



Quick Start Guide - DLMOff

Dim Light Melatonin Testing from biologyofsleep.com

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+ Overview

Dim Light Melatonin Offset (DLMOff) is used as an objective, comprehensive assessment of an individual's circadian rhythm function and the timing of their biological clock. DLMOff is typically measured by collecting saliva samples around waking at regular intervals in a dimly lit environment and analyzing the melatonin levels in those samples. The DLMOff timing provides valuable information about an individual's natural sleep-wake pattern and can be used to:

- Distinguish between sleep physiology and behavioral factors
- Establish if an individual's circadian rhythm is too long, too short, unstable, or misaligned
- Screen for insufficient or overproduction of melatonin and/or idiosyncratic drug interactions
- Identify optimal timing for sleep therapies (supplementation/bright light) that could otherwise negatively affect an individual's sleep-wake cycle

+ Use For

Routine morning symptoms, spanning after waking to mid-day. Commonly implemented for:

- Post-Sleep Fatigue/Hypersomnolence
- ASPD, DSPD
- Shift-Work
- Sleep Maintenance Insomnia
- Early Morning Awakening

+ Evaluation Criteria

During the evaluation of a patient, it is advised to acquire the temporal aspects and duration of symptom precipitation, combined with the extent of variability observed in routine bedtime and wake times. An evaluation of natural vs. forced awakening (alarm clock/other) is particularly valuable when determining expected waking levels of Melatonin.

+ Patient Collection Schedule

The standard protocol anchors sampling to an individual's routine wake time and collecting samples every half hour for 3 hours to verify the circadian phase relative to expected melatonin offset. This approach offers insights into the magnitude and duration of any potential phase shift and identifies optimal timing and duration for various sleep interventions and therapies.

For early morning sleep disturbances happening 1-2 hours pre-waking, with a routine sleep time and normal sleep latency, a recommended approach is to schedule sampling to begin 1-2 hours pre-waking and sampling hourly. This sampling strategy effectively covers a time span of 5-6 hours post-wake time. However, conducting onset testing may be more applicable if there is a suspicion of an advanced sleep phase.



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+ Medication

There are two prevailing modalities among healthcare providers regarding the assessment of melatonin production levels in the context of prescription medication and supplements:

1. Discontinue all medications and supplements to determine the baseline circadian profile (increases patient burden) to rule out physiological dysregulation first.
2. Discontinue sleep-related medications only and determine an individual's current circadian profile to rule out physiological dysregulation last. In the event of atypical results, you may discontinue or invert dosing schedules based on the timing of the results to observe effects on sleep behavior.

While most medications do not impact the circadian rhythm directly, there are several classifications of pharmacological compounds that do impact melatonin production, depending on the dosage and individual physiology. A general recommendation is to stop any medication that your patient can safely and comfortably discontinue under your care for 3-5 days before beginning the assessment.

Visit <https://biologyofsleep.com/sleep-medicine-index> to see the latest index of medications.

+ Melatonin Supplementation

While measurable levels of exogenous melatonin or melatonin-containing supplements typically persist in saliva for up to 24 hours, we frequently observe prolonged circadian dysregulation for a duration of up to 10 days or more, even after discontinuing supplementation. This can manifest as elevated melatonin levels, phase shifts, and oscillating profiles. This phenomenon is inter-individual dependent and influenced by the duration and dosage of routine supplementation. It is recommended to follow a discontinuation/withdrawal protocol for melatonin supplementation as outlined below:

- 3 days (minimum) for ≥ 1.5 mg dosing as needed
- 5 days (better) for ≥ 1.5 mg routine dosing to ≥ 3 mg and dosing as needed
- 10 days (best) for ≥ 3 mg routine dosing to ≥ 5 mg dosing as needed
- 15 days (ultimate) for ≥ 5 mg routine dosing



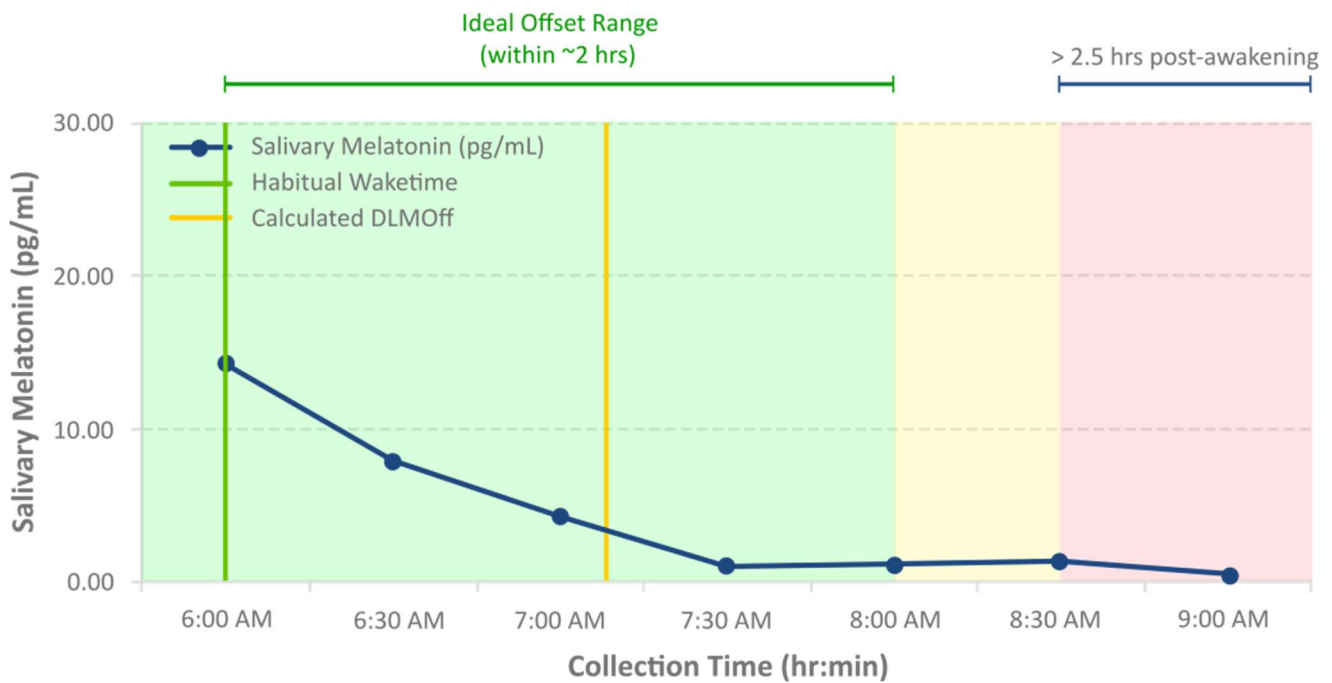
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+ Typical Results Profile

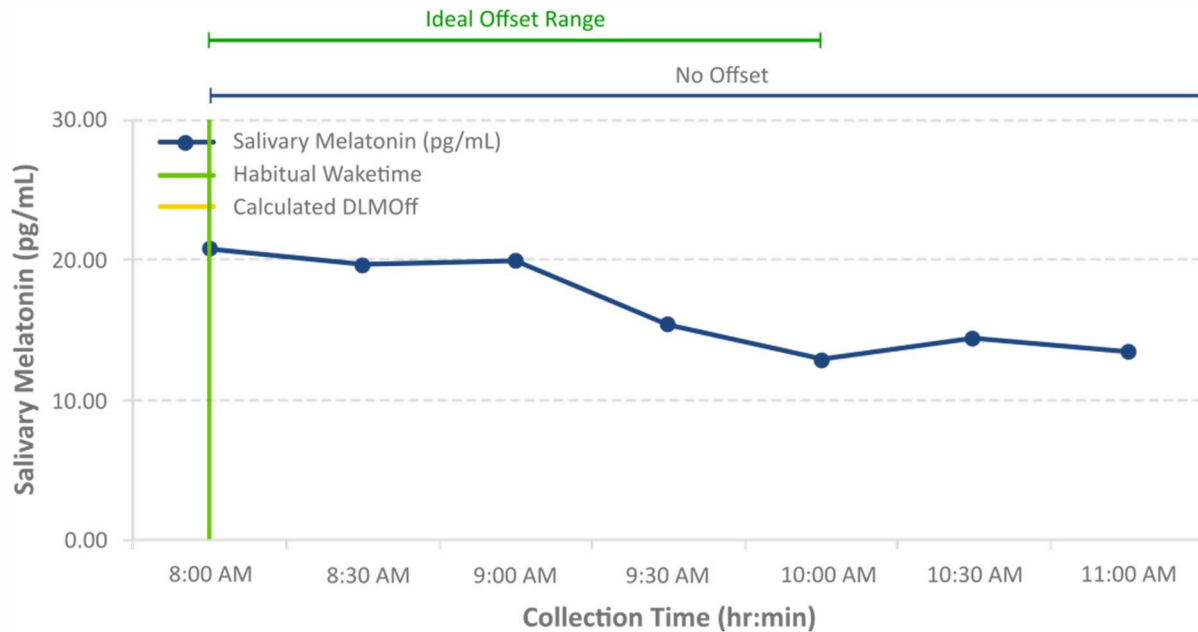
Dim Light Melatonin Offset (DLMOff) usually exhibits an inverse pattern as melatonin onset. DLMOff typically occurs within approximately ~2 hours after waking (green zone), especially if awakening is forced for social reasons. The yellow zone (approximately +/- 30 minutes outside of the ideal range) may suggest a mild misalignment, whereas the red zone usually indicates a significant phase shift. A typical phase-response curve exhibits elevated melatonin levels upon waking (depending on age), which gradually decrease until reaching baseline within ~2 hours. Naturally occurring waking presenting with low waking levels is commonly observed and does not typically signify a misalignment, unless accompanied by frequent early morning awakenings.



Example Profiles

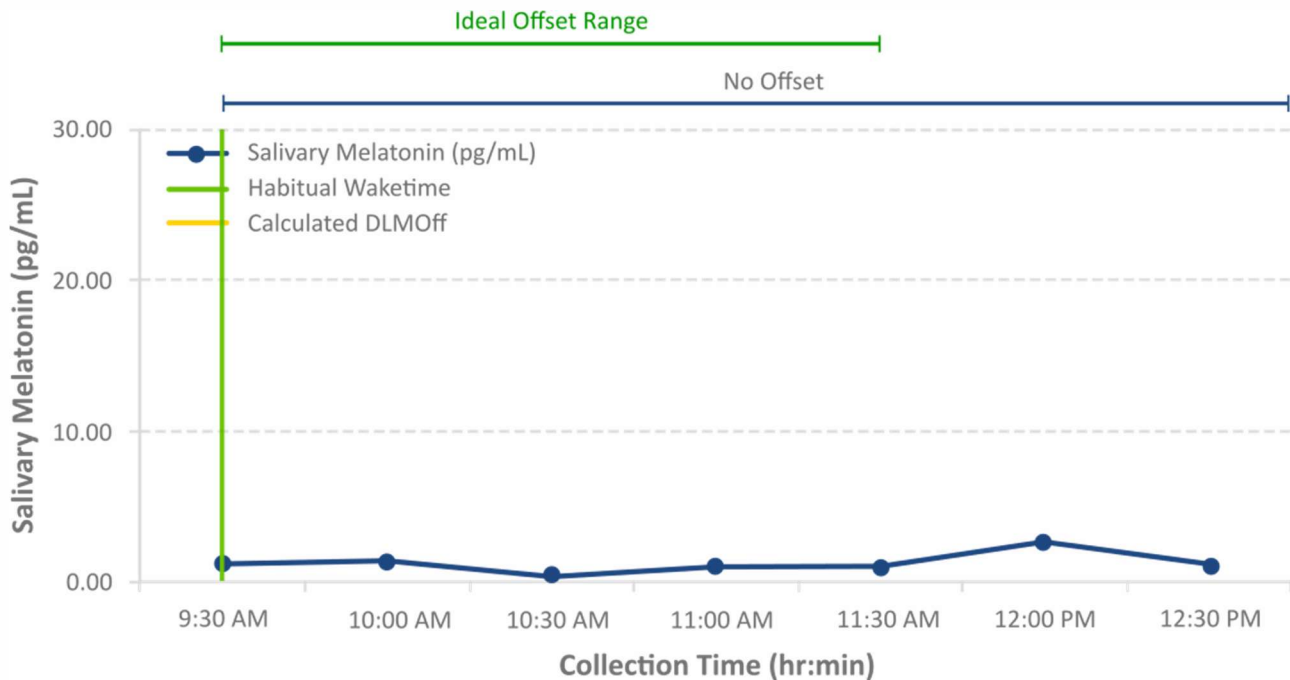
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+ No Offset / Late Offset Profile Example



This profile exhibits no DLMOFF and high early morning melatonin. Whether natural or forced awakening, this profile is often indicative of a delayed phase shift or melatonin overproduction.

+ No Offset / Early Offset Profile Example



This profile exhibits no DLMOFF and low early morning melatonin. This can be typical under naturally occurring waking and does not typically signify a misalignment, unless accompanied by frequent early morning awakenings. However, if forced awakening is present, it is often indicative of an advanced phase shift or melatonin underproduction.