Health problem addressed

Diabetic patients lack nerve sensation and hence develop ulcers in soles due to localised high pressure. Eventually these turn to gangrene and need leg amputation. If the high pressure points can be located and assessed early, shoe soles can be designed to spread the pressure which may prevent ulceration.

Product description

An optical sensor has been improvised which together with a computer provides a video of colour coded dynamic foot pressure distribution. A composite image is also provided. At selected points (6 points in the prototype) the time variation of pressure is shown graphically.

Product functionality

Light is passed through a thick transparent plate having a white cover above. At points of pressure on the cover, total internal reflection breaks down and light rays coming out are scattered down to a video camera placed below. The software processes the video data and creates an artificially colour coded contour image and graphs of pressure.

Developer’s claims of product benefits

Commercial pedographs are difficult to afford and access in the Third World. The improvised version presented here can be made in the Third World and offered cost-effectively. It is also simple to use and robust. A diabetic hospital in a Third World country is using a prototype for patient assessment regularly for more than a year. It uses a standard Personal Computer. Maintenance and repair are also simple.

Operating steps

First a video of the pressure distribution of a walking foot is taken through computer command. Next the software is initiated to give the desired dynamic colour contour images and the time variation of pressure at points selected by mouse clicks. Patient ID is also entered.

Development stage

The prototype is under field trial in a hospital for about a year and is working satisfactorily. The hardware and the software both are mature. No regulatory approval has been sought so far. Product trial: Since January 2010 at Baqai Institute of Diebetology and Endocrinology, Baqai Medical University, Karachi, Pakistan. More than 150 patients have been studied so far. No comparison could be made with available commercial equipment. Calibration performed using basic principles of Physics.

Future work and challenges

It is ready to be commercialised. However, it needs to be compared with a standard device regarding its absolute values of pressure calibration. There is no risk involved. The device is not well known in low and medium income countries. Therefore, promotion of its necessity and use is necessary among the doctors in these countries.

Use and maintenance

User: Technician
Training: On job training, one day.
Maintenance: Technician

Environment of use

Setting: Urban in secondary and tertiary health care facilities.
Requirements: Typically mains ac power supply, 220V +/-15%. It includes a personal computer (desktop or laptop). However, battery operation (using a rechargeable battery) is possible if using a laptop computer. (Power requirement: 15W at 12V excluding that for the laptop).

Product specifications

Dimensions (mm): 750 x 500 x 500
Weight (kg): 25
Consumables: none
Life time: 15 years
Retail Price (USD): 6000
Other features: Reusable. Runs on batteries, uses software and is compatible with telemedicine devices.
Currently sold in: Pakistan (product trial)
Disclaimer

Eligibility for inclusion in the compendium has been evaluated by EuroScan member agencies and WHO. However, the evaluation by EuroScan member agencies and WHO 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 new and emerging 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 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.