Polycentric prosthetic knee joint

Country of origin | United States of America

Health problem addressed
Around 9.5 million people with an above-knee amputation living in low and middle income countries need a prosthesis to regain mobility for livelihood, employment and social integration. Most of the amputations are due to injuries, especially road traffic crashes, diabetes, and other health conditions. Modern above-knee prosthesis are prohibitively expensive, especially due to the cost of the knee joint, which is the most complex component of an above-knee prosthesis.

Product description
It is a polycentric prosthetic knee joint, which mimics the movement of a normal knee joint while walking. At the same time, it provides stability during the weight-bearing phase to ensure the person can walk with their artificial limb without falling.

Product functionality
A prosthetic knee joint is the connector between below and above knee prosthetic components to provide knee movement like a normal knee. It usually gets attached to a modular component or a pylon at the lower end which ultimately connects to a prosthetic foot. On the other end, it connects to a prosthetic socket again through a modular attachment.

Developer’s claims of products benefits
Prosthetic clinics in the developing world typically recycle used donated prosthetic knees or use locally made single-axis knees. Donated knees are cost prohibitive to maintain and perform poorly in rugged environments. Single-axis knees are unstable and can buckle, especially when walking on uneven surfaces. The polycentric prosthetic knee joint provides increased stability for uneven and unpaved terrain, withstands high usage by using an oil-filled nylon polymer which self lubricates with use, it can be used in humid and wet environments and it is low cost. It provides 165° range of motion at the knee, which is critical for low and middle income countries, especially for kneeling, squatting, biking and agricultural work.

Development stage
The knee has been fit on over 4,600 patients, primarily in India. In 2013, the latest version of the product was tested to ISO 10328 - Prosthetics structural testing of lower-limb prostheses.

Future work and challenges
Successful outcomes depend on availability of trained prosthetists who can fabricate a custom socket to fit over the patient’s residual limb. Scaling is currently limited to areas with established prosthetic clinics capable of providing a proper fitting.

Use and maintenance
User: Self-use
Training: Instructions for use comes with the product, fitting training is required for prosthetists
Maintenance: Not required

Environment of use
Settings: Rural, urban settings, at home
Requirements: A trained prosthetist to fit the product

Product specifications
Dimensions (mm): 60 x 80 x 140
Weight (kg): 0.68
Consumables: None
Life time (years): 5
Retail price (USD): 80
List price (USD): 80
Other features: Single-use, portable
Year of commercialization: 2008
Currently sold in: India

Contact details
Krista Donaldson
Email affordableknee@gmail.com
Telephone + 1 415 642 1143
http://www.who.int/disabilities/technology
Disclaimer

Eligibility for inclusion in the compendium has been evaluated by WHO and external technical advisers listed in the Acknowledgements. However, the evaluation has been solely based on a limited assessment of data and information submitted in the developers’ applications and, where available, of additional sources of evidence, such as literature search results or other publicly available information. There has been no rigorous review for safety, efficacy, quality, applicability, nor cost acceptability of any of the technologies. Therefore, inclusion in the compendium does not constitute a warranty of the fitness of any technology for a particular purpose. Besides, the responsibility for the quality, safety and efficacy of each technology remains with the developer and/or manufacturer. The decision to include a particular technology in the compendium is subject to change on the basis of new information that may subsequently become available to WHO.

WHO will not be held to endorse nor to recommend any technology included in the compendium. Inclusion in the compendium solely aims at drawing stakeholders’ attention to innovative health technologies, either existing or under development, with a view to fostering the development and availability of, and/or access to, new and emerging technologies which are likely to be accessible, appropriate and affordable for use in low- and middle-income countries.

WHO does not furthermore warrant or represent that:

1. the list of innovative health technologies is exhaustive or error free; and/or that
2. the technologies which are included in the compendium will be embodied in future editions of the compendium; and/or that
3. the use of the technologies listed is, or will be, in accordance with the national laws and regulations of any country, including but not limited to patent laws; and/or that
4. any product that may be developed from the listed technologies will be successfully commercialized in target countries or that WHO will finance or otherwise support the development or commercialization of any such product.

WHO disclaims any and all liability and responsibility whatsoever for any injury, death, loss, damage, use of personal data, or other prejudice of any kind whatsoever that may arise as a result of, or in connection with, the procurement, distribution and/or use of any technology embodied in the compendium, or of any resulting product and any future development thereof.

Developers whose technology has been included in the compendium shall not, in any statement of an advertising, commercial and/or promotional nature, refer to their participation and/or inclusion in the compendium. In no case shall the latter use the WHO name and/or the emblem, or any abbreviation thereof, in relation to their business or otherwise.