Chailey's approach to a redesign of a Lynx back support set up and ISO testing it on a budget

Joe Searchfield and Charlie Bird
Chailey Clinical Services, East Sussex

Summary
This presentation details the redesign of the framing structure of custom Lynx back supports at Chailey Clinical Services. Then we look at testing the design to ISO 16840 standard. The results and findings of impact, static and repetitive loading are presented and discussed, including the use of slow-motion footage.

Aims & Objectives
This project aimed to review and standardise the Lynx seating system and how it is framed at Chailey Clinical Services, and then produce corresponding technical documents. This project will also enable us to qualify that Chailey Clinical Services' Lynx back supports have been tested to a known standard. Using these test results any required changes to the framing specification could be identified and a maximum user weight could be defined.

Background
A testing protocol was developed using the relevant parts of ISO 16840 and carried out as close to the standard as possible with the resources available. Static and repetitive testing was carried out by applying forces using a winch and a force meter. Whereas impact testing was carried out using a pendulum.

A testing rig was manufactured to suspend the pendulum and assist with applying forces to the back support. Results show that the lateral supports of the Lynx are the weakest point, and had the lowest maximum load achieved, 23kg for static inwards load on the lateral. However, the lowest maximum load achieved for loads that correlate to user weight is 29kg (posterior static loading). Assuming trunk weight as 53.7% of body weight (Plagenhoef, Evans and Abdelnour, 1983) this correlates to a maximum user weight of 54kg.

Discussion
To our knowledge testing a custom-made complex lynx back support has not been carried out using the ISO framework. We discuss some of the pitfalls of ISO testing and its limitations. One example is of using the standard loading pad shapes as stated in the standard for custom-made bespoke spinal profiles. We will aim to demonstrate that, although quite time-consuming, testing on a relatively low budget can be achieved and can produce some useful results.

References
Plagenhoef, S., Evans, F. and Abdelnour, T., 1983. Anatomical Data for Analyzing Human Motion. Research Quarterly for Exercise and Sport, 54(2), p.171.
ISO 2014, Determination of static, impact and repetitive load strengths for postural support devices, ISO 16840-3:2014, ISO

Email: joe.searchfield@nhs.net