

# Final Report

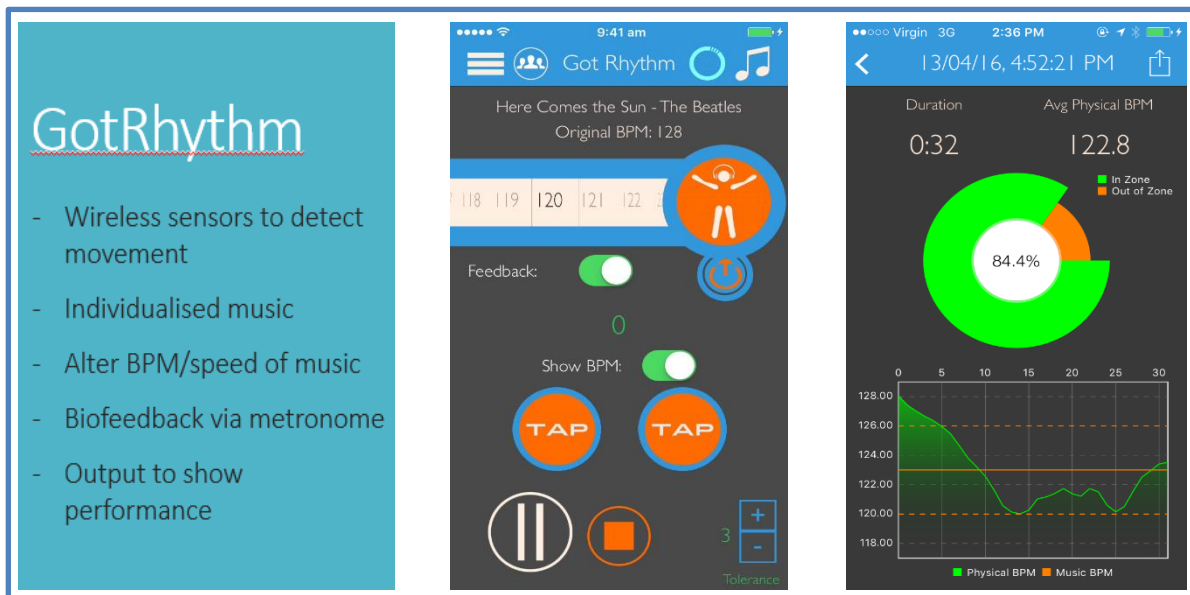
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Title of Project: GotRhythm: a mobile phone app to improve movement following stroke.

## Summary

The use of music therapy to improve recovery of movement following neurological injury is gaining momentum. However, the field has been limited by the separation of music and feedback about movement in relation to the music. We have developed a novel Mobile Software Application (app)—GotRhythm—that uses mobile phones and wireless wearable sensors to deliver music therapy to patients *with real-time bio-feedback*.

Our app delivers a motor training protocol based on individualised choice of music, providing a simple, inexpensive, patient-driven rehabilitation intervention. The app collects data during training, providing a comprehensive motor performance dataset that can be correlated with clinical and physiological outcomes.



We completed testing of GotRhythm to improve motor function and increase excitability of motor areas of the brain in healthy younger and older adults controls. The outcomes of this research showed (1) that younger and older participants were able to use GotRhythm easily and enjoyed using the app; (2) increased excitability in motor areas of the brain after a single 20 minute session with the app. During this phase of the research, we tested a range of movements with GotRhythm, including finger tapping, bimanual thumb tapping, and wrist flexions and extensions: this

provided important pilot work to extend the usability of the app to a stroke survivor population.

We then completed testing of GotRhythm in a chronic stroke survivor sample. First, we found that it was possible to individualise the task used with GotRhythm to suit participants impairments and rehabilitation goals: stroke survivors were able to increase 'Time in Zone'—a measure of successful motor performance on GotRhythm with 20 minutes of training. This work helped us to create a battery of movements that are functionally meaningful and suitable for training with GotRhythm that we have subsequently tested in chronic and acute stroke survivors. Second, we showed, in a subset of chronic stroke survivors, a small but non-significant increase in excitability of motor areas of the brain after 20 minutes of GotRhythm.

Together, this work shows that GotRhythm is an enjoyable, user-friendly application for music therapy that can improve motor performance and induce plastic changes in motor areas of the brain. This provides a basis for further work examining the effect of multiple sessions of GotRhythm on lasting improvements in motor performance in individuals with neurological conditions. This work is currently being written up for a PhD thesis and submission to a peer-reviewed journal.