EXERGEN
CORPORATION

Exergen TemporalScanner Calibration Choices

Exergen offers two options in using Temporal Artery Thermometers. The standard TemporalScanner is calibrated to provide a true core temperature, and the other is the same instrument, but recalibrated to display an oral equivalent temperature.

- **Standard**: The standard model, like a pulmonary artery catheter or esophageal probe, is measuring arterial (core) temperature. Arterial temperature is close to rectal temperature, approximately 0.8°F (0.4°C) higher than oral temperatures. This is by far the model selected by the vast majority of hospitals.
    - ✓ **An upward adjustment is required to account for the higher temperatures in order to avoid unnecessary fever workups (please see attached guidelines).**

- **Oral Equivalent**: The model with the oral equivalent calibration is programmed to compute the normal average cooling effect at the mouth, and automatically reduces the higher arterial temperature by that amount. This calibration allows the hospital to maintain existing protocols for fever workups based on oral temperature, and results in a reading consistent with the 98.6°F (37°C) mean normal oral temperature, in the range of 96.6 - 99.5°F (35.9 - 37.5°C) commonly seen with normal oral temperature measurements.
    - ✓ **No change in protocol is required if the hospital's protocol is based on an oral temperature.**

While oral temperature has never been considered a gold standard, and can easily mislead the clinician in identifying a fever, historically, it is the most common site for measuring body temperature. As such, the level of temperature requiring a fever/septic workup is typically based on an oral temperature, despite the fact that there can be a two degree difference (core/oral/axillary) among temperature measurement sites.

Nonetheless, it is not always easy to change collective memory (a normal temperature is still considered as 98.6°F (37°C) by the world in general (including clinicians), despite the site being measured, and despite the fact that only 8% of the world has a normal temp at 98.6°F (37°C). Accordingly, Exergen offers the oral equivalent calibration. The measurement is still as valid as the uncorrected standard model, but no change in protocol is required when using the oral equivalent model.

- Exergen TemporalScanner Thermometer, Model TAT-5000, Arterial (Standard) Model: Part Number 124275

- Exergen TemporalScanner Thermometer, Model TAT-5000, Oral Equivalent Model: Part Number 124375

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Adjustment in Fever Thresholds with Temporal Artery Temperature Assessment

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Temporal artery temperature (TAT) is a core temperature, defined as the temperature of the blood perfusing the major organs. The physics and physiology of the measurement are designed to accomplish this by scanning the skin over the TA, then mathematically replacing the heat lost from the blood perfusion to the environment.[1] As a core temperature, TAT is confirmed to be comparable to pulmonary artery (PA) temperature,[2,3,4] esophageal temperature,[5] rectal temperature.[6,7,8,9,10,11]. As expected for a core temperature, TAT is approximately 0.4°C (0.8°F) higher than oral temperature.[12,13] TAT has fewer and different local artifacts that cause variations than either oral or rectal temperatures, and thus will not always be exactly the same. In particular, oral temperature is heavily influenced by local cooling[14], and rectal temperature has long been known to exhibit an inertia in response to thermal changes,[15,16] recently observed in infants.[17]

The table below provides several fever guidelines and the recommended adjustment when using TAT. The adjustment rule is simply as follows:

- If current protocol is based on pulmonary artery, esophageal, or rectal temperatures: No change is necessary.
- If current protocol is based on oral temperatures: Add 0.4°C (0.8°F).

Fever Guidelines and Recommended Adjustment for Temporal Artery Temperature

Source	Fever Guidelines	Correction for Temporal Artery	Fever Guidelines Based on Temporal Artery
Infants and toddlers best practice guidelines[18,19,20,21,22]	1) infants 0 to 90 days of age with a **RECTAL** temperature ≥38.0°C (100.4°F), and 2) infants and children 3 to 36 months of age with a **RECTAL** temperature ≥39.0°C (102.2°F).	No change in existing protocol is necessary	1) infants 0 to 90 days of age with a **RECTAL** temperature ≥38.0°C (100.4°F), and 2) infants and children 3 to 36 months of age with a **RECTAL** temperature ≥39.0°C (102.2°F).
Infectious Diseases Society of America Guidelines – Revised 2002*[23,24]	A single **ORAL** temperature ≥38.3 (101°F)	Add 0.4°C (0.8°F)	A single **TA t**emperature ≥38.7 (101.8°F)
	An **ORAL** temperature ≥38.0°C (100.4°F) ≥ 1 hour	Add 0.4°C (0.8°F)	A **TA** temperature ≥38.4°C (101.2°F) ≥ 1 hour
Principles and Practice of Pediatric Oncology[25]	One **ORAL** temperature ≥38.5°C (101.3°F)	Add 0.4°C (0.8°F)	One **TA t**emperature ≥38.9 (102.1°F)
	Three **ORAL** temperatures ≥38.0°C (100.4°F) at least 4 hours apart within 24 hours.	Add 0.4°C (0.8°F)	Three **TA** temperatures ≥38.4°C (101.2°F) at least 4 hours apart within 24 hours.
National Institutes of Health, Pediatric Oncology Branch, National Cancer Institute**[26]	One **ORAL** temperature ≥38.3°C (101.0°F).	Add 0.4°C (0.8°F)	One **TA** temperature of ≥38.7°C (101.8°F).
	Two oral temperatures ≥38.0°C (100.4°F)		Two TA temperatures ≥38.4°C (101.2°F)

* Fever Definition in Neutropenic Patients with Unexplained Fever

** Evaluation and treatment of fever in the non-neutropenic child with cancer

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