



## Letter to the editor regarding ‘Improvement of local microcirculation through intermittent Negative Pressure Wound Therapy (NPWT)’



It is with great interest that we read the study entitled ‘Improvement of local microcirculation through intermittent Negative Pressure Wound Therapy (NPWT)’ by Sogorski et al. in healthy volunteers [1]. Although many studies have previously assessed perfusion changes during NPWT with laser Doppler flowmetry (LDF), LDF has become a controversial technique in NPWT perfusion research since the pioneering work of Kairinos et al. [2–4]. Because Sogorski et al. simultaneously measured perfusion changes during cutaneous NPWT with both LDF as well as previously unexploited spectroscopic techniques, their study therefore contains valuable data [1]. In their discussion however, Sogorski et al. state that the observed increase of the tissue blood content during NPWT supports the hypothesis of Kairinos et al. [2–4], being that NPWT induces compression that results in a decrease of vessel diameter. Moreover, they state that their results (see Table 1), which show an increase of LDF-measured blood flow with a constant oxygen saturation, do not necessarily indicate a gain in perfusion [1]. Yet, the results of Sogorski et al. indicate that, although the proportion of oxygenated blood indeed remains relatively the same, the total

amount of blood and the velocity with which it travels through the evaluated tissue segment is increased [1]. This implies that the total oxygen availability to the tissue under investigation is actually increased, which is in direct contrast to the conclusion in their discussion. The explanatory framework provided by Kairinos et al. includes that NPWT compresses vessels, inducing an increase in flow and a decrease of tissue blood content and therefore a decrease in oxygen availability [2–4], which is essentially in contrast to the current results of Sogorski et al. [1]. These new observations provide an interesting new perspective to the ever further increasing understanding of the effect of NPWT on perfusion. A solution to obtain a more definite answer in this ongoing debate on NPWT effects on perfusion and oxygenation may be achieved by using complementary spectroscopic techniques during cutaneous NPWT, allowing for calculation of the mean vessel diameter of the tissue under investigation [5].

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**Table 1**

Detailed perfusion changes under the foam over the course of measurements ( $\Delta$  vs. BL), “on-phases” are marked grey, significant are marked bold, BL = baseline, CI = confidence interval, BF = blood flow, RBCV = red blood cell velocity, StO<sub>2</sub> = postcapillary oxygen saturation, rHb = relative hemoglobin content.

| TIME | BF              |             | RBCV            |             | StO <sub>2</sub> |             | rHb             |             |
|------|-----------------|-------------|-----------------|-------------|------------------|-------------|-----------------|-------------|
|      | $\Delta$ vs. BL | CI          | $\Delta$ vs. BL | CI          | $\Delta$ vs. BL  | CI          | $\Delta$ vs. BL | CI          |
| BL   | 1.000           | -           | 1.000           | -           | 1.000            | -           | 1.000           | -           |
| 5    | <b>1.220</b>    | 1.042-1.399 | 0.995           | 0.938-1.051 | 0.952            | 0.889-1.015 | <b>1.052</b>    | 1.013-1.092 |
| 10   | <b>1.214</b>    | 1.047-1.382 | 1.021           | 0.938-1.103 | 1.010            | 0.936-1.083 | <b>1.076</b>    | 1.044-1.107 |
| 15   | <b>1.525</b>    | 1.111-1.938 | 1.077           | 0.925-1.229 | <b>1.099</b>     | 1.035-1.164 | <b>1.065</b>    | 1.024-1.106 |
| 20   | <b>1.697</b>    | 1.130-2.264 | 1.135           | 0.946-1.325 | <b>1.106</b>     | 1.018-1.194 | <b>1.084</b>    | 1.033-1.136 |
| 25   | <b>1.813</b>    | 1.123-2.502 | 1.159           | 0.931-1.386 | <b>1.131</b>     | 1.022-1.239 | <b>1.125</b>    | 1.058-1.192 |
| 30   | <b>1.807</b>    | 1.158-2.457 | 1.153           | 0.938-1.368 | 1.099            | 0.984-1.214 | <b>1.140</b>    | 1.068-1.211 |
| 35   | <b>2.087</b>    | 1.327-2.848 | 1.212           | 0.959-1.465 | <b>1.202</b>     | 1.110-1.295 | <b>1.134</b>    | 1.067-1.202 |
| 40   | <b>2.063</b>    | 1.348-2.777 | 1.202           | 0.977-1.427 | <b>1.170</b>     | 1.071-1.269 | <b>1.131</b>    | 1.058-1.205 |
| 45   | <b>2.377</b>    | 1.446-3.309 | 1.274           | 0.983-1.565 | <b>1.192</b>     | 1.072-1.311 | <b>1.158</b>    | 1.074-1.242 |
| 50   | <b>2.317</b>    | 1.414-3.221 | <b>1.275</b>    | 1.004-1.547 | <b>1.240</b>     | 1.097-1.382 | <b>1.165</b>    | 1.084-1.246 |
| 55   | <b>2.378</b>    | 1.400-3.356 | 1.272           | 0.988-1.556 | <b>1.267</b>     | 1.080-1.455 | <b>1.178</b>    | 1.093-1.263 |
| 60   | <b>2.453</b>    | 1.421-3.486 | <b>1.290</b>    | 1.006-1.574 | <b>1.216</b>     | 1.082-1.350 | <b>1.167</b>    | 1.087-1.248 |

## Declaration of interest

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H.J.C.M. Sterenberg is CEO of QuaSpec BV (Fiber-optic spectroscopy instrumentation).

P.R. Zwanenburg is a speaker for GD Medical Pharma BV and Hospithera NV (Negative Pressure Wound Therapy distribution companies).

## References

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