


PubMed **Format:** Abstract**Full text links**J Adhes Dent. 2018;20(1):41-55. doi: 10.3290/j.jad.a39881.

Visible Light Curing Devices - Irradiance and Use in 302 German Dental Offices.

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Abstract

PURPOSE: To determine the irradiance delivered by visible-light curing (VLC) units and obtain information about the exposure times and the maintenance protocols used by dentists.

MATERIALS AND METHODS: The irradiance (mW/cm²) delivered by 526 VLCs from 302 dental offices from the Rhine-Main area, Germany, was measured using an integrating sphere (IS) and a MARC patient simulator (M-PS); additional information was gathered using a survey.

RESULTS: Irradiance was measured from 117 standard quartz-tungsten-halogen (QTH), 5 high-power QTH, 2 LED 1st-generation, 333 LED 2nd-generation, 61 LED 3rd-generation, and 8 plasma-arc curing (PAC) units. Depending on the measurement method, 8% (IS) or 11% (M-PS) of the VLCs delivered < 400 mW/cm². Depending on the VLC, the shortest exposure times required to deliver a radiant exposure of 16 J/cm² ranged from 7 to 294 s. The number of exposure cycles used by dentists when light curing a restoration ranged from 1 to 14. The shortest total exposure time used by dentists on a restoration was 5 s, the maximum was 200 s, and the median was 20 s. Of the 526 VLCs, 41% had intact, undamaged light tips. Only half of the dental offices checked the irradiance from their VLCs regularly, 97% disinfected the VLC, and 86% used eye protection.

CONCLUSION: Approximately 10% of the VLCs delivered < 400 mW/cm² and 14% of the dental offices used no form of eye protection. To achieve sufficient light curing of RBC restorations, more awareness about the VLCs used in the dental office is required.

PMID: 29457157 DOI: [10.3290/j.jad.a39881](https://doi.org/10.3290/j.jad.a39881)**LinkOut - more resources**

