Background
Scoliosis is a three-dimensional curvature of the spine measuring greater than ten degrees. Idiopathic scoliosis is the most common type and is further classified based on its onset (infantile, juvenile, adolescent). Despite the prevalence of scoliosis, the ideal treatment, and timing, has yet to be defined. Casting is used to halt curvature progression, or delay the time until surgery, as spinal fusion can disrupt normal growth. Placement of a Mehta cast is one casting technique. There is a paucity of information in the literature on the changes in peak inspiratory pressure (PIP) that occur during cast placement, or its’ restrictive effects on post-extubation respiratory mechanics.

Patient Presentation
We report a case of a 2 year-old male diagnosed with infantile idiopathic scoliosis, presenting for Mehta cast placement. Past medical history was significant for a right unilateral incomplete cleft lip, submucous cleft palate, and plagiocephaly. The surgical history included cleft lip repair at age 14 months, and 5 prior Mehta cast placements (starting at age 15 months). The patient had no prior anesthetic complications. The patient weighed 10.6 kilograms, with normal vital signs and an unremarkable physical exam. His mother denied any respiratory illnesses. Imaging showed a curvature of thirty-five degrees. There was no other preoperative data (no labs, echo, or pulmonary function tests).

Operative Course
After induction of general anesthesia using an inhalational technique with 70% nitrous oxide and 8% sevoflurane, a size two laryngeal mask airway (LMA) was inserted and pressure support ventilation was initiated. The patient was then moved to the casting table where application of the Mehta cast was completed. Anesthesia was maintained with 2% sevoflurane. The intraoperative course was unremarkable, and there were no problems with ventilation. At the end of the case, the patient was breathing spontaneously, and the LMA was removed during stage 3 of anesthesia. Laryngospasm occurred immediately. Attempts at breaking laryngospasm, including positive pressure ventilation and propofol administration, were unsuccessful. Positive pressure breaths were delivered, but stomach insufflation was occurring, suggesting the possibility of a tight cast and restriction of the thorax. Desaturation and bradycardia ensued. Atropine and succinylcholine were administered, and chest compressions initiated. The restrictive cast was simultaneously removed, and ventilation improved dramatically. The patient was intubated and CPR was continued for approximately 2 minutes, with return of spontaneous circulation.

Examples of Mehta Cast

Discussion
To date, there is only a small body of literature describing the effects of Mehta casting on respiratory dynamics. A retrospective review by Dhawale et. al. (2) found an increase in peak inspiratory pressure (PIP) after Mehta cast placement, with a decrease in PIP after windows were cut in the cast. A prospective, observational case series of 18 patients published by Jensen et. al. (3) had similar findings.

Based on our own experience, we favor general anesthesia with placement of an endotracheal tube. Additionally, an extubation during stage 3 of anesthesia might not be ideal in this scenario. Spontaneous ventilation in an awake patient provides valuable information regarding the clinical effects of changes in respiratory dynamics after Mehta cast placement.

Summary
This is a case report of altered respiratory mechanics after Mehta cast placement, a procedure for which the ideal anesthetic technique has not yet been defined. There is an extremely small body of literature that suggests that these cases should be performed with an endotracheal tube with concurrent monitoring of PIP. LMA placement, while efficient and convenient, may not be the best method to monitor changing respiratory dynamics.

References