



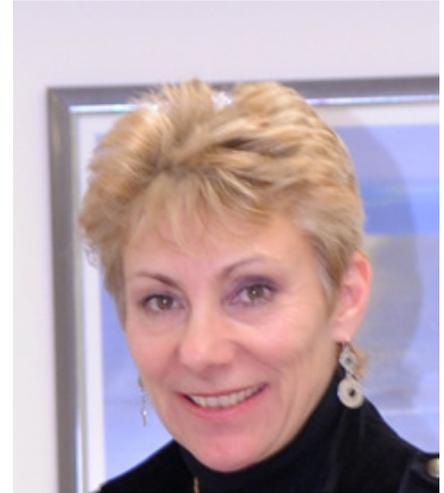
From Prototype to Manufacture

The Neater Uni-Chair – A researcher's perspective

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The idea of a one arm drive wheelchair for hemiplegic users evolved from a simple prototype in 2002 to a product ready for manufacture in 2009. The idea and engineering principles which produced the first prototype were evaluated by a specialist team at the University of Brighton to explore the appropriateness and application of such a piece of technology. With the backing of the clinical experts, the research expertise and a manufacturing partner the prototype called the Ergonomic Self Propelled wheelchair or ESP moved from a concept to a reality.

Initial studies tested the efficacy, ergonomics and ease of use in non-disabled users. Following success in these trials, the research was replicated with disabled users. The trials included driving the ESP and an equivalent dual handrim wheelchair around an indoor circuit with a range of surfaces, carpet and wood flooring, a ramp, and through a chicane of bollards. Heart rate and oxygen consumption were recorded and time taken to complete the circuit. This study endorsed the earlier results and indicated that users found the ESP easier to drive. Hand position, and ease of use were also measured. Users commented particularly on how easy the wheelchair was to propel and to manoeuvre in tight spaces. The following quotes were provided by a couple of users:

'The steering is very sensitive and responsive and the chair very comfortable. This will be a great improvement to mobility over conventional wheelchairs'.

'The single handrim is far less complicated than a dual handrim and the footplate mechanism moves easily. I can do three point turns in confined spaces'.

The research team noted how quickly the users were able to learn to drive the wheelchair. Therapy teams had raised concerns that the concentration required to learn such a skill may have resulted in increased tone, however, this was only noted in two users, and was only a temporary effect.

The research and development involved was heavily reliant on hemiplegic wheelchair users who undertook further clinical and home trials. Their feedback resulted in a major redesign of the steering mechanism which on paper had looked promising but in reality was problematic. The original steering had an engageable/disengageable facility, however, the users found this was not helpful and so it was redesigned. The team discussed the issue of whether steering that could not be disengaged would be problematic to carers. Users and carers did not report this as an issue, in fact for some it was perceived as beneficial. Further

testing demonstrated that the new design of steering was preferable to the original engageable/disengageable mechanism. The final home study enabled users to trial the wheelchair in their home environments. All reported a sense of freedom, independence and satisfaction with the ESP wheelchair.



Late prototype ESP/Neater Uni-Chair

Subsequent pilot studies have indicated that the ESP is easier to use than a dual handrim equivalent when undertaking daily activities such as bed making. A second study exploring distribution of pressure under the seat and backs of legs, also suggests that there is less effort exerted at commencement of propulsion. There may be a link between increased pressure at commencement of propulsion and development of pressure sores. Further work is planned to explore these findings scientifically.

The research was a successful collaboration between Dr Mandy, University of Brighton, Samuel Lesley, design engineer, and Neater Solutions manufacturing and design engineering. The team were funded by the Department of Health for the initial development work. This was completed in February 2009 with the project receiving a 10 (out of 10) rating from the Health Technology Development board committee. The wheelchair commenced manufacture in April 2009.

The ESP changed its name to Neater Uni-Chair when it became available for manufacture. One user who purchased the wheelchair has recently reported that it is 'brilliant'.

Individual client assessments with the Neater Uni-Chair can be arranged through Neater Solutions. Tel: 01298 23882 Email: info@neater.co.uk Web: www.neater.co.uk