Optimization of laser-solder repair technique for possible application in strabismus surgeries.

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Abstract:

Strabismus is the lack of binocular vision due to an inability to control one of the eye muscles. Corrective surgery is the most common recourse and consists of adjusting and reattaching the extraocular muscle to the sclera. In approximately 10% of cases involving re-insertment of the extraocular muscle via suture techniques, the needle is inserted too deeply into the eye resulting in perforation of the retina. Fibrin glues and cyanoacrylates have been substituted with unsatisfactory mechanical results. The goal of this study was to maximize the tensile strength of rabbit extraocular muscles repaired using a laser-solder technique developed by McNally et al., Biodegradable polymer membranes of controlled porosity were fabricated with poly(L-lactic-co-glycolic acid) (PLGA) and salt particles using a solvent-casting and particulate-leaching technique. The porous membranes were doped with protein solder composed of 25 % and 50%(w/v) serum albumin and 0.5mg/ml indocyanine green (ICG) dye mixed in deionized water. In vitro tissue specimens were repaired using the solder-doped polymer membranes in conjunction with an 805nm diode laser. The tensile strength was tested on an MTS machine and results were analyzed with the Student's T-test.