Comparison between activated carbon and activated felt in bone healing process

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Bone diseases such as fractures and bone defects may result from several reasons, where the repair process is normally long and painful. The most used therapies are based either on the implantation of a biocompatible prosthesis or through the insertion of a biomaterial in the local injury. However, those treatments involve extended and costly surgical intervention. Thus, the comparison with two biomaterials such as the use of activated carbon (AC) and activated felt (ACF) as bone biosubstitute to assist the bone repair can be an alternative to overcome those problems.

The study was performed by induction of a bone defect in rat tibias and their subsequent treatment with ACF and AC. Four different groups of rats were studied: control (CTL), untreated Injury (NT), Injured treated with activated carbon fiber felt (ACF) and Injured treated with activated carbon (AC). All groups were evaluated by histological and biomechanical properties of bone after the healing process and by phosphatase alkaline level (ALP).

The NT group presented lowest values of stress at break, besides histological changes related to disorganization of the tissue. Gradually, the groups ACF and AC showed to improve their mechanical properties in comparison to CTL group. The group AC presented the highest value of stress at break and ACF presented strain increase in comparison to AC. However, both biomaterial groups presented organized histological aspects.

Thus, both activated carbon and activated felt seemed to assist the process of bone healing in experimental model in rat’s tibia. Moreover, activated carbon

promote in the formation of more resistant bone.