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Study of atmospheric cold plasma jet effect on tooth whitening

M Mohammadnejad[1], E Khorrami[1], S N Siadati[1], and Y Rezaei[2]

1. Department of Physics, Faculty of Basic Sciences, Azarbaijan Shahid Madani University
2. Faculty of Dentistry, Tabriz University of Medical Sciences

E-mail: mohammadnezhad@azaruniv.ac.ir

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Abstract

In this research, in order to investigate the effect of the plasma on teeth whitening, a two-electrode structure plasma jet operating at atmospheric pressure was designed and built. First, the electrical characteristics and the plasma spectrum were recorded to calculate the delivered power to the plasma and to identify the active species produced in the plasma. Then, the prepared teeth in different groups (with and without fluoride gel) were subjected to the plasma and for comparison, the color of the teeth (before and after processing) was evaluated using a spectrophotometer. The results showed a significant effect of plasma on teeth whitening. The reason for this whitening effect may be attributed to the chemical activity of the jet due to the penetration of more air molecules and the production of more nitrogen and oxygen species in the plasma that reaches the teeth. Also, the greatest whitening effect was observed in the group where the teeth were first treated by plasma and then fluoride gel was placed on the teeth. Moreover, the effect of different plasma powers on teeth whitening was investigated and it was shown that due to the increase in the concentration of active species at higher powers, whitening increases with increasing power.

Keywords: Atmospheric cold plasma, Plasma jet, Dental treatment

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