Supportive Solutions in Lower Limbs for Individuals with Neurological Conditions

In collaboration with Dalal Baumgartner (SATB2 Connect) and Podiatric Biomechanical Practitioner, Dr Abbie Najjarine

Group 10

33

Individuals Australia & NZ

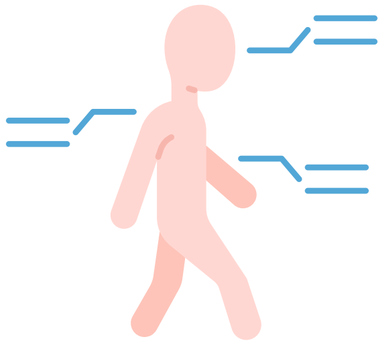
706

Individuals Globally

48

Countries

S	A	T	B	2
Speech and Language Delays - Speech may be limited or absent.	Craniofacial **A**bnormalities - Bones of the skull and face. Swallowing and/or feeding difficulties.	**T**eeth Anomalies.	**B**ehavioural symptoms, with or without brain irregularity.	Visible by age **2.**



UNEVEN GAIT

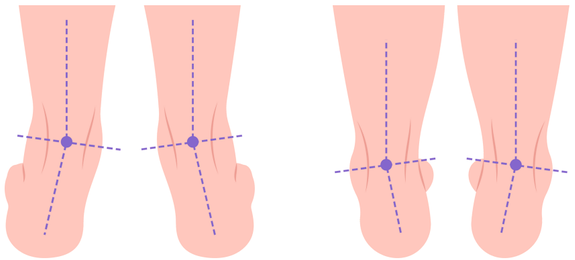
TOE CLAW

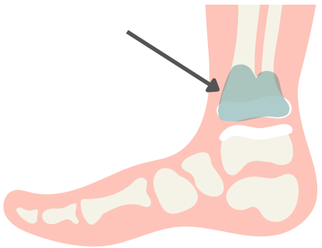
Naomi's Biomechanical Anomalies

ANKLE STABILITY

ONE FOOT PRONATED, ONE FOOT SUPINATED

Pronated *Supinated*





MALLEOLAR POSITION

Clinical Need | Prior Art | Our Solution | Innovation | Feasibility

CURRENT TECHNOLOGIES

Nike Go Fly Ease

+	-
• Easy to put on • Bi-stable	• Hard to remove • Requires lower limb stability to operate

Naomi's Current In-shoe Personalised Orthotic

+	-
• Personalised Support • Improved Comfort	• Blisters • Requires assistance to put on/off

Supramalleolar Orthotic (SMO)

+	-
• Stability • Build Quality • Very supportive	• Rigid, restricts natural ankle motion • Muscular Issues • Blister formation

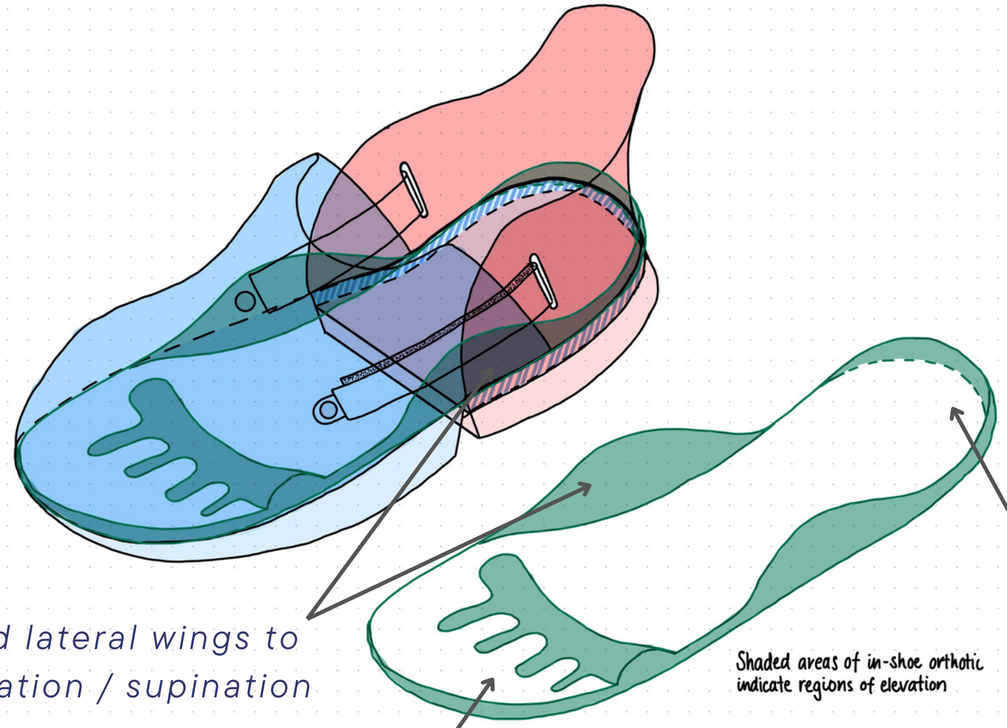
Billy Footwear

+	-
• Easy of use through zipper • High top = Ankle support	• Easy to fiddle with

OUR SOLUTION

CUSTOMISED IN-SHOE ORTHOTIC WITH 'EASY ACCESS' SHOE DESIGN

1 In Shoe Orthotic: Aligns foot for optimal biomechanical position / pressure distribution to promote stability, support, and gait cycle

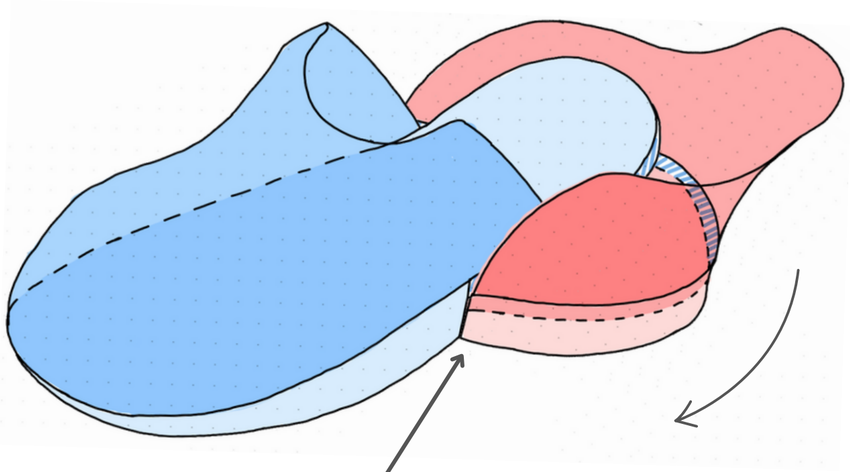


Medial and lateral wings to align pronation / supination

Toe crest with toe grooves

Deeper heel groove to promote correct gait

2 Accessible Shoe Design allows for independence and 'at home' use



Hinge allows 2 components to bend together - allows foot to easily slide in

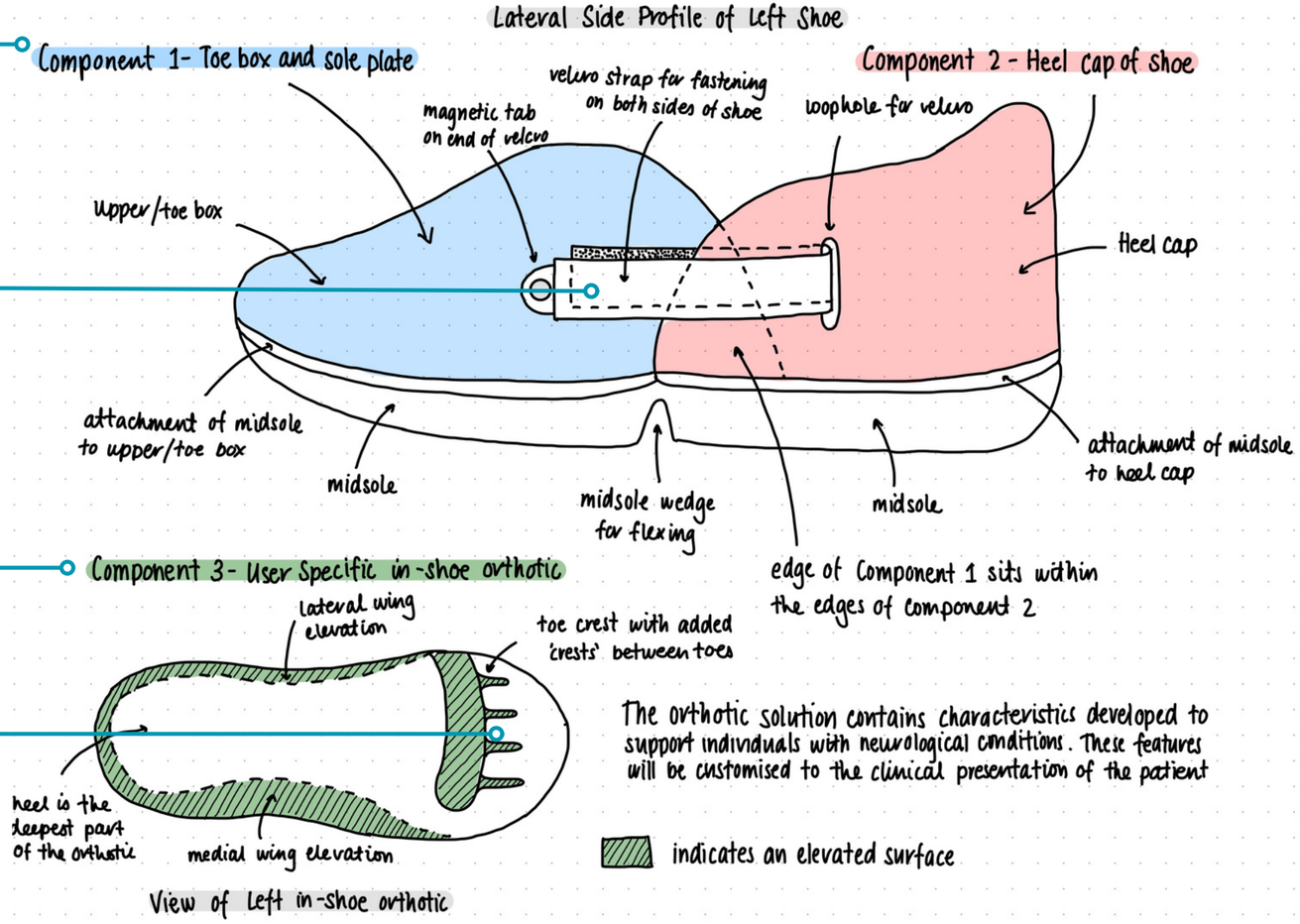
PRODUCT DEMONSTRATION

CAD Exterior Shoe Component

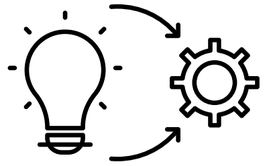
Prototype Demonstration

INNOVATION

- Increased **Independence**
- Introduction of **magnets** to prevent **fidgeting** / improve longevity of velcro
- Balance between **stability** and **rigidity**
- **Versatility** - can be incorporated into different shoes
- Additional components to target **toe claw**

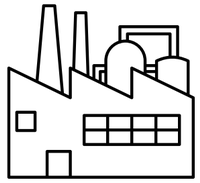


FEASIBILITY



Adaptability

Our solution is aimed specifically to meet Naomi's biomechanical needs. However, both components of our design can be adapted for others with neurological disorders affecting their lower limb functionality.



Manufacturing

Scanning using Foot Plantar Pressure Measurement Systems, then take a negative imprint into a custom mould. Pressing the material to this shape, then grinding the excess away.

Cost

Firm Foam: $10/shoe

Magnets: $3/shoe

Hook-and-loop: $5/shoe

Customised eyelets: $0.4/shoe

Fabric: $40/shoe

Licensing Manufacturing: $15,000

THANK YOU

Milly Hookway, Holly Ferstl, Brayden Duguid, Sithma Gunawardena, Josephine Mcdougall, Steve Mathew Kurien, Hamish Vass