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PURPOSE: Some students with severe Cerebral Palsy, (CP), who are wheelchair bound and dependent on caregivers for activities of daily living (ADLs) have difficulty participating in their special education for a variety of many reasons. This report will describe how the Quadriciser Robotic Therapy System, (QRTS), increases alertness and bowel function, and in turn improves the student's ability to participate in his specialized education.

Case Description: The patient was a 12-year-old student with spastic quadriplegic CP. Major mobility impairments included his dependency on caregivers for all transfers and positional changes, wheelchair propulsion, and all ADLs. As reported by caregivers, he had difficulty remaining awake during school, sleeping approximately 75% of his school day. The QRTS was embedded in his daily curriculum to address his physical activity limitations, arousal level, and painful constipation, which were limiting factors for engaging in his special education. The student used the QRTS from August of 2019 until February of 2020, just prior to the school closing in March of 2020 due to the COVID-19 pandemic.

Figure 1-
Wheelchair Quadriciser Unit



Note. The student accesses machine using personal wheelchair

Figure 2- Changes in Alertness

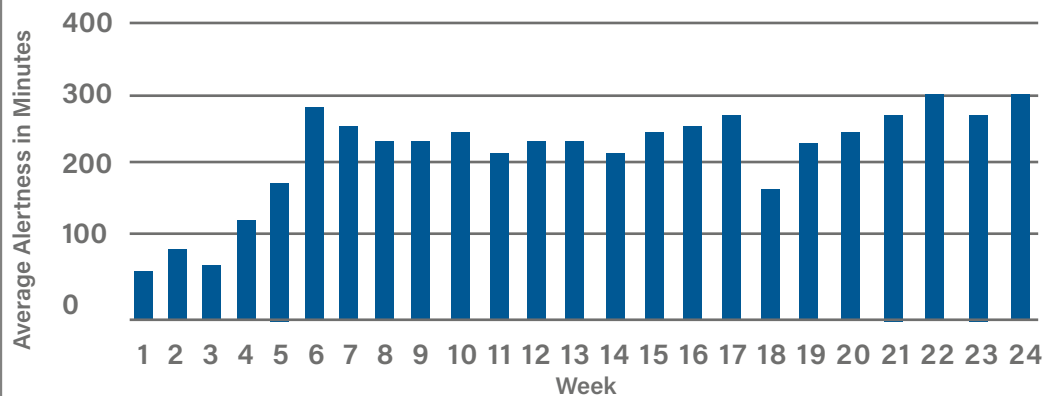
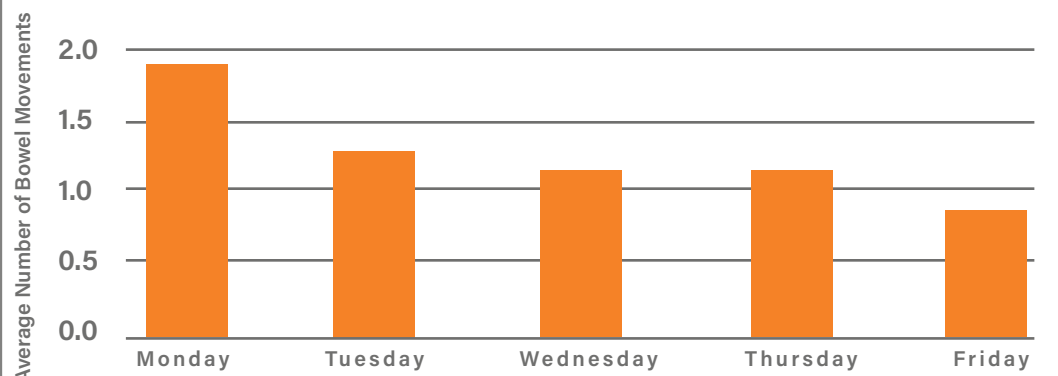


Figure 3- Changes in Bowel Movements



Outcomes: The student's time of alertness during his school day significantly increased with continued use of the QRTS (see Figure 2). A full school day consisted of 400 minutes except for early release, which consisted of 280 minutes. He began school in August with an average weekly alertness of 64 minutes, and by February 2020 he was alert for an average of 300 minutes. This increased alertness enabled him to utilize his specialized instruction toward reaching his academic goals. Bowel function became more regulated with an average of 1.95 bowel movements during the beginning of the week, and by the end of the week he was having an average of 0.89 bowel movements per day (see Figure 3). The caregivers reported the student vocalized abdominal pain less frequently after the QRTS program began. As a result, limitations in academic activities such as cooking, music, art and book club, and classmate interactions due to stomach cramps from difficult bowel movements significantly reduced.

Discussion: The addition of the QRTS to an embedded physical therapy intervention increases educational access for a student with severe cerebral palsy. Further investigation is warranted to establish treatment effects in a larger sample size.

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This paper serves as a synopsis of the case study. © 2020 Dana Mather. For the complete case study details, please contact Quadriciser.