Evaluation of therapeutic exercises programs in patient with Juvenile Idiopathic Arthritis

ABSTRACT

Objective : The objective of this study is to investigate the effects of a highly frequent and vigorous combined hydrotherapy and land-based physiotherapy program on the musculoskeletal outcomes of Juvenile Idiopathic Arthritis (JIA) in children and adolescents. The main focus of this study was to formulate and assess if there are statistically significant changes in muscle strength, aerobic capacity and joint range of movement, during a three week (15 sessions) therapeutic exercise program.

PATIENTS AND METHODS

Participants : The participants were 24 children, 15 girls and 9 boys. The age range of the participants was 8-16 years old, mean 11.4 years. The initial diagnosis of JIA for the participants was on average 5.4 years before participation on the program. All the participants started treatment between 2009 and 2013 by the Pediatric unit of University Hospital of Ioannina, Greece. In order to participate in this study, the patients had to be diagnosed with JIA with the revised criteria of EULAR. Other inclusion criteria were that the pathology of JIA was only; stable, oligoarticular, extended oligoarticular and polyarticular JIA, stage II and III on the Steinbroker scale, pharmacologically controlled, without any cardio-vascular co-morbidities.

Assessment : All the participants were assessed prior and post exercise intervention. The experimental group was, also, assessed on the completion of every five sessions. The assessment included: measurement of maximal muscle power and maximal muscle endurance with an isokinetic device (Biodex s4 PRO). Joint range of movement was assessed with an electronic goniometer (dataLINK Biometrics) and with the aforementioned isokinetic device. The aerobic capacity was investigated with an ergosperometer

(ADinstrument Powerlab 8/30). All the data collected from the above devices were saved at a password protected electronic computer.

Interventions : Two exercise programs were compared the control and the experimental program; the first one was undertaken by the participants prior to the experimental. Both exercise programs included the same participants and lasted the same period (same time and frequency). Control program : The control sessions were held at the home setting, unsupervised and were patient specific. It was performed five times a week and included muscle stretching, strengthening, resistance training and aerobic exercise. Experimental program : The guidelines advise an eight week training program that includes three sessions per week. To achieve the main targets of the experiment we performed ergophysiological modifications and reduced the length of the program to three weeks. We increased the frequency of training to 5 sessions a week and the intensity to 85% of maximal HR. The length of each session was 75 minutes and included both dry land and hydrotherapy training. The experimental program was performed immediately after the completion of the control program at the hospital setting by groups of six to eight children. The experimental program algorithm was a 10-minute warm-up followed by 30 minutes of aqua aerobic training. The intensity was progressively increased according to patient tolerance. A 10 to 15 minute rest period was given to each participant, followed by 10 to 15 minute static bicycle training. The exercise program continued with free and mechanically assisted weight training and was concluded with a 10-minute cool down involving gentle passive stretching.

RESULTS

The results of this study indicated that the control exercise program did not result in a statistically significant improvement in the aerobic capacity, muscle strength and joint range of movement. On the contrary, the experimental program results demonstrated a statistically significant improvement in muscle endurance and joint range of movement, yet there was no significant change in aerobic capacity.

CONCLUSION

This study demonstrates that this 15 session experimental exercise program significantly improved muscle endurance as well as strength and range of movement. The experimental exercise program can significantly improve the musculoskeletal outcomes of JIA, without causing any exacerbations of the condition.

Key Words: Physiotherapy, therapeutic exercises, Juvenile Idiopathic Arthritis

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