



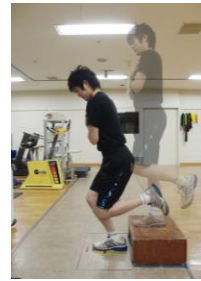
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# 研究分野

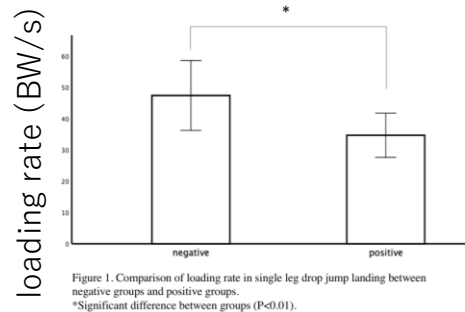
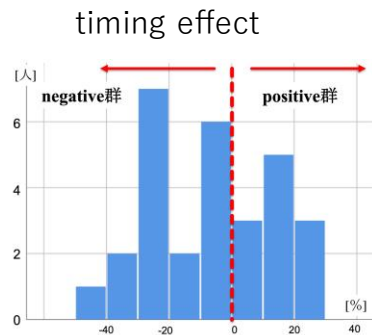
運動器理学療法 / スポーツ傷害予防 /  
バイオメカニクス / XR技術のリハビリ応用

## 【スポーツ傷害予防研究】

- 下肢スポーツ傷害は着地動作で多く発生
- ACL術後スポーツ復帰前に着地衝撃大きい
- 着地衝撃に関与する因子の検討

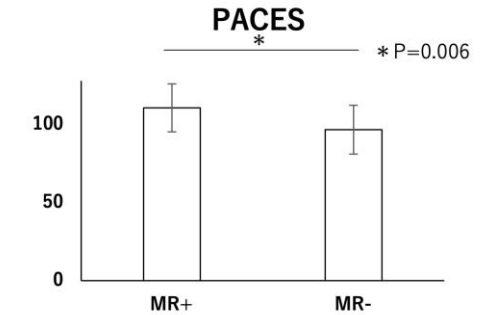


- ✓ 健常大学生をtiming effectにより2群に分類
- ✓ 2群間で着地衝撃 (loading rate) を比較検討



## 【XRリハビリテーション研究】

- 従来のリハは受動的で意欲が継続しない
- Extended Reality (XR) 技術で楽しく運動意欲向上
- XRドレッドミル歩行の開発と実行可能性研究
  - ✓ 地域高齢者42名を介入群とコントロール群の2群
  - ✓ 2群間で運動の楽しさ (PASCE) を比較検討



XRトレッドミル歩行の様子

安全に運動がより楽しく可能

タイミングよく瞬発的な筋力発揮できる人は着地衝撃が小さい





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# 研究分野

Orthopedic Physical Therapy/ Sports Injury Prevention/  
Biomechanics / Application of XR Technology in Rehabilitation

## 【Sports Injury Prevention】

- Lower-limb sports injuries frequently occur during **landing**.
- After **ACL reconstruction**, high impact forces during landing remain a major risk factor before return to sport.
- We investigate **biomechanical factors related to landing impact**.

✓Healthy university students were classified into **two groups based on the timing effect**.

✓**Loading rate (BW/s)** during landing was compared between groups.

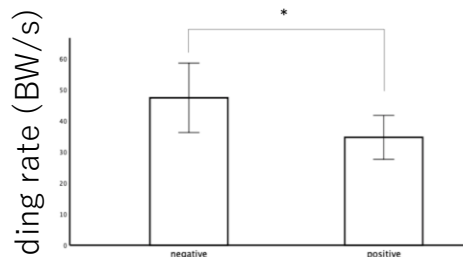
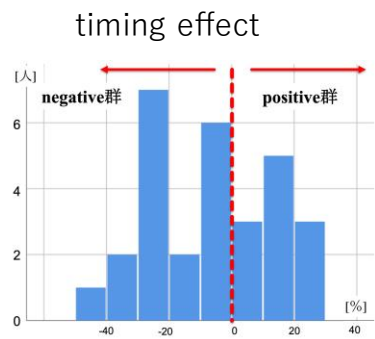


Figure 1. Comparison of loading rate in single leg drop jump landing between negative groups and positive groups.  
\*Significant difference between groups (P<0.01).

The ability to produce a **timely explosive force** may be a determinant of **safe landing ability**.

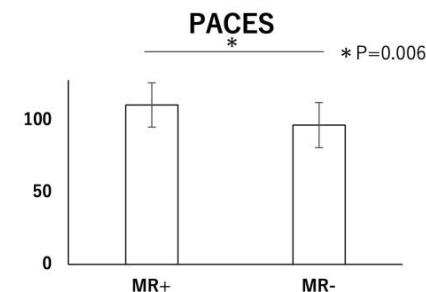
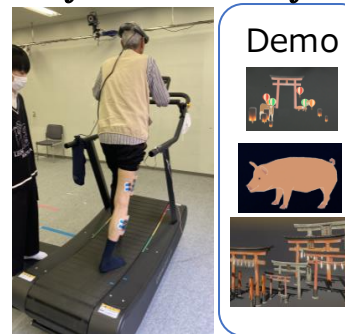
## 【XR-based Rehabilitation】

- Conventional rehabilitation is often **passive**, leading to decreased motivation.
- **Extended Reality (XR)** technology enables **enjoyable and motivating exercise environments**.
- We developed an **XR-based treadmill walking system** and conducted a **feasibility study**.

✓Community-dwelling older adults (n = 42)

✓Randomized into **intervention and control groups**

✓Enjoyment of exercise was evaluated using **PACES (Physical Activity Enjoyment Scale)**.



Safe, immersive, and motivating walking exercise using XR technology

