

Transfemoral Prosthesis with Altered Knee Location

Researchers at the University of South Florida have developed a novel transfemoral prosthesis in which the knee location is moved to a position dissimilar to the intact leg's knee location. In addition, other mass and length parameters are optimized to tune the dynamics to achieve an optimal gait. This concept can be integrated with existing prostheses.

Typical transfemoral prostheses comprise a femoral portion that replaces the missing portion of the patient's thigh and a tibial portion that replaces the patient's lower leg. The two portions of the prosthetic are joined by a "knee" joint that, when the prosthetic is worn, aligns with the location at which his or her knee previously existed. While such prostheses are of great benefit to transfemoral amputees, they often are not ideal. Specifically, such amputees often have an asymmetric gait when using conventional transfemoral prostheses. It can therefore be appreciated that it would be desirable to have a transfemoral prosthesis that enables transfemoral amputees to have a more symmetric gait.

Our researchers have found a solution to this problem by altering the knee location below the location of the intact knee. This can reduce the mass of the prosthetic, but still keep a symmetric gait pattern, thus improving the individual's ability to walk comfortably and for extended periods of time by reducing the mass and potentially the torque at the joints. In addition, the dynamics can be tuned specifically to the needs of the individual, possibly on an as-needed basis where the knee location could be moved to suit the current activity in real-time.

This invention will enable a symmetric gait and subsequently increase the comfort by decreasing the mass, creating a tuned dynamic, and decreasing the detrimental effects of an asymmetric gait for individuals that wear prostheses. It has direct applications in the fields such as prosthetics and medicine.

ADVANTAGES:

- Enables symmetric gait for transfemoral amputees
- Restores comfortable walking by reducing mass of the prosthesis
- Allows for individual-specific tuning of the transfemoral prosthesis

Prosthesis for the Restoration of Symmetric Gait

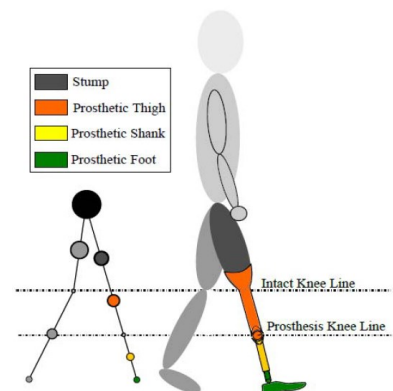


Figure: Schematic diagram showing a five-mass walker model (left) and a prosthesis having a knee joint that is lowered to generate a symmetric gait while reducing the mass of the prosthesis