

# Meet the inventor

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### Invention: Ulnar Splint



### Briefly describe your idea

Many patients present with tingling affecting their little and ring fingers. The advice given by doctors is generally to (a) avoid pressure on the ulnar nerve at the elbow, and (b) avoid prolonged elbow flexion – yet there is no splint designed to accomplish this.

We have developed a novel splint designed for first line treatment of the symptoms of ulnar nerve entrapment – a common problem. The two key novel features are: (a) a flexible exoskeleton to protect the nerve from direct pressure, and (b) a simple method whereby flexion of the elbow can be restricted when required.

### Why is your idea so unique?

There is currently no elbow splint that can protect the ulnar nerve from direct pressure and can limit elbow flexion. However, there is a need for such a device – as concluded in the Cochrane review of ulnar neuropathy treatment.

Unlike existing medical splints we are designing the ulnar splint to be attractive and colourful in design and thus appealing to wear – appearing more like a sporting product than medical. It will be extremely light weight and cheap to produce compared to other medical splints.

The incorporation of motion technology as part of the patent provides a great opportunity for generation of intelligent splints, providing feedback on movement for rehabilitation.

### What impact has the innovation had or is likely to have?

The ulnar splint is designed as first line primary care treatment which is immediately available without further referral, and may reduce the need for ulnar nerve surgery. This will potentially be both convenient for patients and reduce overall treatment costs.

### What gave you the idea?

The idea came from seeing patients in clinic with suspected ulnar nerve symptoms – tingling of the little and ring fingers – and repeatedly providing the same advice (protect the nerve at the elbow, avoid prolonged elbow flexion) without having a suitable splint to recommend. Knowing that a splint was available and widely used as first line treatment for carpal tunnel syndrome (causing tingling/numbness on the other side of the hand) it seemed obvious I should try to develop a similar product for the ulnar nerve. With a substantial market as a possible first line treatment, the splint needed to avoid pressure being put on the nerve as well as preventing prolonged elbow flexion. I had an idea how to design the splint and the existing carpal tunnel splint showed it could be done, guiding the eventual route to market for a new ulnar splint.



### **What backing have you received to develop your idea?**

I've received substantial support and encouragement from Health Enterprise East, who funded the patent work and also awarded a £5000 Innovation Voucher in 2015 for development of prototypes for a small pilot study. The help received from my biomedical engineering colleagues in Addenbrooke's for the development of the early prototypes and refinement of my idea has been invaluable. Also, I have had support, alongside Addenbrooke's R&D department, in getting permissions for the pilot clinical study.

### **What have been the major challenges faced?**

- Explaining there is a market for such a device, and a route to market (the same as the existing carpal tunnel splints)
- Explaining that I had an idea for a good solution that might work, and that it would be cheap to produce. After these two relatively straightforward 'entry hurdles' HEE has been extremely supportive
- Working with biomedical engineering to refine and simplify the original concept, plus produce prototypes
- Working with lawyers and HEE to patent the idea.
- Communicating with commercial companies to develop the prototype further – to produce a small batch of products for use in a pilot study
- Getting seed funding for the small pilot study - £5000 via HEE Innovation Voucher

### **What is the current situation with the innovation and future plans for it?**

Having identified the need, and conceptualised the ideal solution, we have constructed and tested several prototypes to determine the best way of accomplishing the goals. A patent was submitted to protect the intellectual property early in 2014, which importantly covers broad claims including protection (of other nerves or scars) at other joints, and including movement detection technology to track movement and rehabilitation.

Since then discussions have started with an existing medical splint company to produce quality prototypes to enable us to undertake a small trial. Pending ethical approval this trial should start by spring 2016.

We now plan to gain a CE mark for this class 1 device, and commercialise it globally, most likely via a licensing agreement.

### **From your own experiences what advice/tips would you give to other people who have an idea for a new invention in their Trust**

- Daydream about problems and how to solve them; identify lots of problems that need solving
- Do pursue your idea, do talk to your innovation hub early
- Decide if there is a substantial need – assess the potential clinical benefit, the number of people who might be affected and the financial benefits if the innovation works
- Sketch down solutions to the problem you plan to overcome; think early about making the solution as simple as possible
- Do a patent search early – this is easily done via Google and will give you information on what's already been tried and how likely it is you could patent your idea

