

Singapore pilots innovative approach to diabetic foot care through 3D-printed custom insoles

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This innovation transforms diabetic foot care from a manual craft into a precise science



Sengkang General Hospital (SKH) has piloted an innovative approach to diabetic foot care through in-house production of 3D-printed custom insoles in a cross-institution collaboration with Singapore General Hospital's (SGH) 3D printing centre.

Traditional pressure-relieving insoles, produced overseas, typically take up to two months to reach patients, with extended time needed for adjustments as it may involve shipping the insoles back and forth sometimes. Now, patients can receive precisely customised insoles in just one week - marking a significant advancement in both accessibility and quality of care for patients with diabetes.

In Singapore, diabetes affects over 400,000 people, with one in three Singaporeans facing a lifetime risk of developing the condition. If current trends continue, this number could reach one million by 2050. Studies show that 15-25% of patients with diabetes develop foot ulcers, with over 80% of lower limb amputations originating from these ulcers.

This innovation transforms SKH's diabetic foot care from a manual craft into a precise science. Traditional insoles are created by hand or with the aid of CNC machines, using materials like EVA foam or other suitable materials. This manual process not only takes longer but can lead to variations in quality and fit. Any adjustments needed may mean shipping the insoles back overseas, further extending waiting times.

In contrast, SKH's new approach involves digitally scanning the foam box impressions before designing each insole with varying densities and precise topographical adjustments for different areas of the foot using specialised software. The subsequent in-house 3D printing ensures these exact specifications are manufactured with consistent quality.

The SKH Podiatry team spearheaded this multi-disciplinary innovation with the Department of Orthopaedic Surgery and Plastic, Reconstructive & Aesthetic Surgery Services teams under the SKH Diabetic Limb Salvage (DLS) service, as well as SGH's 3D printing centre.