



CardioWall® Case Study: Nuffield Orthopaedic Centre

For the Children's Rehabilitation Service based at Nuffield Orthopaedic Centre (NOC) part of Oxford University Hospitals NHS Foundation Trust, the CardioWall® is a pivotal piece of equipment. They use it daily in their treatment and management of young people with a range of challenging conditions.

The Pain Service at the NOC, known as OxCYPP (Oxford Centre for Young People in Pain), is led by Dr Konrad Jacobs. **It is one of a very small number of services in the UK specialising in managing children and young people with chronic pain**, and was also the first service to use interactive gym equipment in their work.

The service predominantly treats children with chronic pain, providing physical, emotional and functional interventions.

Rugged Interactive's CardioWall was introduced into the service in September 2013 and since then has **been become a focal point of rehabilitation for patients and practitioners.**



Key Staff at OxCYPP

- **Dr Konrad Jacobs:** Clinical Consultant Psychologist - clinical lead for OxCYPP
- **Julia Smith:** Specialist Paediatric Physiotherapist and project lead for CardioWall®
- **Catherine Barry:** Team lead for Paediatric Physiotherapy department
- **Anne-Marie Van Es:** Specialist Occupational Therapist
- **Lisa Fox:** Therapy Assistant

Rugged interviewed the paediatric therapy team to explore what it is about the CardioWall® that has made it such a valuable tool for the work they do.

Benefits of the CardioWall® at NOH

Following conversations with many members of the paediatric therapy team about the addition of the CardioWall® to the treatment options, five clear categories of benefit emerged:

1. **Outcome Measures**
2. **Motivation**
3. **Overcoming 'Fear-Avoidance'**
4. **Positive Reinforcement**
5. **Physical Benefits**



1. OUTCOME MEASURES

The CardioWall® is used to measure baseline levels of fitness. It also allows practitioners to monitor progress and track improvements across a number of physical and emotional areas.

For example, the CardioWall® is used at the beginning of a 2-week physiotherapy programme to assess a patient's physical ability to engage with the apparatus. Practitioners might assess, for example, whether patients are using both limbs, whether they are crouching down and if there is anything that they are particularly avoiding.

At the end of the programme the patient is then assessed again on the CardioWall® to look at quality of movement changes – are patients more relaxed, and what improvements have been made in mobility, balance, coordination and confidence?

2. MOTIVATION

Physiotherapy often needs to be repetitive, and sometimes improvements can be slow. This can impact on a patient's desire to continue and complete the physiotherapy programme. The CardioWall® is used to overcome this reluctance by providing a fun and stimulating way of promoting movement and rehabilitation exercises.

"It's kind of a motivating factor, patients engage in a bit more of the boring side of physio that we are asking them to do – and then the CardioWall® is a big reward – it's fun, it's colourful, it's engaging and they often really enjoy it" – **Julia Smith**

3. OVERCOMING 'FEAR-AVOIDANCE'

For many patients of the paediatric unit, physical exercise is an essential part of their rehabilitation, yet those exercises are often painful to do, so patients are reluctant to complete them.

Therapists use **distraction techniques** to overcome the problem of Fear-Avoidance.

"The fear-avoidance model of chronic pain describes how individuals experiencing acute pain may become trapped into a vicious circle of chronic disability and suffering. (Crombez et. al, 2012). Introduced by Lethem et al. in 1983, this model helped explain how these individuals experience pain despite the absence of pathology."

"Often, you'll find that because they're in front of the lights, they're not facing you, they engage really well and they just do movement that maybe they've been worried about or are fearful of"
– **Julia Smith**



The CardioWall® is one of the unit's most effective distraction techniques.

"When a child has a physical pain or cognitive impairment, there can be a tendency to reduce or stop exercise and physical activity. [The CardioWall®] distracts from all types of symptoms such as pain, fatigue and stiffness – which can be very, very helpful" – **Dr Konrad Jacobs**

The other aspect of the CardioWall® that makes it an especially effective distraction for patients is **competition**.

The CardioWall® provides a score output for every game played, which allows an individual or physio to track progress over time and effectively to compete against themselves or other patients whose scores are recorded. The introduction of a



leaderboard at NOC has enhanced this, encouraging intra-competition with other patients and their families.

“Patients love the leaderboard. They come in and have a bit of a challenge. [It’s] another nice motivating factor, because everyone wants to be number 1!” – Julia Smith

4. POSITIVE REINFORCEMENT

Using the CardioWall® provides patients with a sense of progress and the internal motivation to better themselves and to adhere to their therapy programme. Attaining a score on the CardioWall®, and then seeing their scores improving, gives patients a **sense of achievement and a positive mindset** that can be highly beneficial to all aspects of their treatment programme.

They also find a relationship-building benefit too. Patients will typically make the best progress when the **patient-therapist bond** is a strong one:

“Because the CardioWall® is such fun, the patients enjoy using it with the physios. Generally, this helps build the bond between patient and therapist, which then has a positive effect on their therapy and programme outcomes” Lisa Fox, Therapy Assistant

Independence

The CardioWall® also improves independence. As patients can exercise and be active independently on the CardioWall®, without the aid of a physiotherapist, this helps build confidence and gives them a sense of achievement – which itself is very valuable in their therapy programme.

“The thing we like from a treatment point of view is, you can change the levels/settings... they’re independent on the machine, they can do it themselves.” – Julia Smith

5. PHYSICAL BENEFITS

The physios at NOC set personalised exercise programmes to achieve a variety of specific physical rehab outcomes.

Weight-bearing activities – patients may reduce their weight-bearing activity due to pain and Fear-Avoidance. But such physical activity is vital for maintaining and improving muscular strength. The CardioWall® enables practitioners to prescribe specific exercises in a controlled manner that can be easily assessed.

Ilizarov frame patients are another beneficiary group:

“When working with children who have Ilizarov frames on their legs, the CardioWall® is a really great way to get children to weight-bear on that leg” – Victoria Healey, Specialist Paediatric Physiotherapist

At the NOC, such CardioWall®-oriented exercises are frequently used to work on areas such as lower and upper limbs, balance, core stability, hand-eye coordination, grip strength and general mobility.



Summary – the Team Lead’s Perspective

Catherine Barry, Team Lead for Specialist Paediatric Physiotherapists summarised for us the benefits of the CardioWall® seen at NOC, explaining that it enables patients to “*maximise their potential*”.

“The benefits of the CardioWall® are two-fold.

*Firstly, for our patient cohort, the CardioWall® has brought a fun addition to our treatments. It has provided application **across musculo-skeletal physiotherapy, rheumatology and cerebral palsy sectors**. It has been commonly used in the **rehabilitation of knee conditions**, and offers a unique, flexible way to challenge the patient, and offer **fun strengthening and balance activities**. **Feedback from patients always includes the words ‘fun’, ‘challenging’ and ‘loved that’!***

*Secondly, from the staff perspective, the CardioWall® offers the team a **unique treatment modality which is adaptable to their caseload**. The wall can enable physiotherapists to **increase the patient’s participation during treatment**, which is very rewarding. It accommodates patients of all shapes, sizes and fitness level (inclusivity).*

*“I am aware how lucky we are as a team to offer such an exciting treatment modality, it stands out and brings out the competitive side, **enabling the patient to maximise their potential.**”*

On completion of our visit to the NOH, the CardioWall® was upgraded to the latest model with updated software and bespoke front graphics. The new CardioWall® design was chosen by the physiotherapy team at NOH – we have to say, it looks great!



*Our thanks to **Dr Konrad Jacobs, Julia Smith, Catherine Barry, Abigail Cooper, Victoria Healey and Lisa Fox** for their time, and for giving us insight into how effective the CardioWall® can be in a medical setting.*

