

## GALIUM-ARSENIDE LASER PHOTOSTIMULATION AUGMENTS THE STRENGTH OF HEALING RABBIT CALCANEAL TENDONS

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Laser photostimulation has been purported to promote fibroplasia and collagen synthesis in skin wounds. To test the hypothesis that GaAs laser promotes collagen synthesis and hence augments the strength of healing tendons, the right calcaneal tendons of 21 rabbits were tenotomized, repaired and immobilized in plaster casts. Then, beginning one day after surgery, the repaired tendons of 14 rabbits were exposed to 904 nm Ga-As laser of  $1 \text{ J cm}^{-2}$  [N=7 tendons] or  $1.5 \text{ J cm}^{-2}$  [N=7 tendons] daily. The remaining 7 tendons served as non-treated controls. On the 14th post-operative day, the tendons were excised, and tested on an Instron device for differences in tensile strength and tensile stress. Analysis of variance showed that the mean tensile strength of photostimulated tendons,  $94.7 \pm 12.25 \text{ N}$  and  $89.7 \pm 10.83 \text{ N}$  for  $1 \text{ J cm}^{-2}$  and  $1.5 \text{ J cm}^{-2}$  respectively, were significantly different from the control values,  $56.4 \pm 4.05 \text{ N}$ . Subsequently, Student-Neuman-Keul post-hoc test revealed that **stimulation at  $1 \text{ J cm}^{-2}$  and  $1.5 \text{ J cm}^{-2}$  significantly increased the tensile strength of the tendons over controls**. Correspondingly, the mean tensile stress of stimulated tendons,  $251.6 \pm 34.35 \text{ N cm}^{-2}$  for the  $1 \text{ J cm}^{-2}$  dose and  $221.60 \pm 30.94 \text{ N cm}^{-2}$  for the  $1.5 \text{ J cm}^{-2}$  dose, were significantly higher than mean control value,  $153.56 \pm 11.64 \text{ N cm}^{-2}$ . No differences were found in the mean tensile strength and mean tensile stress of tendons stimulated at the two doses. These findings indicate that 1 or  $1.5 \text{ J cm}^{-2}$  Ga-As laser augments the healing strength of experimentally tenotomized rabbit calcaneal tendons and that doses greater than  $1 \text{ J cm}^{-2}$  may not promote healing better than a dose of  $1 \text{ J cm}^{-2}$ .

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Your attention is directed to the sections of this paper highlighted in bold print. This study concludes that the laser irradiated tendons have almost **twice** the tensile strength value as those of tendons which have not been lasered, healing on their own. Tensile strength is defined as the ultimate load or force required to rupture or tear each tendon. The Respond Laser 2400 System was used to conduct this research.  
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