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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 participants¹

- Effect on Eye convergence²

=> Lack of evaluation

=> Only on static tasks



EMI® on insoles

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♂, 10♀, 27.05 yrs (±4.24))

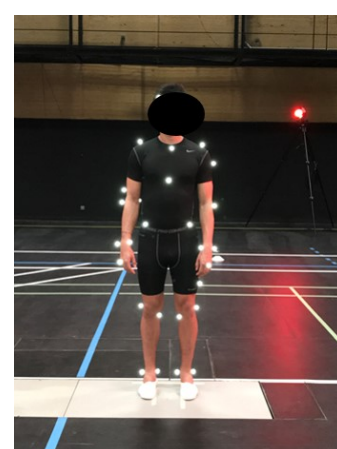
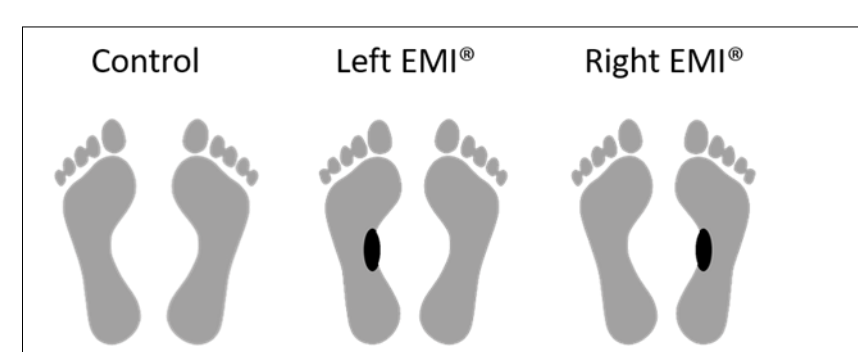
- EMI® conditions: control (without), under left foot, under right foot

• Static (Force plate ATMI®)

Conditions:

- Feet: parallel and 30° angle

- Eyes: open and close



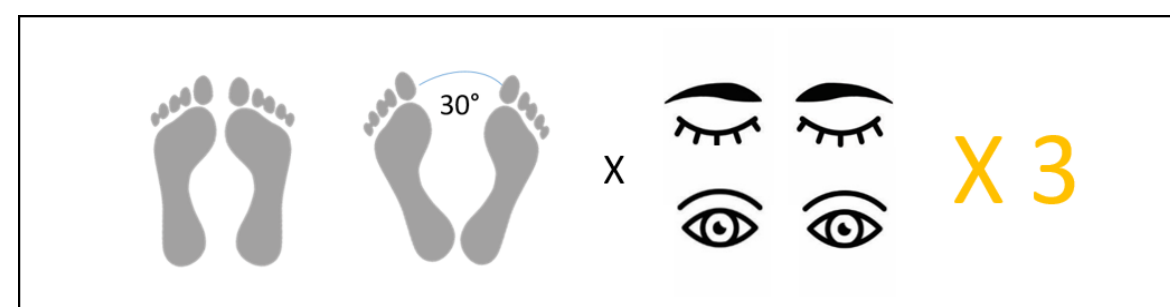
Analysis:

CoP displacement on ML and AP axis :

- Average position: \overline{ML} \overline{AP}

- Between trials within subject variability: BTV_{AP} , BTV_{ML}

- Within trial within subject variability



Ellipse Area

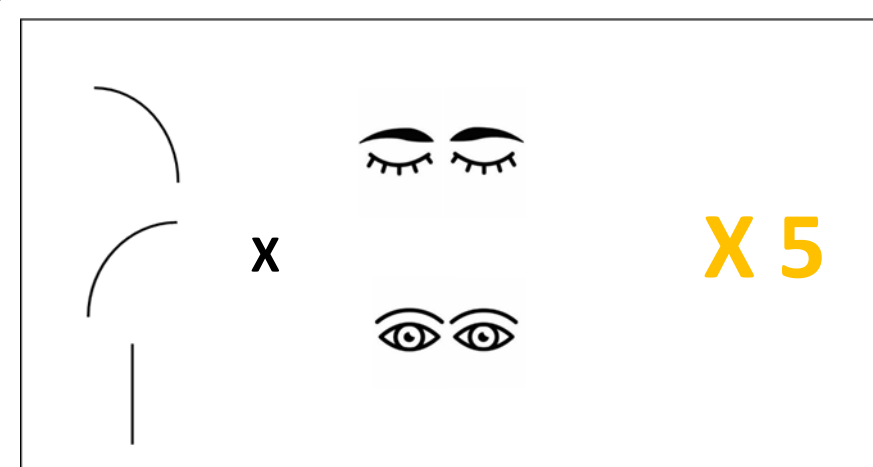
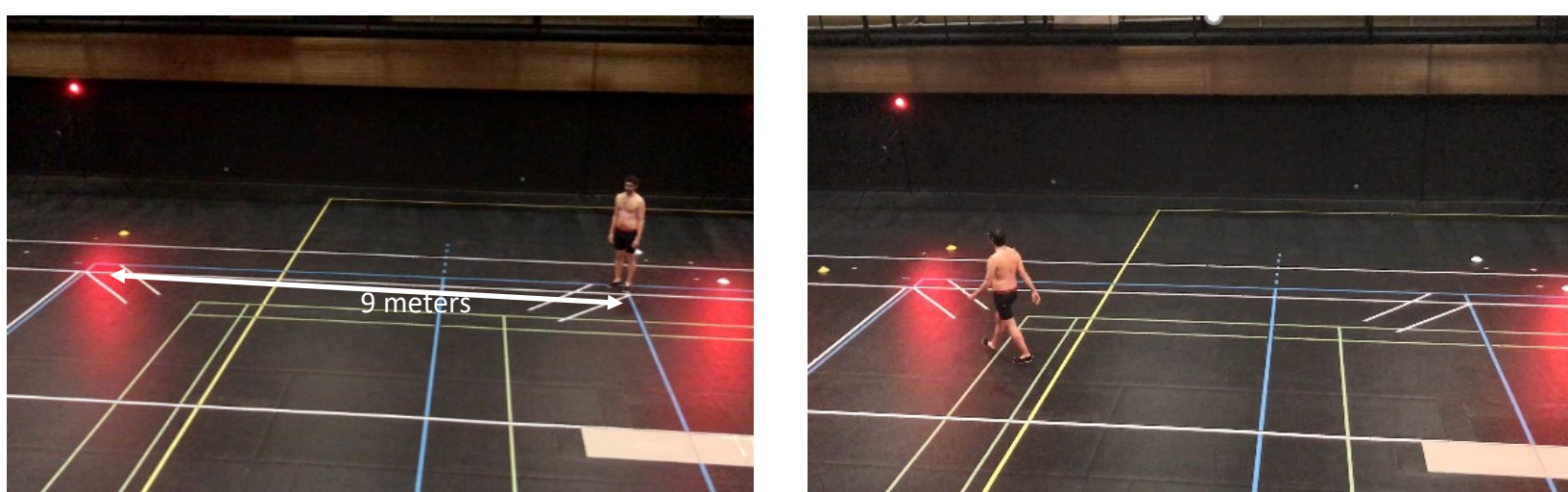
• Locomotion (Vicon®)

Design based on Podokinetic after rotation (PKAR) protocol^{3,4} (30' of walking stimulation)

Conditions:

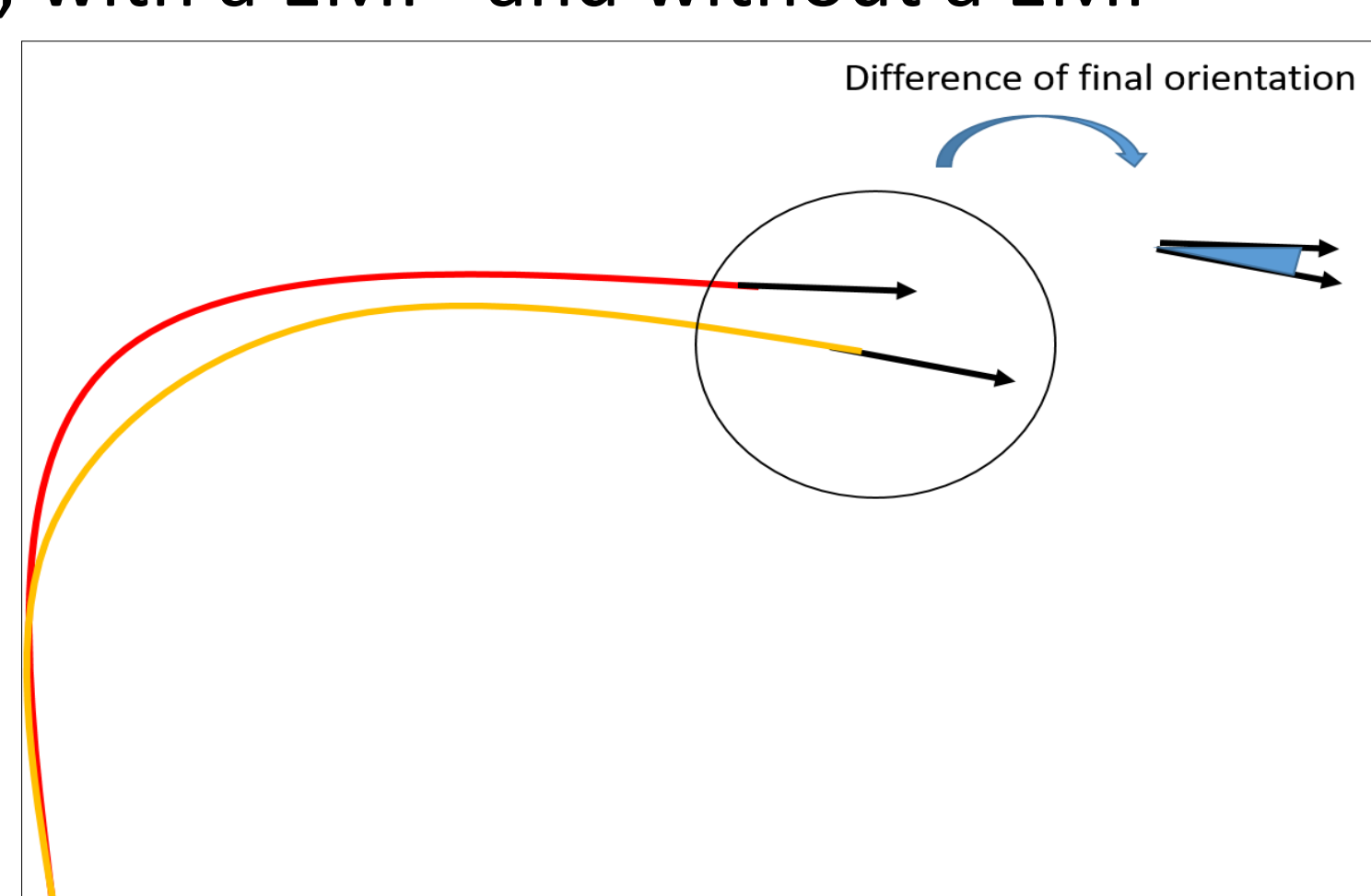
- Eyes: open and close

- 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

STATIC:

Only significant effects on feet position, eye condition and interaction between eye and feet position.

No significant effect of EMI®

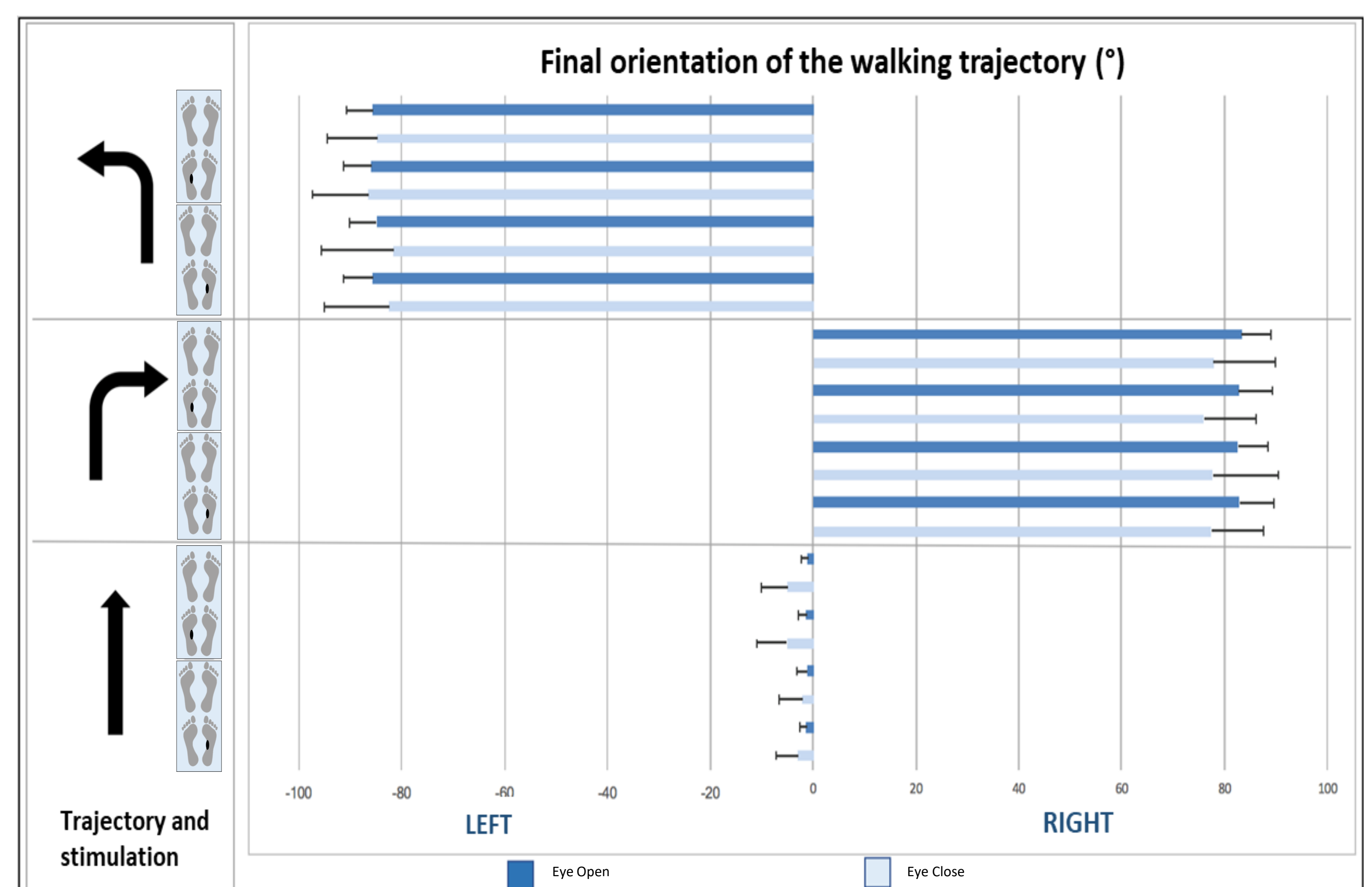
	Control	EMI®	Interaction
\overline{ML}	*** $\eta^2_p = 0,618$	*** $\eta^2_p = 0,511$	*** $\eta^2_p = 0,526$
\overline{AP}		** $\eta^2_p = 0,359$	** $\eta^2_p = 0,287$
Surface Area		*** $\eta^2_p = 0,776$	
BTV_{ML}	* $\eta^2_p = 0,210$		
BTV_{AP}		*** $\eta^2_p = 0,871$	

Results of the 4 ways repeated measures ANOVA (EYExFOOTxEMIxEMISide)

Significant effects are represented as well as their size effect (η^2_p)

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:

- Evaluate population with foot postural deficiency:
More effect of EMI® on eye vergence on a population with foot postural deficiency²
- Normalize the evaluation of foot postural deficiency:
No standardized procedure (compare foam effect² on CoP with Depron®)

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