Pluto Brace for Clubfoot
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Challenge: create a radically different design for clubfoot bracing that would yield higher rates of adherence to bracing schedules and therefore prevent relapse in clubfoot patients.

Research focus areas: Patient families, clubfoot clinicians, the Ponseti treatment method, brace options on the market

1. Patients are uncomfortable when both feet are attached to a bar, especially when sleeping.
2. Parents dislike their children being attached to a bar, especially when only one foot is being treated for unilateral patients.
3. Clinicians struggle with maintaining patient/parent compliance to the bracing regimen. Research must show that new braces maintain external rotation in the ankle in relation to the leg in order to ensure effectiveness.

Need Statement developed by the team:
Clubfoot patients need a way to wear their brace comfortably, especially during sleep, because brace discomfort results in a lack of compliance and is leading to relapse.

Meet the Team
Daniel Deng: mechanical engineering, 2023
Claire Olivas: chemical and biomolecular engineering, 2022
Kate Saperstein: biomedical engineering, 2023
Alyse Tran: mechanical engineering, 2023

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Figure 1—Prototype Iterations
Figure 2—User Feedback
Figure 3—Pluto Brace

Solution
Pluto Brace: bar-less, spring-loaded brace that allows both unilateral and bilateral patients independent movement of their feet

Neoprene thigh and calf cuffs to firmly and comfortably secure the brace

Knee hinge allows for knee mobility

Extendable calf support to accommodate for children’s growth

External rotation mechanism that clinicians can adjust the rotation angle of for personalized treatment

Torsion spring pushes foot upward, ensuring that the foot does not point downward and resist treatment

Snaps in and out of the existing Ponseti boot, allowing for easy integration with existing system