Growth-Friendly Implant

A 'growth-friendly implant' is a temporary spinal device used in the management of 'early-onset scoliosis (EOS)' that permits continued spinal and thoracic growth while controlling deformity. Unlike definitive spinal fusion, these systems aim to stabilize curvature without halting skeletal development.

Key Characteristics

- Designed for 'children with immature spines'
- Allows for 'incremental lengthening' over time
- Intended for use 'prior to final spinal fusion'
- Helps preserve 'lung development and height potential'

Common Types

- Traditional Growing Rods (TGR)
- Magnetically Controlled Growing Rods (MCGR, e.g., MAGEC)
- Vertical Expandable Prosthetic Titanium Rib (VEPTR)
- Shilla Growth Guidance System

Clinical Goal

To control progressive spinal curvature in EOS while maintaining spine and thoracic growth, delaying or avoiding early definitive fusion.

Comparative cohort studies

In a registry-based comparative cohort study (early-onset scoliosis patients after implant removal) Matan S Malka et al. from the Morgan Stanley Children's Hospital (Columbia Univ, New York). Arkansas Children's Hospital; Shriners Philadelphia; Seattle Children's Hosp. published in Spine Deformity Journal, to evaluate if re-implanting growth-friendly constructs within 12 months after implant removal (ROI) stabilizes deformity compared to observation-only. Early re-implantation (< 12 mo post-ROI) significantly reduces 2-year coronal Cobb progression compared to no replacement [1].

Critical Review

- **Strengths**:

Multicenter registry with well-defined exposure groups.

Radiographic outcomes measured at a meaningful 2-year follow-up.

Statistically robust with p-values: Cobb 81° vs 53° (p=0.003); progression ≥5°: 64% vs 30% (p=0.04)

- **Limitations**:

Small observation cohort (n=11) limits generalizability.

Indications for ROI and patient selection unclear—could bias results.

Lack of data on functional outcomes or complications post re-implantation.

Does not assess long-term outcomes past 2 years or final fusion timing.

Score (0–10)

5.5

(Moderate quality; clinically relevant, but underpowered and limited in scope)

Takeaway for Practicing Neurosurgeons

Prompt re-implantation after growth-friendly device removal appears crucial to arrest deteriorating curves in EOS. However, decision-making should be individualized, considering technical feasibility and patient comorbidities.

Bottom Line

Re-inserting a growth-friendly implant within 12 months of removal significantly reduces coronal curve progression over 2 years and should be prioritized when feasible—though data are limited by small control group and absence of long-term outcomes.

Full Citation and Corresponding Author

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[1)]
Malka MS, Lenke LG, Givens RR, Lu K, Rymond CC, McCarthy R, Samdani AF, Yaszay B, Pahys J, Vitale MG, Roye BD, Group PSS. Failure to replace removed growth friendly implants results in deteriorating radiographic outcomes. Spine Deform. 2025 Jul 4. doi: 10.1007/s43390-025-01137-5. Epub ahead of print. PMID: 40613981.