The relationship between st[illegible], speed-strength and performance in change of direction tasks

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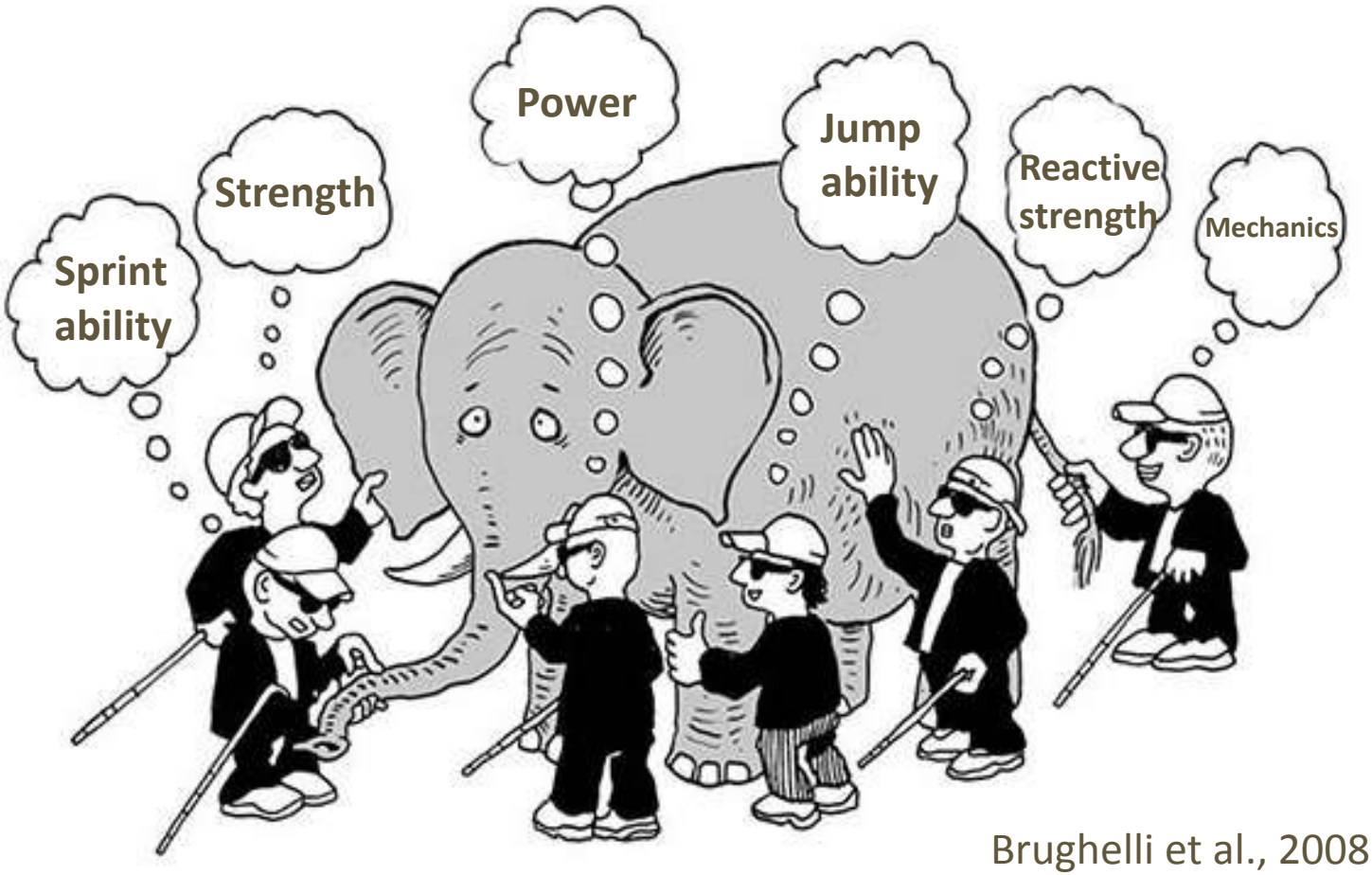
Change of Direction (COD) Performance



Brughelli et al., 2008

Thesis Flowchart

How can performance in COD tasks be enhanced in rugby union players?

Literature review

Chapter 2: Physical characteristics and performance in change of direction tasks: a brief review and training considerations

Cross-sectional research

Chapter 3: Study 1 -The relationship between multidirectional jumping and performance in change of direction tasks

Chapter 4: Study 2 – The relationship between performance in multidirectional jumping and change of direction tasks in individual- and team-sport players

Chapter 5: Study 3 – The relationship between performance in multidirectional jumping and change of direction tasks in individual- and team-sport players

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Thesis Flowchart (cont.)

Experimental research

Chapter 6: Study 4 – The influence of eccentric strength training on performance in change of direction tasks in adolescent rugby union players

Chapter 7: Study 5 – The acute influence of accentuated jump training on performance in change of direction tasks in adolescent rugby union players

Chapter 8 - Practical applications and conclusions

Literature Review Bourgeois et al., 2017 (JASC)

- COD assessment and 'global' COD performance?

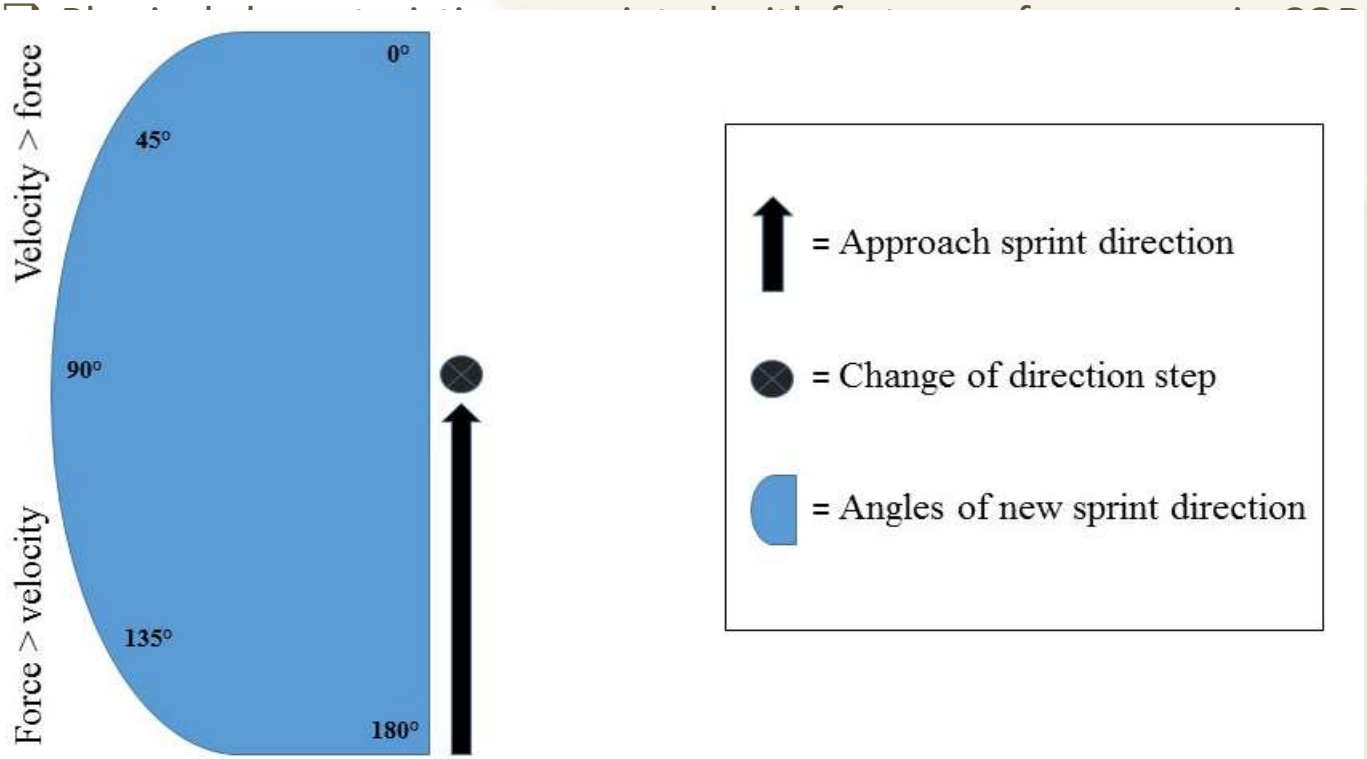

Figure 2.1. Continuum of mechanical determinants of changing sprint direction.

Bartlett, 2007; Holmberg, 2009)

- ***Video analysis,*** and ***Posture, Placement and Intention***

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COD and Multidirectional Jumping (MDJ) Tasks

Bourgeois et al., 2017 (JSCR)

Reliability (*n* = 20) and Kinetic Analysis (*n* = 19)

- **Performance measures**
  - COD: approach time, exit time and total time
  - MDJ: approach time, jump distance

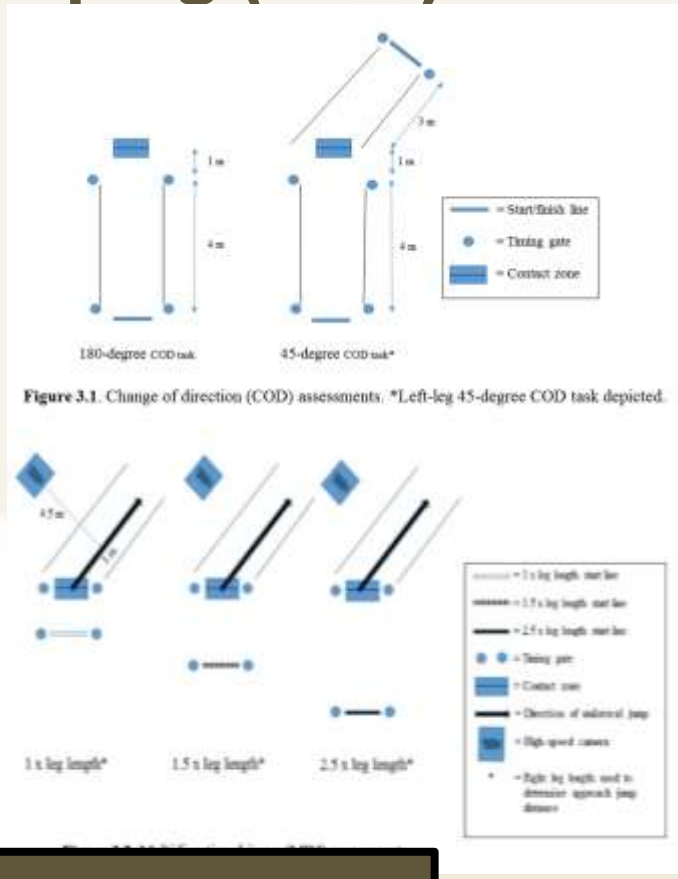

Figure 3.1. Change of direction (COD) assessments. *Left-leg 45-degree COD task depicted.

Findings

Task-specific kinetics

me) were

nance

- ***COD plant-step kinetics*** dis ces
  - ***Fy and Fz*** = ***180°*** perfo
- ***MDJ plant-step kinetics an*** nd SLOW performances

HIGH *inter*- and *intra*-individual variability

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Strength, Speed-strength and Performance in COD Tasks

Cross-section Analysis of Football Code Athletes (*n* = 12)

- 180° and 45° COD performance
  - Sprint times
- CMJ and DJ (unilateral; vertical, horizontal and lateral)
  - Displacements and stance-phase kinetics
- Isometric and isokinetic unilateral strength

Findings

- CMJ and DJ ***impulse and vertical take-off velocity*** correlated with 180° and 45° COD performance
- ***Vertical and horizontal CMJ and DJ*** measures shared task-specific association
- ***Eccentric force*** during CMJ and DJ correlated with COD performance
- ***45° COD tasks superior*** in distinguishing Forwards and Backs

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Effects of a Six-week Strength Training Programme on COD Performance in Youth Rugby Athletes Bourgeois et al., 2017 (Sports)

Strength Training Intervention

- **Eccentric phase-emphasis condition** (EPE, weeks 1 to 6, *n* = 12)
  - Posttest 1 (week 7), Rest (weeks 8 and 9), Posttest 2 (week 10)
  - Washout period (weeks 11 to 13)
- **Conventional condition** (weeks 15 to 20, *n* = 6)
  - Posttest 1 (week 21), Rest (weeks 22 and 23), Posttest 2 (week 24)
- **Performance measures**
  - **Strength**: relative isometric unilateral peak force production
  - xit time and total time

Mode-specific response

  - **EPE** = (s) decrease ⇒ (ecrease

SLOW experienced greater benefit

- **COD Benefits**
  - **180°** = ***EPE total time*** g erious

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Short-term Accentuated Jump Training and Performance in COD Tasks in Adolescent Rugby Union Players

Jump Training Intervention

- **Accentuated jump condition** (AJT, weeks 1 to 4, *n* = 8)
  - Posttest 1 (week 5), Washout period (weeks 6 and 7), Posttest 2 (week 8)
- **Control condition** (CON, weeks 1 to 4, *n* = 8)
  - Same as above
- **Performance measures**
  - **JUMP**: CMJ, DJ and MDJ displacements and stance-phase kinetics
  - **COD**: approach time, exit time and total time

ACUTE response observed

  - (m-vl) HCMJ, VDJ and M*lse,* ***vertical take-off velocit***

SLOW experienced greater benefit

- **COD Benefits**
  - **180** = (m-vl) ***approach a***

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PRACTICAL APPLICATION

- Consider ***sport-*** and ***position-specific*** criterion COD task(s)
  - Posture, Placement and Intention; Individual-specific changes; *Time?*
- ***MDJ*** can be used to ***train, assess and predict*** 180° and 45° COD performance
  - Sufficient familiarisation; establish reliability
- Mechanical determinants are ***task-specific***
  - ≥ 90° → Fy and Fz; ≤ 90° → Fx and Fz
  - *MDJ GCT:distance reactive index?*
- ***Mode-specific*** response to strength training
  - Conventional: more acute
  - Eccentric-phase emphasis: retention and development; *≤ 90° COD tasks?*
- ***10 sessions*** of accentuated jump training influenced jump and COD measures
  - ***DJ*** measures most improved
  - *Accentuated jump training beneficial post-COD-step task(s)?*

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QUESTIONS