TOOTH WHITENING BY A DIRECT-CURRENT COLD ATMOSPHERIC-PRESSURE AIR PLASMA MICRO JET ASSISTED WITH A GEL CONTAINING NO H₂O₂

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Aesthetics of teeth, including tooth color, is of great importance to people. Conventional clinical tooth-whitening treatments are mainly based on hydrogen peroxide (H₂O₂), while some studies demonstrate that the bleaching process can be accelerated when enhanced by heat or light (laser, cold light). The dependence on H₂O₂ may lead to sensitivity or different degree of injury on soft tissue. As the forth material state, non-thermal plasmas have recently attracted much interest in biomedicine. Studies confirm that nonthermal plasma is effective in accelerating the tooth whitening process.

Based on our previous work, we carried out a whitening method using a direct-current cold atmospheric-pressure air plasma micro jet (PMJ) assisted with blank gel (without H₂O₂) or gel with 3% H₂O₂. Compared to using the PMJ assisted by 35% H₂O₂ gel, an improvement of whitening degree was observed and the treating time was shortened dramatically from 20min to 5min. And there was no significant difference in whitening efficacy between the blank gel system and 3% H₂O₂ system. Out of safety consideration, the pulp chamber temperature was monitored by thermocouple and found to remain below 37 degrees Celsius. Compared with our previous work (PMJ with 35% H₂O₂ gel or no gel), this PMJ with blank gel setup is more effective and more close to clinical tooth whitening processing. Free of any potential H₂O₂ or thermal irritations, this setup can be well adapted for clinical application.

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