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Abstract

Due to the wide use of laser systems in human activities, an accidental event of laser exposure may occur where the most susceptible part to injury is the eye. A typical invisible pulsed, far IR, CO_2 laser beam was used as an intrabeam accidentally struck an eye leading to raise its temperature to a limit where a pain sensation was started followed by aversion response with a delay of 0.25 s. At this time, the laser beam was assumed to terminate with respect to the cornea. The finite element method (FEM) was used successfully to predict, numerically, the temperature distribution through the anterior part of the eye when subjected to the laser beam. The FEM program was written using Visual Basic 6 coding. The effects of laser parameters such as laser beam profile, pulse width, and repetition rate on the temperature distribution and the consequential thermal damage were studied. The efficiency of the constructed computer program of the present work was examined by the comparison of the predicted results with those obtained from previously published experimental and theoretical works. The comparison shows good agreements.