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Impact of a thin plantar orthopaedic insert on posture and locomotion

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INTRODUCTION

EMI® (Medio-Intern Element):
- Podiatrist tool included in insoles
- Correction of postural deficiency:
  
Contralateral effect of a 3 mm high EMI® on ML displacement of the CoP of healthy participants\textsuperscript{3}
- Effect on Eye convergence\textsuperscript{2}

\rightarrow Lack of evaluation
\rightarrow Only on static tasks

AIM AND HYPOTHESIS

Aim: Evaluate the effect of the EMI® on posture and locomotion
Hypothesis: effect of EMI® on ML and AP axis and on Ellipse surface

DESIGN AND ANALYSIS

- Participants: 19 healthy volunteers (9\textsuperscript{♂}, 10\textsuperscript{♀}, 27.05 yrs (±4.24))
- EMI® conditions: control (without), under left foot, under right foot

\textbullet{} **Static (Force plate ATMI\textsuperscript{*})**

\textbullet{} Conditions:
  - Feet: parallel and 30° angle
  - Eyes: open and close

Analysis:
CoP displacement on ML and AP axis:
  - Average position: $\overline{ML}$, $\overline{AP}$
  - Between trials within subject variability: BTV\textsubscript{AP}, BTV\textsubscript{ML}
  - Within trial within subject variability

Ellipse Area

\textbullet{} **Locomotion (Vicon\textsuperscript{*})**

Design based on Podokinetic after rotation (PKAR) protocol\textsuperscript{3,4} (30’ of walking stimulation)

\textbullet{} Conditions:
  - Eyes: open and close
  - Trajectory: straight, turn left 90°, turn right 90°

Analysis:
Comparison between the difference in final orientation of locomotion with/without vision, with a EMI® and without a EMI®

RESULTS

\textbf{STATIC:}

Only significant effects on feet position, eye condition and interaction between eye and feet position.
No significant effect of EMI®

Results of the 4 ways repeted mesures ANOVA (EYExFOOTxEMIxEMIside)
Significant effects are represented as well as their size effect ($\eta_\text{p}^2$)

\textbf{LOCOMOTION:}

No significant effect of EMI® on the final orientation of the walking

CONCLUSION AND FUTURE WORKS

Our protocol, involving healthy participants, was not able to show significant effect of EMI® on posture and locomotion
Feet positions has significant effects on posture: clinical activities have to be standardized to be able to compare CoP movement.

Future works:

\textbullet{} Evaluate population with foot postural deficiency:
  - More effect of EMI® on eye vergence on a population with foot postural deficiency\textsuperscript{2}

\textbullet{} Normalize the evaluation of foot postural deficiency:
  - No standardized procedure (compare foam effect\textsuperscript{2} on CoP with Depron®)

BIBLIOGRAPHY
