Dog Grip: Evaluating Dog Shoe Traction

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Project Background

The University of Georgia - College of Veterinary Medicine is researching traction-enhancing products **(TEPs)** to improve safety and performance in working dogs. There is a ***large gap in the clinical effects of dog shoes*** making it difficult to evaluate injury prevention such as falls, joint strain, and long-term musculoskeletal issues. Our team was tasked with designing a portable device that provides accurate, repeatable measurements of both **linear** and **rotational traction** for multiple simulated limb weights across various surfaces.

Methods for Solution

The device must be **transportable** and **simplistic**, providing the user with quantifiable data to determine **coefficients of traction**.

Two-Part Method

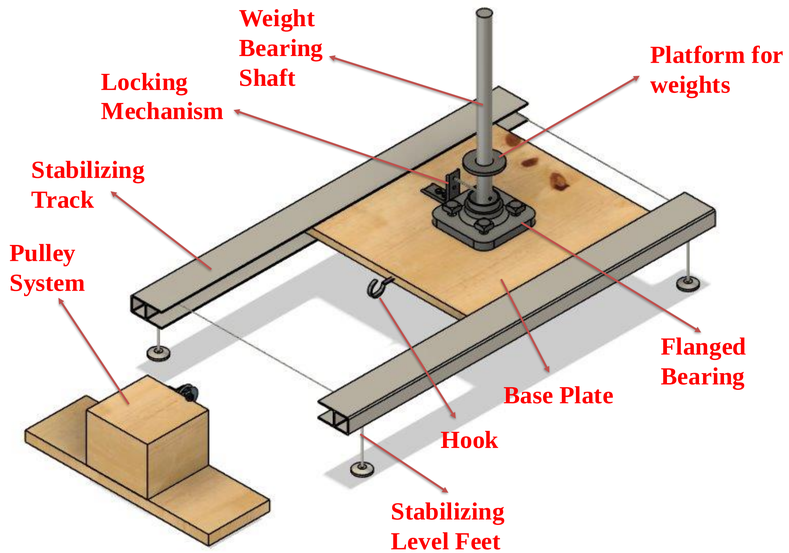
Locked: force gauge and decoupled pulley system with stabilizing frame

Unlocked: torque gauge rotating about center rod bearing

$$\mu = \frac{F_t}{N} \qquad \tau = rF_t$$

These methods provide our clients with **measures of slippage**.

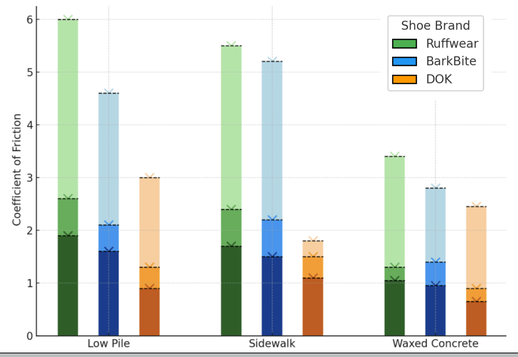
Solution Details



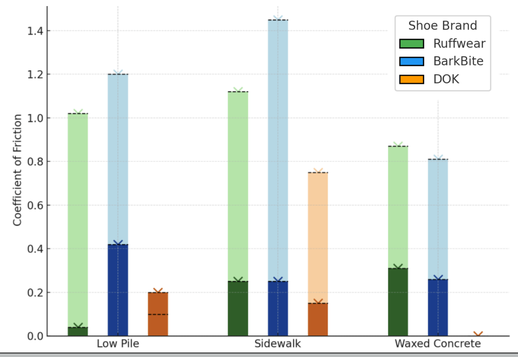
Coefficients of Friction

by Flooring Material, Shoe, and Simulated Limb Weight

Linear Traction



Rotational Traction



Results & Impact

Linear Traction

Surface	Ruffwear	BarkBrite	DOK
Low Pile Carpet	1.96 E-14	2.14 E-14	1.04 E-12
Sidewalk	1.86 E-09	4.88 E-13	4.13 E-10
Waxed Concrete	3.05 E-13	2.20 E-09	3.49 E-13

Rotational Traction

Surface	Ruffwear	BarkBrite	DOK
Low Pile Carpet	1.04 E-12	1.04 E-12	1.04 E-12
Sidewalk	1.94 E-05	1.31 E-07	1.33 E-05
Waxed Concrete	4.84 E-05	2.88 E-06	----------

$p < 0.05$

Our design prioritizes **portability**, **ease of use**, and **adaptability**, addressing a real-world problem with a practical, engineering-based solution that directly impacts ***animal safety*** and ***performance***. Friction analysis allows for traction enhancement which aids ***injury prevention.***

Summary & Recommendations

- ***Refining the rotational testing mechanism*** to reduce play and increase torque sensitivity
- ***Exploring alternative bearing or locking mechanisms*** to improve control during rotational test
- ***Conducting long-term durability*** testing on various surfaces
- ***Biomechanical analysis*** for clinical effects of TEPs for dawgs

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The University of Georgia College of Veterinary Medicine – Dr. Bryan Torres & Mat Sartorato