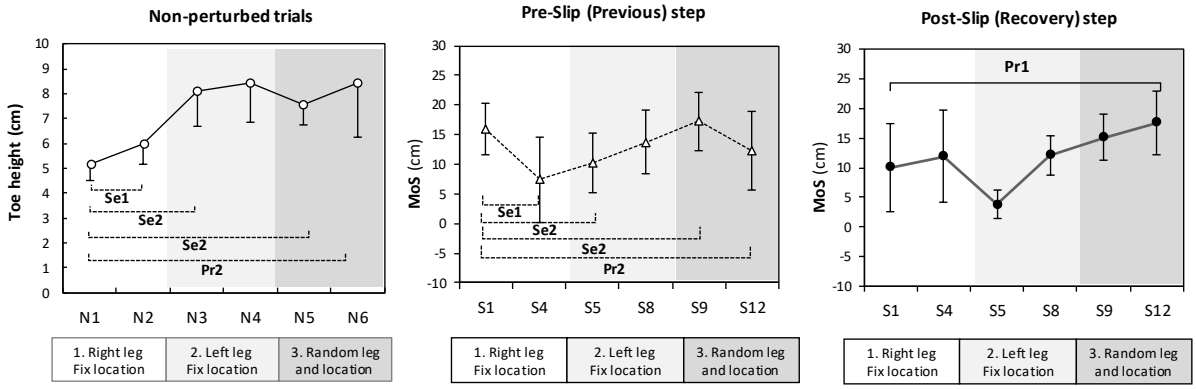
**S2 Appendix. Summary of the study hypotheses and corresponding statistical analyses**

| Study hypotheses | Statistical analysis |
|---|---|
| ***Primary:*** | |
| [Pr1] Exposure to perturbations with increasing unpredictability can improve balance recovery responses | [Pr1] Improvements in balance recovery responses were assessed by examining whether changes existed in recovery-step kinematics at the completion of the condition using random hazard locations (S1 vs S12 and T1 vs T12). |
| [Pr2] in the absence of predictive gait alterations. | [Pr2] To confirm the absence of predictive gait alterations at the end of condition 3, kinematics between the first and last non-perturbed trials (N1 vs N6), and previous-step kinematics between the first and last trials for slips (S1 vs S12) and trips (T1 vs T12) were compared. |
| ***Secondary:*** | |
| [Se1] Predictive gait alterations (e.g. shift of CoM) acquired through exposure to perturbations at a fixed condition | [Se1] Predictive gait alteration was first assessed by examining whether changes existed in gait parameters during regulated non-perturbed trials (N1 vs N2), and secondly, change in previous-step kinematics during slip/trip trials at the fixed hazard locations (S1 vs S4 and T1 vs T4). |
| [Se2] would not transfer to conditions where both the type and location of perturbation were randomly presented and highly unpredictable. | [Se2] If significant changes (i.e. predictive gait alterations) were observed, transfer between limbs and locations was assessed by investigating whether the changes persisted when a condition was changed without notice (inter-limb transfer: N1 vs N3, S1 vs S5 and T1 vs T5, inter-location transfer: N1 vs N5, S1 vs S9 and T1 vs T9). |




The figures were extracted and modified to indicate the comparisons corresponding to the primary (Pr) and secondary (Se) hypotheses.