CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36164

Project Title

Indications of Laterality in Bipedal Dinosaurs Using Gait Analysis from Dinosaur Trackways

Abstract

Objectives/Goals

The objective of this project is to determine whether certain types of bipedal dinosaurs may have shown laterality which would likely indicate handedness, or right vs. left limb preference.

Methods/Materials

Measuring tapes (cm), protractor, pencils, paper, established Symmetry Index formula. Multiple measurements were taken of each track way. Left and right measurements were put through the symmetry index formula to determine whether the track way showed asymmetry in the tested measurement.

Results

I was able to collect 42 individual pieces of data (measurements) based on fossilized footprints. I measured for stride, pace, pace angulation, track length, track way width, number of footsteps in each track way, track width, toe angle and pace angle. However, after inputting all measurements into the symmetry index formula, only one showed significant asymmetry. Therefore, I was not able to conclude that bipedal dinosaurs showed laterality, or limb preference (handedness). However, given the limited number of authenticated track ways to which I had access to measure, it is possible that further research of additional track ways could yet conclude that such animals did show laterality / limb preference.

Conclusions/Discussion

A recently published (2015) study about kangaroos and wallabies concluded, for the first time, that laterality and handedness exist in animals other than apes. As bipedal dinosaurs are the only other bipedal animals with manipulative upper limbs (other than wings in birds), if it were possible to determine if they exhibited handedness (or limb dominance / preference), it would enhance our understanding of how these extinct animals manipulated the environment around them, and interacted with one another.

Summary Statement

Through measurements of authenticated fossilized bipedal dinsoaur track ways, I sought evidence of gait assymetry to determine indications of laterality and handedness, but was unable to find significant assymetry.

Help Received

My parents provided assistance by driving me to locations in Utah and Arizona. Andrew Milner, Site Paleontologist at the Dinosaur Discovery Site and Johnson Farm, allowed me access beyond the public areas and onto the actual trackways, and also shared information about the trackways and reviewed my