Prevalence Of Gross Motor Delays In Boys With Hemophilia Ages 4 - 14: Single site study

CiBD Center for Inherited Blood Disorders

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Introduction:

Children with hemophilia may experience internal bleeding in their joints or muscles, which can limit their activity. Parents of children with hemophilia may restrict certain activities for fear of injury and developing a bleed. [1] Inactivity has been shown to lead to decreased strength, proprioception and balance, which puts children with hemophilia at a higher risk for injury. [2].

At our Hemophilia Treatment Center, standardized gross motor testing is typically not included in the physical therapy evaluation. Gross motor skills are physical abilities involving large muscle groups, which are necessary for development of locomotion, stability, coordination, balance, and body strength. [3]

Objectives:

The aim of this study was to determine if the young boys with hemophilia at our clinic have gross motor delays that may have been missed during the annual physical therapy evaluation. By identifying delays, our clinic can improve our standard of care and promote gross motor development in our patients to enhance their ability to be physically active and protect their joints and muscles from injury.

Methods:

Boys with Hemophilia A or B between the ages 4 to 14 were tested by the physical therapist at our clinic using the Bruininks-Oseretsky Test of Motor Proficiency, Second edition, BOT2. The BOT2 is a valid and reliable gross motor test that is responsive to change. It covers a wide age range, 4-21 year olds, and is widely used by physical and occupational therapists, as well as adaptive physical educators to detect mild to moderate motor delays. The complete form has 8 subtests, 3 for fine motor and 5 for gross motor. The subtests can be used individually, or two for composite scores, or all for total motor composite score. The five subtests used in this study included upper extremity (UE) coordination, bilateral coordination, balance, strength, running speed and agility (run/agility).
Over one year period, a total of 42 boys completed the study with scores distributed between three age groups.

Group	Ages	Total #
Group 1	4-7 year olds	N = 17
Group 2	8-11 year olds	N = 15
Group 3	12-14 year olds	N = 10

Exclusion criteria included a bleed within the last week that was unresolved or other physical limitation preventing participation. All severities of hemophilia were included in the test subjects, but were not separately analyzed in the results.
All participants were either on prophylactic or on demand factor infusion regimens.
A consent form was signed by a parent and any child over the age of 7 according to IRB regulations. Each parent was given a letter outlining their child's scores and written recommendations by the physical therapist.

Results:

Overall 22 out of 42 boys with hemophilia scored below average for at least one of the gross motor subtests on the BOT2. No adverse events or bleeding episodes occurred during or as a result of the gross motor testing.

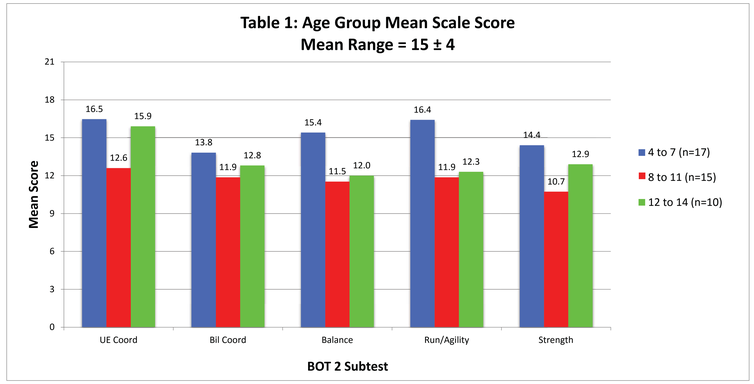

FIGURE 1 Group 1: Ages 4-7 Group 2: Ages 8-11 Group 3: Ages 12-14

The mean scores for each subtest were within the normal range of the BOT2 mean score of 15 ± 4 for all age groups except strength for Group 2, which was greater than one standard deviation below. (See Figure 1).

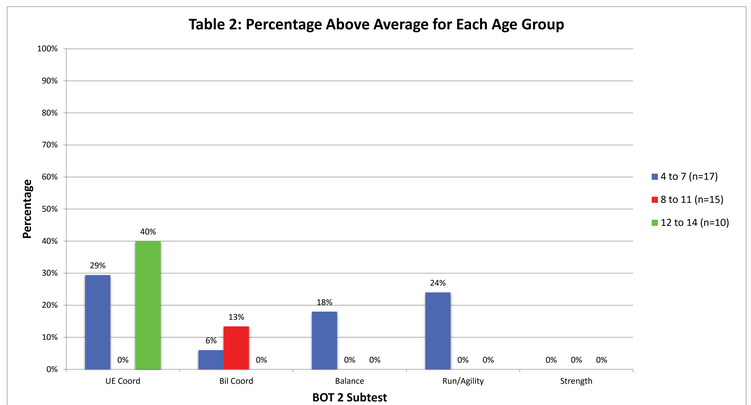

FIGURE 2 Group 1: Ages 4-7 Group 2: Ages 8-11 Group 3: Ages 12-14

Group 1 had 29% score above average for upper extremity coordination, 18% for balance, and 24% for run/agility.
Group 2 had 13% score above average for bilateral coordination only.
Group 3 had 40% score above average for UE coordination only.
(See Figure 2).

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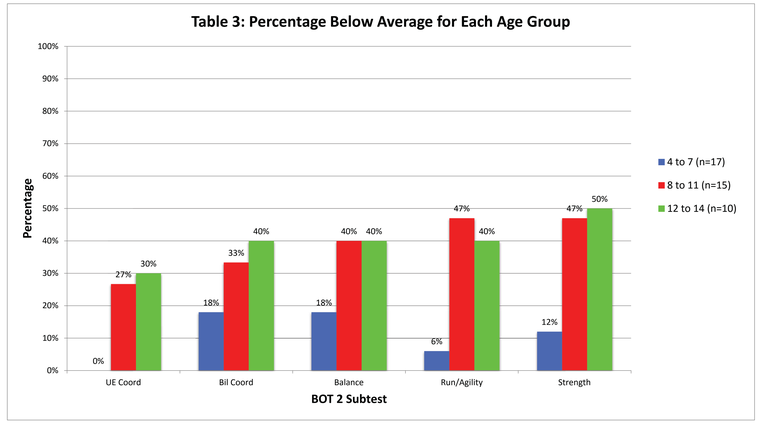

FIGURE 3 Group 1: Ages 4-7 Group 2: Ages 8-11 Group 3: Ages 12-14

Group 1 had 18% score below average for balance and bilateral coordination, 12% for strength, and 6% for run/agility.
Group 2 had 40-47% score below average for balance, strength, and run/agility. 27% scored below average for UE coordination. 33% scored below average for bilateral coordination.
Group 3 had 40-50% score below average for bilateral coordination, balance, strength and run/agility. For UE coordination, 30% scored below average. (See Figure 3).

Conclusion:

At our hemophilia treatment center more than 50% of the boys with hemophilia demonstrated gross motor deficits. The percentage of boys showing deficits increased and persisted after age 7. This reinforces the need to include some standardized gross motor testing during the annual physical therapy evaluation for our patients with hemophilia to identify boys who score below average and make referrals for intervention at an early age to prevent persisting gross motor deficits.

References:
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