**Magnetic prosthetic suspension system**

**Country of origin**: Malaysia

**Health problem addressed**

A prosthesis is used as part of amputee rehabilitation and the suspension system is an important feature that affects prosthesis users’ quality of life. Individuals with lower limb amputation need to wear prosthesis to perform activities of daily life, especially walking.

**Product description**

The magnetic suspension system is a magnetic coupling device, which holds the residual part of the limb (stump) inside the prosthesis (artificial limb). It consists of three parts: a metal plate inside the socket, which is attached to a prosthetic soft liner; a magnetic assembly (the source of magnetic power), which remains outside of the socket - positioned between the prosthetic socket and the pylon (internal frame of the prosthetic leg); and a switch, which connects or disconnects the coupling device. The soft liner acts as a sort of “second skin” between the movable soft tissue of the stump and the hard shell of the socket. The soft liner provides comfort and holds the stump inside the prosthesis with the help of the magnetic coupling device.

**Product functionality**

After donning the prosthetic soft liner, the user puts the stump inside the prosthesis. The mechanical switch is positioned in the “On” mode. The magnetic field will hold and retain the stump within the prosthesis. While removing, the user needs to position the switch to the “Off” mode, which will then allow the user to withdraw the stump from the prosthesis. The system comes with an optional acoustic safety alarm, which can warn the user about imminent possibilities of suspension failure.

**Developer’s claims of products benefits**

The system is easy to fabricate, cheaper than other suspension systems, more durable and easy to use. It requires less maintenance, reduces pain in the residual limb, decreases interface pressure and reduces pistoning.

**Development stage**

The system patent is pending both in Malaysia (PI2012700220) and the US (13/865,677). The technical aspects have been approved by the University of Malaya Medical Ethics Committee and the product has been clinically tested by lower limb amputees. The findings of a technical evaluation have been published in the Institute for Scientific Information (ISI) journals. A paper on the biomechanical evaluation of the system was awarded with the best research in the field of “Advancing technologies” in the 14th International Society for Prosthetics and Orthotics (ISPO) world congress.

**Future work and challenges**

Future work includes implementation of large scale manufacturing and worldwide distribution.

**Use and maintenance**

**User**: Self-use  
**Training**: Not required  
**Maintenance**: On-site once a year

**Environment of use**

**Settings**: Rural, urban, ambulatory, at home  
**Requirements**: A trained prosthetist to fit the product into a prosthesis

**Product specifications**

- **Dimensions (mm)**: 30 x 30 x 30  
- **Weight (kg)**: 0.25  
- **Consumables**: Batteries, if used with safety alarm  
- **Life time (years)**: 5  
- **Retail price (USD)**: 500  
- **List price (USD)**: 250  
- **Other features**: Reusable

**Year of commercialization**: Ready to be commercialized
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