HSC Belfast Health and Social Care Trust

The Star Excursion Balance Test as a measure of lower limb function in people with severe haemophilia

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Introduction and objectives

Current recommendations from the World Federation of Haemophilia recommend regular musculoskeletal assessment, incorporating Haemophilia Joint Health Score (HJHS) and Haemophilia Activities list (HAL) (Srivastava et al, 2013). However these tools lack appropriate measures of dynamic function to identify early functional deficits.

Common balance tests available include Berg Balance (Berg et al 1992), timed "get-up and go" (Mathias et al, 1986), Functional reach (Duncan et al, 1990) and One-Legged-Stance (Fregly & Graybiel, 1968). These tests have limitations for those with early joint changes. Instrumented balance evaluation systems are expensive and time consuming.

The Star Excursion Balance Test (SEBT) has been shown to be a reliable non-instrumented test of lower extremity dynamic balance for some conditions (Gribble et al 2012). It involves balancing on one leg while reaching with the non-weight bearing leg in 3 directions (anterior, postero-lateral and postero-medial). The aim of this study was to consider the suitability of the SEBT as a screening tool for patients with severe haemophilia.

Methods

10 patients with severe haemophilia A (aged 16–40 years) completed the SEBT as part of their annual musculoskeletal assessment. Reach distances were normalised to leg length and compared with ankle range of motion, HAL and HJHS. Pearson's test was used to identify relationships between reach distances, HAL, HJHS and range of movement.

Results

20 Ankles
- Group A (n=9) normal ankles (no prior history of injury or bleed)
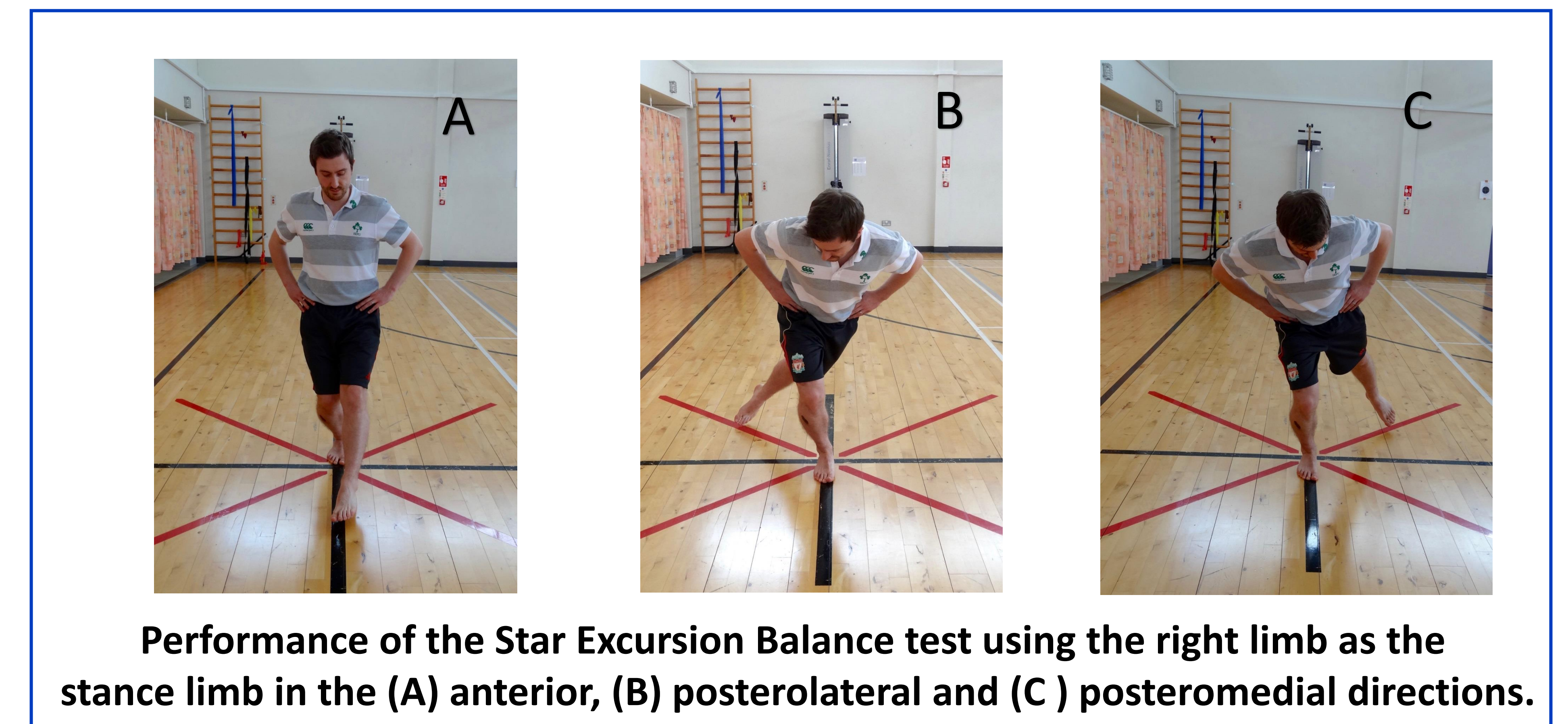- Group B (n=11) target ankle joints

Group B demonstrated
- Reductions in mean reach distances in all directions for the SEBT compared with group A
- Reduction in mean ankle range of motion
- Poorer HJHS and HAL scores when compared with group A

For group B there was a strong positive correlation between HAL and anterior reach (r^2=0.5732, p<0.01), a moderate negative correlation between HJHS and anterior reach (r^2=0.4779, p<0.01), and a moderate positive correlation between dorsiflexion and anterior reach (r^2=0.3602, p<0.01). No relationship was demonstrated between HAL, HJHS or range of movement and posterolateral or posteromedial reach directions.

Conclusions

This study supports earlier work demonstrating that ankle dorsiflexion positively relates to performance of the SEBT. It also demonstrated a relationship between anterior reach distance and HJHS and HAL. It is quick and easy to administer requiring no more than a tape measure and approximately 2m^2 of floor space. As the test requires balance to be maintained at the limit of stability it may provide valuable information in lower extremity function in people with severe haemophilia.

References

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Performance of the Star Excursion Balance test using the right limb as the stance limb in the (A) anterior, (B) posterolateral and (C) posteromedial directions.

Mean HJHS / HAL scores

Strong +ve correlation between HAL & anterior reach (r^2=0.5732, p<0.01)

Mean Reach distance (cm)

Moderate +ve correlation between dorsiflexion & anterior reach (r^2=0.3602, p<0.01)

Mean Dorsiflexion & Plantar flexion (degrees)

Moderate -ve correlation between HJHS & anterior reach (r^2=0.4779, p<0.01)

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