Impaired motor performance in Turner syndrome: what is its relation to psychological tests?

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Background

Motor performance is often impaired in patients with Turner syndrome. The exact prevalence of motor problems is unknown and the etiology is unclear.

Objectives

1. To describe motor performance in our population of children and adolescents with Turner syndrome including the differentiation in specific motor skill domains.
2. To identify the relationship between motor performance and intelligence scores, processing speed and visual-motor integration.

Turner population: n = 121

Excluded:
• No informed consent (n = 6)

Study population: n = 115 (age 11.9 ± 4.3 years; 35% 45,X)
• MABC-2 and VMI (n = 66)
• WPSSI-III and WISC-III (n = 53)
• No tests (n = 41)

Methods & Materials

Participants were enrolled at the Radboudumc Turner Centre of Expertise, Nijmegen, the Netherlands.5 We offer motor and psychological screening at the time of diagnosis and according to our Turner protocol at ages 3, 5, 11 and 16 years (at 3 years only motor tests).

Motor performance

The Movement Assessment Battery for Children-2 (MABC-2) was used. The MABC-2 includes a total score and 3 domain scores on 1) manual dexterity, 2) ball skills and 3) static and dynamic balance. The reference value is a standard score of 10 ± 3 SD.

Intelligence scores and Processing Speed (PS)

The WPSSI-III (for age 3-8 years) and the WISC-III (for age 6-17 years) was used to measure total IQ (TIQ), verbal IQ (VIQ) and performance IQ (PIQ), and the processing speed (PS). The reference value is 100 ± 15 SD.

Visual-Motor Integration (VMI)

The Developmental Test of Visual Motor Integration (VMI) includes motor and visual perception subtests. The reference value is 100 ± 15 SD.

Results

<table>
<thead>
<tr>
<th>MABC-2</th>
<th>TIQ</th>
<th>VIQ</th>
<th>PIQ</th>
<th>PS</th>
<th>VMI total</th>
<th>VMI visual perception</th>
<th>VMI motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>0.299</td>
<td>0.185</td>
<td>0.308*</td>
<td>0.485**</td>
<td>0.374**</td>
<td>0.402**</td>
<td>0.393**</td>
</tr>
</tbody>
</table>

Pearson’s correlation coefficients * = p < 0.05, ** = p ≤ 0.01, *** = p ≤ 0.001

Conclusion

Patients with Turner syndrome have a remarkably significant impaired motor performance (mean MABC-2 score -1.25 SD). Patients showed impaired performance on all different subtests and visual-motor integration. We found a strong association between motor performance and processing speed. Furthermore, PIQ and visual-motor integration tests showed a significant positive correlation with motor performance. Whether this is a causal relationship or whether it is related to the fact that motor skills are mandatory for a proper performance of the tests, needs further investigation.

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