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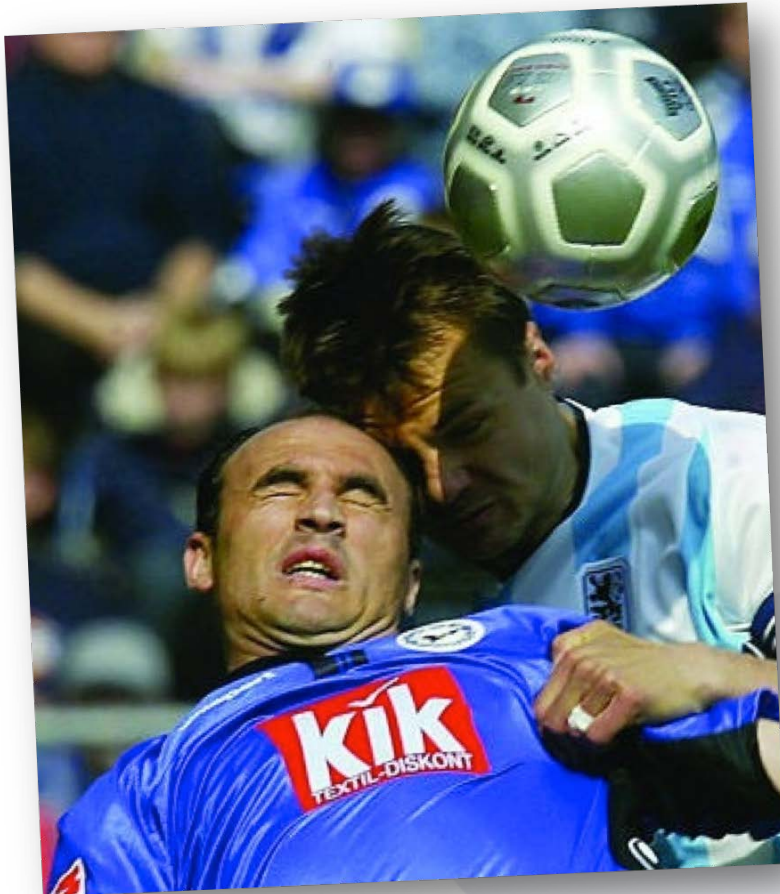
# CONCUSSIONS IN PERFORMING ARTS WORKPLACES: LET'S LOOK AFTER OUR BRAINS!

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# INTRODUCTION TO CONCUSSION

# Concussion



- ✦ Receiving unprecedented attention in sports, especially collision sports and youth sports
- ✦ Note that this is a medical diagnosis and non-healthcare professionals are not able to label a head impact as a concussion



# Concussion in Performing Arts

- ✦ Numerous opportunities for head trauma
- ✦ One known scientific article addressing concussion in theatre
- ✦ Minimal literature (3 articles in PubMed database) on concussion in dance



Courtesy Belhaven University Dance

# Terminology for Non-Healthcare Professionals

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- ★ **Head Impact:** any blow to the head or face, including head movement caused by a whiplash
- ★ **Sign:** an observable clinical characteristic
- ★ **Symptom:** an occurrence, sensation, feeling, or other circumstance reported by a patient
- ★ **Concussion:** a medical diagnosis of brain injury based on a clinician's expert evaluation of a variety of signs and symptoms
- ★ Correct non-healthcare terminology:  
Head impact with concussion-like symptoms



# SCIENCE BEHIND CONCUSSION



# Guiding International Document

- ★ The accepted resource for sports-related concussion is the “Berlin Guidelines” in the *British Journal of Sports Medicine*, 2017

## Consensus statement on concussion in sport—the 5<sup>th</sup> international conference on concussion in sport held in Berlin, October 2016

Paul McCrory,<sup>1</sup> Willem Meeuwisse,<sup>2</sup> Jiří Dvorak,<sup>3,4</sup> Mark Aubry,<sup>5</sup> Julian Bailes,<sup>6</sup> Steven Broglio,<sup>7</sup> Robert C Cantu,<sup>8</sup> David Cassidy,<sup>9</sup> Ruben J Echemendia,<sup>10,11</sup> Rudy J Castellani,<sup>12</sup> Gavin A Davis,<sup>13,14</sup> Richard Ellenbogen,<sup>15</sup> Carolyn Emery,<sup>16</sup> Lars Engebretsen,<sup>17</sup> Nina Feddermann-Demont,<sup>18,19</sup> Christopher C Giza,<sup>20,21</sup> Kevin M Guskiewicz,<sup>22</sup> Stanley Herring,<sup>23</sup> Grant L Iverson,<sup>24</sup> Karen M Johnston,<sup>25</sup> James Kissick,<sup>26</sup> Jeffrey Kutcher,<sup>27</sup> John J Leddy,<sup>28</sup> David Maddocks,<sup>29</sup> Michael Makdissi,<sup>30,31</sup> Geoff Manley,<sup>32</sup> Michael McCrea,<sup>33</sup> William P Meehan,<sup>34,35</sup> Sinji Nagahiro,<sup>36</sup> Jon Patricios,<sup>37,38</sup> Margot Putukian,<sup>39</sup> Kathryn J Schneider,<sup>40</sup> Allen Sills,<sup>41,42</sup> Charles H Tator,<sup>43,44</sup> Michael Turner,<sup>45</sup> Pieter E Vos<sup>46</sup>

# What is a Concussion? (McCrory et al. *British Journal of Sports Medicine*, 2017)

★ *“...May be caused either by a direct blow to the head, face, neck or elsewhere on the body with an impulsive force transmitted to the head.”*

## ★ Plain English:

- ✧ Yes, a direct blow is a common way of sustaining a concussion
- ✧ BUT, being struck in the face or neck, or having a whiplash style movement of the head (without actual head impact) can also cause one



# What is a Concussion? (McCrory et al. *British Journal of Sports Medicine*, 2017)

★ *“...Typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, signs and symptoms evolve over a number of minutes to hours.”*

## ★ Plain English:

- ✧ Brain function usually is affected soon after the injury
- ✧ Brain function usually is restored naturally over time
- ✧ Sometimes signs and symptoms are delayed

# What is a Concussion? (McCrory et al. British Journal of Sports Medicine, 2017)

- ★ *“...May result in neuropathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.”*
- ★ Plain English:
  - ✧ Brain tissue changes may occur
  - ✧ Signs and symptoms occur because the brain's function is affected, not because the brain's structure is damaged
  - ✧ X-rays, CT scans, MRIs, etc. are not helpful

# What is a Concussion? (McCrory et al. *British Journal of Sports Medicine*, 2017)

★ *“...Results in a range of clinical signs and symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive features typically follows a sequential course. However, in some cases symptoms may be prolonged.”*

## ★ Plain English:

- ✧ May or may not “black out” (lose consciousness)
- ✧ Signs and symptoms usually improve over time
- ✧ The time may be long in some individuals

# What is a Concussion? (McCrory et al. *British Journal of Sports Medicine*, 2017)

- ★ *“...The clinical signs and symptoms cannot be explained by drug, alcohol, or medication use, other injuries (such as cervical injuries, peripheral vestibular dysfunction, etc.) or other comorbidities (e.g., psychological factors or coexisting medical conditions).”*
- ★ **Plain English:**
  - ✧ **Must rule out other causes of the signs and symptoms**

# So, What is a Concussion?

- ✦ An injury not to be taken lightly
- ✦ An injury with unpredictable effects
- ✦ An injury that requires appropriate attention by a qualified healthcare practitioner



# RESEARCH ON CONCUSSIONS IN PERFORMING ARTS



# *Journal of Occupational & Environmental Medicine, 2017*

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## FAST TRACK ARTICLE

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### Concussion in Theater: A Cross-Sectional Survey of Prevalence and Management in Actors and Theater Technicians

*Jeffrey A. Russell, PhD, and Brooke M. Daniell, MEd*

- ★ First known scientific article devoted to head injuries in theatre
- ★ 209 participants
- ★ Prevalence of at least one head impact in theatre career: 67% (140 of the 209 participants)

# Russell & Daniell, *J Occup Environ Med*, 2017

Obtain article at: <http://bit.ly/theaterconcussions>

Head Impacts in Theatre Activities	Number Reporting	Percent of Sample	Number Reporting	Percent of Sample
1	10	7%	32	23%
2	22	16%		
3	35	25%	108	77%
4	12	9%		
5	6	4%		
More than 5	55	39%		



# RECOGNIZING A POSSIBLE CONCUSSION: CONCUSSION RECOGNITION TOOL, 5<sup>TH</sup> EDITION (CRT5)

# Concussion Recognition Tool 5 (Br J Sports Med, 2017)

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## CONCUSSION RECOGNITION TOOL 5 ©

To help identify concussion in children, adolescents and adults



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### RECOGNISE & REMOVE

Head impacts can be associated with serious and potentially fatal brain injuries. The Concussion Recognition Tool 5 (CRT5) is to be used for the identification of suspected concussion. It is not designed to diagnose concussion.

#### STEP 1: RED FLAGS — CALL AN AMBULANCE

If there is concern after an injury including whether ANY of the following signs are observed or complaints are reported then the player should be safely and immediately removed from play/game/activity. If no licensed healthcare professional is available, call an ambulance for urgent medical assessment:

- Neck pain or tenderness
- Double vision
- Weakness or tingling/burning in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative

#### Remember:

- In all cases, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Assessment for a spinal cord injury is critical.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not remove a helmet or any other equipment unless trained to do so safely.

If there are no Red Flags, identification of possible concussion should proceed to the following steps:

#### STEP 2: OBSERVABLE SIGNS

Visual clues that suggest possible concussion include:

- Lying motionless on the playing surface
- Slow to get up after a direct or indirect hit to the head
- Disorientation or confusion, or an inability to respond appropriately to questions
- Blank or vacant look
- Balance, gait difficulties, motor incoordination, stumbling, slow laboured movements
- Facial injury after head trauma

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#### STEP 3: SYMPTOMS

- Headache
- "Pressure in head"
- Balance problems
- Nausea or vomiting
- Drowsiness
- Dizziness
- Blurred vision
- Sensitivity to light
- Sensitivity to noise
- Fatigue or low energy
- "Don't feel right"
- More emotional
- More irritable
- Sadness
- Nervous or anxious
- Neck Pain
- Difficulty concentrating
- Difficulty remembering
- Feeling slowed down
- Feeling like "in a fog"

#### STEP 4: MEMORY ASSESSMENT

(IN ATHLETES OLDER THAN 12 YEARS)

Failure to answer any of these questions (modified appropriately for each sport) correctly may suggest a concussion:

- "What venue are we at today?"
- "Which half is it now?"
- "Who scored last in this game?"
- "What team did you play last week/game?"
- "Did your team win the last game?"

#### Athletes with suspected concussion should:

- Not be left alone initially (at least for the first 1-2 hours).
- Not drink alcohol.
- Not use recreational/ prescription drugs.
- Not be sent home by themselves. They need to be with a responsible adult.
- Not drive a motor vehicle until cleared to do so by a healthcare professional.

The CRT5 may be freely copied in its current form for distribution to individuals, teams, groups and organisations. Any revision and any reproduction in a digital form requires approval by the Concussion in Sport Group. It should not be altered in any way, rebranded or sold for commercial gain.

**ANY ATHLETE WITH A SUSPECTED CONCUSSION SHOULD BE IMMEDIATELY REMOVED FROM PRACTICE OR PLAY AND SHOULD NOT RETURN TO ACTIVITY UNTIL ASSESSED MEDICALLY, EVEN IF THE SYMPTOMS RESOLVE**

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# Step 1: Red Flags

## STEP 1: RED FLAGS — CALL AN AMBULANCE

If there is concern after an injury including whether ANY of the following signs are observed or complaints are reported then the player should be safely and immediately removed from play/game/activity. If no licensed healthcare professional is available, call an ambulance for urgent medical assessment:

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- Weakness or tingling/burning in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative



# Step 2: Observable Signs

## STEP 2: OBSERVABLE SIGNS

**Visual clues that suggest possible concussion include:**

- Lying motionless on the playing surface
- Slow to get up after a direct or indirect hit to the head
- Disorientation or confusion, or an inability to respond appropriately to questions
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- Balance, gait difficulties, motor incoordination, stumbling, slow laboured movements
- Facial injury after head trauma





# Step 3: Symptoms

## STEP 3: SYMPTOMS

- Headache
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- Balance problems
- Nausea or vomiting
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- Blurred vision
- Sensitivity to light
- Sensitivity to noise
- Fatigue or low energy
- "Don't feel right"
- More emotional
- More Irritable
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# Step 4: Memory Assessment

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(IN ATHLETES OLDER THAN 12 YEARS)

Failure to answer any of these questions (modified appropriately for each sport) correctly may suggest a concussion:

- "What venue are we at today?"
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- "Did your team win the last game?"

# Must “Translate” Memory Questions from Sports Context

## CRT5

1. What venue are we at today?
2. Which half is it now?
3. Who scored last in this match?
4. Which team did you play last week/game?
5. Did your team win the last game?

## Sample Translation: Theatre

1. What theatre are we at today?
2. Did we have an intermission yet?
3. Who is the lead actor [or, your understudy]?
4. What was the last play you were in?
5. When was your last performance?

# Must “Translate” Memory Questions from Sports Context

## CRT5

1. What venue are we at today?
2. Which half is it now?
3. Who scored last in this match?
4. Which team did you play last week/game?
5. Did your team win the last game?

## Sample Translation: Stunts

1. What film are we filming now?
2. What stunt are we running now?
3. What actor are you stunt doubling for?
4. When were you last on the set?
5. What was the last film you were in?

# Must Avoid Multiple Concussions!

- ✦ The best predictor of a concussion is a history of at least 1 previous concussion
- ✦ Subsequent concussions require more conservative management when returning to performance
- ✦ Sustaining multiple concussions increases the risk of long-term negative effects (especially if they are not managed properly)

# Second Impact Syndrome

- ★ Sustaining a subsequent concussion prior to the complete healing of a previous concussion
- ★ Can cause:
  - ✧ Brain swelling/bleeding
  - ✧ Severe/long lasting symptoms
  - ✧ Coma
  - ✧ Death
- ★ Must be avoided!



# Possible Long-term Consequences of Concussion

- ★ Chronic changes in:
  - ✧ Cognitive function
  - ✧ Neuroelectrical brain activity
  - ✧ Muscular control
- ★ Depression
- ★ Memory impairments
- ★ Chronic traumatic encephalopathy (CTE)
- ★ May lead to Alzheimer's disease



# APPROPRIATE CARE FOR A CONCUSSION OR HEAD IMPACT WITH CONCUSSION-LIKE SYMPTOMS

# Care for Concussion or Head Impact with Concussion-like Symptoms

- ✦ Removal from activity without return that day
  - ✦ QUESTION: If that is the standard for sports, why shouldn't it be standard in performing arts?
- ✦ If symptoms are relatively mild and do not require emergency care...
  - ✦ Refrain from physical activity
  - ✦ Refrain from heavy concentration activities such as cell phone use, computer, and video game use, reading, etc.
  - ✦ NO alcohol, tobacco, or non-prescribed medication (except acetaminophen or paracetamol for headache)
  - ✦ See a healthcare provider as soon as possible; delay in care may lengthen recovery



# Providing Appropriate Healthcare\*

## ✦ Ideal “on-site” professionals

- ✧ Athletic Therapists (Canadian Athletic Therapists’ Association)—[athletictherapy.org](http://athletictherapy.org)
- ✧ Athletic Trainers (National Athletic Trainers’ Association)
- ✧ Physicians (especially with sports medicine or occupational medicine training that includes concussion training)



\*the author has no financial conflict of interest to disclose



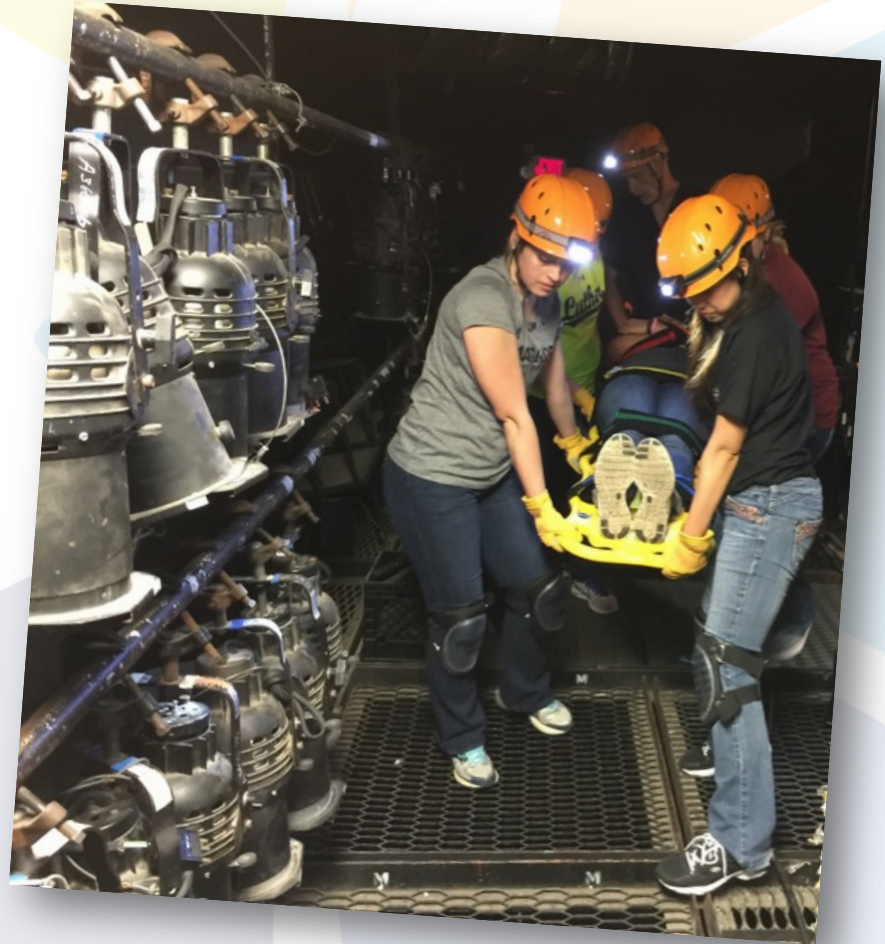
# MITIGATING RISK

# Areas for Performing Arts and Healthcare Collaboration

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- ✦ Health, fitness, and healthcare for performance and production personnel
- ✦ Application of sports emergency preparedness to unique theatre settings
- ✦ Occupational health, physical training, treatment, and rehabilitation





# Some Organizations and Venues with Athletic Trainers/Therapists

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# Preparation Ahead of Emergencies is Key!

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# Reduction of Risk: Technical Roles



# Petzl Vertex Best\*

\*The author has no financial conflict of interest to disclose



- ✦ Head centering adjustable
- ✦ Chin strap
- ✦ Head lamp capable
- ✦ Rated for electrical non-conductivity

# Reduction of Risk: Acting and Stunt Roles

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- ✦ Creativity of costumers to hide protective equipment
- ✦ Partnership between healthcare workers and set constructors
- ✦ Accountability of choreographers and stunt designers



Spiderman



# IMPORTANT SUMMARY POINTS

# Challenges in Concussion Care: Errors in Thinking

- ✦ “Football players get concussions, not performers and performing arts professionals.”
- ✦ “I just had a ding to the head. It’s no big deal.”
- ✦ “I didn’t ‘black out,’ so I didn’t have a concussion.”
- ✦ “I’m feeling a bit better now, so I can go back to activity.”



# Challenges in Concussion Care: What Do We Do with These?

- ✦ “If I take time off to recover, I won’t get paid.”
- ✦ “My boss/faculty/artistic director/stage manager doesn’t understand.”
- ✦ “I don’t want people to think I’m not tough enough.”
- ✦ “My venue does not have access to healthcare providers.”
- ✦ “My workplace won’t supply headgear, and they’re too expensive to buy myself.”

# How Do We Increase Access to Qualified Healthcare?

## ✦ Education

- ✧ Performing arts industries: the potential seriousness of head impacts and the need for proper healthcare
- ✧ Healthcare practitioners: the rigorous and often dangerous work of those in performing arts and the need for them to access high quality care

## ✦ Identification of Appropriate Practitioners

- ✧ Physicians (not all fully understand concussion management nor performing arts)
- ✧ Athletic therapists [Canada]/Athletic trainers [USA] (skilled at managing concussions in sports)

# Conclusions

- ★ You Don't Mess Around with Concussions!
- ★ Performing arts venues must implement multi-faceted detection and management schemes for individuals who sustain head impacts, especially those with concussion-related symptoms
- ★ Protection against concussion is substantially better than treating it



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**THANK YOU!**

