Dynamic postural stability in blind athletes using the Biodex Stability System

Aydoğ Sedat Tolga¹, Aydoğ Ece², Çakıcı A², Doral Mahmut Nedim¹

¹Hacettepe University, Medical School, Department of Sports Medicine, Ankara, Turkey
²SSK Ankara Educational Hospital, Physical Medicine and Rehabilitation Clinics, Ankara, Turkey

Introduction
Three systems affect the upright standing posture in humans -- visual, vestibular, and somatosensory. It is well known that the visually impaired individuals have bad postural balance. On the other hand, it is a well documented fact that some sports can improve postural balance. Therefore, it is aimed in this study to evaluate the dynamic postural stability in goal-ball athletes.

Methods
Twenty blind goal-ball players, 20 sighted and 20 blind controls were evaluated using the Biodex Stability System (BSS). Three adaptation trials and three test evaluations (a 20-second balance test at a platform stability of 8) were applied to the blind people, and to the sighted with eyes open and closed. Dynamic postural stability was measured on the basis of three indices: overall (OA), anteroposterior (AP) and mediolateral (ML). Means of each test score were calculated. The tests results were compared for the blind athletes, sighted (with eyes open and closed) subjects and blind people.

Results

Table 1- Dynamic postural stability results in the groups

<table>
<thead>
<tr>
<th></th>
<th>OA index</th>
<th>AP index</th>
<th>ML index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sighted (eyes open)</td>
<td>1.57±0.45</td>
<td>1.19±0.34</td>
<td>3.58±1.29</td>
</tr>
<tr>
<td>Sighted (eyes closed)</td>
<td>4.71±1.55</td>
<td>3.18±0.99</td>
<td>1.23±0.35</td>
</tr>
<tr>
<td>Goal-ball players</td>
<td>6.22±1.92</td>
<td>4.20±1.35</td>
<td>4.47±1.24</td>
</tr>
<tr>
<td>Blind sedentary</td>
<td>8.12±4.72</td>
<td>5.13±3.47</td>
<td>6.46±3.42</td>
</tr>
<tr>
<td>p value</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

* The goal-ball players were not different than the blind sedentary, in all other comparisons statistically significant differences (p < 0.01).
** The goal-ball players were not different than the blind sedentary and the eyes-closed sighted people, however, statistically significant differences (p<0.01) were found in all the other comparisons.
#: Those of blind sedentary people were different the rest (p<0.05).

There were significant differences between the results of the blind people and the sighted subjects with regards to all of the three indices. Although the stability of goal-ball players were better than sedentary blinds', only ML index values were statistically different from the other group (p:0.04).

![Figure 1- Means of the three indices in the blind people, and in the sighted with eyes closed and eyes open](image)

Conclusion
Dynamic postural stability was demonstrated to be affected by vision; and it was found that blind people playing goal-ball 1-2 days per week have higher ML stability than the sedentary sighted people.

References
Wong AM et al. (2001) Arch Phys Med Rehabil