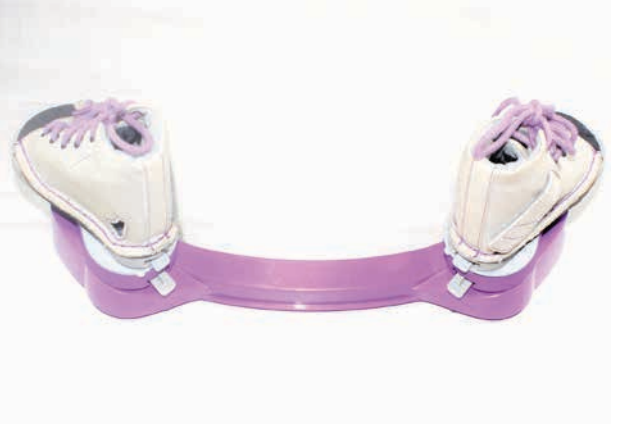
Clubfoot Module



Problem Statement: Every year in India, more than 50,000 children are born with clubfoot, a congenital deformity in which the child's foot appears rotated inwards at the ankle. The condition is usually treated by a non-invasive correction procedure by fitting a foot abduction brace (FAB). The FAB is a fixed metal bar attached to two shoes with laces and a strap to hold the foot firmly in position. Recurrences following clubfoot correction can be prevented by regular use of the brace until the child is four to five years old. However, there is a lack of an objective method to measure actual hours of brace usage. The researchers present a clubfoot brace module for monitoring the FAB to address the need to capture brace usage data and monitor brace adherence to reduce recurrence rates.

Uniqueness of the Solution: The researchers have developed a module that can be placed inside the brace. Sensors in the module capture the brace usage data every 15 minutes and store it locally on a data card. BLE-based (Bluetooth Low Energy-based) wireless transmission system sends the data from the brace daily to a remote cloud server via a smartphone application. The sensors record this data, and a web-based application helps to visualise it in real-time. The system has already been tested in a pre-clinical setting, demonstrating its feasibility in clinical practice. Prototype devices with similar features have been reported by a few research labs, but none of them are available in the market yet.

Current Status of Technology: The functional prototype of the clubfoot module has been developed, and bench testing of the device is completed.

Societal Impact: The Clubfoot module can accurately measure and remotely transmit brace usage data. It has the potential to transform caregivers' behaviour towards brace adherence, which could result in a tangible reduction in recurrence rates. Reduction in recurrence rates helps prevent future disabilities and improve the quality of life in the affected children.

Patent(s): Filed

Relevant Industries: Healthcare, Biomedical Engineering.

Faculty: Prof. Bhallamudi Ravi, Mechanical Engineering.