TABLE E-1 Complications in Groups with Subcutaneous and Submuscular Placement of a Single Growing Rod

	Subcutaneous	Submuscular	P Value*
No. of patients	17	54	≤0.05
Age at initial growing-rod implantation† *(yr)*	5.8 (2.6-10)	6.7 (2.4-10)	NS
Duration of follow-up† *(mo)*	57 (25-86)	67 (24-166)	NS
Surgical procedures per patient‡ *(no.)*	101/5.9 (4-13)	334/6.3 (3-12)	NS
Instrumented vertebral levels per patient† *(no.)*	11.7 (7-14)	13.1 (9-18)	≤0.05
Lengthening procedures per patient† *(no.)*	4 (0-11)	4 (1-10)	NS
Duration between growing-rod lengthening procedures† *(mo)*	10.1 (6-15)	9.8 (2-24)	NS
Planned surgical procedures§ *(no.)*	89	307	NS
Unplanned surgical procedures‡ *(no.)*	12/0.7 (0-3)	27/0.5 (0-4)	NS
Total complications‡ *(no.)*	30/1.8 (0-6)	61/1.1 (0-7)	NS
Wound complications# *(no.)*	2/2 (0-1)	5/6 (0-2)	NS
Implant complications# *(no.)*	9/18 (0-4)	24/25 (0-6)	NS
Alignment complications# *(no.)*	2/2 (0-1)	1/1 (0-1)	NS

*NS = not significant. P values of ≤0.05 indicate a significant difference between the subcutaneous and submuscular groups. †The values are given as: mean (range). ‡The values are given as: total number/mean (range) per patient. §Includes the initial growing-rod implantation, scheduled lengthening procedures, and definitive fusion. #The values are given as: number of patients/number of complications (range).

TABLE E-2 Complications in Groups with Subcutaneous and Submuscular Placement of Dual Growing Rods

	Subcutaneous	Submuscular	P Value*
No. of patients	34	35	NS
Age at initial growing-rod implantation† *(yr)*	5.4 (1.7-9.5)	5.6 (1.9-9.9)	NS
Duration of follow-up† *(mo)*	48.8 (25-114)	58.6 (25-126)	NS
Surgical procedures per patient‡ *(no.)*	253/7.3 (2-15)	210/6 (2-15)	NS
Instrumented vertebral levels per patient† *(no.)*	14 (9-18)	13.8 (9-17)	NS
Lengthening procedures per patient† *(no.)*	5.5 (1-13)	4.5 (1-10)	NS
Duration between growing-rod lengthening procedures† *(mo)*	9.4 (6-26)	12.1 (5-33)	NS
Planned surgical procedures§ *(no.)*	225	200	NS
Unplanned surgical procedures‡ *(no.)*	22/0.6 (0-5)	10/0.3 (0-3)	NS
Total complications‡ *(no.)*	55/1.6 (0-7)	28/0.8 (0-4)	≤0.05
Wound complications# *(no.)*	11/16 (0-4)	4/5 (0-2)	≤0.05
Implant complications# *(no.)*	15/27 (0-4)	14/15 (0-2)	NS
Prominent implants# *(no.)*	4/4	0	≤0.05
Unplanned surgery due to implant complications** *(no.)*	6/9 (0-3)	1/1 (0-1)	≤0.05
Alignment complications# *(no.)*	3/3 (0-1)	3/4 (0-2)	NS

*NS = not significant. P values of ≤0.05 indicate a significant difference between the subcutaneous and submuscular groups. †The values are given as: mean (range). ‡The values are given as: total number/mean (range) per patient. §Includes the initial growing-rod implantation, scheduled lengthening procedures, and definitive fusion. #The values are given as: number of patients/number of complications (range). **The values are given as: number of patients/number of procedures (range).

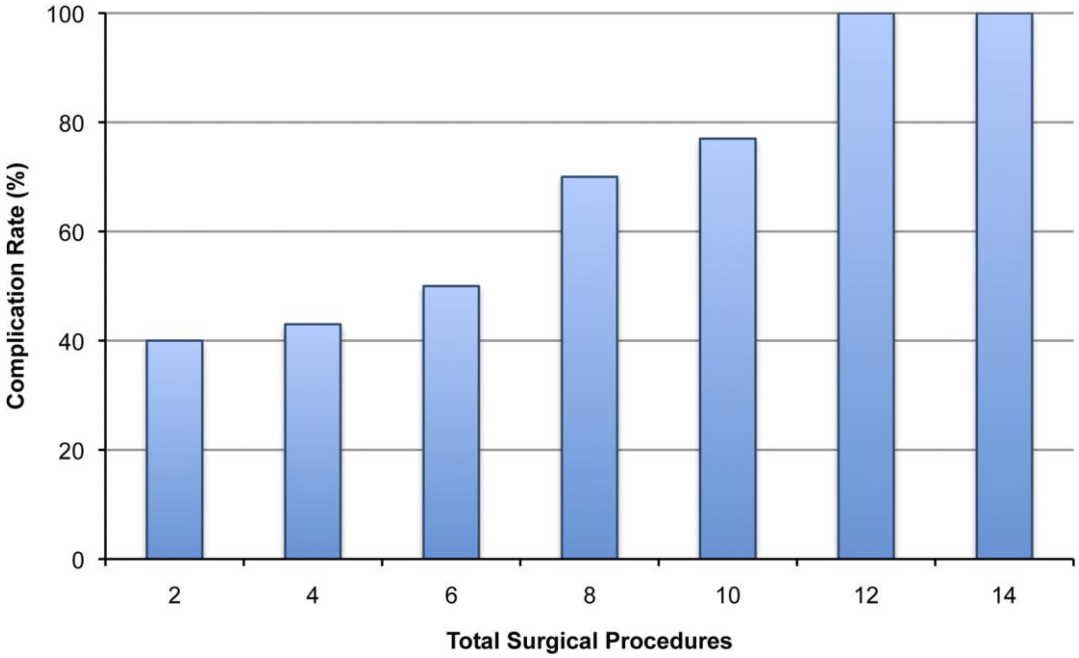

Fig. E-1
The complication rates increased according to the number of procedures. All patients who had more than fifteen procedures had at least one complication.

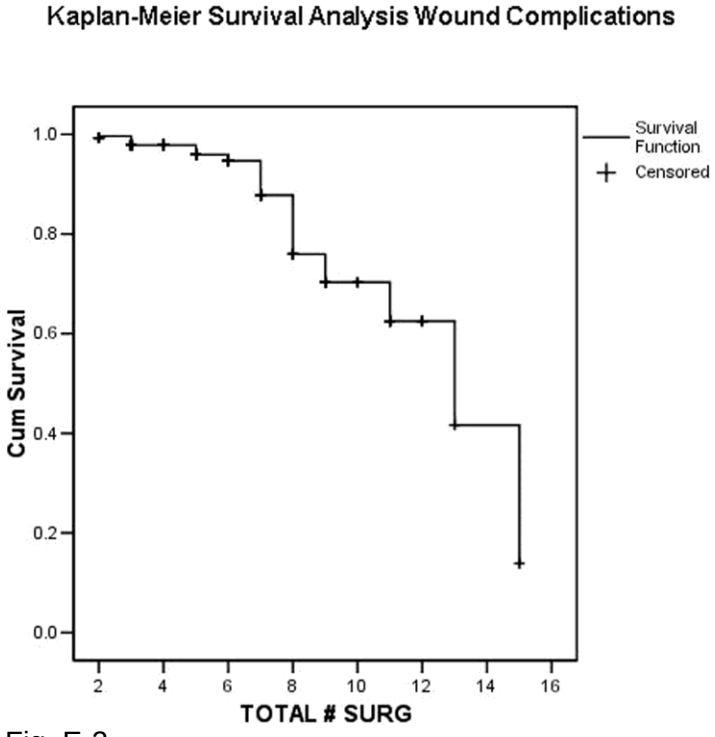

Fig. E-2
Kaplan-Meier analysis of wound complications demonstrated a >95% complication-free rate at six procedures (i.e., an approximately 5% wound-complication rate after six procedures). At thirteen procedures, the complication-free rate dropped to approximately 40% (a 60% rate of wound complications).

Fig. E3-A
A thirty-month-old boy with early-onset scoliosis. Other medical comorbidities included tracheomalacia and a cardiac conduction disorder.

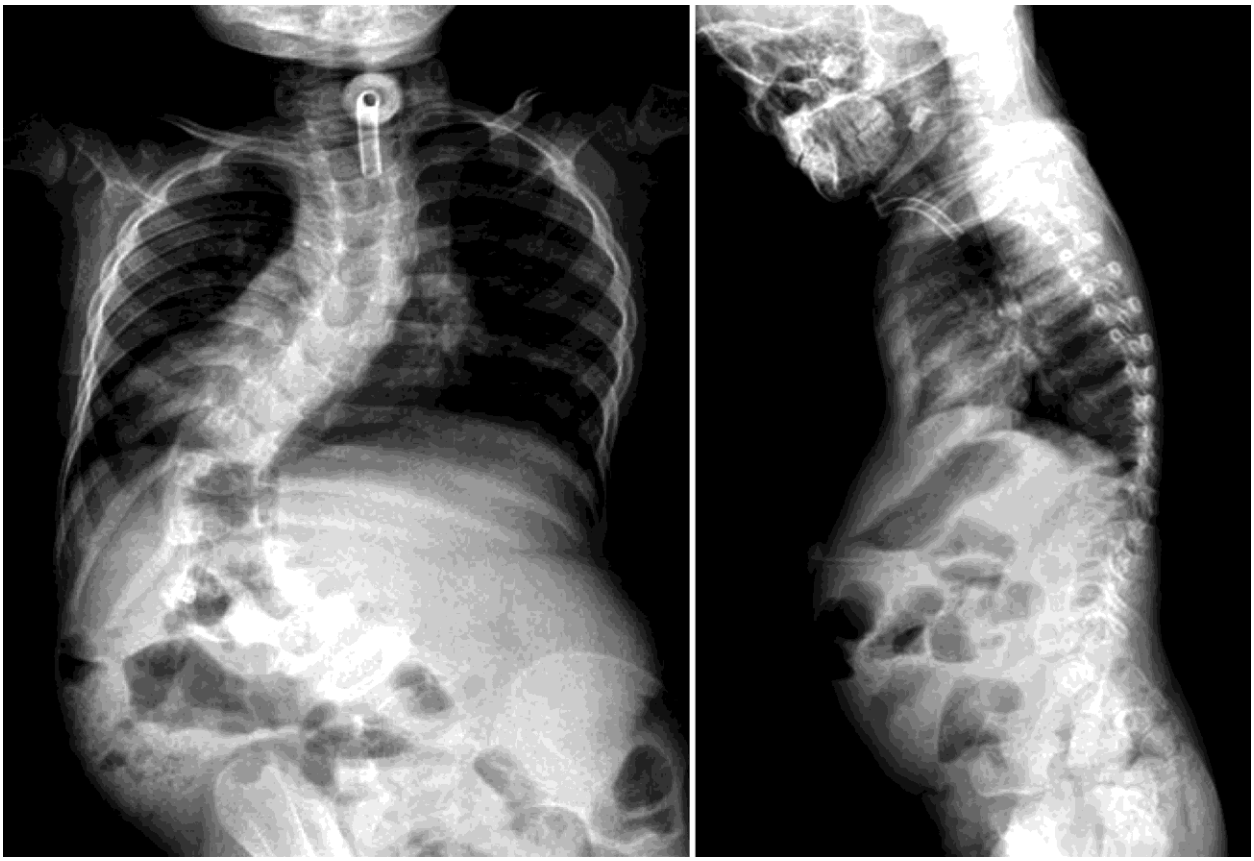

Fig. E3-B
Preoperative anteroposterior and lateral radiographs demonstrate a scoliotic curve of 90°. The initial T1-S1 height was 200 mm. (Reprinted, with permission from Elsevier, from: Mahar AT, Bagheri R, Oka R, Kostial P, Akbarnia BA. Biomechanical comparison of different anchors [foundations] for the pediatric dual growing rod technique. Spine J. 2008;8:935.)

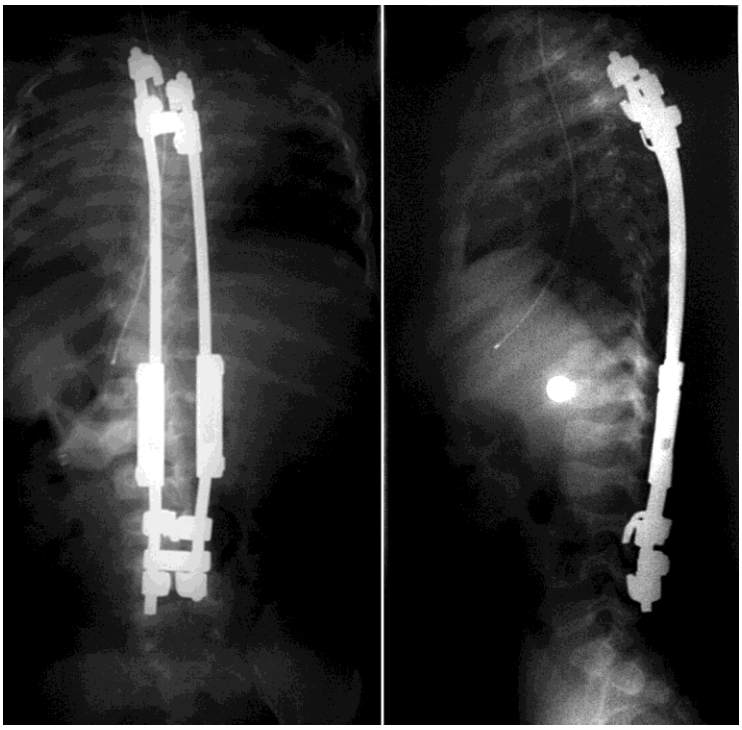

Fig. E3-C
The patient underwent insertion of dual growing rods, and there was improvement of the scoliotic curvature.

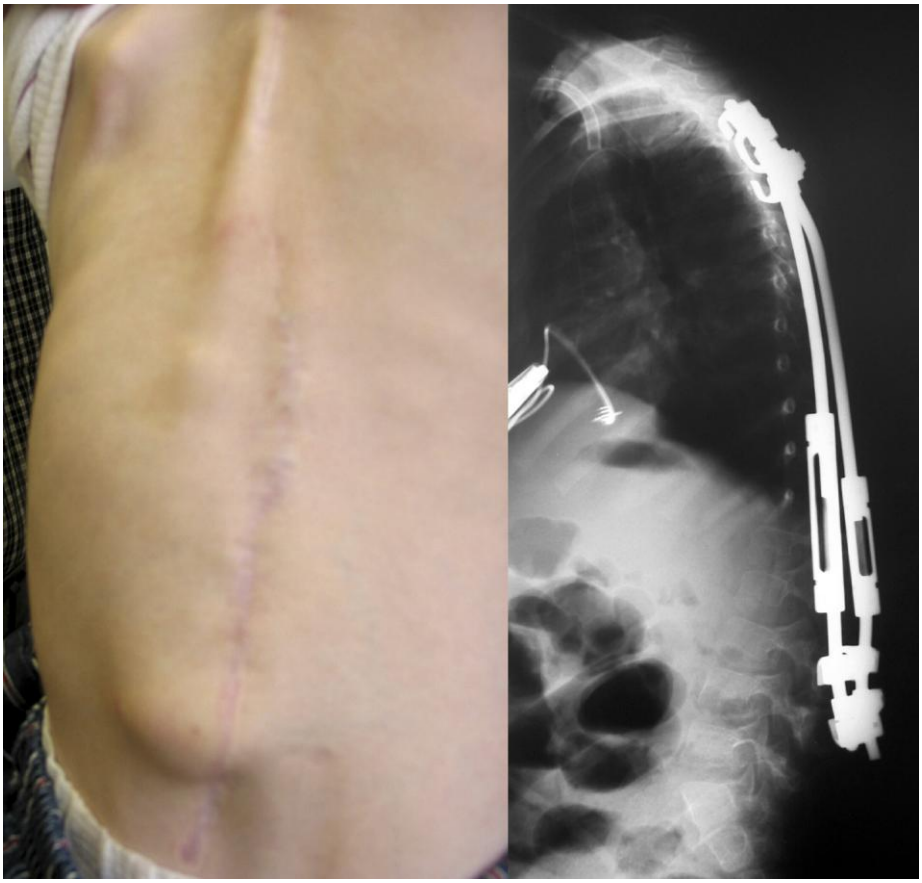

Fig. E3-D

During seven years of active treatment, the patient received fifteen surgical procedures, including the initial growing-rod implantation, nine lengthening procedures, and five unplanned surgical procedures. The five unplanned surgical procedures were due to complications associated with implant pull-out, skin breakdown, and wound infection. This clinical photograph demonstrates rod prominence at the caudad incision. The lateral radiograph demonstrates hook pull-out at the lower foundation; the hooks were replaced by pedicle screws.

Fig. E3-E
This postoperative wound infection and skin breakdown required unplanned surgery with irrigation, debridement, and secondary wound closure.

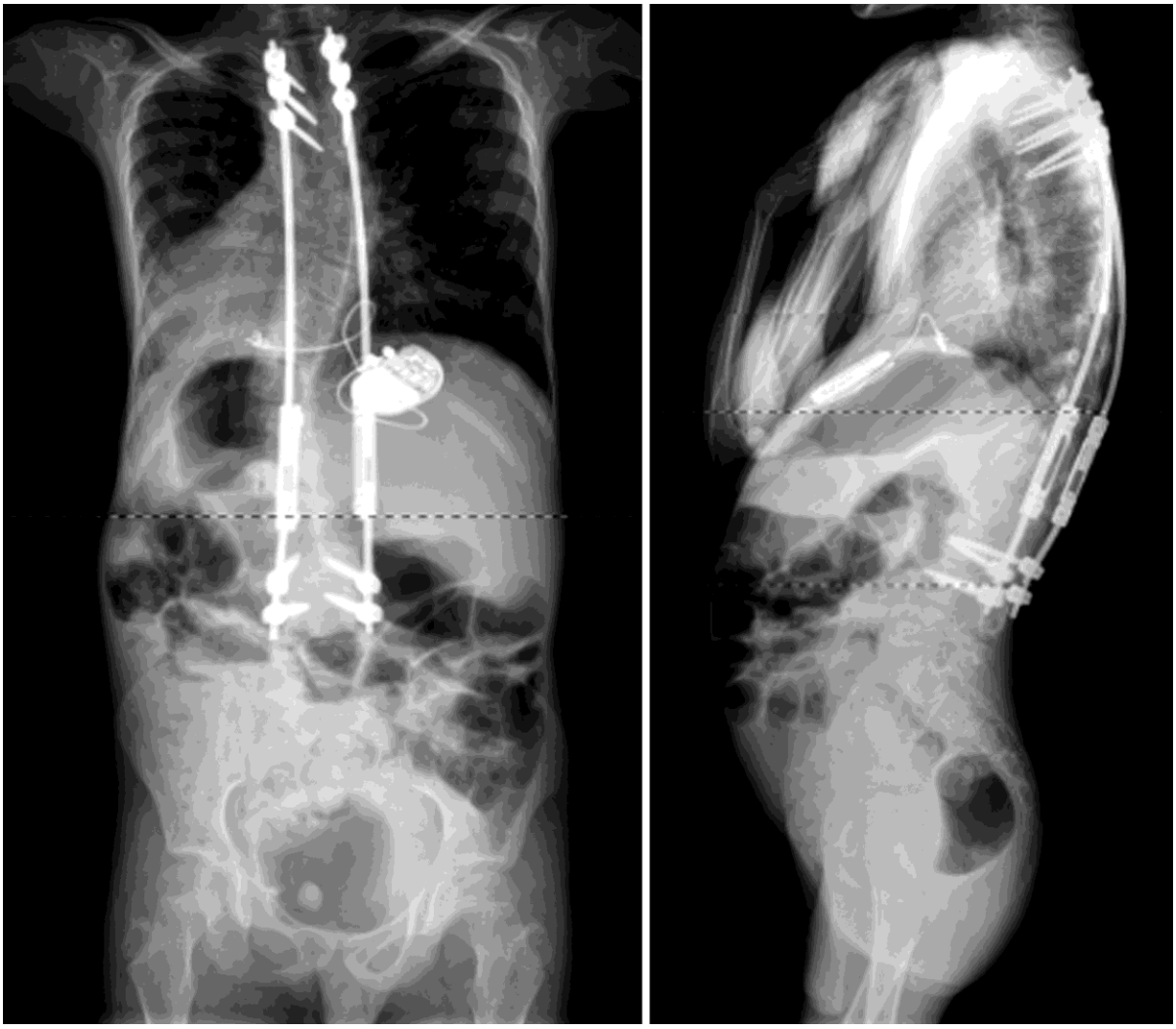

Fig. E3-F
The most recent follow-up radiographs, made at the age of ten years, demonstrate a scoliotic curve of 35° and a T1-S1 height of 333 mm; all hooks have been replaced with pedicle screws.

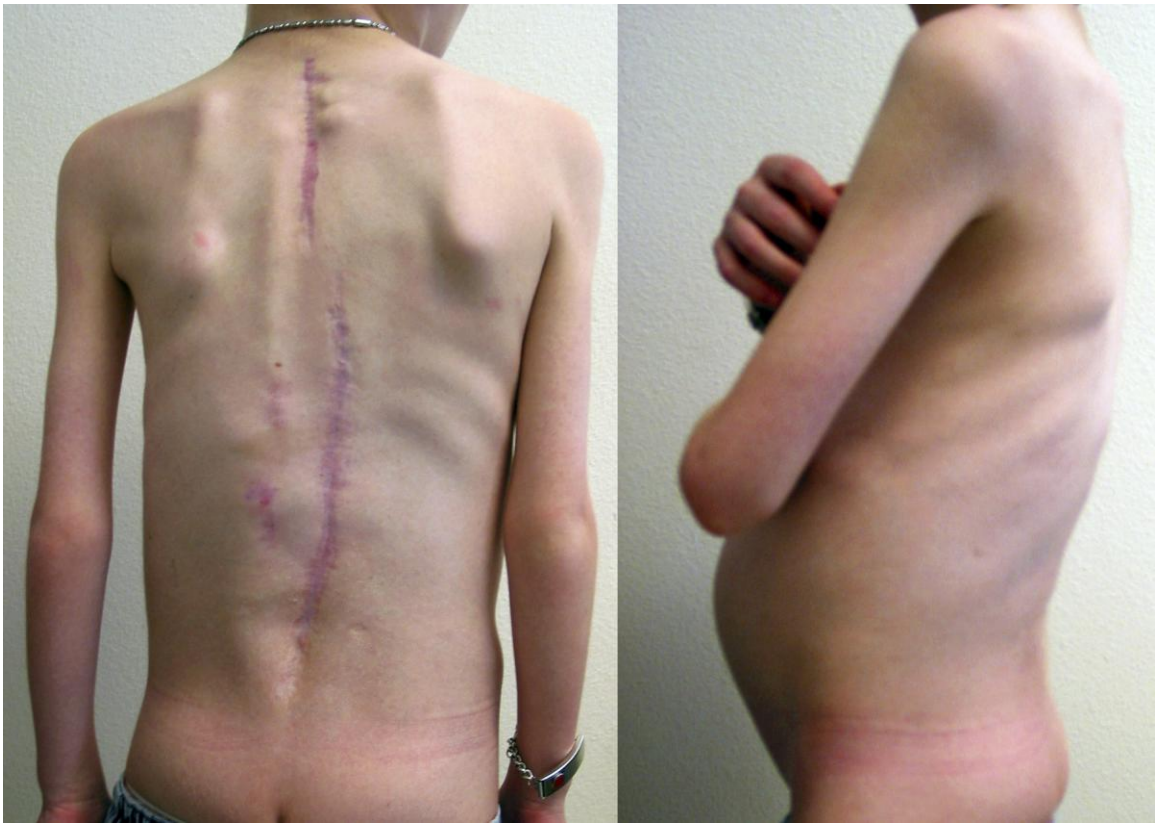

Fig. E3-G
The most recent clinical photographs, made at the age of ten years, after 7.5 years of active treatment.

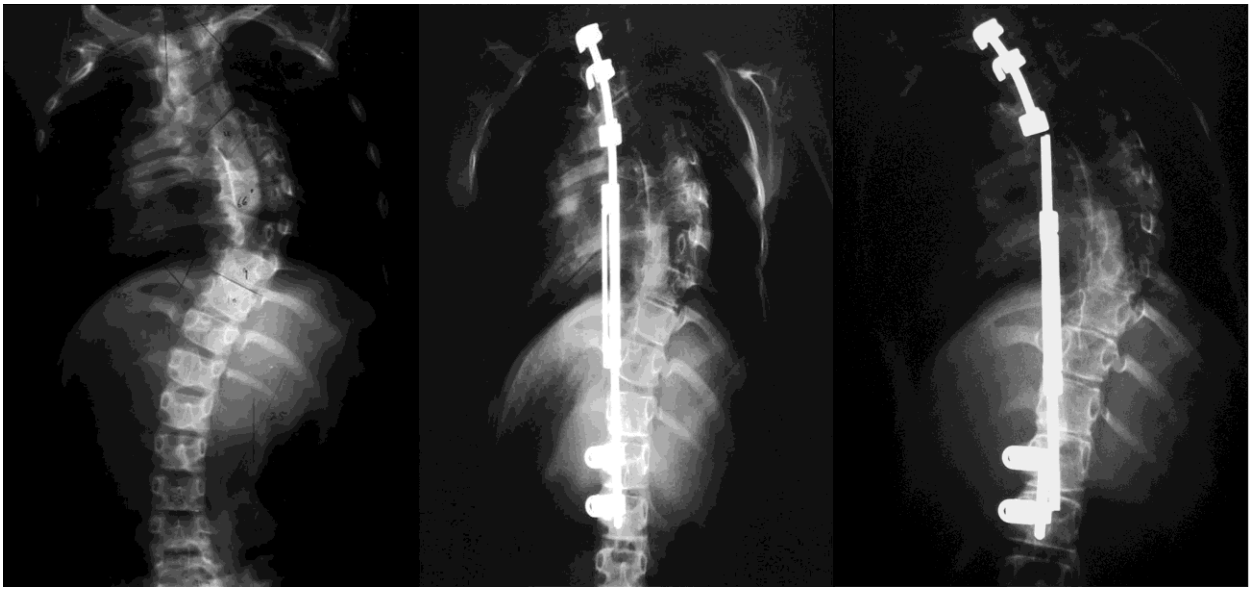

Fig. E-4
Radiographic images of a patient who underwent instrumentation with a single growing rod. The single-rod construct fractured after seven lengthening procedures. (Courtesy of Hazem El Sebaie, MD, FRCS, Cairo University Hospital, Giza, Egypt.)