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Fund "Nauka" Project № 21023 Resume – Competitive-based Session 2021: "Reducing the incidence of pin infections with external fixation by using pins with different structure and antibiotic releasing/ coating" Project leader: Chief assist. prof. Preslav Plamenov Penev, MD, PhD

The aim of this project is to determine the effectiveness of antibiotic-releasing/ coated pins on the incidence of pin infections during external fixation.

Tasks: The tasks were formulated to achieve the main objective of the project and are as follows:

- 1. To produce annotated and nitrated titanium pins with antibiotic and without antibiotic release/ coating;
- 2. To implant pins with and without antibiotic coating in rats;
- 3. To contaminate the contact area between the pin and soft tissues in individual groups with Staphylococcus aureus;
- 4. To track the development or absence of bacterial infection by laboratory and microbiological tests;
- 5. Statistical processing and analysis of the results obtained.

Methods: For the realization of the aim and objectives, it is necessary to produce pins with and without antibiotic release/ coating. Setting up groups with experimental animals and dividing the experimental animals (rats) into nine main groups. Each group consists of 12 specimens:

- 1. Group I consists of experimental animals in which pins were placed without antibiotic coating and without bacterial contamination.
- 2. Group II pins without antibiotic but with bacterial contamination.
- 3. Group III pins with antibiotic coating without bacteria.
- 4. Group IV pins with antibiotic coating 1 and bacteria.
- 5. Group V pins with antibiotic coating 2 and bacteria.
- 6. Group VI annotated titanium pins without antibiotic and bacteria.
- 7. Group VII annotated titanium pin with antibiotic and bacteria.
- 8. Group VIII nitrated titanium pin without antibiotic and bacteria.
- 9. Group IX nitrated titanium pin with antibiotic and bacteria.

Bacterial contamination is with a suspension containing Staphylococcus aureus.

Laboratory and microbiological testing and culture will be used to report results to prove or disprove bacterial growth and inflammatory process. Statistical methods for significant difference and reliability will be used.

Results: The hypothesis that is posed is that pins with antibiotic release/ coating will reduce the incidence of bacterial infections compared to pins without antibiotic release/ coating.