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Walk with Path: Combining technology with design

Peter Crane, Lise Pape

Abstract: Walk with Path is a UK based, early stage healthcare company that focuses on improved mobility, injury prevention and user-centered design based intervention. The company is developing two products to assist Parkinson's or Neuropathy patients with mobility: Pathfinder and Path Feel. The company has recently raised Angel funding to assist with the development and launch of their first product and have won several Innovation awards.

Keywords: Walk with Path, Path Finder, Path Feel, Technology, Design, London, Alzheimer's, Mobility

1. The success story

Walk with Path is an early stage healthcare company that focuses on improved mobility, injury prevention and user-centered design based intervention. Founded in the spring of 2014, Walk with Path has since won numerous awards including from: The Helen Hamlyn Centre for Design, Wates Foundation, The Dyson Foundation, Innovate UK, Health Social Innovators and UnLtd. In addition, Walk With Path has also featured at prestigious events such as Mass Challenge and the "Pitch at the Paras" held at the 2016 Rio Paralympics (organized by the Department of International Trade, Brazil, and the Innovation Forum). Following a successful pilot trial, Walk With Path raised angel investment from the UK and Danish investors to launch in 2017, their first product: Path Finder. Path Finder is a shoe attachment for Parkinson's patients that provides visual cues to guide the foot movement and gait. Walk With Path is also developing a second product, Path Feel, which is currently in an earlier stage of development and is designed for individuals with peripheral neuropathy or balance issues in general.

2. Where did it start

In Spring 2014, motivated by her father's struggle with Parkinson's disease, Ms Lise Pape, conceived the two products developed by Walk With Path. At the time, Lise was studying for an MSc in Innovation Design Engineering between the Royal College of Art and Imperial College

Peter Crane: Peter K. Crane, Rare Pharma Ltd, 126 Ferry Hinksey Road, Oxford, Oxfordshire, OX2 0BY, Great Britain, E-mail: peter@rare-pharma.com
Lise Pape: Walk with Path Ltd., 54 Sun Street, Waltham Abbey, Essex, EN9 1EJ, Great Britain

London and thus applied concepts from user based design into the development of both products. User based design is an approach in which problems are first identified by consultation with end users and the product then designed iteratively based on regular user feedback and evaluation. This contrasts with a typical design process, where a product is conceived and developed before being tested on end users [1]. The products were first exhibited in June 2014 in London, and after receiving grants, Lise was able to formally register the company later that year. Starting as a one person operation, Lise was able to find employees and co-founders via her personal and universities networks, such that Walk With Path now has a multidisciplinary team of 8 from a diverse set of backgrounds including science, technology and design.

Figure 2. Ms Lise Pape in the electronics workshop with an early version of the walk with path technology.

3. The technology & development

In Parkinson's disease (PD) and multiple sclerosis (MS), a loss of motor control is observed in later stages of the disease which subsequently leads to an increased risk of falls. Studies in the have shown that patients suffering from PD are greater than 3 times more likely to suffer a hip fracture than the control population [2,3]. Furthermore, these hip fractures present a significant cost burden for healthcare systems struggling to control costs associated with ageing populations: in the UK the cost associated with hip fractures is estimated at more than £1.1bn a year [4]. Technologies that can help prevent falls for patients suffering from a loss of motor control have huge potential societal and cost benefits for patients and healthcare providers alike. Walk With Path has developed two products: Path Finder and Path Feel, are both designed to help with injury prevention for patients suffering from impaired mobility resulting from reduced motor function. Both these technologies were the subject of national phase

patent applications in 2014 (subsequently split), with Path Finder currently undergoing CE marking as a class I medical device. Path Feel will subsequently be taken through this regulatory pathway (but most likely as a class 2) once Path Finder has been commercially launched in 2017.

Path Finder, a shoe attachment that provides visual cues for the wearer to follow improving movement and gait, has been shown to reduce the Freezing of Gait symptoms in Parkinson's patients by 65%. This follows a pilot study in collaboration with Radboud University based in the Netherlands. Based on this, a multi-centre study is planned, which will constitute a formal clinical trial to further validate the efficacy of the device. The actual technology relies on a pair of specially designed shoes with small green lasers attached, these lasers project green beams ahead as the patient walks and crucially are controlled by a sensor (not under the heel) that monitors the patients walking. Whilst there are other devices on the market (walking canes or frames) that provide visual feedback for gait improvement, these often require a high level of attention from the user, increasing the risk of a fall. In comparison, Path Finder provides a consistent method of visual cueing, as the line will always be administered with the same distance and angle from the user (requiring less effort and concentration from the user).

Path Feel, the second product and an active feedback insole, is currently undergoing trials to evaluate its effect on balance together with University College London. A literature study in 2014 demonstrated that vibrational feedback improves balance and posture in healthy ageing individuals [5], whilst other reports have illustrated that the use of vibrational feedback can compensate for the reduced sensitivity experienced by patients with neuropathies [6]. These literature studies acted as a proof of concept for the Path Feel device. Path Feel provides vibrational feedback (haptic) to the user, enhancing their sensory perception and thus improving their gait, posture and balance. Path Feel is also equipped with Bluetooth and pressure sensors to allow real-time data collection for long term healthcare management. There are, however, competing devices to Path Feel such as in Moticon insole. The Moticon insole measures pressure distribution, however, it does not provide any feedback in response. The direct real-time feedback provided by Path Feel is a clear USP and allows it to have more impact upon balance, gait and posture.

Figure 3. An illustration of a Path Feel prototype being modelled by a member of the Walk with Path team in a gait lab.

The main method for long term rehabilitation today is physiotherapy. A central challenge with this approach is a 70% non-compliance rate associated with physiotherapy, causing a lack of effectiveness [7]. By introducing products which can closely integrate into a patient's daily life, this non-compliance issue can be resolved and rehabilitation improved. Path Feel and Path Finder thus represent a new approach to both management of existing conditions (preventing falls) and rehabilitation from existing injuries.

4. Looking to the future

In the coming months, Walk With Path plans to focus on the commercialization of the Path Finder device in anticipation of a 2017 commercial launch. The Path Finder device will originally be sold B2C via their website to customers based predominately in Europe; however, given recent media attention, and interest from patients across the globe, there are opportunities to expand sales to customers in Australia, India, Canada, the USA and South America. Concurrently, the team is building up B2B sales relationships with potential distributors in the UK. In addition to these business developments for Path Finder, the team will continue to develop Path Feel and is also exploring numerous new projects that could impact positively upon the lives of those with impaired motor function.

The Company

Walk With Path Ltd.
Somerset House
London WC2R 1LA
United Kingdom
https://www.walkwithpath.com/

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Peter Crane conducted research at Oxford University in carbohydrate chemistry, synthetic biology and glycobiology. In addition, he has undertaken periods in industrial small molecule and biologic research, conducted healthcare venture sourcing/due diligence for an international biopharmaceutical company, and organised several global deep technology initiatives. He is now launching life-science companies in the area of glycobiology, working with several Chinese organisations on international consulting projects and also serves as senior advisor to the Innovation Forum Network. He has spoken extensively on the topic of UK-China engagement both in China and the UK, and has published on the matter in leading Chinese newspapers. He also writes on the topics of AI, Blockchain and Social Impact.