Quadriciser®

Case Study

Jump Starting the Overall Health of Children with Severe Disabilities

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PURPOSE: To learn how the Quadriciser helped the staff of the PACE program meet the exercise and physical fitness needs of the children with more severe spastic quadriplegia. PACE is a pilot program (Program for Activity, Creativity, and Exercise) based at the Kluge Children's Rehab Center in Charlottesville, Virginia.

METHODS: The PACE program is a ten week program in which children meet once a week for 45 minutes. After assessing the physical fitness needs of each participate, the director of the pilot program decided to record data in two specific categories: change in heart rate during exercise and total amount of calorie expenditure during exercise. Three children were chosen to use the Quadriciser as their main method of exercise and training during each session.

A Polar heart rate monitor was used to collect and record the amount of calories that were expended during each exercise session.

The director determined an initial speed and resistance that each child would begin his or her exercise session. Each session lasted 20 minutes. The speed was increased at the halfway point of each session. The tension of the cables and pulleys were adjusted throughout the session based on the decrease in spasticity or the increase in flexibility of each child during exercise. Each child was assigned a coach that monitored the child during exercise. They made individual adjustments to the Quadriciser and assisted the child as needed. Each coach recorded the data on the child's performance before, during and after each exercise session.

Results:

Child A: Highest recorded heart rate was 130 beats per minute with highest recorded caloric burn of 248 calories during one session

Child B: Highest recorded heart rate was 131 beats per minute with highest recorded caloric burn of 321 calories during one session

Child C: Highest recorded heart rate was 119 beats per minute with highest recorded caloric burn of 305 calories during one session

Child A		(1st 10 mins - 2nd 10 Mins)		(before-after)
Week	Time	Speed	Calories	HR
Did Not Attend				
Week 2	20	25 - 30	206	66 - 105
Week 3	25	25 - 35	241	71 - 121
Week 4	20	25 - 35	223	70 - 114
Week 5	20	25 - 35	225	71 - 117
Week 6	20	30 - 40	238	68 - 126
Week 7	20	30 - 40	242	71 - 129
Week 8	20	30 - 40	245	70 - 127
Week 9	20	30 - 40	246	72 - 130
Week 10	20	30 - 40	248	71 - 128
Child B				
Week	Time	Speed	Calories	HR
Did Not Attend				
Week 2	20	25 - 35	257	88 - 129
Week 3	25	35 - 45	316	89 - 123
Week 4	20	35 - 45	276	91 - 128
Week 5	20	35 - 45	281	92 - 131
Week 6	20	35 - 50	304	91 - 127
Week 7	20	35 - 50	312	87 - 130
Week 8	20	35 - 50	319	86 - 124
Week 9	20	35 - 50	321	88 - 126
Week 10	20	35 - 50	319	87 - 131
Child C				
Week	Time	Speed	Calories	HR
Week 1	30	30 - 40	276	90 - 110
Week 2	30	30 - 40	286	88 - 114
Week 3	30	30 - 40	302	91 - 116
Week 4	30	30 - 40	305	88 - 116

**Child C dropped out of the program after week 4*

Conclusion: The Quadriciser opened up a new avenue of exercise to a population of children who have limited physical fitness opportunities. Typical strength training and physical fitness exercises do not adequately meet the needs of children with severe disabilities. As a result, these children have a difficult time improving their cardiovascular endurance and controlling their weight. Based on the results of this pilot program, the Quadriciser demonstrated the ability to assist children with severe disabilities to reach a target heart rate to allow them to improve their cardiovascular endurance and burn the calories necessary to lose weight.

The results of the pilot program indicate that further research and documentation needs to be done. Further research is needed to determine the desire target heart rate zone that each child must be able to achieve and sustain to improve their cardiovascular endurance. Additional research also needs to be done to determine if the Quadriciser can assist children with severe disabilities to manage their weight and increase their overall range of motion and flexibility.