The Heat Map of Prevention: Utilizing Thermographic Imaging for Early Detection of Diabetic Foot Ulcers

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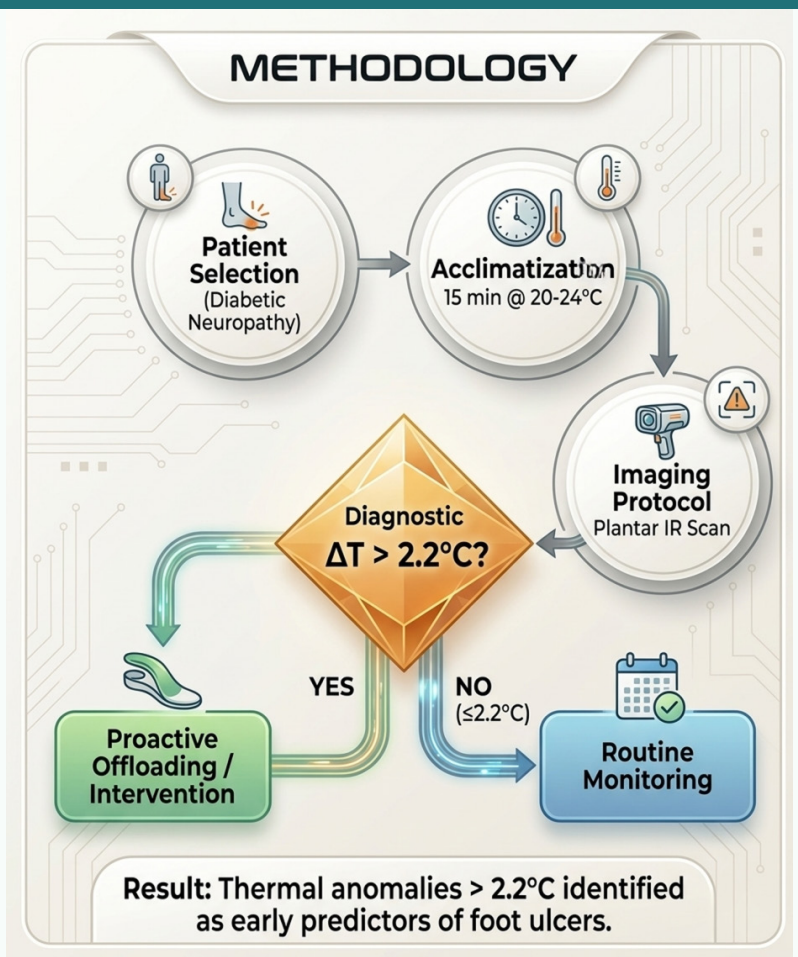
Introduction: Diabetes can cause diabetic neuropathy which results in a loss of sensation (or the ability to 'feel') making it difficult for patients to identify their foot injuries at the onset of the injury before having developed severe inflammation. This research utilizes infrared thermography to bridge the visual 'pain gap' to create an accurate visual representation of the patient's foot, providing a source of localized thermal 'hotspots' ($\Delta T > 2.2°C$)[1]. The advantage of this proactive monitoring will allow for timely off-loading in order to prevent tissue breakdown and/or significantly decrease the risk of needing to amputate the patient's foot.

OBJECTIVES

To Evaluate the diagnostic precision of non-invasive infrared sensors in mapping Pre-ulcerative thermal anomalies.

To Determine the correlation between plantar temperature asymmetry and the risk of localized tissue necrosis.

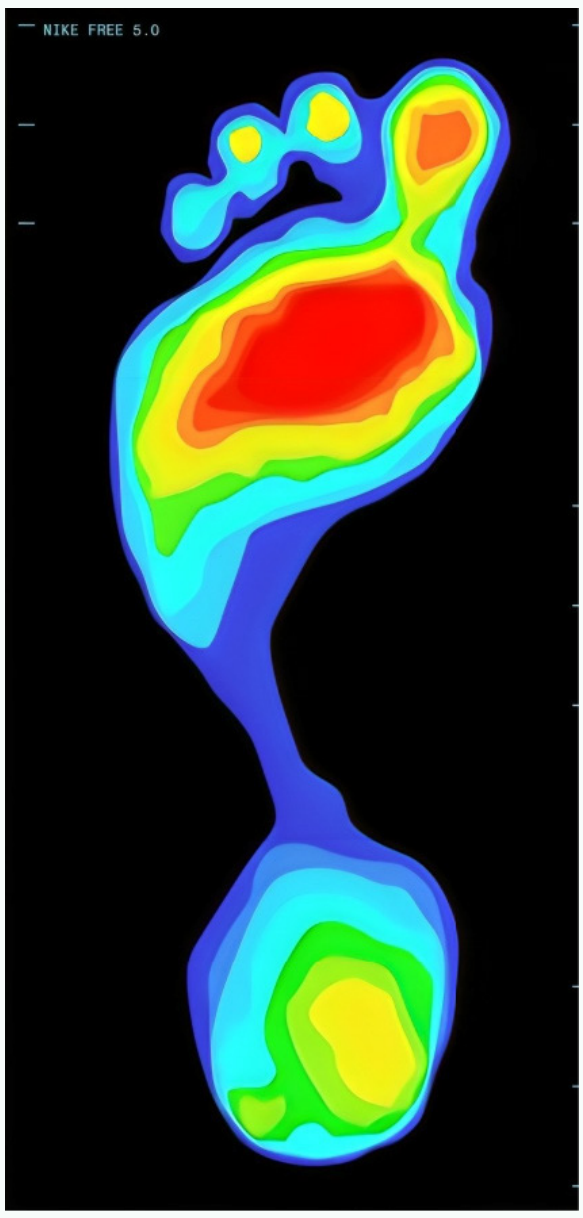


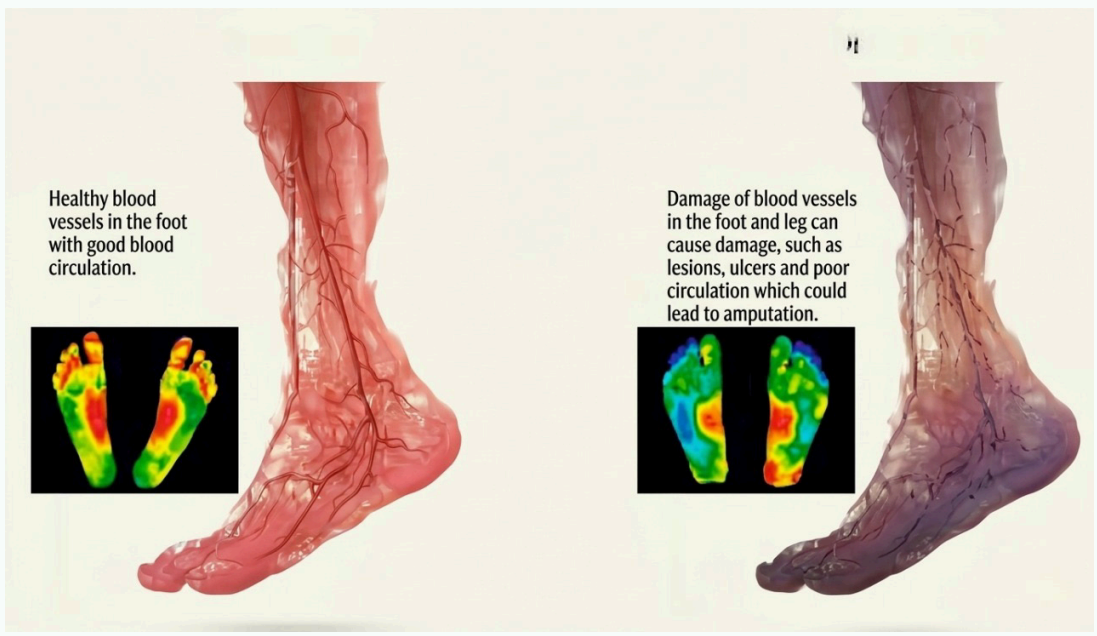
CORE MESSAGE

The Challenge: Diabetic neuropathy creates a "pain gap" where ulcers develop unnoticed until infection sets in.

Our Discovery: Infrared Thermography acts as a visual pain sensor, detecting localized "Hot Spots[1]" (>2.2°C[1] temperature rise) that signal inflammation before skin breakdown.

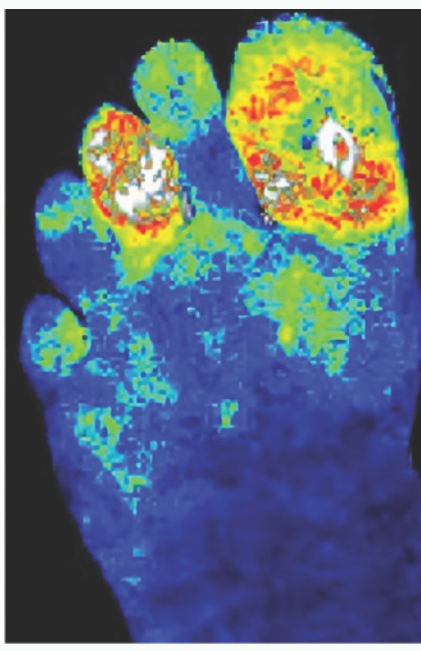
The Impact: Shifting from reactive care to proactive thermal monitoring can reduce diabetic-related.





CONCLUSION

Thermal scanning is a fast, low-cost, and radiation-free tool for routine diabetic foot assessments.
By identifying "at-risk" feet early, this technology can prevent amputations and significantly reduce healthcare costs.



REFERENCES

Lavery, L. A., Higgins, K. R., Lanctot, D. R., Constantinides, G. P., Zamorano, R. G., Armstrong, D. G., Athanasiou, K. A., & Agrawal, C. M. (2004). Home monitoring of foot skin temperatures to prevent ulceration. Diabetes Care, 27(11), 2642-2647. https://doi.org/10.2337/diacare.27.11.2642

Prevention is better than Amputation