



Patient Undergoes Halo-Gravity Traction While Virtually Participating in School During COVID-19 Pandemic: A Case Report

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Introduction

COVID-19 was first reported in December of 2019 as a cluster outbreak in Wuhan, China¹ but quickly spread around the world reaching pandemic status according to the World Health Organization in March of 2020². This has had a profound impact on everyday life for children with school closures, stay at home orders, and implementation of other social distancing policies^{3, 4}. These restrictions on everyday life have led to concern that children are more likely to become depressed or develop anxiety as a result⁵. However, there is also the argument that a subset of children with social phobias or other extenuating circumstances may experience a temporary lessening of social distress associated with school closings and a shift towards virtual activities⁶. This may be the case with patients attending school while hospitalized for extended periods of time.

Prior to the COVID-19 pandemic, pediatric patients at our institution had access to educational materials provided by the hospital and the local school district. However, this is a significantly different environment compared to learning alongside fellow classmates and interacting with known teachers. Through the adoption of virtual education during the COVID pandemic, our hospitalized patients can receive the same amount of remote teaching by their own teachers as their classmates. In this study, we report on a 7-year-old male with severe early onset scoliosis who underwent staged halo-gravity traction (HGT) prior to bilateral growing rod insertion resulting in a 5-week hospitalization. We report on the patient's ability to participate fully in remote learning in the 4 weeks leading up to his operation.

Case Information

A six-month-old boy initially presented with a complex congenital rib deformity of the anterolateral chest with a left sided congenital scoliosis. The patient was treated with left sided VEPTR implantation and reconstruction of the chest followed by bilateral VEPTR placement with partial rib wedge resection. The patient's VEPTR treatment course was complicated by multiple episodes of wound dehiscence and

infection leading to bilateral VEPTR removal, re-insertion, and subsequent re-removal over the 6.5 years treated with VEPTR constructs. The patient was 7-years old when presenting with progressive scoliosis following removal of bilateral VEPTR implants (Figure 1A). At this time, due to his curve stiffness, rate of scoliosis progression, and the risk of wound complications associated with rib-based anchors, traditional growing rod insertion with pre-operative halo gravity traction was recommended as the next operative step. The patient was admitted for 24 days of halo gravity traction (HGT) in August through September of 2021, in the midst of the COVID-19 pandemic. The patient's traction was increased by two pounds per day until reaching a goal weight of 30 pounds (50% of total body weight). His left thoracic curve measured 76° before HGT and decreased to 41° after. While undergoing HGT, this patient was able to participate fully in virtual schooling on a daily basis for four hours per day, the same as all of his classmates (Figure 1B).

Following insertion of bilateral growing rods, the patient was discharged after four days of inpatient recovery (Figure 1C). He was then evaluated at 1-month postoperatively via a Telemedicine visit with no complications identified.

Discussion

Significant harms with potential long-term implications are expected with school closures during the COVID-19 pandemic including a decline in child physical and mental health along with decreased future economic earning potential^{4, 7-9}. However, in the same way that the medical field has adapted to the challenge posed by COVID-19 by increasing telehealth visits^{10, 11}, there has been a significant increase in electronic resources in a large-scale effort to apply technology in a virtual learning environment.

Although virtual learning presents unique challenges, one potential positive is that online education does not need to be limited to the home and pediatric patients who are admitted to the hospital for an extended period of time can have access to their own school's remote learning and classwork while continuing to

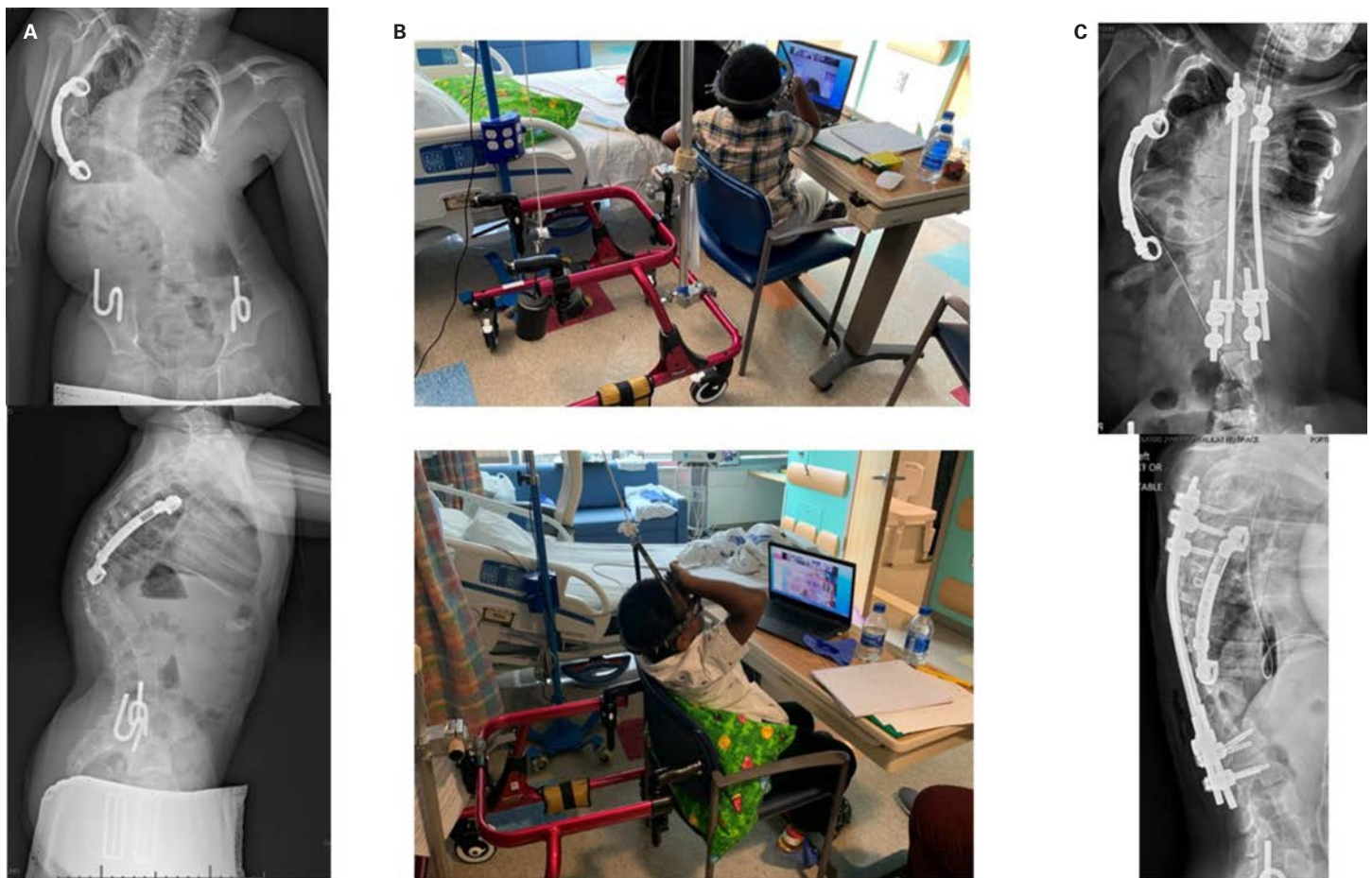


Figure 1. (A) AP and Lateral radiographs prior to halo-gravity traction; (B) Patient attending school virtually while in halo-gravity traction; (C) Post-operative AP and Lateral radiographs following growing rod insertion.

interact with their peers. While educational materials provided by the hospital and the local school district were available for hospitalized patients prior to the COVID-19 pandemic, increased adoption of virtual learning allows an increased opportunity for these patients to remain integrated with their fellow peers. Prior work has demonstrated that students with chronic illnesses are significantly more likely to repeat a year in school, have academic challenges, and report significant emotional distress. Additionally, these children tend to have lower social confidence relative to their peers¹². Given reports that educational support for chronically ill patients varies by location and across school districts^{13, 14}, increased remote learning in schools may have profound benefits for chronically ill and hospitalized patients related to their education and quality of life.

While this is not the first case of a patient utilizing virtual learning materials while hospitalized, it does represent the changing learning environment for hospitalized children during the COVID-19 pandemic. Encouraging children who are hospitalized and able to continue with their schoolwork virtually alongside their peers represents an important benefit that these patients can continue to pursue.

Conclusions

This case of a 7-year-old boy with congenital scoliosis admitted to the hospital for a total of five weeks represents a potential positive side effect of the COVID-19 pandemic. Due to improvements in school's remote learning functionality, he was able to participate fully in all online school related activities alongside his classmates prior to his operation. Progress made by school districts improving access for virtual learning in a normal classroom environment should not be abandoned with the resolution of the COVID-19 pandemic.

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