



Role of Intravenous Iron in Iron Concentration and Fracture Recovery in Mice with Iron-Deficiency Anemia

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Introduction

Iron deficient anemia = low hemoglobin & iron

- Affects 90% of post-op orthopedic trauma patients (Landers et al., 2025)
- Associated with longer stays, infections, transfusions, and poor recovery
- Transfusions used only for severe cases; moderate IDA often untreated
- Moderate IDA can last 6+ months, worsening fatigue, depression, quality of life.

Objective

This study evaluates the role of intravenous iron therapy (IVIT) on iron concentration and fracture recovery in a preclinical mouse model of iron deficient anemia (IDA)

Methodology

Subjects



C57BL/6 Mice
Control, Untreated IDA,
IDA treated with IVIT

Trauma Model



1-mm Femur Fracture
Simulates Orthopedic Trauma

Data Collection

Iron Analysis	Functional Recovery
Prussian Blue Staining	Dynamic Weightbearing (DWB) Analysis
Iron Quantification Assay	

Results

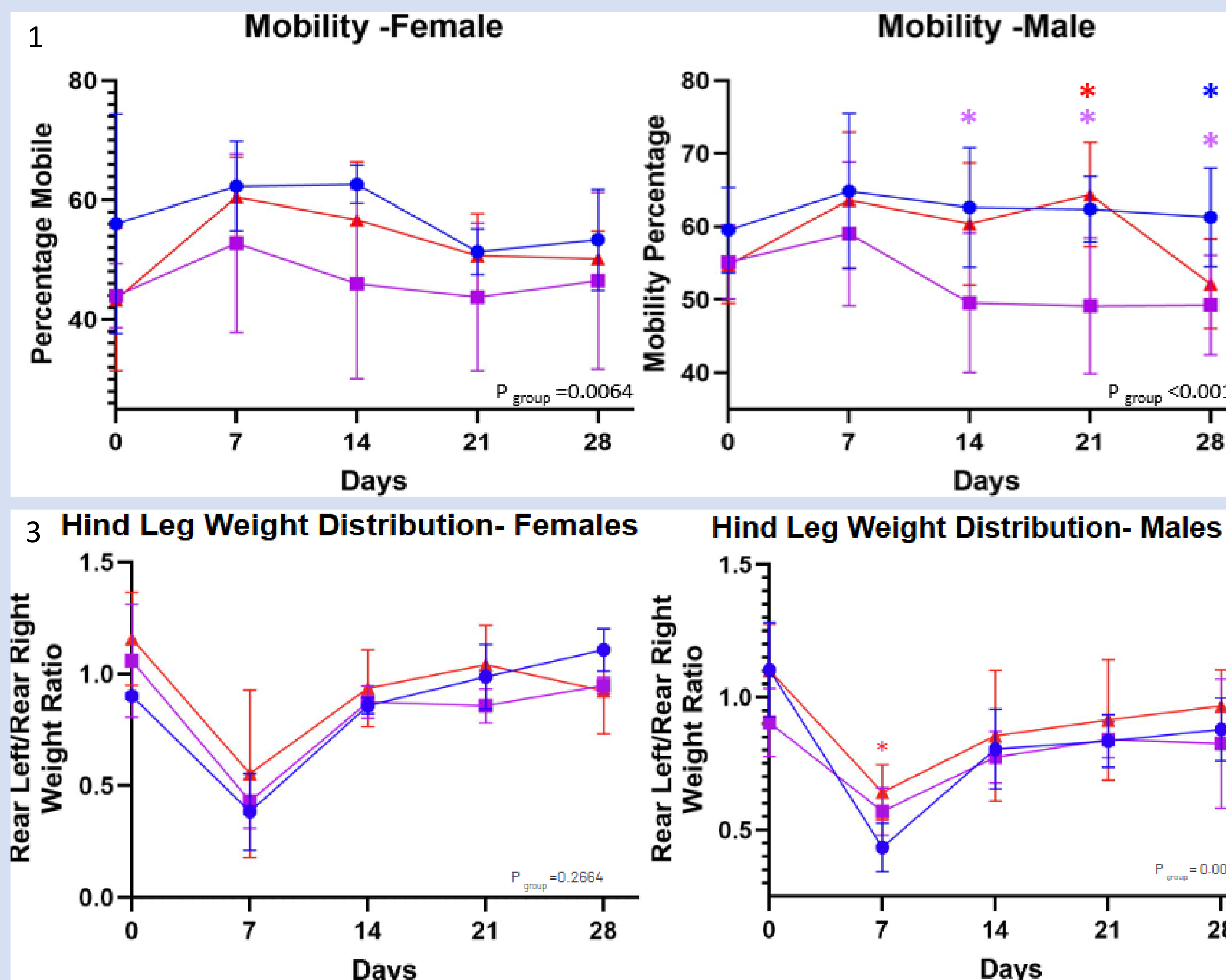


Figure 1. *Mobility significantly increased in male IVIT group and notably in female IVIT groups. Duration of Mobility and Immobility in Male and Female Subjects Over 28 Days. Statistical significance indicated by P group values.*

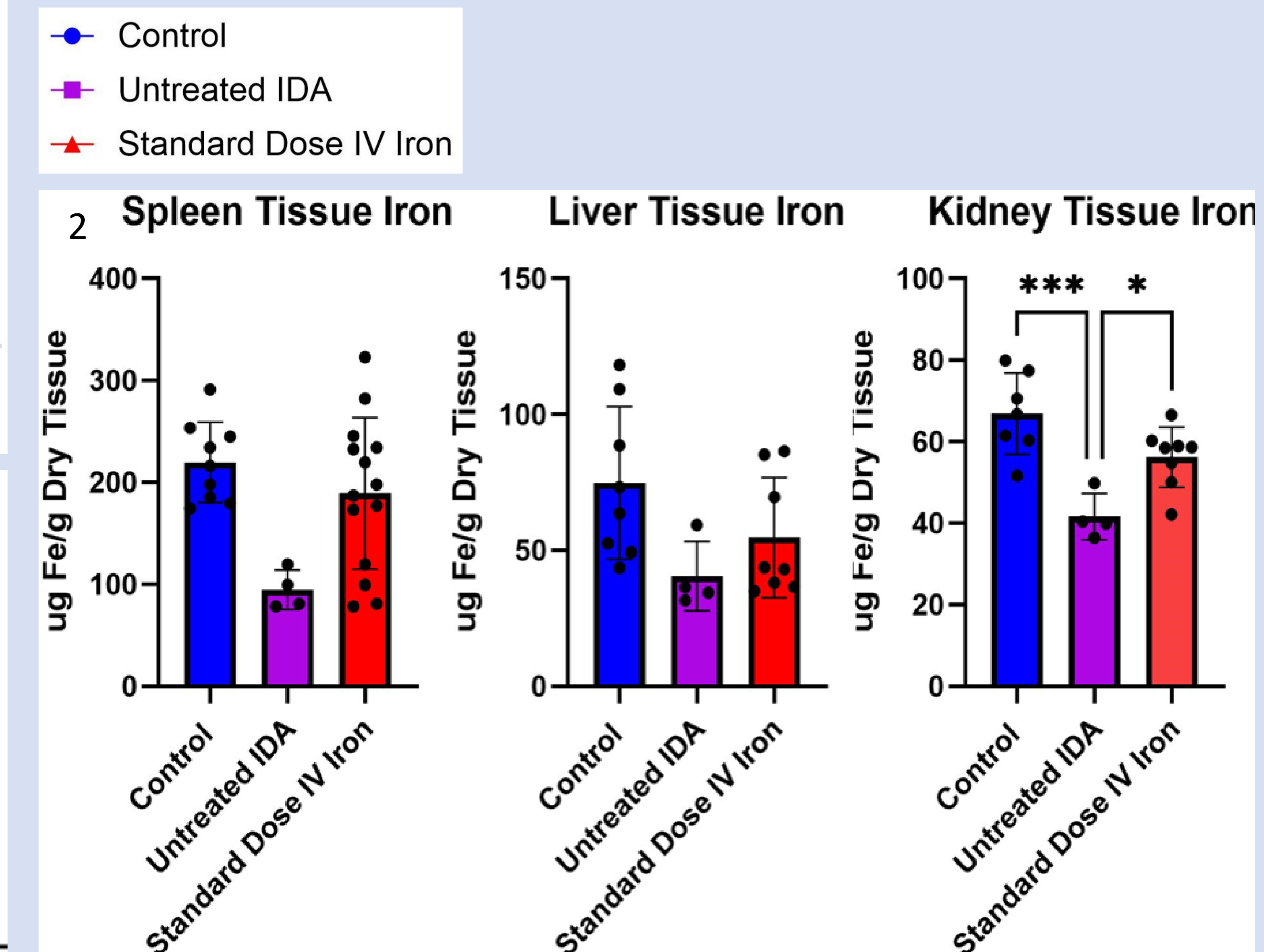
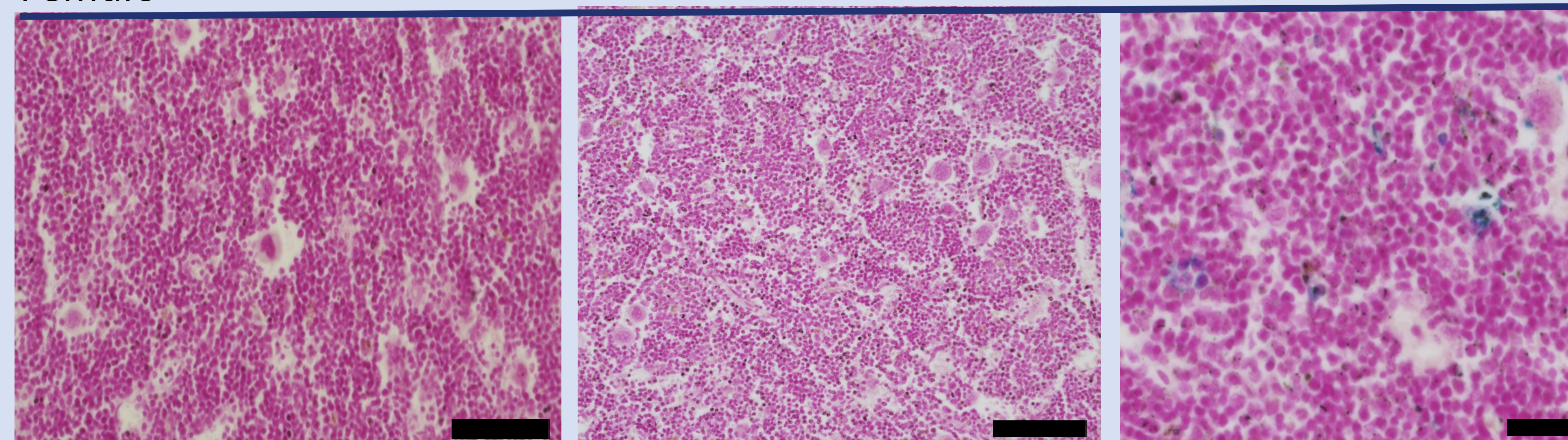


Figure 2. *Standard dose IV iron group shows higher iron levels than untreated IDA. Iron concentration ($\mu\text{g Fe/g dry tissue}$) in kidney, liver, and spleen samples from control, untreated IDA, and standard-dose IV iron groups.*

Figure 3. *Male and Female graphs show an increase in weight distribution for the IVIT group compared to untreated IDA. Weight distribution measured over 28 days in male (left) and female (right) subjects.*

Femurs

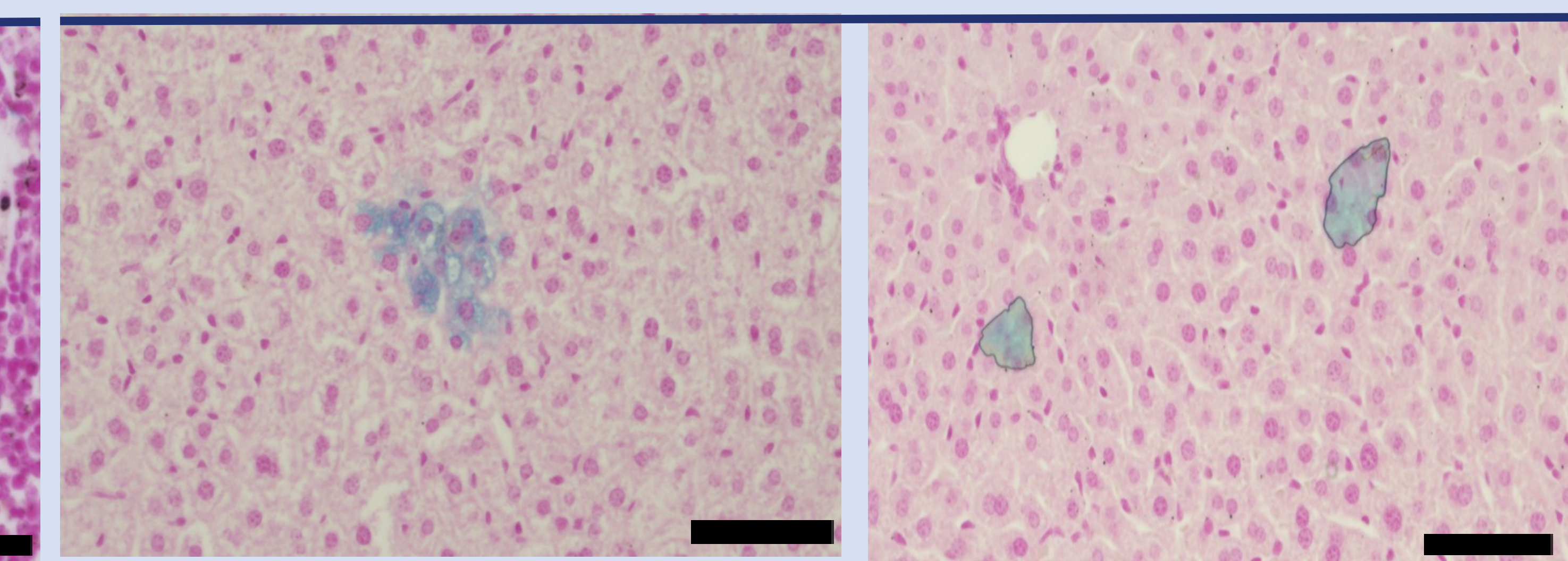


Standard IV Iron

Untreated IDA

Control

Livers



Untreated IDA

Control

Conclusion

Findings

- IDA groups had reduced iron levels, decreased mobility and delayed return to weightbearing.
- IVIT groups showed higher iron levels, improved mobility and a faster return to weightbearing.

IVIT may be a promising treatment for orthopedic trauma patients with IDA.

Next Steps

How is bone healing and strength impacted?

- Micro-CT imaging of the bone and the healing that follows fracture.
- Calus formation or other abnormalities?

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