INTRODUCTION

Functional ambulation outcome measures in spinal cord injury (SCI) are numerous and clinicians must use outcome combinations that bring relevant information to their clinical practice. The 6-min Walk-Test (6MWT) shows a good inter- and intra-rater reliability with this clientèle (1). It is also well correlated with the 10m Walk-Test, the WISCI-II and the Timed Up & Go in SCI (1) and with the 2-min Walk-Test in stroke populations (2).

OBJECTIVES

This project examined the profile of the distance covered during the 6MWT by comparing the walked distance at 2 (T2), 4 (T4) and 6 (T6) minutes. As the 6MWT was conceived to assess the exercise response (3), the hypothesis was that individuals who walk slower will show decreased walking distances from T2 to T4 and even more decrease from T4 to T6 because of fatigue.

METHODOLOGY

PARTICIPANTS: Fifty-nine adult individuals with an SCI lesion were evaluated at rehabilitation admission and/or discharge. They were able to walk a short distance and those having major cognitive problems were excluded. We assessed 28 patients with tetraplegia and 30 with paraplegia (AIS E : n=1). Two of them had a complete lesion (AIS A).

Table 1: Descriptive characteristics of the participants (n=59) (46 males)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Height (cm)</th>
<th>Mass (kg)</th>
<th>LEMS (50)</th>
<th>Maximal 10MWT (m/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>49 (17)</td>
<td>172 (13)</td>
<td>74.6 (14.2)</td>
<td>38 (10) 41 (9) 0.86 (0.43) 1.09 (0.49)</td>
</tr>
<tr>
<td>Range</td>
<td>17 - 78</td>
<td>122 - 191</td>
<td>52.3 – 110</td>
<td>14 - 50 23 - 50 0.22 – 1.89 0.32 – 1.90</td>
</tr>
</tbody>
</table>

EVALUATIONS: The 6MWT was performed using the standardized instructions recommended by the American Thoracic Society (3). It was conducted on a flat-surface corridor graduated over a 30 meter length. Participants walked back and forth within this length. They were instructed to walk the greatest possible distance for 6 minutes with their usual walking device and orthoses. Evaluators were participants’ treating physical therapists (8 experienced physical therapists). Time was communicated to participants 1 to 3 times during the test and limited encouragements were given by therapists (not in order to increase the speed).

RESULTS

The 59 participants were divided into three groups:

<table>
<thead>
<tr>
<th>Group 1 (n=26)</th>
<th>Group 2 (n=36)</th>
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<tbody>
<tr>
<td>Evaluated with the 6MWT at rehabilitation admission and at discharge;</td>
<td>every subject evaluated at admission (including subjects from Group 1)</td>
</tr>
<tr>
<td>Group 3 (n=4)</td>
<td>every subject evaluated at discharge (including subjects from Group 1)</td>
</tr>
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</table>

The major reasons explaining why participants were not evaluated with the 6MWT at both periods of assessment were short lengths of stay and absence of walking ability at admission. Table 2 shows the distances covered during the 6MWT for these three groups and the distances walked (gains) from one time point to another (T1 vs. T2, T2 vs. T4, T4 vs. T6).

The 26 SCI participants increased their total distance walked at discharge compared to admission (437 m vs. 240 m). For these participants at admission and discharge, as well as those in Groups 2 and 3, the distances covered over the time intervals were constant (Figure 1 and Table 2) and no difference was observed between the slow and fast walkers (Figure 1) as determined by values of walking speed under and over the median value computed during the first 2 minutes of the test.

Statistical analyses (ANOVA and paired t-tests) were used to assess the effects of time (T2 vs. T4 vs. T6) and group (slow vs. fast walkers) on the distance covered for each time. The level of association between the values for each time was examined using Pearson correlation coefficients. Regression analyses allowed determination of the equation to predict the walking distance covered during the first two minutes could be used to predict those reached at T4 and T6 (Figure 2).

The results question the relevance of using the common 6-min walk test in individuals with a SCI able to walk farther than 30 m at 2 minutes (or faster than 0.25 m/s). For these individuals, the distance at 2 minutes might be used to predict the distance reached at 4 and then 6 minutes of walking. Future studies will need to report the Borg scale and cardiorespiratory responses in order to better understand the strategy used by the individuals with SCI during the 6MWT and identify the appropriate instructions to use to test their walking endurance.

DISCUSSION AND CONCLUSION

These results did not support the hypothesis that distance traveled (or speed) would decrease during the evaluation, reflecting the fatigue expected in an endurance test. Two possibilities would explain these observations: 1) The 6MWT is not long enough to induce fatigue in the SCI population, and 2) the standardized directives used for people with cardio-respiratory diseases are not efficient to evaluate endurance capacities in individuals with SCI. In fact, an examination of the scores on the Borg Scale (perceived exertion scale) in a subgroup of participants showed that the values were not elevated (range from 0.5 to 6/10 at 6 minutes).

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REFERENCES