

Project Title

Digitising the Process of Customised Offloading Insoles for Diabetic Patients with Active Plantar Foot Ulcers

Project Lead and Members

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Project members:

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Organisation(s) Involved

Tan Tock Seng Hospital (TTSH) Podiatry Department and BioLab (Australia)

Project Period

Start date: 05-2018

Completed date: 09-2018

Aims

- To improve the turnaround time for fabricating a pair of customised offloading insoles from 3 weeks to 2 weeks in order to enhance diabetic foot ulcer healing
- To eliminate the need to block off clinician time for in-house plaster cast modifications

Background

Customised offloading insoles reduce excessive pressures over diabetic plantar foot ulcers to ensure optimal wound healing. However, customising this device requires a long, manual and labour-intensive process. In TTSH Podiatry Department, the average turnaround time (TAT) for a pair of manually fabricated customised insoles is

approximately 3 weeks (20.7 days). This long TAT translates to patients not receiving their offloading insoles earlier, which increases the risk of wound, infection and amputation. There is also a need to re-work for misplaced or broken plaster casts and the outcome of the final device is dependent on the hand skills of the Podiatrist and Technician (no standardised objective manufacturing process).

Methods

A team comprising of Podiatrists, Technician and Operations Executive was formed to study the causes of the high TAT. We utilised quality improvement tools including a fishbone diagram and a Pareto chart. From the findings, we implemented an innovation process to digitise our manual process. We adopted available technology of an iPad 3D-scanner and worked closely with our industry partner (Biolab) for a protocol-based prescription. We traced and compared the TAT of customised insoles fabricated manually by our Technician over the last 4 months prior to the implementation of digitisation and those by Biolab over the next 4 months.

Results

The turnaround time for fabricating a pair of customised insoles improved from 20 days to 7 days after digitisation. The digitised process with 3D-scanning and protocol-based prescription showed superiority to the manual handcrafted process in reducing peak pressures for offloading plantar foot ulcers. Other positive outcomes include manpower savings, less material wastage and less storage space. Digitisation has disrupted the conventional process. iPad 3D-scanners and protocol-based software can now be used remotely at any location or settings without the need for a resource intensive setup or support.

Lessons Learnt

Successful digitisation in Healthcare includes electronic medical records, monitoring devices etc. This project has shown the possibility of other aspects of clinical practice adopting available technology to digitise their processes. Engaging in regular discussion with our

industry partner was also crucial in ensuring standardisation of the scanning and prescription process for the fabrication of accurate end products.

Conclusion

The successful digitisation process of customised offloading insoles for diabetic patients with plantar foot ulcers has now been a standard practice for the past 1 year. There are plans to procure more iPad scanners to reduce the time taken to obtain foot scans.

Additional Information

2019 NHG Quality Improvement Award - Innovation in Healthcare (Best Award)

Project Category

Process Redesign

Keywords

Process Redesign, Technology, MedTech, Quality Improvement, Improvement Tool, Turnaround Time, Cost Savings, Manpower Savings, Podiatry, Tan Tock Seng Hospital, BioLab Australia, Foot Orthoses, Diabetic Foot Ulcers, Offloading Insoles, Fishbone Diagram, Pareto Chart, 3D Scanning, Protocol-Based Prescription

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