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ABSTRACT

The effects of specific play apparatus experience on a test of upper body muscular endurance was investigated among a group of children 4-6 years old. Both the control and experimental group consisted of 45 subjects randomly selected on the basis of age from two private day care centers situated in the same community. The two groups were of similiar socioeconomic status. Each group had a 30 minute free-play period and a 30 minute structured-play period of motor development activities 5 days a week for 10 weeks. The only difference between the treatment of the two groups was in the playground equipment available. The experimental group had more equipment of the "upper body" movement variety (e.g., horizontal ladders) than did the control group. Subjects were pre- and post-tested for upper body muscular endurance using the straight-arm hang. Results indicated that specific playground experiences, as provided by a well equipped play environment which had overhead climbers and ladders available, was a contributing factor in the increased muscular endurance performance of the experimental group. (JM)

Playground Apparatus Experience and Muscular Endurance Among Children 4 - 6

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Running head: The Effects of Play Apparatus

Abstract

The effects of playground apparatus experience on a test of endurance was investigated. Two groups of children 49-83 months were pre- and post-tested for upper body muscular endurance using the straight-arm hang. The experimental group (N=45) was allowed the opportunity for activity within an experimental outdoor play apparatus area, 30 minutes per session, five days a week, for 10 weeks. Control group (N=45) activity consisted of equivalent time allowances on an area with limited apparatus. Statistical analysis utilizing t-tests revealed no significant differences ($p>.05$) between groups on age, weight or height. Further analysis (Groups x Test ANOVA) revealed no difference on the pretest ($p>.05$), but indicated the experimental group out performed the control on the posttest ($p<.05$). Within group analysis indicated no significant increase ($p>.05$) from pre- to posttest for the control, but an increase ($p<.01$) was revealed for the experimental group.

It was concluded that the outdoor playground apparatus experience contributed to a significant increase in upper body muscular endurance.

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The play environments in which young children interact have become an area of increasing interdisciplinary concern. Research has credited playgrounds as effective learning mediums in the development of specific social, cognitive and motor behaviors. Unfortunately not very many of our public or private educational centers for young children provide adequate play environments. It has been assumed through empirical evidence that such deprivation may effect the motor development of the child and result in inferior behavior, compared to children who experience a variety of play apparatus activity. Some of the assumed benefits of playground apparatus activity are muscular strength and endurance, especially if the environment provides for overhead ladder experiences (Hutinger, 1954; Morris, 1955; Gallahue, 1976; Dauer & Pangrazi, 1979).

The purpose of this study was to investigate the effects of specific play apparatus experience on a test of upper body muscular endurance among children 4 to 6 years of age.

Method

Two groups of children (N=90) ages 49-83 months were involved in the study. Each group (experimental and control) consisted of 45 subjects randomly selected on the basis of age; 15 four, five and six year olds. Subjects for the two groups were selected from two private day-care

centers (with grades k-1) situated within the same community. The two groups were of similar socioeconomic status.

The experimental treatment period lasted 5 days a week, over 10 weeks, with each session approximately 30 minutes in duration. An additional 30 minutes of structured non-playground-apparatus motor development activities were also administered daily. At the experimental site. commerically purchased apparatus consisting of two horizontal ladders, one 45° overhead ladder, one cargo net climber and one fire pole, were added to an existing play area. The designated area had been equipped previously (approximately 3 yr.) with two see-saws, two swings, one slide, one sandbox, one balance beam, one Jungle-Jim climber, and one merry-go-round. No more than 30 subjects were active in the play area at any session with the range usually being 20 to 28. The subjects were not given play instruction, rather were allowed free-play within the area.

The control group also participated in two regularly scheduled 30 minute movement activity sessions daily; one structured and the other free-play. The control play area was altered to present the same number of apparatus as the experimental site, however, the additional pieces were not of the "upper body" movement variety.

Subjects were pre- and posttested for upper body muscular endurance using the straight-arm hang as described by Gabbard, Kirby and Patterson (1979). A digital .01 sec stop clock (Lafayette Model #54015) and micro switch embedded in a 1.27 cm diameter hanging bar, were used for timing the

length of the hang. Subjects were given two trials each for pre- and posttest. The best of two, with one day between trials, was used to represent each test score. The pre- and posttest trials were conducted the week before and the week after the 10 week experimental period. Due to attrition from pre- to posttest, 83 subjects (of 90) were used in the analysis.

Results and Discussion

Statistical analysis utilizing t-tests revealed no significant differences ($p>.05$) between the experimental and control groups on age, weight and height. A Groups x Test ANOVA (Least-Squares Solution) with repeated measures on the second factor revealed a main effect of tests $F(1,81) = 54.06$, $p<.01$, as well as a Groups x Test interaction $F(1,81) = 33.42$, $p<.01$. The Groups x Test interaction was further investigated via simple main effects analysis and is illustrated in Figure 1. Simple main effects across groups indicated no difference in groups at the pretest

Insert Figure 1 about here

$F(1,162) = 0.26$, $p>.05$, but indicated the experimental group out performed $F(1,162) = 3.79$, $p<.05$, the control on the posttest. The analysis

within groups across tests found no increase $F(1,81) = 105$, $p > .05$ from pre- to posttest for the control group, but an increase $F(1,81) = 112.88$, $p < .01$ was revealed for the experimental group.

The results of this investigation indicated that specific playground experience was a contributing factor in the increased muscular endurance performance of the experimental group. It is most likely that the increase was due to the type of apparatus available and activities performed during the play sessions. A large portion of the activity on the experimental site consisted of movement on climbing type apparatus (horizontal ladders and climbers) which were not abundantly available on the control site. Observation indicated that a large portion of the movements performed on ladders and climbers involved hanging by the hands and use of the upper body and as a result partially accounting for the increase in upper body endurance.

In conclusion, playground apparatus experience as provided by a well equipped play environment, which has climbers and overhead ladders available, can provide a positive contribution toward the upper body muscular efficiency of young children.

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Footnote

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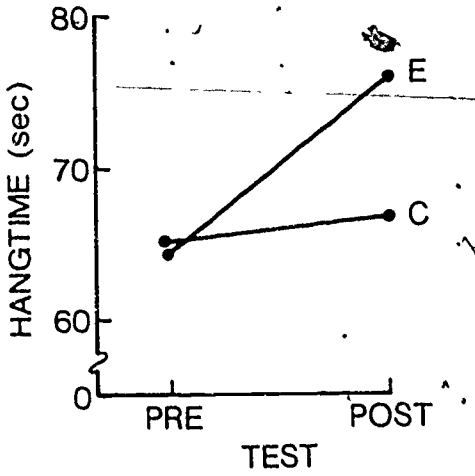
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HANGTIME (sec)
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C
PRE
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