

## Pushing the envelope of powered mobility to meet postural need

Following a referral to RPMS was to identify equipment available which is suitable to support postural needs requiring a prone standing position

To determine whether this wheelchair could be sufficiently adapted to support this particular client's indoor and outdoor wheelchair needs.

The client's goals were to be able to mobilise safely and independently indoors, leave her home environment, and access the promenade.

### Client

**Diagnosis:**  
• Congenital myopathy  
• Osteopenia

**Posture:**  
Assessed standing up and lying in supine on her settee and using her current Romatic Return standing frame which is her main means of mobility.

Has little to no flexion on the right hip which is internally rotated and she has got contractures in the knee which limits knee flexion to 20 degrees. Her right knee goes to hyperextension when she stands.

The left hip flexes to 30 degrees and knee flexes to 70 degrees. When she stands the right foot is behind the left foot.

Her trunk has significant kyphoscoliosis and she has wasting of the upper and lower limb muscles

4foot 2 inches in height

### Challenges

Client can only stand only flat and has no ability to achieve a close to 90 – 90 sitting position. This limits the amount of conventional wheelchair designs and seating solutions.

Needs to be able to enter from rear of chair due to her transfers and stance.

Needs to be able still use a sling standing style hammock seat anchored to the front of the chair.

Needs to lean anteriorly on support ideally with a tray mounted controller due to fix posture

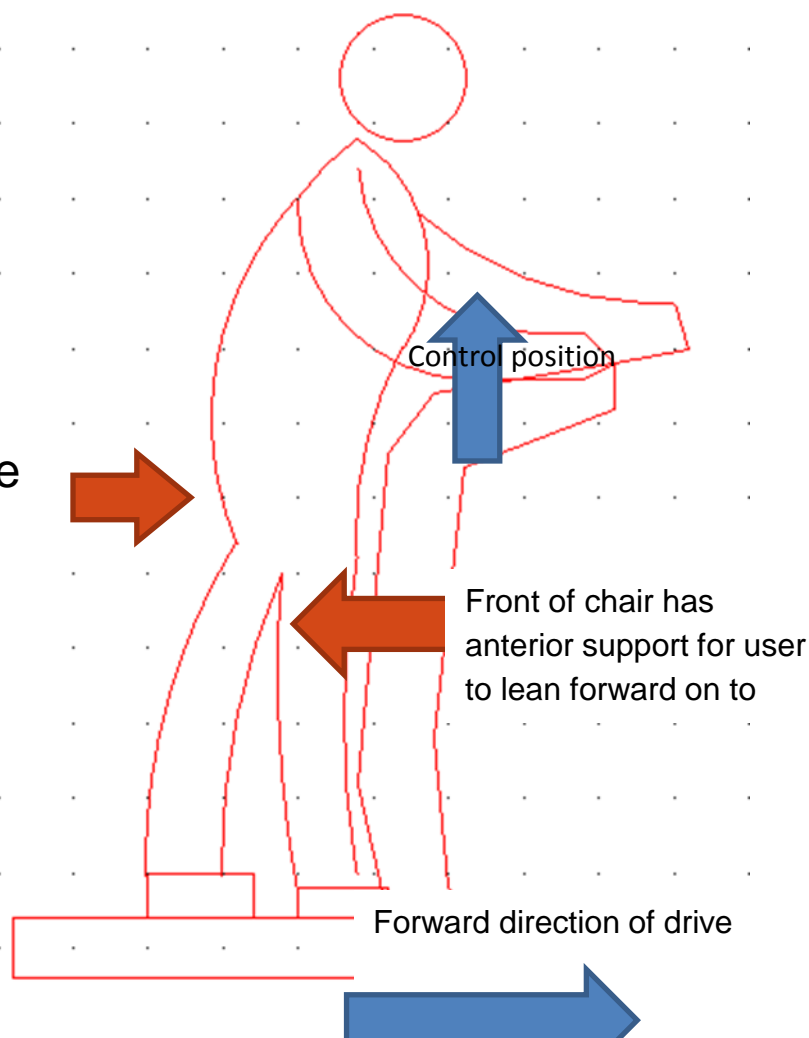
Needs to be able to stand with one leg in front of another due to fixed hyper extension of the right knee.

Needs to have anterior support for Client to lean forward on to rest against due to both hips being in fixed extension with no flexion.

Needs to fit with NHS Wheelchair Service powered mobility criteria that is predominantly indoor use with outdoor capability.

### The Design

User to be able to enter from rear of chair. User to have a sling standing style hammock seat anchored to the



- Chair to be electrically powered wheelchair that is predominantly indoor with outdoor capability. This chair must be able to manage outdoor
- Ideally chair to be limited to or able to be programmed to 4 miles an hour.
- User can be lifted on to chair so height is not and important factor but for drive characteristics and stability.
- User is approximately 130cm height.
- Front anterior support to be able to be padded or shaped to maximise contouring support

### The Search

In accordance with Medical Device Directive of design and prescription of medical devices RPMS set out to investigate if there was a commercial available device that is supported by NHS prescription criteria within the UK and European Market.

Leading manufacturers were contacted with written design criteria to see if they had a commercially available mobility device, either in the UK or through out the EU

Unfortunately there was no commercially available mobility item that they could offer.

The design criteria was discussed with in the West Midland Regional Rehabilitation Engineers meeting to see if the was experience in meeting this design criteria. This group were unable to provide feedback on experience of such a product and it was agreed that no conventional wheelchair could be adapted to meet the design criteria

The Posture Mobility Group clinical forum was contacted to see if there was wider experience in provision to this design criteria. This forum had no answer fulfil the criteria.

RPMS conducted a wider search and found 2 potential devices that partly met the design criteria. These were:

- The Tek Robotic Mobility Device
- The Rollerscoot

The Rollerscoot was the closest matched to design criteria

### The Trial



A Roller scoot was obtained and the client was asked to attend Oak Tree Lane Centre for a trial



Full Risk Versus Benefit Analysis was conducted

Manufacturers of Rollerscoot present at trail and consented to modifications not effected intended use and CE marking as a medical device

Modifications specifications designed and signed off by Rehabilitation Engineer as modifications were added.

### Rollerscoot:

The Rollerscoot is a stand up scooter that it operated by a joystick, there are five speed levels up 4 mph. The rider stands on the footplate then leans into the Rollerscoot resting their legs against the padded support.

Its key features are:

Overall Width 24.4" / 62 cm  
Overall Length 28.7" / 73 cm  
Max. Range 12 miles  
Max. Speed 4mph  
Maximum user weight 18 stone / 115 kg  
Seat type Padded Perching Seat  
Turning radius 22.2" / 56.5cm  
Safe Climbing Angle 6 Degrees  
Maximum Safe Slope 6 Degrees

### The Build



Front pad made from EZT covered in Dartex

Controller mount using in house manufactured brackets

Extended footplate made from 9mm HD PE plastic with steel reinforced bracket

Harnesses made from 2.5cm nylon webbing, padded Velour and attached using hook and eyelets off a steel plate



### The Handover



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