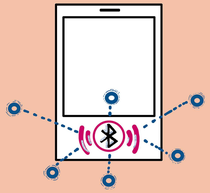
SOS: Save Our Soles

A SMART SOCK

Anna Akwukwuma, Brandon Low, Jolynne Tan, Shaz Raja, Sophia Wan and Wiktoria Brdej
Concord College



Peripheral Arterial Disease

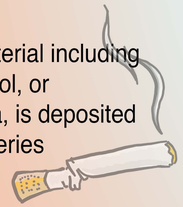
What?
Peripheral arterial disease (PAD) is a condition where one's limbs don't receive enough blood flow [1]

Where?
Arteries that carry blood to your limbs; in particular, the legs

When?
After arteries are narrowed or blocked

Why?
Often due to atherosclerosis [2]

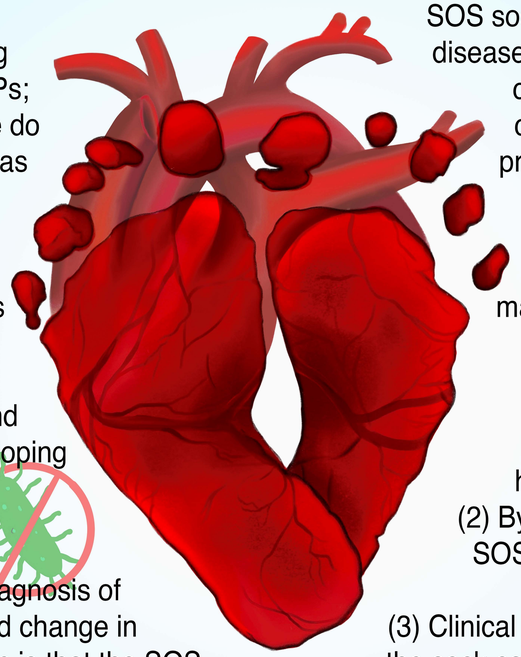
How?
Fatty material including cholesterol, or atheroma, is deposited in the arteries



Who?
Those who are old, diabetic and smoke are at risk [3]

Detection of PAD

PAD affects 9% of the population [4] and is usually diagnosed through physical examinations, the ankle-brachial pressure index test (ABPI), ultrasound scans and angiograms [2]. Current diagnosis relies on patients noticing symptoms and reporting to their GPs; however, only about 75% of people do not experience symptoms [4] such as intermittent claudication (leg pain), leg ulcers, shiny skin and brittle toenails [5]. Those that experience symptoms mistake them for causes of ageing and do not inform their GPs. This means that in most individuals, PAD is detected late and they have a higher chance of developing further cardiovascular disease.



Our Vision

We propose a solution to aid the diagnosis of PAD (characterised by an increased change in heart rate): a smart sock. Our vision is that the SOS sock paves a new path of preventive medicine with one sole purpose: promoting health and wellbeing via early screening and diagnosis. Hope lies in the fact that the SOS socck acts as a precursor for an era of smart devices that work to improve the health of the population.

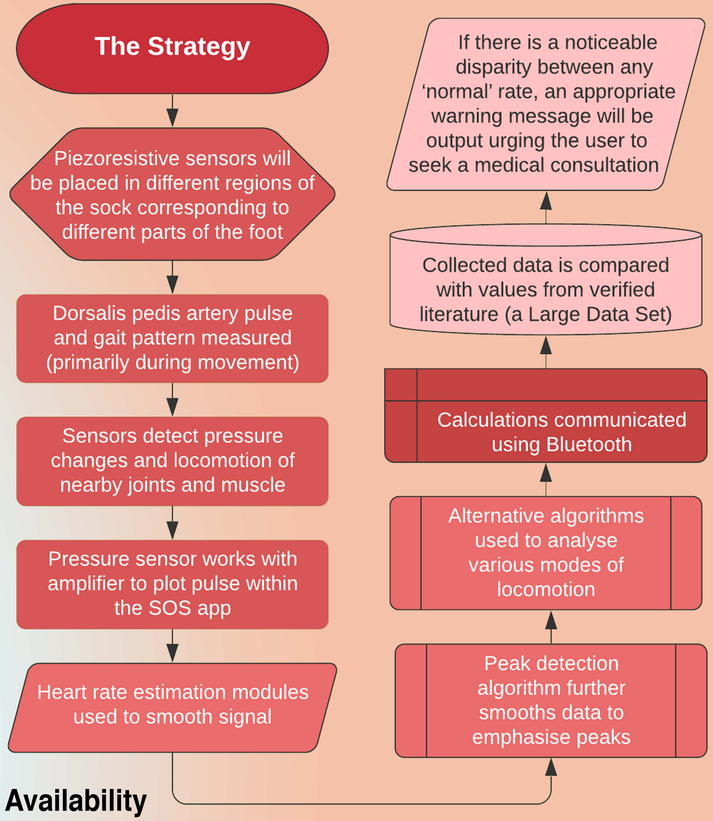
The NHS Long Term Plan

The implementation of the SOS sock acts in line with the NHS Long Term Plan: holding preventative medicine at its core. We hope that a slow implementation of the SOS sock in the UK will reduce cardiovascular disease that currently accumulates healthcare costs of £7.4 billion and non-healthcare costs of £15.8 billion per year [6]. If this proves successful, our long term hope is that with the improvement of fabric-based technology, additional health monitors (e.g. blood pressure) may be included in the sock, contriving a reduction in costs in the future.

Feasibility

(1) The SOS sock is first introduced to health professionals (e.g. cardiologists)
(2) By discretion of health professionals, the SOS sock is first recommended to patients with, and suspected of, PAD
(3) Clinical trials will be carried out to see whether the sock can accurately and consistently measure heart rate (comparing with ABPI)
(4) If the sock is found to be accurate after the trials, we may be able to conclude the efficacy of our product in early detection of signs for prompt intervention and treatment

The Strategy



Availability

Initially given out on prescription by GPs to those who may be assessed as having a higher risk of PAD. It will work as a subscription costing £10 per month.

Properties of the SOS sock [7]

- Made with bamboo fibres that are antibacterial and hypoallergenic [8]
- Ribbed cuff and arch to create a snug fit
- Embroidered with electroconductive yarns to allow the seamless integration of a waterproof sensor [9]
- Stretchable and in different sizes
- Washable in lukewarm water

References