

EyeGaze Case Report

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1. Overview

This Case report outlines the reasoning behind the provision of an EyeGaze system and the design of a custom mounting bracket for a client with Motor Neuron Disease (MND). The manufacture of the special bracket is outlined.

2. Background

The client is a male 53 years of age with a diagnosis of MND. MNDs are classified according to whether they are inherited or sporadic, and to whether degeneration affects upper motor neurons, lower motor neurons, or both. In adults, the most common MND is amyotrophic lateral sclerosis, which affects both upper and lower motor neurons [1].

2.1 Clients functional abilities

The client's functional abilities are they have lost full control of both their upper and lower limbs, they are experiencing respiratory problems. The client uses an oxygen source to provide a Continuous positive airway pressure.

The client is chair bound and relies on cares to hoist them to transfer to other seating and bed. The client has limited head movement, and full control of eye movement. The client has little or no posture control and will if unsupported fall to either side.

2.2 Seating system

The client has a provision of a specialist seating system that provides the client with good postural management, and maintains clients comfort and reduces risk of tissue break down. The seating system is a comfy chair with riser recliner function, and lateral support to maintain trunk and upper body position.

Cook and Hussey [2] suggest the following reason for a seating solution:

"The primary purpose of a seating device is to maximise a person's ability to function in activities across all performance areas, (self-care, work or school, play or leisure)."[2]

They continue to outline three areas of seating intervention based on consumer need. The three areas are shown below:

1. Seating for postural control and deformity management;
2. Seating for pressure management;
3. Seating for comfort and postural accommodation [2].

3. Methods

The client was assessed and their case discussed at a multi-disciplinary team meeting (MDM) consisting of an OT, SLT, and an engineer. At the meeting, consideration to diagnosis, prognosis of the condition, functional ability, posture, the environment the clients wishes and needs etc were discussed and a plan for intervention was created, in this case provision of EyeGaze was decided would best suit the client. With reference to the model Human Machine Interface (HMI) as described below was referred to.

3.1 Human Machine Interface (HMI)

"In the industrial design field of human-machine interaction, the user interface is the space where interaction between humans and machines occurs." [3]

The goal of interaction between a human and a machine at the user interface is effective operation and control of the machine, and feedback from the machine which aids the operator in making operational decisions [3].

How the client would access the assistive device included several methods: head switch with scanning, a head mouse, and EyeGaze system were considered. A full system description is given below.

3.2 Ethical statement

The Client has not been named in the case report. The client was asked if they would participate in the study they gazed verbal consent to use their case but wished to remain unnamed.

4. Results

The client was provided with a system that consisted of a tablet PC and a bolt on EyeGaze camera a PCEye Go from Tobii. A mounting bracket to fix the two together as an off the shelf version was not available. A custom bracket had to be created, for use with a floor or desk stand. Figure 1 shows

the bracket components, while Figure 2 illustrates their assembly. Figure 3 shows the device mounted in the bracket. The client was able to access communication software namely the Grid 2 and access the PC. Some modification in the creation of batch files to switch the Tobii software on and Grid 2 off and the reverse.

5. Conclusion

The final systems that were considered were the EyeGaze and the head switch. It was found that although the client could control their head to operate a switch. Due to the rapid progression of the client's disease it was decided to provide an EyeGaze. This it was felt was the best solution as the client would lose control of their head at some point in the future. The use of EyeGaze would therefore offer the client a single device for duration of their condition, reducing the need to change devices which they would have to learn to use as their condition progresses.

Another advantage of the EyeGaze is that it would offer a lot more versatility in access, this would give the client a much easier route

to communication and every day activities in terms of using the web, face book, mobile phone etc.

6. References

1. National Institute of Health. Motor Neuron Diseases Fact Sheet, www.ninds.nih.gov/disorders/motor_neuron_diseases/detail_motor_neuron_diseases.htm, Publication date March 2012, Accessed Nov. 2016
2. Cook, A., and S. Hussey. "Assistive technologies: principles and practice. St Louis: Mosby Year Book." (2002).
3. Wikipedia. User interface, en.wikipedia.org/wiki/User_interface, 2011, Accessed Nov. 2016

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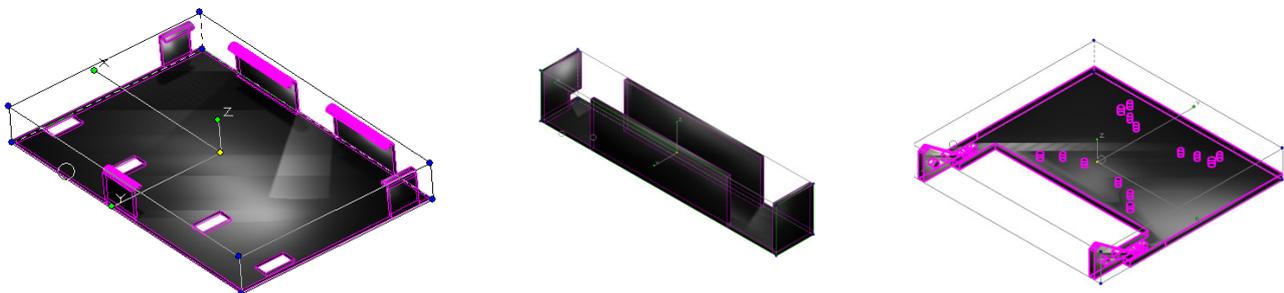


Figure 1 3D components of mount

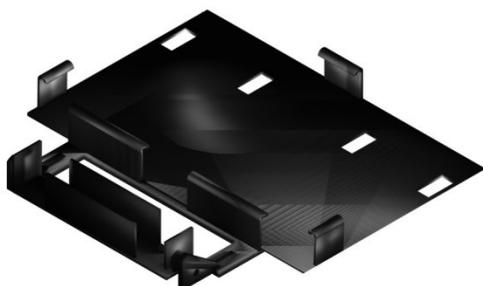


Figure 2 Assembly of components



Figure 3 Photos of mounted device