

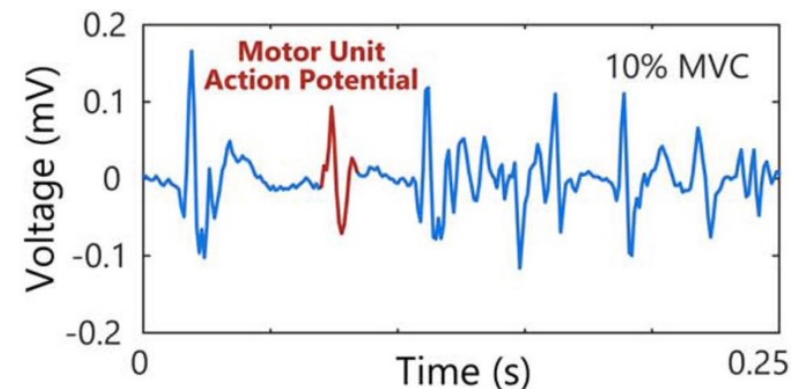
Electromyographic evaluation of the effects of horseshoe on equine muscle function

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Introduction

- Horseshoes modify limb biomechanics, altering muscle activity
- Electromyography (EMG) measures muscle electrical activation during contraction

Fig 1:
Example of
EMG data



- Greater amplitude = greater active muscle fibers recruited
- Understanding how horseshoes affect muscle function can improve equine welfare and reduce injury risk

Objective

Assess the impact of horseshoe on equine muscle function through electromyography analysis

Methods

- Treatments**
 - N = 6 (3 geldings and 3 mares)
 - 3 types of horseshoe: Flat (control), Wedge, Suspensory



Fig 2: Left to right: Flat, Wedge, Suspensory

- Muscles**
 - Branchiocephalicus* (BR), *triceps brachii* (TB), *latissimus dorsi* (LATS), *gluteus medius* (GM), *tensor fasciae latae* (TFL), *semitendinosus* (ST)



Fig 3: GM and TFL EMG sensors

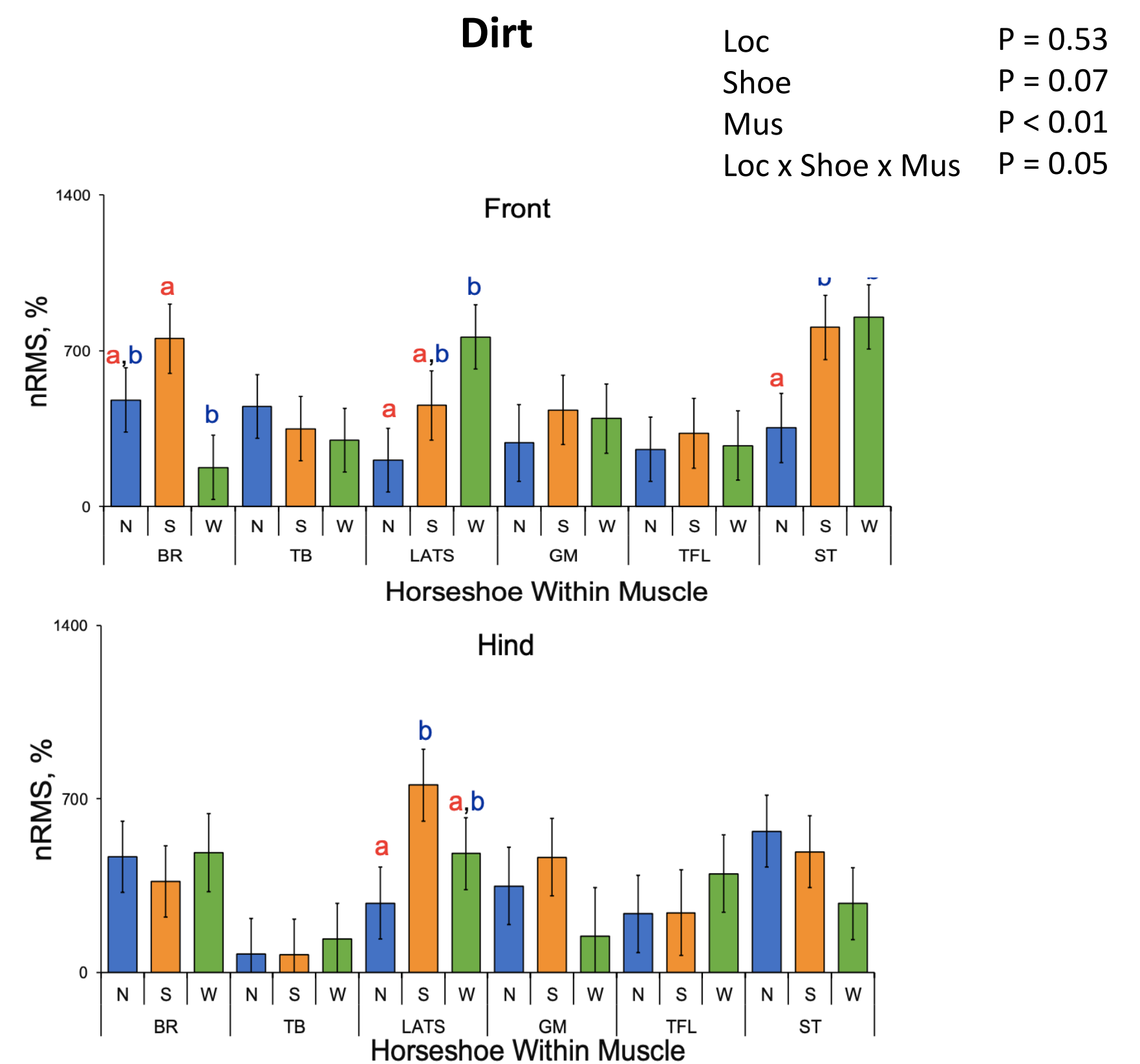
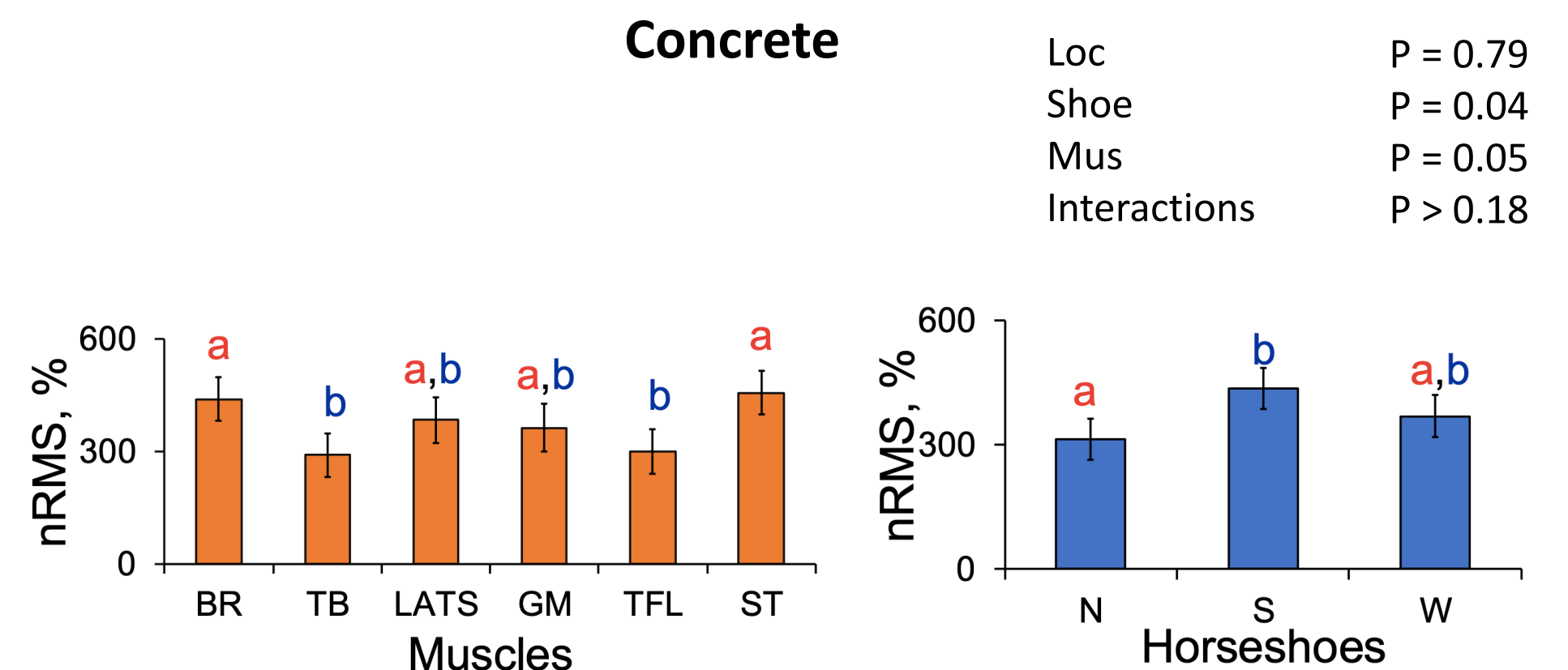
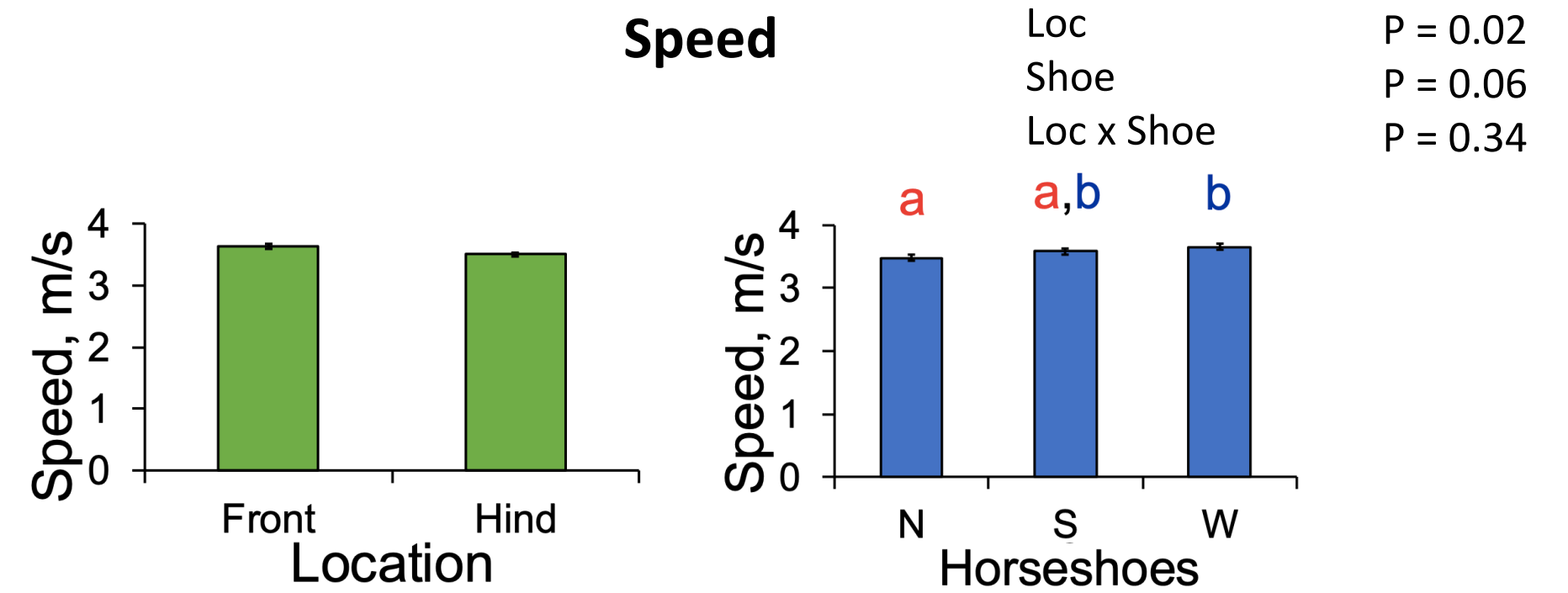
- Test**
 - Data collected over six consecutive days, six horses/day
 - Days 1-3: horseshoes on hindlegs
 - Days 4-6: horseshoes on forelegs
 - All horses exposed to each horseshoe type twice, once on hind and once on front legs
 - Three 45.72m trots on both concrete and dirt footings



Fig 4: Horse trotting on concrete footing

- Analysis**
 - EMG amplitude derived as normalized root mean square (**nRMS**; %) in Myomuscle program (Noraxon MR 3.16)
 - Organized data in Excel
 - Analyzed using SAS 9.3
 - Statistical significance determined at $P < 0.05$, trends at $0.05 < P < 0.10$

Results



Conclusion

- On concrete, across all muscles and both shoe locations, S shoe produced greatest increase in muscle recruitment
- On dirt, front shoe placement did not affect most muscles except for the LATS and ST
- On dirt, hind shoe placement only affected the LATS activity
- Overall, utilizing alternative shoes can cause increase in muscle fiber activity in a muscle specific manner

Acknowledgments: