

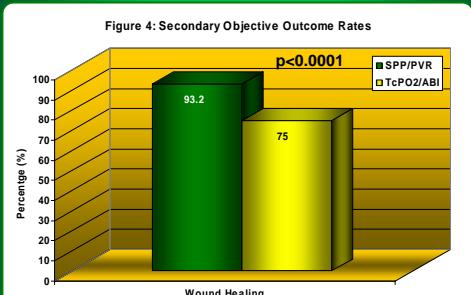
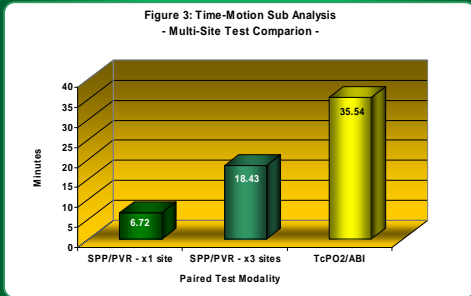
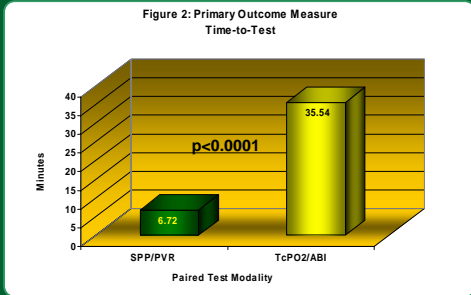
# A Time-Motion Study of Paired Technologies Evaluating for Wound Healing Potential

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## Background

Technological advancements have led to provisional point-of-care noninvasive vascular testing (NIVT) as informative tools in the wound management arena. Despite scientific rigor, standard NIVTs .g., Ankle-Brachial Index (ABI), Transcutaneous Oxygen Monitoring (TCOM), and Toe-Brachial Index (TBI) have known limitations. ABI is documented as inaccurate in the diabetic or renal compromised patient while TCOM is highly operator dependent, time consuming and often yields confounding results. TBI may be compromised by physical constraints. Skin Perfusion Pressure (SPP) and Pulse Volume Recording (PVR) are alternative tools for evaluating large vessel and distal perfusion in the lower extremity. We sought to compare TCOM/ABI against SPP/PVR for clinical utility and wound healing prediction accuracy.



## Methods

Our prospective, nonrandomized, Institution Review Board approved single-center investigation evaluated outcomes for 100 new patients presenting with lower extremity wounds. The primary objective assessed the time required to conduct paired NIVTs (transcutaneous oxygen monitoring and ankle-brachial index vs. skin perfusion pressure and pulse volume recording) for each patient. A secondary objective evaluated SPP and TCOM for healing prediction rates. Baseline test measurements were compared to patient healing status outcome.

Figure 1: Demographics

Variable	(n=100)	Range	SD
Age (mean)	69.3	20-96	16.6
BMI* (mean)	28.04	13.4-48.8	6.7
Female	54	-	-
Diabetes Mellitus	48	-	-
Kidney Disease	10	-	-

\*67% of population are overweight or obese per CDC guidelines



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## Findings

**Study population notable for 48% (48/100) diabetes mellitus rate.**

**Primary objective:** Utility – Time-To-Test (TTT)

- Time utility comparison was highly significant ( $p < 0.0001$ ) with a mean skin perfusion pressure and pulse volume recording single site test time of 6.72 minutes ( $\pm$  SD 2.41) compared to a mean transcutaneous oxygen monitoring/ankle-brachial index test time of 35.54 minutes ( $\pm$ SD 8.86). Refer to **Figure 2** for data illustration.

As good clinical practice dictates, both lower extremities should be evaluated. Therefore, in addition to the single site SPP/PVR tests above where the laser was placed proximal to the wound, additional testing was performed to include evaluation of the great toe bilaterally (a combined total of 3 test sites). The results of this sub analysis are presented below.

- Multi-site SPP/PVR testing yielded a cumulative SPP/PVR mean TTT of 18.43 minutes. **Figure 3** illustrates the comparative results.

**Secondary objective:** Healing potential prediction (see **Figure 4**)

- The observed skin perfusion pressure wound healing prediction accuracy rate was 93.2% (82/88) compared to 75% (66/88) with transcutaneous oxygen monitoring ( $p < 0.0001$ ).

## Conclusion

Our study demonstrates a statistically relevant difference between these technologies in both the amount of time required to conduct lower extremity testing (approximately 80% reduction in mean test time for SPP/PVR compared to TCOM/ABI) and the accuracy rate of SPP to predict wound healing. Our findings reveal skin perfusion pressure to be a highly useful tool for triaging wounds.