Finite element method based analysis of bio-heat transfer problems in human skin during burns and afterwards

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Abstract

In order to simulate the burns in human skin, a three-dimensional computational model of bio-heat transfer problems based on finite element method is developed. The purpose of the simulation is to get the temperature profiles in the human skin during burn. Temperature profiles in multi-layered skin under the contact of a hot object and hot water are investigated. The work is extended for the case of skin damage intensities and burn treatments. Cooling of burned area are examined from the heat transfer point of view. The burn intensity analysis is performed using the Henrique's burn integral equation. Finally the code is adopted in the open source heat transfer analyser AdvThermal. The AdvThermal is a module of the Adventure System for the analysis of the heat conduction problems. The outcome of the work will be beneficial for the treatment of burn injuries.

Keywords: Pennes bio-heat equation, skin burn, finite element, burn intensities