The Strathclyde Prosthetic Foot
A High Performance Prosthetic Foot for Low Income Countries

Richard Copeland, Robin Rackerby, Laura Underhill, Zoë Tankard
Dr. Arjan Buis, Dr. Philip Riches, Mr Stephanos Solomonidis
Biomedical Engineering, University of Strathclyde
Corresponding author: arjan.buis@strath.ac.uk

Clinical Need
In the developing world there are ~1-2 amputees per 10000 people\(^1\). An amputation can cause significant financial strains\(^2,3,4,5\) and social exclusion\(^7,8\).
The anatomical foot provides shock absorption and energy return\(^9\); this needs to be recreated in the prosthetic foot.
The Strathclyde Foot is a dynamic, inexpensive foot for the developing world with a durable, cosmetic rubber casing.

Objectives
The main objectives were:
- To mechanically test the energy return, shock absorption and stiffness of the rubber-cased feet in comparison to the Core and VariFlex foot.
- To mechanically test one rubber-cased foot against two feet that are currently available in low income countries.
- To analyse gait of two rubber-cased feet in comparison to the VariFlex and Trés feet.

Results

- The core of the Strathclyde foot was encased in rubbers with varying shore densities (10A-40A).
- These feet were compared using static proof testing with an Instron E10000.
- The 40A foot was compared to other prosthetic feet used in low income countries. The VariFlex was used as the baseline during all static proof tests.
- Gait analysis was carried out on the 10A and 40A feet in comparison to the Trés and VariFlex feet comparing Ground Reaction Forces (GRF) and angles.

Method

- Modify Mould
- Modify Cores
- Encase Cores in Rubber
- Static Proof Testing

- Market Comparison
- Gait Analysis

- The core of the Strathclyde foot was encased in rubbers with varying shore densities (10A-40A).
- These feet were compared using static proof testing with an Instron E10000.
- The 40A foot was compared to other prosthetic feet used in low income countries. The VariFlex was used as the baseline during all static proof tests.
- Gait analysis was carried out on the 10A and 40A feet in comparison to the Trés and VariFlex feet comparing Ground Reaction Forces (GRF) and angles.

Discussion and Conclusion

- Test between Cores
- Standardise the position of the Core and VariFlex foot

References