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### Effect of Calcium Chloride and Isoflurane on Force Frequency Relationship in Canines

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# Effect of Calcium Chloride and Isoflurane on Force Frequency Relationship in Canines

Harrison Patrizio BS, Lawrence Mulligan PHD

## Introduction

- Proper calcium cycling is critical for a optimally functioning heart.
- Improper calcium cycling in humans can contribute to heart failure.
- Human calcium cycling is difficult to study due to the risks of damaging the patient's cardiac tissue.
- Risk of further damaging cardiac tissue is substantially increased in a heart failure patient.
- Past studies focus on studying the effects of changing calcium cycling in lab rats.
- Current research shows limited alternative methods in studying relationships between calcium cycling and FFR in larger mammals.

## Objective

To determine the response of the canine force frequency relationship to calcium chloride and isoflurane infusion.

## Significance

- A strong correlation between canine and known human calcium cycling would supply an alternative avenue to explore the role of calcium cycling in failing cardiac tissue.
- This supplies future research with a substitute for human patients in researching cardiac calcium cycling.

## Methods

- **Study Design:** Analysis of canine cardiac function data set previously collected by Dr. Mulligan.
- **Data Analysis:** This data will be analyzed using Graphpad to collect significant findings. These findings will be expressed graphically to convey the effects of calcium chloride and isoflurane on the canine force frequency relationship.

## Expected Outcomes & Conclusions

- Infusion results:
  - **Calcium chloride:** expected to show an increase in force generated by canine cardiac tissue.
  - **Isoflurane:** expected to show an decrease in force generated by canine cardiac tissue.
- The data is expected to be comparable to known FFR outcomes in human participants.
- The expected outcome provides an alternative research tool to advance the understanding of cardiac calcium cycling in canines.

## Future Research

- Extraction of the potentiation ratio and recirculation fraction in these canines may provide further useful insight on how calcium cycling relates to heart failure.