

TITLE: PORTABLE DISINFECTION SYSTEM BASED ON INDUCTION HEATING

FIELD OF INTEREST

Periprosthetic joint infection treatment

CLINICAL NEED

Periprosthetic infections of joints with implants constitute a relevant problem for patients, surgeons and, in general, for public health systems. Microorganisms often produce biofilms on the implant's inert material, hindering the appropriate treatment for the patient after the implantation of a prosthesis.

Furthermore, as a result of the increasing resistance of bacteria to antibiotics, patients often require invasive surgeries in which the prosthesis needs to be removed and replaced, after long periods of pharmaceutical treatment. This situation leads to health risks for the patients, as well as social costs in terms of quality of life and dependency, with a corresponding increase of treatment costs which are, roughly, ten times higher than a prosthesis implantation without complications.

As an alternative or a supplementary technique to eliminate prosthetic infections, non-contact inductive heating of prostheses and/or implants has been proposed. Studies on hyperthermia treatment for cancer have shown that it is possible to heat metal objects transcutaneously and selectively within the body, for instance with the application of pulsed electromagnetic fields.

DESCRIPTION OF THE INVENTION

The invention consists in a portable induction heating system for eliminating biofilms and microorganisms through localized hyperthermia of the metallic elements of prostheses or implants, suitable for its medical use in operating rooms, comprising an induction coil, a DC-AC power electronic stage connected to the induction coil and a DC power supply stage connected to the DC-AC power electronic stage; and where these three elements are housed inside a sealable insulation housing comprising a sterilizable, electrically insulating, thermally conductive material. The DC-AC power electronic stage comprises, furthermore, a wide-bandgap semiconductor bridge-type power stage that allows for a highly compact and efficient design that also provides a very high efficiency dissipating heat. As a result, the system of the invention can be completely sealed and, thus, easily sterilized without requiring the use of air or liquid cooling means.

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ADVANTAGES

Provide an effective elimination of bacteria by hyperthermia. Induction heating generated in the implant can be applied mainly onto the bacterial biofilm, while the surrounding tissue is only subject to indirect heating.

TECHNOLOGY KEYWORDS

Infection treatment, induction heating, periprosthetic.

IPR STATUS

Patent application number: EP22382889.8
Applicants: UNIZAR, FIBHULP y FIIS-FJD.

TYPE AND ROLE OF PARTNER

Looking for developing the technology and looking for commercial partners interested in licensing.

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