Intermittent Fasting (IF) Before and After Fracture Accelerates Tibia Fracture Repair

Mark Phillip Karavan, Kier Maddox Blevins, Benjamin Alman[1]
[1]Duke

INTRODUCTION:
Bone fracture repair remains a common clinical challenge. Therapeutic fasting has been shown to significantly improve morbidity and mortality in male mice. Additionally, it has improved wound healing in the setting of skin burns and ulceration via activation of pro-angiogenic factors in mice. Our study tested whether intermittent fasting facilitates accelerated bone fracture repair in male mice.
METHODS:
The effects of intermittent fasting on bone fracture repair were evaluated by analyzing the radiographic union scale in tibial fracture (RUST) score, bone volume, bone volume / total volume, apparent density, and polar moment of inertia via micro-CT imaging of fractured tibias in fasting mice. Mice were intermittently fasted for 5 weeks before fracture. Mice were sacrificed 2 and 4 weeks post-fracture. Fasting mice were allowed a 12-hour feeding period each day in comparison to mice that adhered to an ad libitum (AL) diet, which had access to food at all times.
RESULTS:
Daily intermittent fasting of 12-h for 5 weeks before tibia fracture and for 2 weeks after fracture induced greater RUST scores, greater bone volume, greater bone volume/ total volume, lesser apparent density, and greater polar moment of inertia in male mice. These differences were not observed at 4 weeks post fracture.
DISCUSSION AND CONCLUSION:
This study suggests that intermittent fasting accelerates bone fracture repair in mice, potentially having major implications for human health and clinical application.