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THE INFLUENCE OF ISOINERTIAL-PNEUMATIC RATIO ON FORCE-VELOCITY-POWER RELATIONSHIPS

Boris JIDOVTSSEFF¹, Simon AVRILLON², François HUG³, Gaël GUILHEM²

¹ University of Liège, Department of Sport and Rehabilitation Sciences, Liège, Belgium
² French National Institute of Sport (INSEP), Research Department, Laboratory Sport, Expertise and Performance, Paris, France
³ University of Nantes, Faculty of Sport Sciences, Laboratory Movement, Interactions, Performance, Nantes, France

Introduction

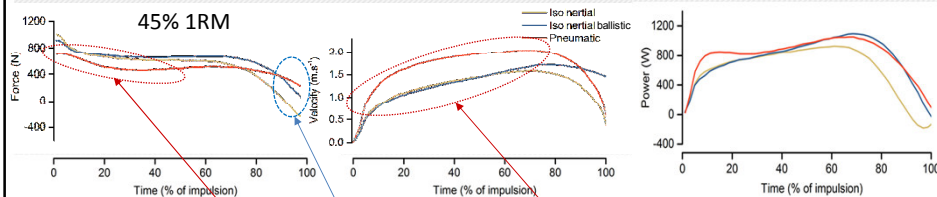
- Aim of resistance training
 - Develop muscles specifically
 - Improve athletic performance
- Limits of traditional free weight resistance training
 - Force needed to initiate the movement
 - Low velocity at the beginning of the movement
 - Decrease of force toward the end of movement
- Pneumatic resistance could be an interesting alternative (Frost et al, 2008)

Introduction



Introduction

Pneumatic versus Isoinertial resistance



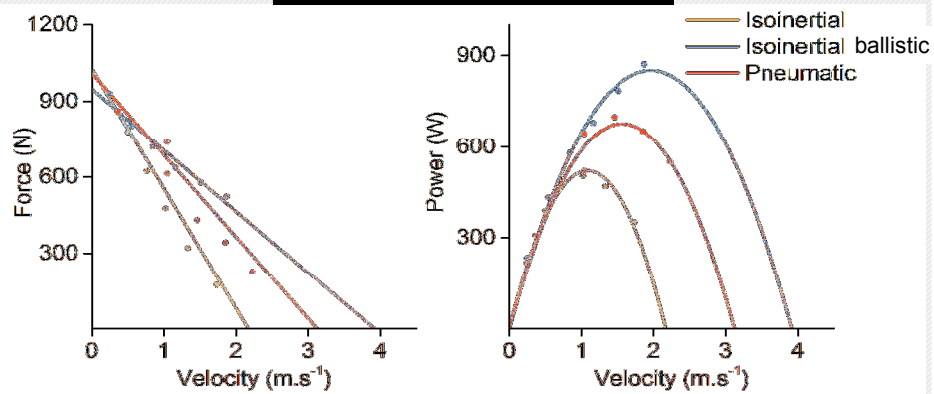
(Frost et al, 2008)

Pneumatic resistance

- The only inertia that need to be overcome = mass of the arms and the barbell
- Limited inertia => **lower force to initiate movement** => **superior velocity**.
- Toward the end of movement **superior level of force** could be maintained.

Introduction

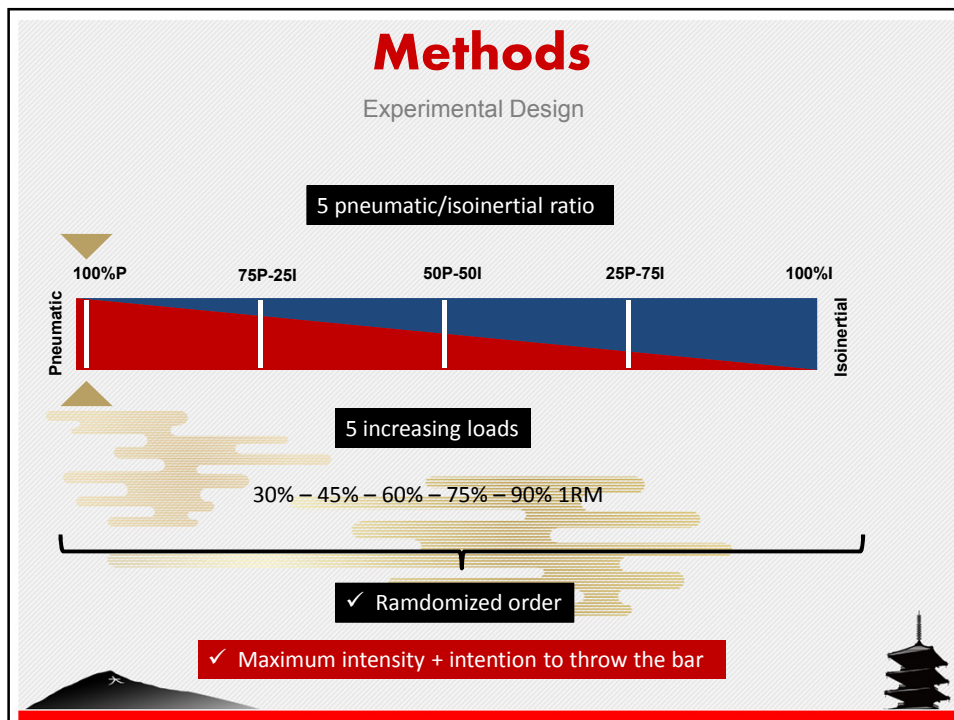
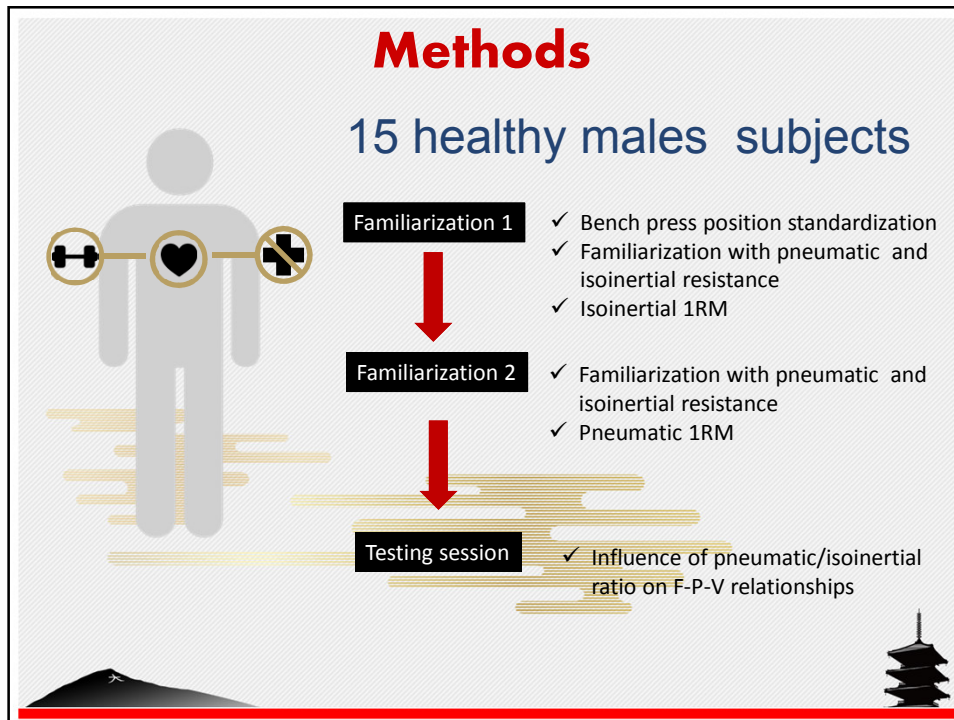
Pneumatic versus Isoinertial resistance

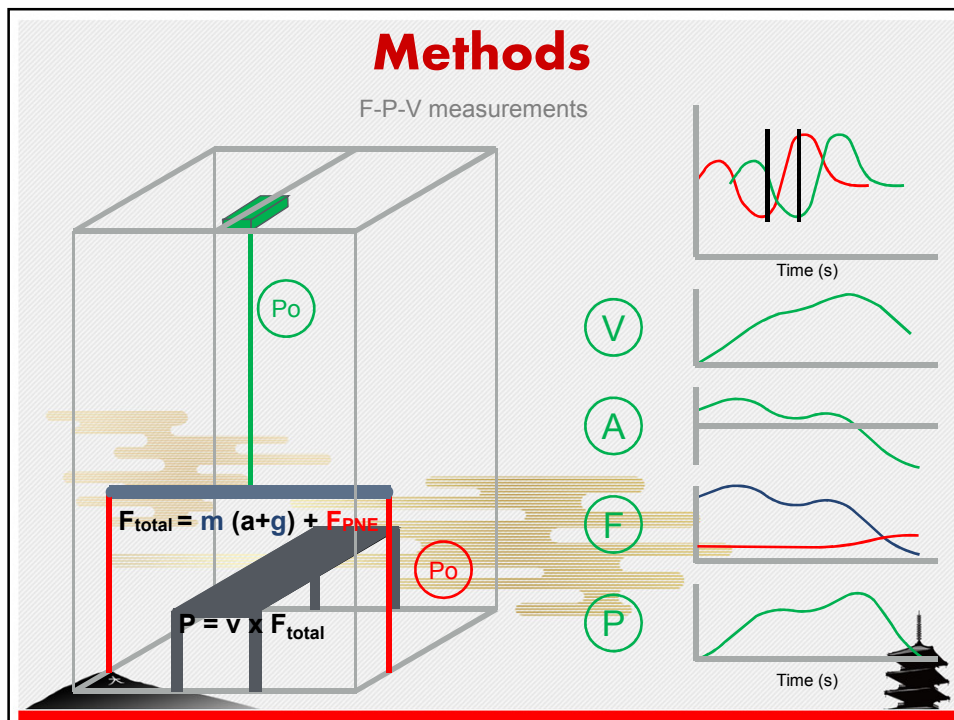


(adapted from Frost et al, 2008)

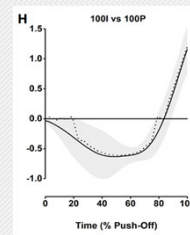
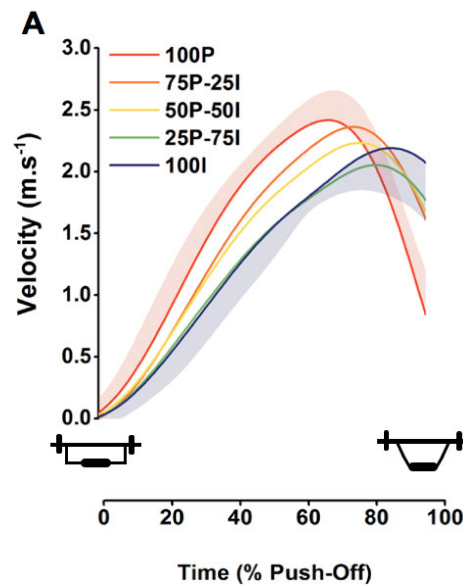
Aim of the study

- Both resistance modalities have advantages and disadvantages
- The effect of combining isoinertial with pneumatic loading on F-V-P is still unknown
- The aim of this study was to determine how different isoinertial-pneumatic ratio influence the F-V-P relationships during bench-press.



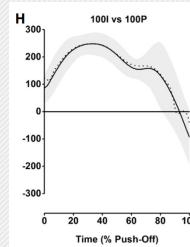
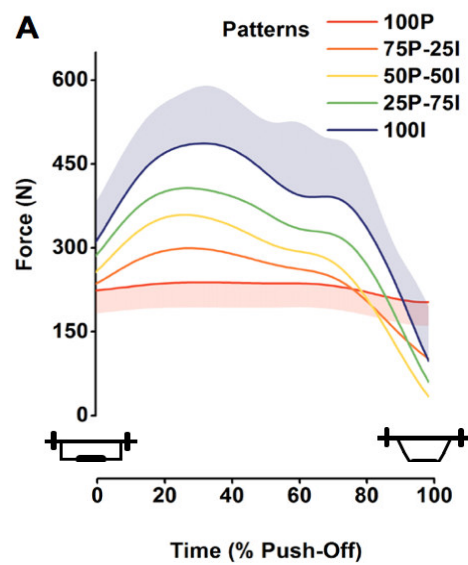


RESULTS



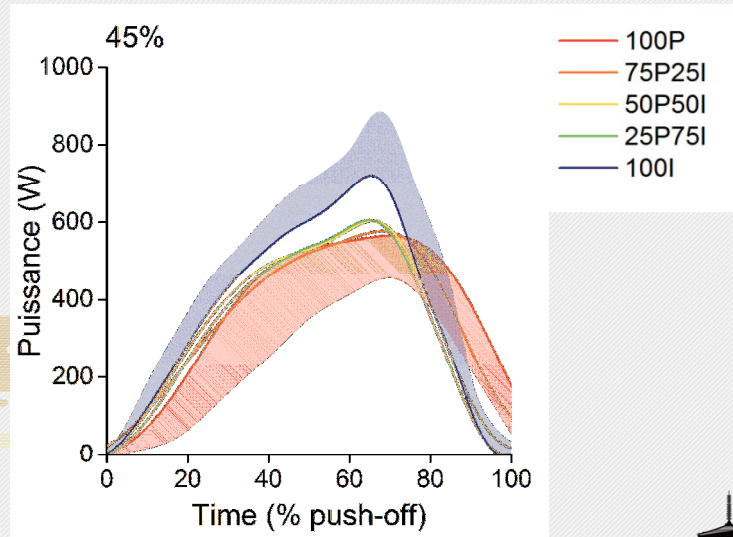
Difference between
100P and 100I

RESULTS

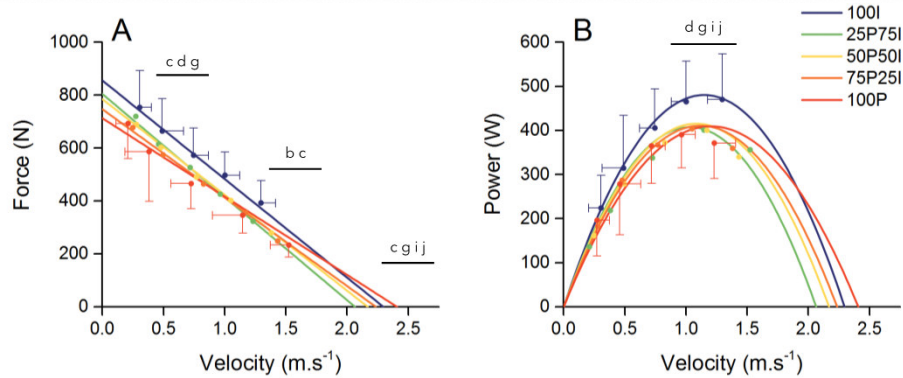


Difference between
100P and 100I

RESULTS



RESULTS



CONCLUSION

- **Kinetics and kinematics patterns are affected** by loading type during ballistic bench press
 - ▶ **Pneumatic resistance** should be use to :
 - ✓ Enhance velocity development in the initial phase
 - ✓ Increase force toward the end of the movement
 - ▶ **Iso-inertial resistance** should be used to :
 - ✓ Improve force in the initial phase
 - ✓ Increase velocity toward the end of movement
 - ✓ To favour maximal power output
- Influence of the resistance ration on the **slope** of the force-velocity relationship
- **Pneumatic** loading elicit a FV profile oriented towards **velocity** vs. a **force**-oriented profile for **isoinertial** loading
- The **repartition** between resistance types **can be adapted** to meet the specific demands of each sport



Acknowledgments

Simon AVRILLON
Gaël GUILHEM



François HUG



UNIVERSITÉ DE NANTES



B.jidovtseff@ulg.ac.be

