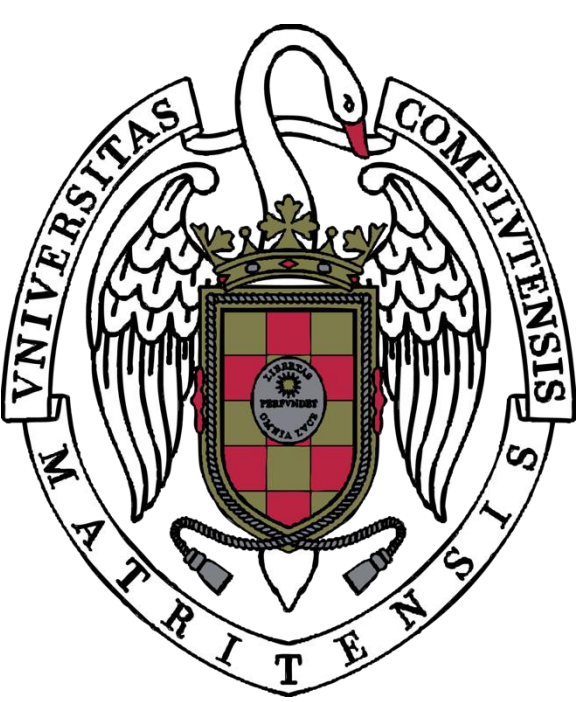




CLINICAL EVOLUTION OF DIABETIC FOOT ULCERS WITH CONTINUOUS TRANSDERMAL OXYGEN THERAPY: A CASE SERIES ASSESSED BY HYPERSPECTRAL IMAGING

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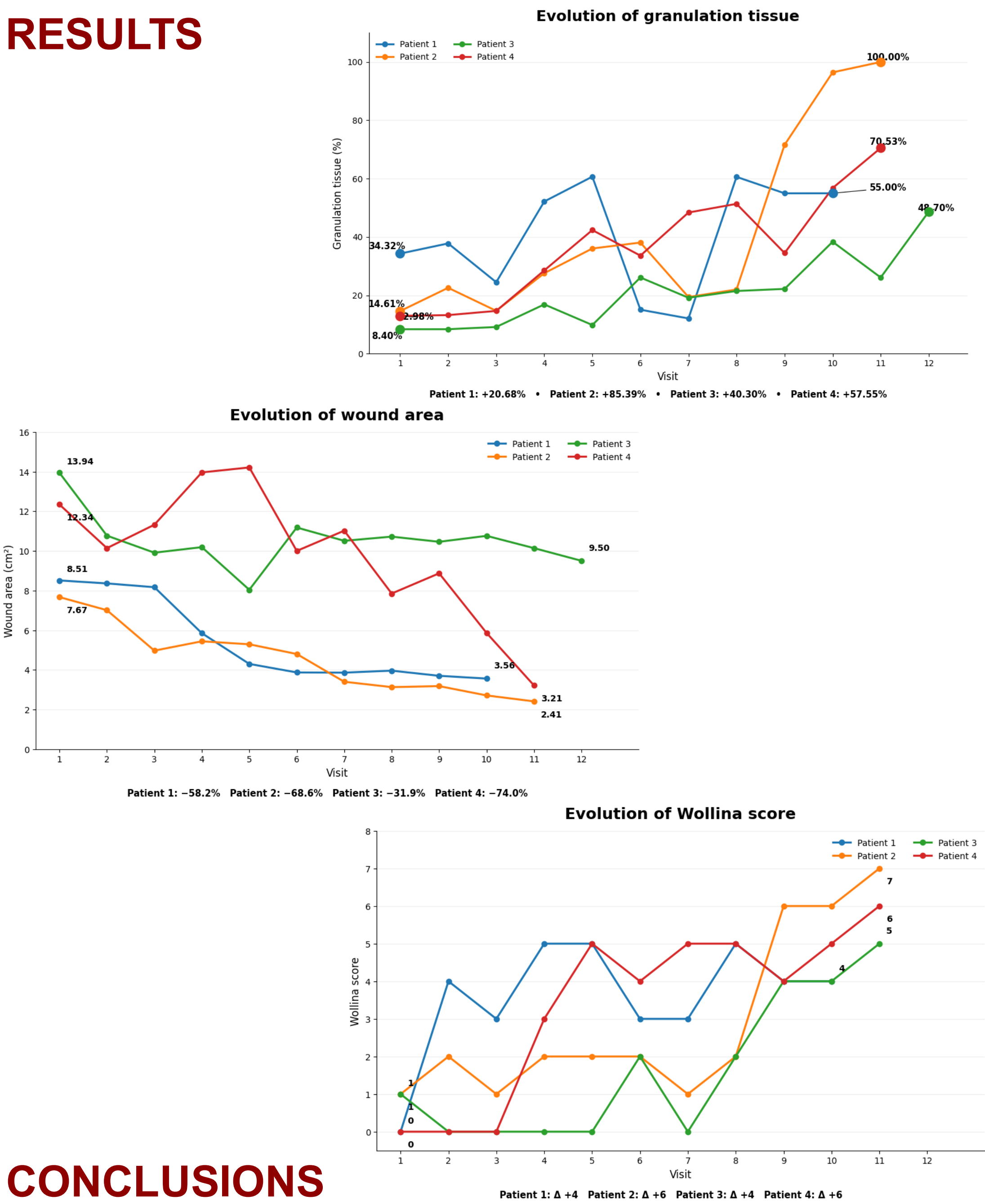
BACKGROUND

Diabetic foot ulcers (DFUs), particularly those with a neuroischemic profile, are associated with impaired tissue perfusion and delayed wound healing. Continuous transdermal oxygen therapy (TTOT) may enhance local tissue oxygenation and support the healing process. Hyperspectral imaging (HSI) provides a non-invasive assessment of tissue oxygenation and perfusion, allowing longitudinal monitoring of physiological changes during wound healing.

AIM

To evaluate clinical evolution and wound area reduction in DFUs treated with TTOT, using HSI to assess changes in tissue oxygenation and perfusion over 12 weeks.

RESULTS



CONCLUSIONS

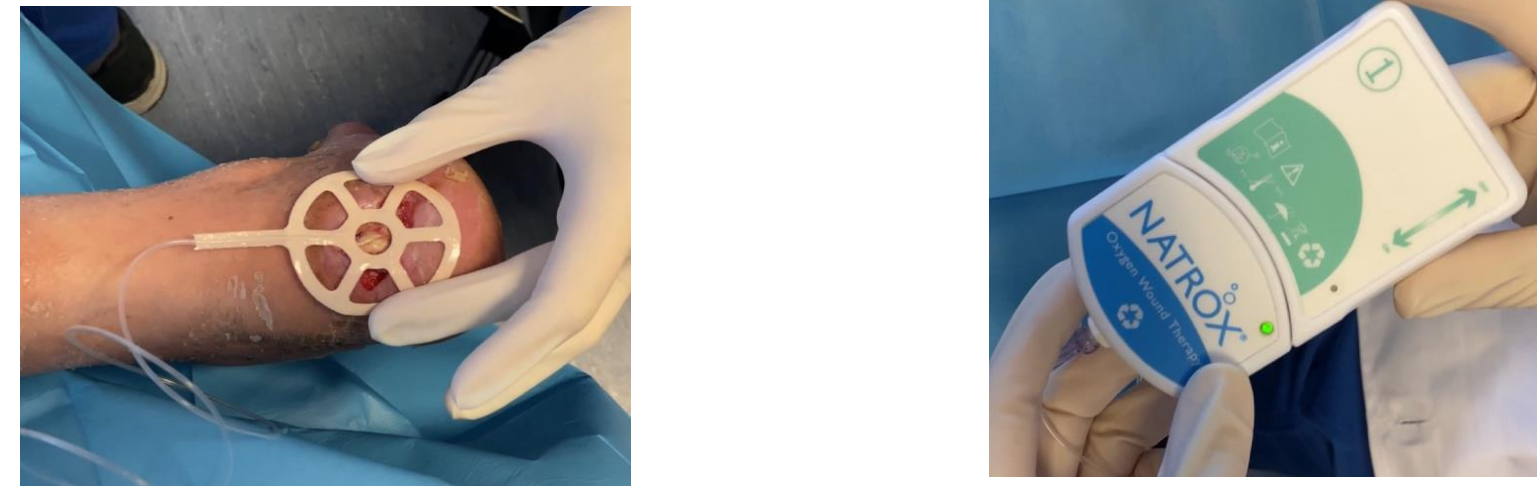
TTOT was associated with clinical improvement in all four patients, with wound area reductions and an improvement in Wollina scores from 0-1 at baseline to 4-7 at week 12. These changes were accompanied by increased tissue oxygenation and improved microcirculation, suggesting a favourable physiological response to treatment. Previous studies TTOT have reported improvements in wound healing and wound-area reduction, supporting its potential role as an adjunctive treatment for hard-to-heal diabetic foot ulcers. However, these preliminary findings should be interpreted cautiously given the small sample size and absence of a control group. TTOT may promote healing in neuroischemic DFUs by improving local oxygenation and perfusion. Hyperspectral imaging is a useful non-invasive tool for monitoring these changes and supporting clinical decision-making.

METHODS

Prospective case series (n=4) with weekly assessments over 12 weeks.

Gender	2 males / 2 females
Type of ulcer	Texas grade 2D
Location	2 posterior heel; 1 post-amputation (3rd–5th toes); 1 lateral foot
Median age	72 years (IQR 6.25)
Median diabetes duration	17.5 years (IQR 19.25)
Median ulcer duration	6.5 weeks (IQR 2.3)
PAD	Absent pedal ABI: 0.53 (IQR 0.32); TBI: 0.30 (IQR 0.18)

TTOT



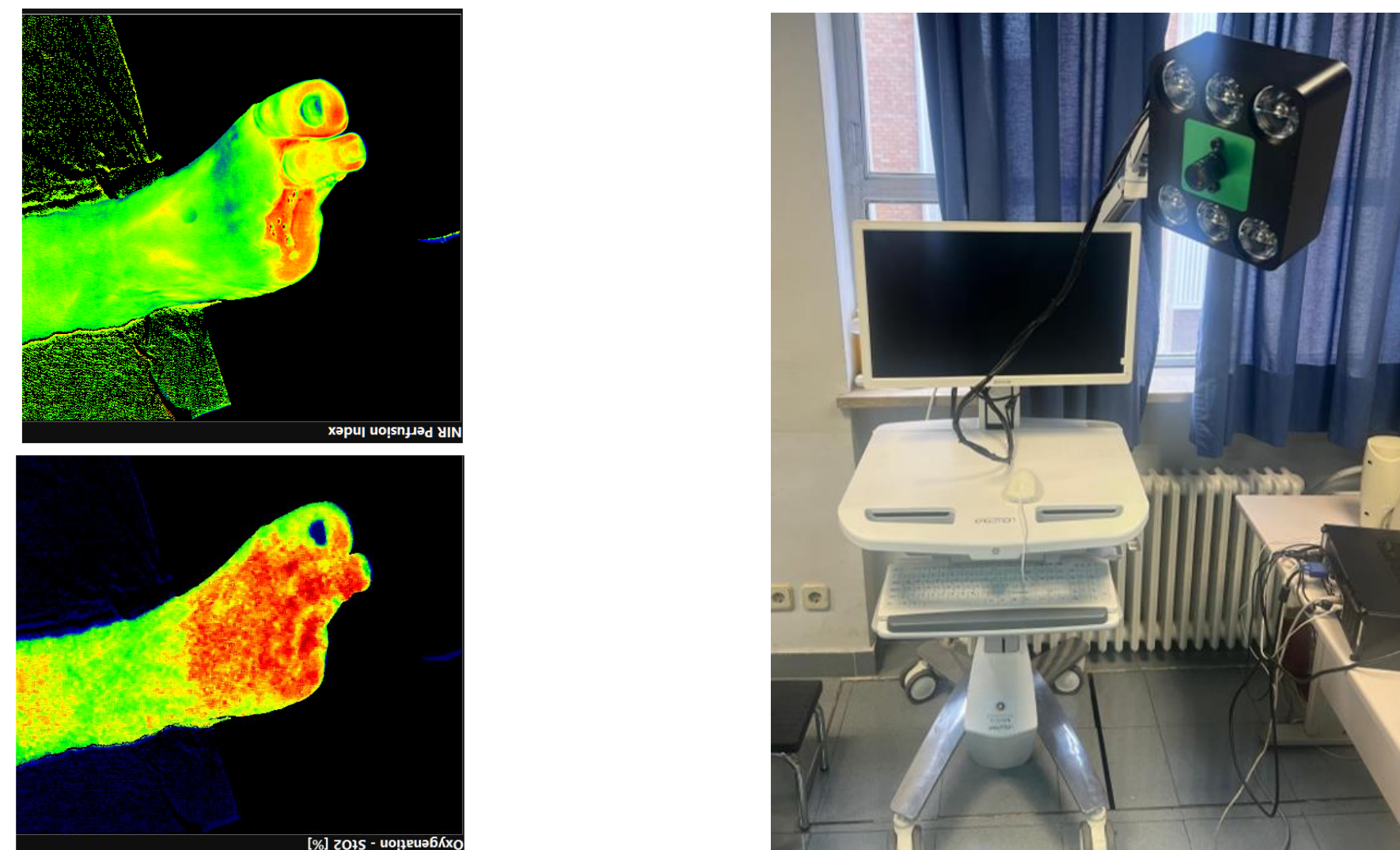
NATROX™ was applied continuously for 12 weeks alongside standard wound care, with the oxygen delivery system positioned directly over the ulcer and connected to a portable oxygen generator for continuous transdermal oxygen delivery to the wound bed.

WOLLINA SCORE

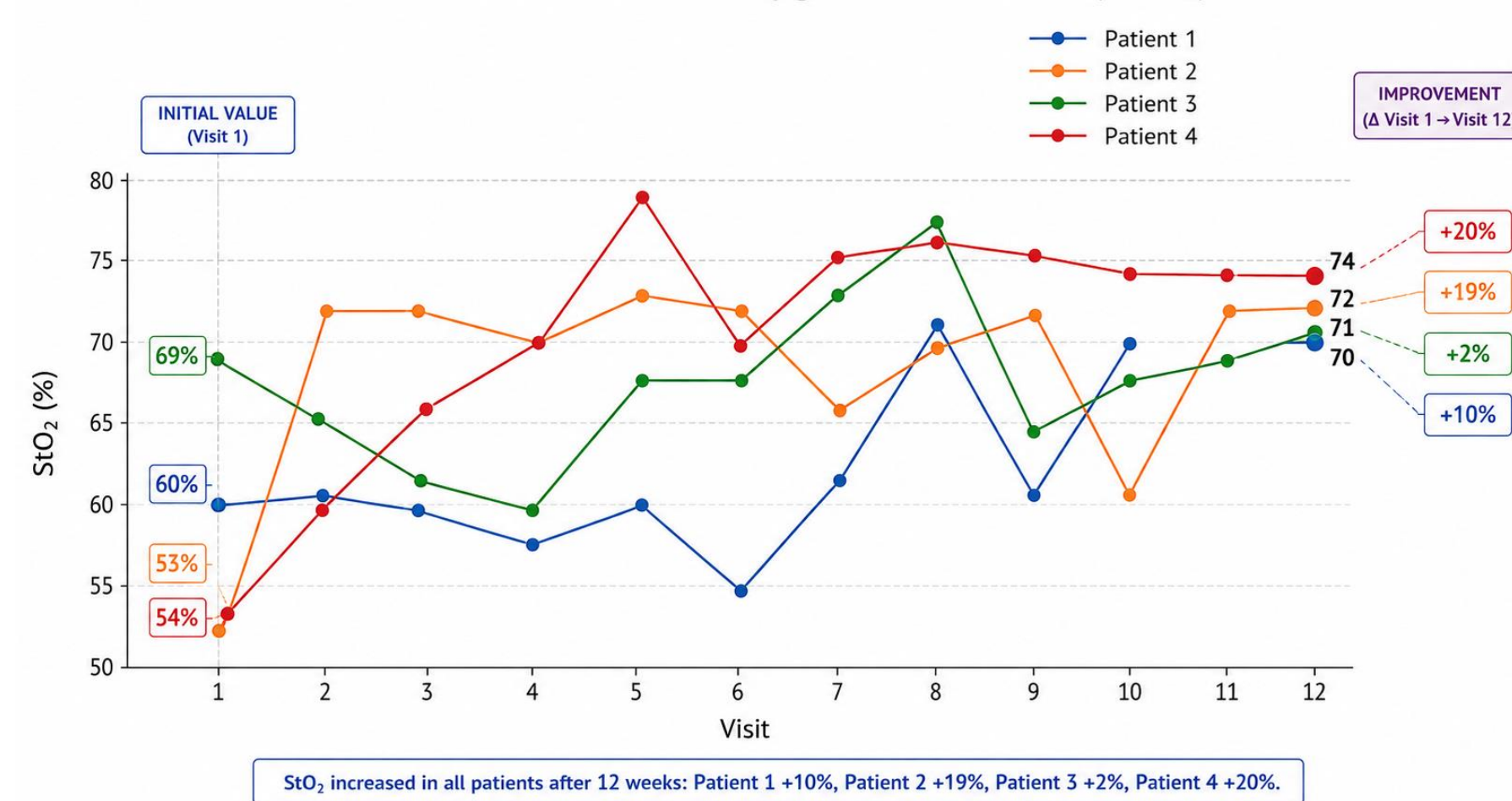


HYPERSPECTRAL IMAGING

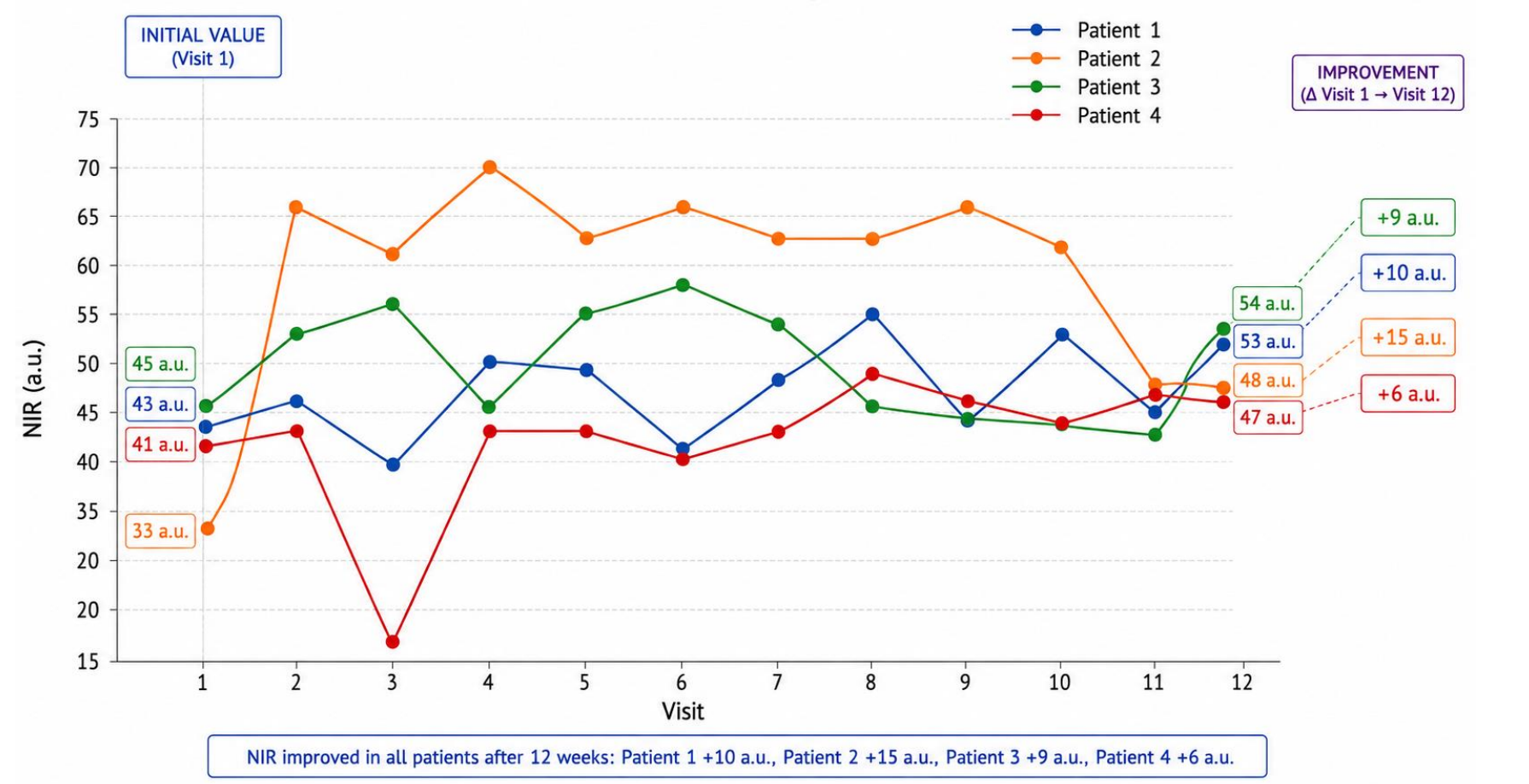
TI-CAM (Diaspective Vision GmbH, Germany) Tissue oxygen saturation (StO₂, %) and near-infrared perfusion index (NIR, a.u.) were recorded longitudinally at each visit. Baseline-to-week-12 differences (Δ) were calculated for descriptive analysis.



Evolution of tissue oxygen saturation (StO₂)



Evolution of near-infrared perfusion index (NIR)



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