USE OF LASER-BASED TECHNOLOGIES IN CARDIOVASCULAR BIOPROSTHESES PRODUCTION

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Bioprostheses formed from xenopericardium have been extensively used in cardiovascular surgery. Xenopericardium cutting is performed with scissors, a scalpel or a nibble matrix, though all these techniques don't provide high-quality accuracy. The purpose of the study was to evaluate the possibility of laser-based technologies application for biomaterial cutting in cardiovascular bioprostheses production.

Materials and methods

The study used a bovine pericardium, preserved with ethylene-glycol diglycidyl ether without any damage to collagen matrix. At the 1st stage xenopericardium cutting was performed using Nd:YAG and Er:YAG solid-state lasers as well as scissors, a scalpel and a nibble matrix. At the 2d stage CO_2 laser, generating continuous radiation. was used. The pericardial structure assessment before and after the cutting was done using light microscopy.

Results: In the marginal zone of the pericardium collagen dissociation up to 40 um was found in scissors and scalpel cutting and up to 5 um in nibble matrix cutting. The mean Nd:YAG laser emission power of 5–9 W didn't allow cutting the pericardium through. Destructive changes such as collagen homogenization and dissociation as well as fibrocyte breakdown were observed up to 60 um from the cutting line. The increase in the mean laser emission power up to 12 W let cut xenopericardium through, however it led to the enlargement of destructive changes area up to 80 um. The study showed that Er:YAG and CO_2 laser emission didn't cause any destructive changes of the pericardium around the cutting area while dissecting the tissue. The cutting speed reached 80 mm/min using Er:YAG laser and this speed increase resulted in lower cutting quality. CO_2 laser use allowed the speed increase up to 400 mm/min.

Conclusion

The use Er:YAG and CO_2 laser emission for the epoxy-treated xenopericardium cutting not having any mechanical or high-temperature impact on the tissues around the cutting area. The use of CO_2 laser lets improve cardiovascular bioprostheses production.

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TYPOLOGICAL PROPERTIES OF NERVOUS SYSTEM INFLUENCE ON DEFENSE BEHAVIOR ELITE ATHLETES IN TAEKWONDO

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The influence of psychological factors on the results of performances of sportsmen in competitions, on the effectiveness of their work at the trainings doesn't give rise to doubt. Indeed, the higher the level of mastery of sportsmen is, the more complicated competitions, in which they take a part, are, the more considerable is the contribution of psychological factors to the reached results. For the lowering of emotional tension of different origin in the psychic there become more active and function the mechanisms of psychological protection. Individual psychological protection is a subject mechanism of forming and realization of the condition of sportsman's readiness to the reaching of success at the emulative actions. The tasks of research, which was carried out by the project № 10-06-38656 a/U and supported by the guarantor of RHSF, included studying of activity of protective behavior in connection with the stability to the psychical overloads and existing adaptative resources, therefore we carried out the comparison with typological behavior of nervous system.

In the research there took a part sportsmen of the combined teams of Russia by tae kwon do VTF (male team – 33 sportsmen, female team – 32 sporstmen) at the age of 18 till 32 years. For the estimation of degree of use the mechanisms of psychological protection we use inventory of Plutchic-Kelermann-Conte and method of studying of typological behavior of nervous system (Ya. Strelyau).

At the base of received results we can make a conclusion, that sportsman with the high showings of the nervous system's strength at the moments of excitement will more rare resort to protective mechanism by the type «regression» and «substitution». People initially predisposed to the control of their behavior have less expressed substitution (sportsmen with the high showing of the nervous system's strength by the braking). In addition there exists an ability that these sportsmen could have the protection by the type «projection» as the protective reaction. Sportsmen with the high level of mobility of nervous processes can demonstrate emotional indifference or rejection of unpleasant for them situation.

At the base of received correlative interconnection we can make a conclusion that the higher qualified tae kwon do sportsman's strength and balance of nervous system the less he is inclined to unconstructive reaction to the difficult situations at the form of primitive psychological protections.

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