Technoleg Iechyd Cymru
Health Technology Wales

HEALTH TECHNOLOGY WALES (HTW) GUIDANCE 014 (November 2019)

Multi-grip myoelectric upper limb prosthetics

HTW Guidance:

Multi-grip myoelectric upper limb prosthetics show promise for use by people with upper limb amputation, but the evidence is insufficient to support their routine adoption.

The relative merits of multi-grip myoelectric upper limb prosthetics as compared with other types of prosthetics for upper limb amputees is uncertain and their current use should be determined by individual patient requirements. Further research into the effectiveness of multi-grip myoelectric upper limb prosthetics is recommended, using validated measures of functional and quality of life outcomes.

Why did Health Technology Wales (HTW) appraise this topic?

The amputation of part or all of the upper limb is needed for a variety of reasons that include injury or disease. Upper limb prostheses can be used for cosmetic or functional reasons and allow people to accomplish some tasks they would otherwise be unable to do. The absence of all or part of the upper limb can also be a consequence of a birth defect, but this appraisal only looked at use of prostheses by amputees.

Electrically-powered prostheses, commonly known as myoelectric prostheses, are controlled by biological signals from the user's muscles. Multi-grip myoelectric prostheses provide separate or simultaneous control of each finger through this electrical stimulation. Alternative and simpler devices offer only an open or closed grip (single-grip) which can be either body-powered (via the use of a harness and cables attached to the residual limb) or myoelectrically powered. Multi-grip myoelectric prostheses are currently available to people in Wales but only if an application for an Individual Patient Funding Request is supported.

This topic was suggested to HTW by the Welsh Health Specialised Services Committee.

The status of HTW guidance is that NHS Wales should adopt this guidance or justify why it has not been followed. HTW will evaluate the impact of its guidance.

Evidence Summary

HTW searched for evidence on the clinical and cost-effectiveness of using multi-grip myoelectric upper limb prosthetics as opposed to standard prosthetics in people that have undergone upper limb amputation. The evidence to inform this comparison was found to be very limited in quality and quantity. There are no published randomised clinical trials (although there is one UK-based trial that is ongoing). Many of the available studies are observational and did not include a control group for comparison.

The evidence suggests that myoelectric and body-powered upper limb prosthetics offer a different range of advantages and disadvantages, but based on current evidence, the comparative quantitative clinical effectiveness of the two is difficult to determine. Qualitative evidence and expert feedback emphasised that upper limb amputees require highly individualised care that depends on multiple factors, including the level of their upper limb amputation and the range of activities/occupations that are required from the prosthesis.

For a full report of the evidence supporting this Guidance, refer to Evidence Appraisal Report 014 (EAR014).

Appraisal Panel considerations

- The panel were informed by the clinical experts that upper limb amputation ranges from removal of part of a hand to loss of the entire limb. The experts also explained that the more proximal (close to the shoulder) the amputation, the more difficult is the rehabilitation process and the ability to replace the function of the lost limb.
- The panel noted that some observational studies are available that describe the clinical effectiveness of multi-grip myoelectric upper limb prosthetics, but the lack of comparative studies versus other types of upper limb prosthetics means that it is very difficult to draw conclusions about the incremental clinical benefits of multi-grip myoelectric upper limb prosthetics.
- The clinical experts told the panel that experience with multi-grip myoelectric upper limb prosthetics in NHS Wales is limited. The majority of experience is in the rehabilitation of injured military veterans, but it was acknowledged that access to prosthetics and rehabilitation in these cases is not representative of the wider health and care system in Wales. When multi-grip myoelectric upper limb prosthetics are made available to patients in Wales, the panel were informed by the clinical experts that their use is supported by clinical assistance and rehabilitation and that the clinical service is delivered at one of three existing specialist Artificial and Limb and Appliance Centres in Cardiff, Wrexham and Swansea. The purchasing of the upper limb prosthesis in these cases follows a successful Individual Patient Funding Request application.
- The panel were informed by the experts that individual patient experience is very important in determining the success or otherwise of using multi-grip myoelectric upper limb prosthesis as compared with standard prosthetics. The panel noted, however, that there is very limited published evidence that describes the experiences of patients and that there is no quality of life outcome data available. From the data available, the panel concluded that levels of patient satisfaction with myoelectric upper limb prostheses are sometimes low, and that there may be poor correlation between laboratory testing and clinical functionality.
- In view of the limited evidence on comparative clinical effectiveness, it was not possible to assess the cost effectiveness of multi-grip myoelectric upper limb prostheses in patients who have had upper limb amputation
- Overall, the panel concluded that the current evidence does not support the routine adoption of multi-grip myoelectric upper limb prostheses in patients who have had upper

limb amputation but the availability of this technology in NHS Wales should be considered for eligible patients via Individual Patient Funding Request applications.

- The panel concluded that further research is needed before routine adoption of multi-grip myoelectric upper limb prostheses in patients who have had upper limb amputation can be supported. This evidence should be derived from comparison of multi-grip myoelectric upper limb prostheses with standard prostheses and include measures of functionality as well as patient experience and quality of life. In the meantime, it is recommended that there should be standardized data collection by the three specialist centres in Wales on the use of multi-grip myoelectric upper limb prosthetics.

Responsibilities for consideration of this Guidance

Health Technology Wales (HTW) was established by Ministerial recommendation[1,2] to support a strategic, national approach to the identification, appraisal and adoption of non-medicine health technologies into health and care settings. The HTW Appraisal Panel comprises senior representation from all Welsh boards with delegated authority to produce guidance 'from NHS Wales, for NHS Wales'. The status of HTW guidance is 'adopt or justify'. There is an expectation from Welsh Government that HTW guidance is implemented with adoption regularly audited by HTW.[3]

The guidance in this document is intended to assist Welsh care system decision makers to make evidence-informed decisions when determining the place of health technologies and thereby improve the quality of care services.

The content of this HTW guidance was based upon the evidence and factors available at the time of publication. An international evidence base was reviewed and external topic experts and HTW committee members consulted to contextualise available evidence to Wales. Readers are asked to consider the generalisability of the evidence reviewed to NHS Wales and that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. It is acknowledged that evidence constitutes only one of the sources needed for decision making and planning.

This guidance does not override the individual responsibility of health professionals to make decisions in the exercise of their clinical judgment in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

No part of this guidance may be used without the whole of the guidance being quoted in full. This guidance represents the view of HTW at the date noted. HTW guidance is not routinely updated. It may, however, be considered for review if requested by stakeholders, based upon the availability of new published evidence which is likely to materially change the guidance given.

Standard operating procedures outlining HTWs evidence review methods and framework for producing its guidance are available from the HTW website.

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Declarations of interest were sought from all reviewers. All contributions from reviewers were considered by HTWs Assessment Group. However, reviewers had no role in authorship or editorial control and the views expressed are those of Health Technology Wales.

Chair, Health Technology Wales Appraisal Panel

1. National Assembly for Wales, Health and Social Care Committee. Access to medical technologies in Wales. December 2014.
2. Response to Recommendations from the Health & Social Care Committee: Inquiry into Access to Medical Technologies in Wales. February 2015.
3. Gething, V. Letter to all Health Board Chairs re Funding for Sacral Nerve Stimulation in Wales. VG_01655_17. September 2017.