

# The Falling of Momo

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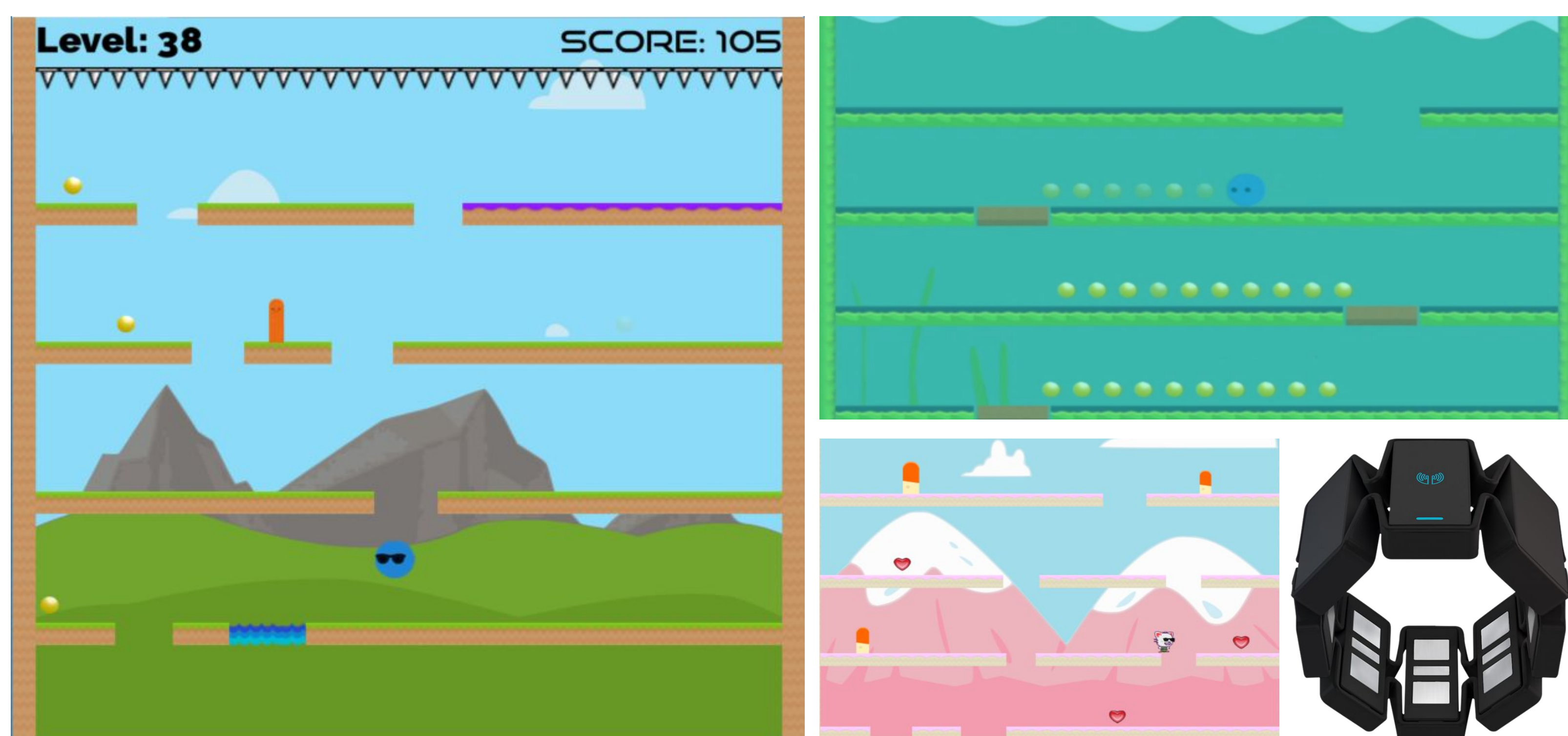
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## A Myoelectric Muscle Training Game

When first learning to use a myoelectric powered prosthesis, patients undergo muscle training to improve the strength, rate, isolation, and control of their muscle contractions. While this is crucial in ensuring long-term adoption and success, patients refer to conventional training approaches as *frustrating*, *monotonous*, and *boring*, making it hard for them to stay motivated.

To make training fun, engaging, and effective, we iteratively improved our working prototype using the feedback and observations gathered through design sessions with amputee patients and clinical experts.

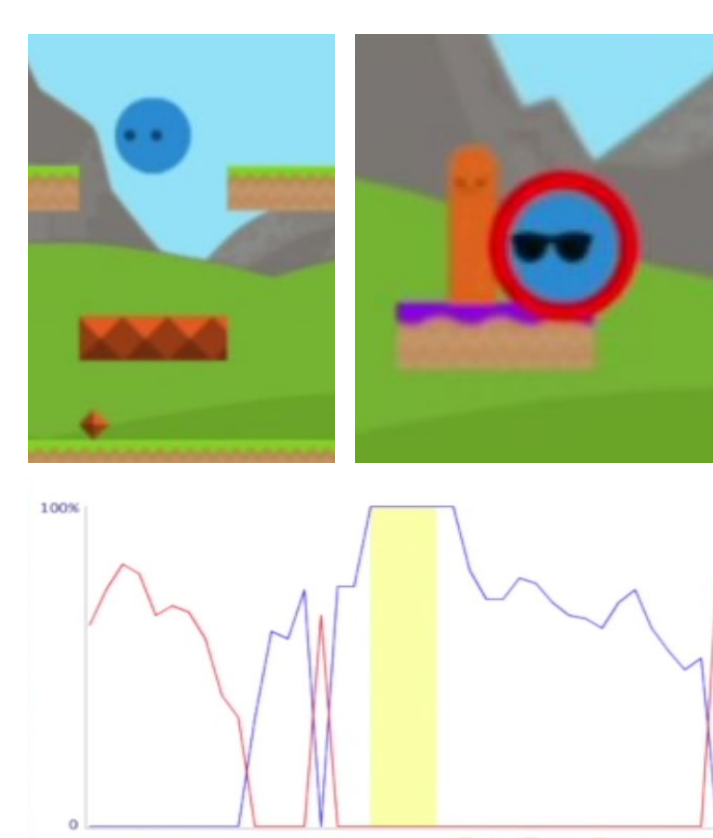
## Our Game



The Falling of Momo has been specifically designed with training goals in mind and provides features to help both patients and clinicians during the training process. It uses the Thalmic Labs<sup>®</sup> Myo armband (\$200 USD), and is a free, open-source project.

## Features

Game elements such as crumbling platforms, an over-exertion warning, and raw EMG signal visualization encourage patients to achieve training goals and provide valuable feedback for clinicians.



## Game Design

We used the four basic elements of games to encourage optimal training behaviour.

- Challenge** Increasing difficulty (level) over time
- Theme** Momo character and surrounding world
- Reward** Accumulating score and collection of coins
- Progress** Gameplay record and cosmetic unlockables

The game is designed specifically to target muscle training goals.

- Strength**
  - *Sticky* and *Icy* platforms
  - Disappearing coins
- Isolation**
  - *Difference* control policy
  - Over-exertion indicator
- Rate**
  - *Impulse* to jump
  - Increasing game speed
- Control**
  - *Crumbing* platforms
  - Narrow gaps

## Future Work

Momo is actively used with patients at our local clinic and has been sent home with one as part of her training, allowing us to explore the benefits of games beyond the clinical environment. We aim to show that game-based training can be an effective alternative to conventional tools, helping patients to strengthen their muscles in preparation for myoelectric control.