



# MAKEYMAKEY: AN INSTRUMENT FOR EVERYONE

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## Summary of work

A case study into the use of adaptive music technology in neuro-rehabilitation. The Royal Hospital for Neuro-disability is a 240 bedded hospital with rehabilitation units and a long stay home. This case study took place on a rehabilitation unit with a focus on Locked-in Syndrome and fine motor movement.

MakeyMakey is widely used for recreational creativity e.g. computer games, virtual musical instruments and physical activity. It consists of an electrical circuit channelled through an interface that recognises conductive materials in place of computer keys. When these ‘keys’ are pressed, selected sound software transfers this into your chosen sound effect.

Having trialled other technologies such as iPad and Soundbeam, their limited sensitivity and adaptability did not allow for use with the restricted motor movements experienced in Locked-in Syndrome.

MakeyMakey’s capacity for using any conductive substance opened up endless potential for sourcing materials that could be manipulated for use with very limited motor function.

## Key benefits

Rehabilitation goals already identified:

- to increase stamina in movement of middle and index fingers of left hand
- increasing range of wrist adduction and abduction

Potential benefits already highlighted in Magee (2013):

- **Physical** - can be used for gross or fine, but in this case fine was the relevant area with focus on increasing stamina.
- **Communication** - whilst technology was mainly used in sessions to focus on functional movement, within this there was scope for choice making e.g. type of instrument sound or conductor
- **Emotional** - technology as well as being for functional benefit, was also used to support adjustment to disability and to facilitate access, in order that the patient could express himself musically. Alongside the functional work, time was made for reflection on his work in sessions and in his on-going adjustment.

## Key learning points

- **Fatigue** - was variable across sessions and was monitored throughout
- **Positioning** - to ensure good positioning and optimise movement, MDT collaboration was key
- **Technological sensitivity** - trial and error of conductor shapes to customise to patient needs
- **Knowledge of equipment** - effectiveness and facilitation in sessions was reliant on time spent by therapists familiarising with the equipment

## Reference:

Magee, W. 2013 Indications and Contraindications for Using Music Technology. In: Magee, W. ed. *Music Technology in Therapeutic and Health Settings*. Jessica Kingsley Publishers, pp. 85-100

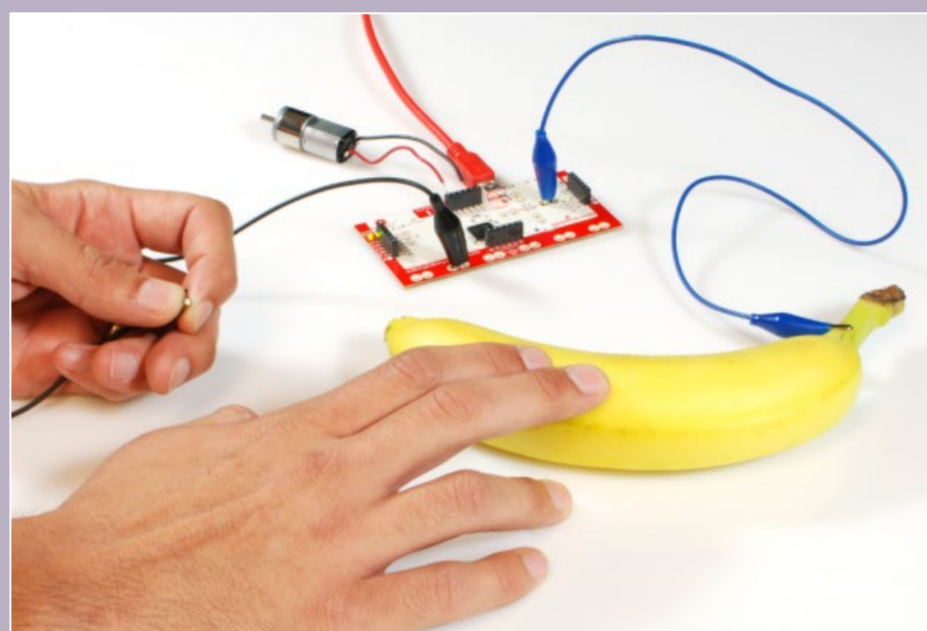


Fig. 1: The Basic MakeyMakey Circuit

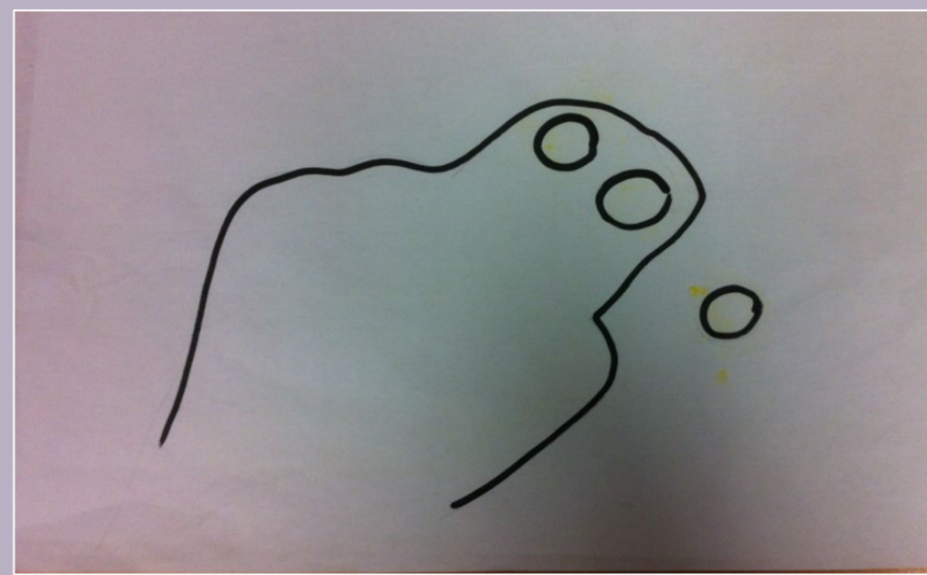


Fig. 2: Traced hand print illustrating circle points for adduction and abduction of index finger movement



Fig. 3: Conductive modelling clay moulded to fit and connect with limited index finger movement in up and downwards motion

## Key outputs

- **Increased stamina** - measurable baseline established for number of repetitions of index finger press and release and adduction and abduction. Clear improvement witnessed from 5 repetitions to 20.
- **Increased motivation** - patient gave positive feedback about adding a musical element to an otherwise ‘dry’ and repetitive exercise.
- **Cause and effect** - clear musical feedback for very small movement → sense of achievement.
- **Giving control** - through choice-making of sounds and conductors and taking part in identifying realistic goal. Giving patient back ownership within a functional rehab exercise. Particularly poignant when other methods and equipment have been used and failed and emphasis has been on ‘loss’ not ‘gains’

## Funding / resources deployed

The MakeyMakey equipment was funded through the hospital’s fundraising department and following a presentation to the multi-disciplinary team further enquiries for more kits were made.