THRESHOLD OF PERMANENT CORNEA THERMAL DAMAGE DUE TO INCIDENTAL CONTINUOUS WAVE CO_2 LASER IRRADIATION

by
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Cor nea ther mal dam age due to in ci den tal con tin u ous wave CO2 la ser ir ra di a tion is stud ied nu mer i cally based on bio-heat equa tion .The in ter ac tion of la ser with tis sue leads to a rapid tem per a ture in creased in tar get and the nearby tis sue. As the tem - per a ture of the eye sur face reaches 44 °C, a sen sa tion of pain will cause aver sion re sponse of the re flex blink and/or shift ing away from the source of pain. The aim of the work is to pre dict nu mer i cally the thresh old limit of in ci den tal la ser power that causes dam age to the an te rior part of the cor nea, which can be healed within 2-5 days as long as dam age is not ex ceed ing the outer part of the eye (ep i the lium). A fi - nite el e ment anal y sis is used to pre dict tem per a ture dis tri bu tion through the cor nea where the necroses re gion can be ob tained us ing ther mal dose equa tion. The ther - mal dose that re quired for dam ag ing the cor nea is pre dicted from pre vi ously pub - lished ex per i men tal data on rhe sus mon keys and used later as a limit for shrink age to hu man cor nea. The re sult of this work is com pared by in ter na tional stan dard of safety and a good nearby re sult is ob tained which ver i fied the re sult of this work.

Key words: *cornea thermal damage, laser safety, incidental laser accident, continuous wave CO2 laser, finite element analysis*