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Soft Wearable Sensory Substitution Device

-Inability to gauge force or loss of sensation in the feet or legs, caused by peripheral neuropathy or diabetes is estimated to affect over 20 million people in the United States. Because walking is inhibited, and trips and falls are more prevalent, this deficiency can have a profound effect on standard of living. While there have been other systems to try and provide sensory substitution, such as vibrotactile sensors, and electric stimulation devices, they do not work, lead to false sensation and require FDA approval.

Researchers at Arizona State University have developed a soft wearable device that can substitute the loss of feeling in the foot. By measuring pressure under the foot and actuating a force system to push against particular areas in the body, a user can determine when their foot touches the ground or another object. Because they know when their foot touches the ground, they may have greater stability in walking and decreased falls. This simple and inexpensive device is lightweight and comfortable enough for daily use which could bring about an improvement in gait and balance deficits.

By providing a sensation substitution, this soft wearable can aid walking, decrease risk of falls and injuries and ultimately increase mobility, giving wearers a greater sense of confidence and improving their quality of life.

Potential Applications

- Walking aid
- Rehabilitation

Benefits and Advantages

- Enables a user to sense when their foot touches the ground or another object
- May improve gait and balance deficits, resulting in greater standard of living
- Simple and inexpensive design
- Helps a user walk more stably and may reduce incidences of falls and trips
- Lightweight and comfortable

For more information about the inventor(s) and their research, please see

[Dr. Sugar's departmental webpage](#)