (n = 2)	Gastrosoleus recession (n = 2)
Nerve compression (n = 2)	Peroneal nerve/tarsal tunnel release (n = 2)
Delayed union (n = 3)	Exchange nail (n = 3)
Partial union (n = 4)	Exchange nail + autograft (n = 4)
Nonunion (n = 5)	Exchange nail + autograft + autograph (n = 5)
Preconsolidation during lengthening (n = 1)	Shortened contralateral limb (n = 1)
Refracture – after nail removal (n = 2)	Insertion of intramedullary rod (n = 2)

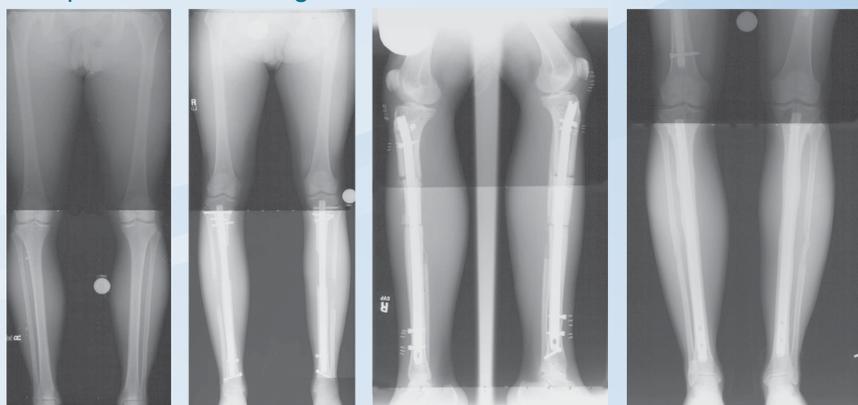
Table 2. Comparison between patients who underwent more than 5 cm of lengthening and those who underwent 5 cm of lengthening

	Amount of Lengthening		p value
	5 cm	>5 cm	
Consolidation index (months/cm of lengthening)	0.85	3.4	p = .000
Number of limbs with nonunion/partial union/delayed union	0	12	p = .000
Complications	1	20	p = .109

Table 3. Comparison between healing and size of nail used

	10.7-mm nail	12.5-mm nail	p value
Number of patients who developed a delayed union/nonunion	0	12	p = .000

Complicated case using a 12.5-mm nail



Preoperative view: 33-year-old male with short stature.

Four months post-distraction. Each tibia was lengthened 8 cm, and the patient developed bilateral nonunion with bone defect.

Lateral view radiographs obtained after rod exchange and nonunion repair with allograft and autograft.

Final result after nonunion consolidation.

Uncomplicated case using a 10.7-mm nail



Preoperative view: 29-year-old male with short stature.

Two lateral view radiographs obtained during the lengthening phase. Temporary tibiofibular screw prevents equinus.

Final result after consolidation was achieved. No complications.

Conclusion

- ISKD is safe to use when lengthening 5 cm or less
- Not recommended for more than 5 cm of lengthening
- Use smaller 10.7-mm diameter nail, if possible
- Use multiple drill hole approach for osteotomy