

The Moveable Cathode Water Cold Atmospheric Pressure Plasma Jet for Titanium Surface Treatment of Dental Implant

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Abstract : In the present time in the laboratory, one can create an ionized gas, that is to say, plasma from room temperature up to ten times more than the temperature of the sun center (150,000,000). All these temperature spectrums of plasma have applications in different disciplines, including dentistry, medicine, science, surface treatment, nuclear waste disinfection, nuclear fusion technology, etc. However, for the sick of simplicity, all these plasma temperature spectrums are classified as cold or low-pressure non-thermal plasma and warm or high-pressure equilibrium plasma. The cold plasma, as we are interested in this paper, exists at lower ion and neutral temperatures with respect to electron temperature, but in the equilibrium plasma, the temperatures of ion and electron are fairly equal. The cold plasma is a partially ionized gas comprising ions, electrons, ultraviolet photons and reactive neutrals such as radicals, excited and ground-state molecules. Cold atmospheric pressure plasmas are widely used in diverse fields of dental medicine, such as the titanium surface of dental implants, which helps in reducing contact angle and supporting the spread of osteoblastic cells and is known to aid in osteoblastic proliferation and osseointegration, thus increasing the success rates of implants. This article focuses on the anticipated uses of a newly designed water-cooled adjustable cathode cold atmospheric pressure plasma Jet (CAPPJ) for titanium surface treatment in dental implant placement.

Keywords : CAPPJ, surface modification, osseointegration, plasma medicine, dentistry

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