RAPID REVIEW OF PERFORMANCE DETERMINANTS IN PARA-DRESSAGE

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Rapid review 1
Identify sport-specific determinants of performance for dressage riding

Rapid review 2
Identify validated clinical impairment measures relevant to determinants of dressage performance

Interviews
Compare Para athletes and stakeholders opinions with determinants of performance and clinical impairment measures

Ridden tests
Measurements of horse performance
Test horse performance measures against rider performance measures

Potential quantitative performance outcome measures

Potential rider performance/impairment measures

Simulator tests
Standardised measurements of rider performance/impairment
Test clinical measures against rider performance/impairment measures

Proposed clinical measures for assessment classification

Clinical tests
Results of clinical measures of impairment

Step 1: Identify target sport and impairment type/s to be classified.

Step 2: Potential quantitive performance outcome measures

Step 3: Ridden tests

Step 4: Assess the relative strength of association between valid measures of impairment and sport-specific measures of performance determinants in order to identify the measures of impairment that account for a significant and independent portion of the variance in performance.

Scientific evidence that assesses the relative strength of association between valid measures of impairment (clinical measures) and performance outcome measures

Validation of clinical measures of impairment

Quantification of activity limitations that affect performance outcomes

Measurements of horse performance

Results of clinical measures of impairment

Standardised measurements of rider performance/impairment

Test clinical measures against rider performance/impairment measures

Test horse performance measures against rider performance measures

Identify sport-specific determinants of performance for dressage riding

Identify validated clinical impairment measures relevant to determinants of dressage performance

Compare Para athletes and stakeholders opinions with determinants of performance and clinical impairment measures

Scientific evidence that assesses the relative strength of association between valid measures of impairment (clinical measures) and performance outcome measures
Speed, Acceleration:

Distance:

Weight:

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**PARA EQUESTRIAN DRESSAGE TEST 2018**

**20x40 Arena**

**GRADE III**

**INDIVIDUAL TEST**

Event: 

Date: 

Judge: 

Position [

Competitor No: 

Name: 

NF: 

Horse: 

Time 5'00" (for information only) 

Minimum age of horse: 6 years

<table>
<thead>
<tr>
<th>No</th>
<th>Letter</th>
<th>Movement</th>
<th>Mark</th>
<th>Correction</th>
<th>Coefficient</th>
<th>Final Mark</th>
<th>Directive Ideas</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A</td>
<td>Enter in working trot, Halt, Immobility, Salute, Proceed in working trot, Track left</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>Quality of pace, halt, and transitions, Straightness, Contact and poll, Bend through turn at C</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CH</td>
<td>Working trot, Medium trot, Working trot</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>Regularity and quality of trot, elasticity, engagement of hindquarters</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>FA</td>
<td>Transitions at H and F, Working trot</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>Lengthening and shortening of steps and frame, maintenance of rhythm, quality of trot</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>AD</td>
<td>Down the centre line, Volte right (10m Ø)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>Regularity, balance and bend through turn and in volte, size and shape of volte</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>DXG</td>
<td>Down the centre line, Volte left (10m Ø), Down the centre line, Track right</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>Regularity, straightness and balance on centre line, bend and balance, size and shape of volte, Bend in turn at C</td>
<td></td>
</tr>
</tbody>
</table>
MEASUREMENTS OF DRESSAGE PERFORMANCE

ARTICLE 432  MARKING

1. All movements, and certain transitions from one to another, which have to be marked by the Judges, are numbered on the Judge’s sheet.

2. They are marked from zero (0) to ten (10) by each Judge, zero (0) being the lowest and ten (10) the highest mark.

3. The scale of marks is as follows:

<table>
<thead>
<tr>
<th>Marks</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Excellent</td>
</tr>
<tr>
<td>9</td>
<td>Very good</td>
</tr>
<tr>
<td>8</td>
<td>Good</td>
</tr>
<tr>
<td>7</td>
<td>Fairly good</td>
</tr>
<tr>
<td>6</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>5</td>
<td>Sufficient</td>
</tr>
<tr>
<td>4</td>
<td>Insufficient</td>
</tr>
<tr>
<td>3</td>
<td>Fairly bad</td>
</tr>
<tr>
<td>2</td>
<td>Bad</td>
</tr>
<tr>
<td>0</td>
<td>Not executed</td>
</tr>
</tbody>
</table>

- **Rhythm**: Regular, that is correct for each pace and at the same tempo with a pronounced beat.
- **Relaxation**: Suppleness and elasticity, free from resistance.
- **Contact/connection**: Light, even and elastic contact, working through from the hind limbs. Indicates a level of thoroughness with the horse functioning in one piece.
- **Impulsion**: Elastic loading and unloading of the limbs during stance that springs the horse off the ground. Indicates the amount of energy being created and contained, but without resistance.
- **Straightness**: Symmetrical propulsive power in both hind limbs, symmetrical lifting and stabilization by both forelimbs and symmetrical contact (mirrored on left and right turns/circles) in the left and right reins.
- **Collection**: Control of the horse’s trunk rotations and maintenance of an uphill trunk orientation. Greater weight distributed to the hind limbs from the forelimbs.
Project Aim:

The aim of this study was to systematically review current knowledge on the fundamental performance attributes, skills and abilities required for dressage.
METHODOLOGY

SportDiscuss
CINAHL
MEDLINE
EMBASE
VetMed

44 Athlete
14 Horse
= 584 able-bodied athletes
= 311 horses

72.7 ± 14.7 %
63.5 ± 15.3 %

1) English language
2) Objective outcome measures
3) Demands of dressage/riding
4) Superior horse performance
METHODOLOGY

Athlete
- ROM
- Segment Coordination
- Physiological demands
- Fitness
- Strength
- Athlete-Horse Coordination

Horse
- Joint/Segment Kinematics
- Trunk Motion
- Impulsion
- Temporal
- Stride length/Adjustability

Gait/ Movement
<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Gait/Movement</th>
<th>Literature</th>
<th>Advanced/Elite Rider Values</th>
<th>Non-rider/beginner rider values</th>
<th>Performance Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk Segment</td>
<td>Walk</td>
<td>Bystrom et al. (2010)</td>
<td>5.95 ± 0.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lovett et al. (2005)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Sitting Trot</td>
<td>Alexander et al. (2015)</td>
<td>10.12 ± 4.65</td>
<td>9.5 ± 2.3</td>
<td>No sig diffs in ROM between beginner and pro, but <strong>beginner riders</strong> max and mean values showed <strong>sig more forward trunk angle than pros</strong> (Eckardt and Witte, 2016)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bystrom et al. (2009)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Eckardt et al. (2014)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Eckardt and Witte (2016)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Terada et al. (2006)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Posting Trot</td>
<td>Lovett et al. (2005)</td>
<td>4.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Canter</td>
<td>Eckardt and Witte (2016)</td>
<td>12.55 ± 11.10</td>
<td>20.5 ± 5.6</td>
<td>No sig diffs in rom between beg and pro (Eckardt and Witte, 2016)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lovett et al. (2005)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theme</td>
<td>Outcome Measure</td>
<td>Gait/Movement</td>
<td>Literature</td>
<td>Performance Effect</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
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<td>------------------------------------------------</td>
<td>--------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Temporal</strong></td>
<td>Stride frequency</td>
<td>Trot</td>
<td>Biau and Barrey (2004)</td>
<td>Greater</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stride Regularity</td>
<td></td>
<td>Biau and Barrey (2004)</td>
<td>Greater</td>
<td></td>
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<tr>
<td></td>
<td>Stride Duration</td>
<td></td>
<td>Biau and Barrey (2004)</td>
<td>Greater</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FL Stance Duration</td>
<td></td>
<td>Deuel and Park (1990a,b)</td>
<td>Shorter FL stance duration</td>
<td></td>
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<tr>
<td></td>
<td>HL Stance Duration</td>
<td></td>
<td>Holmstrom et al. (1994), Clayton et al. (1997)</td>
<td>Longer HL stance duration</td>
<td></td>
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<tr>
<td></td>
<td>Swing Duration</td>
<td></td>
<td>Deuel and Park (1990a,b)</td>
<td>Shorter HL and longer FL swing duration</td>
<td></td>
</tr>
</tbody>
</table>
### Rider Performance

<table>
<thead>
<tr>
<th>Pelvic Segment</th>
<th>ROM not sig different between pro and beginner riders, but the pro riders had sig greater min values (pelvis tilted more forward) (Munz et al, 2014)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Pelvic Segment</th>
<th>no significant differences between pro and beginner riders (Munz et al., 2014)</th>
</tr>
</thead>
</table>

### Horse Performance

- **Stride frequency**: Greater in better performers
- **Stride Regularity**: Greater in better performers
- **Stride Symmetry**: Greater in better performers
Skilled rider characteristics

- Lower heart rate
- Greater forward pelvic tilt
- Lower mean relative phase (lumbar/cervical)
- Less trunk lateral bending ROM
- Less pelvic flexion-extension ROM
- Less left knee flexion-extension ROM

Possible links to dressage performance

- Temporal
- Trunk motion
- Impulsion
- Stride length/Adjustability
- Joint/Segment Kinematics

Skilled rider characteristics

- Lower average deviation of Length of Vector
- Less pelvic lateral flexion
- Reduced forward trunk pitch
- Greater forward pelvic tilt
- Less forward head tilt
- Less knee flexion-extension ROM
- More left elbow flexion and elbow flexion-extension ROM
NEXT STEPS

- **Rapid review 1**: Identify sport-specific determinants of performance for dressage riding.
- **Rapid review 2**: Identify validated clinical impairment measures relevant to determinants of dressage performance.
- **Interviews**: Compare Para athletes and stakeholders opinions with determinants of performance and clinical impairment measures.
- **Ridden tests**: Measurements of horse performance.
- **Simulator tests**: Standardised measurements of rider performance/impairment.
- **Clinical tests**: Results of clinical measures of impairment.
- **Test horse performance measures against rider performance measures**.
- **Test clinical measures against rider performance/impairment measures**.
- **Quantification of activity limitations that affect performance outcomes**.
- **Validation of clinical measures of impairment**.
- **Scientific evidence that assesses the relative strength of association between valid measures of impairement (clinical measures) and performance outcome measures**.
THANK YOU

QUESTIONS?