

# Understanding Gait:

## The production of a digital study aid for P&O students

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### Introduction

The gait cycle is one of the first concepts taught to undergraduates studying prosthetics and orthotics (P&O), with the understanding of gait being described as fundamental in prescribing P&O devices<sup>1</sup>. When studying a degree in P&O, being able to learn the core concepts of this complex topic can be challenging, with many resources lacking simplicity, clarity and well referenced evidence. The accessibility of available resources, in both a usability and location sense, is also lacking.

These factors inspired the creation of a study aid (StA) for the gait cycle for P&O students.

### Project Aim:

Simplify core information on the gait cycle and present this in a clear, accessible and interactive digital StA to improve the understanding and retention of this topic

### Methodology - Making the Study Aid

The StA was devised to support student learning of the gait cycle and associated biomechanics.

Due to time limitations, a prototype of the proposed StA was created which only covered the midstance phase of gait. This stage was chosen due to its complexity, as well as it's role in influencing prescription and tuning of devices.

The StA went through multiple iterations, with the final design shown in figure 1.

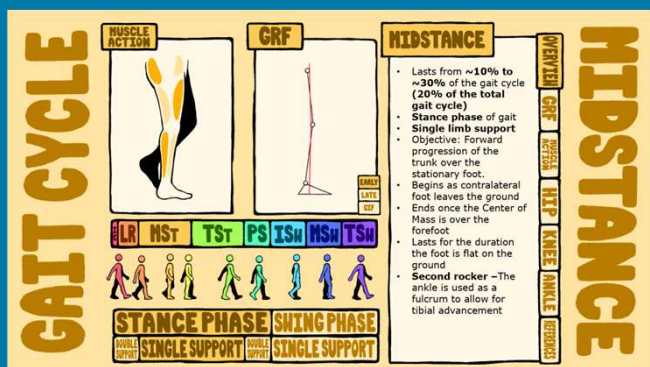


Figure 1. The finalised interface for the study aid

The following features were added to the study aid:

- Layout inspired by flashcards, which have been shown to help knowledge retention when paired with spaced repetition<sup>2</sup>.
- Information sets written in simple, understandable bullet points in accordance with Cognitive Load Theory<sup>3</sup> and the SCULPT model for accessibility<sup>4</sup>
- Information sourced from university recommended reading lists, alongside peer-reviewed articles and P&O textbooks.



- Visual aids in the form of images and GIFs
- Accessible colour contrast and font choices

The StA can be viewed using the QR code (left). It is best viewed using a laptop or device with a sizable screen.

### Methodology - Conducting a Questionnaire

A study was conducted with Ethical permission from the Departmental ethics board of the Strathclyde Department of Biomedical Engineering. Twelve 4th year P&O students from the University of Strathclyde were recruited to take part in a questionnaire. The participants were divided into two groups of 6, where group A was provided with the StA, and group B was not.

The questionnaire consisted of a six-question quiz based on information provided in the StA, and a feedback form which was provided to group A only.

On average, participants in group A scored two marks higher than group B in the quiz, as seen in figure 2 (right).

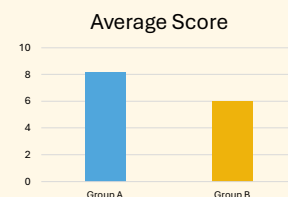


Figure 2. A bar graph showing the average score of each group.

### Matrix Statements



Figure 3. A bar graph showing the answers to the feedback matrix as filled out by group A.

The feedback matrix was overwhelmingly positive, as seen in figure 3 (left).

The written feedback primarily focused on the clarity of the StA both positively and negatively.

The participants also called for further development of the StA to cover the full gait cycle and related topics.

### Discussion

The results of this study prompted the following discussion points:

- Improved retention rates implied by results
- Strong participant support of StA use in learning and revision
- Digitisation may limit accessibility; however digital aids are often preferred to digital when studying<sup>5</sup>
- Accessibility features of the StA can benefit the wider population as well as those who require the adaptations<sup>6</sup>
- Interest was shown for a more extensive StA covering the whole gait cycle and beyond
- Further developments, such as gamification of the StA, could be made to improve learning outcomes and attitudes towards learning

### Limitations

Limitations of this study include limited time, participant bias, small sample size, face validity of the questions, and participant inclusion restrictions. Changes in these areas may provide more relevant and substantial results.

### Conclusion

The study conducted yielded positive results, with the quiz supporting the retention benefits of the StA alongside a positive reception of the StA by students who had previously learned gait. Therefore, the production of a StA with full gait cycle coverage is indicated to be a beneficial investment for future P&O students.

### References

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