Introduction

- Single leg standing is encountered in many occupational and daily activities such as walking [1], staircase climbing [2] and clearing obstacles.
- Body mass index (BMI) affects postural control in static single leg standing [3].
- Less is known about the effects of BMI on balance control during dynamic tasks requiring prolonged single leg balance such as obstacle clearance that requires displacing ones' center of mass.

Objective:
To quantify performance and compensatory movements in individuals with BMI ≥ 30 kg/m² during a simulated obstacle clearance task.

Hypothesis:
Increasing obstacle heights will increase:
1. Task completion time
2. No. of participants displaying compensatory movements.

Methods

Participants:
N = 10 individuals with BMI > 30 kg/m²

- Normal men (BMI): 5
- Morbidly Obese (BMI = 40 kg/m²): 5

Min height: 36cm (14")
Max height: 66cm (26")

Procedure:
Clear Obstacles of 7 heights in 5cm increments

Video-based Task Analysis

Identify the start & end time of stepping and compensatory movements using the software program ELAN v5.1 (The Language Archive)

1. Stepping movements
2. Compensatory movements

Conclusion

- Longer task completion time and increased number of participants using compensatory movements were observed with the increasing obstacle heights. This effect was greater in the morbidly obese vs. obese group.
- Stepping movements and compensatory movements were identified as potential measures of postural control in dynamic task with prolonged single leg stance.
- Ongoing analysis involves the use of wearable inertial sensors to quantify subtle compensatory strategies performed with the torso and hips that cannot be easily detected in the video-based analysis.

Reference


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