SPORTS MEDICINE SYMPOSIUM 2018

“Physiotherapy management of concussion”

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UPMC | CONCUSSION NETWORK

Saturday November 17th Silver Springs Hotel Cork

BON SECOURS HEALTH SYSTEM

Concussion – Physiotherapy Assessment and Management

Sports Medicine Symposium

17/11/18

Talk Overview

- Introduction
- Subjective Physiotherapy Assessment
- Objective Physiotherapy Assessment
- Treatment Strategies
- Conclusion

Concussion…

- CDC Definition

"A concussion is a type of traumatic brain injury—or TBI—caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head & brain to move rapidly back & forth. This sudden movement can cause the brain to bounce around or twist in the skull, creating chemical changes in the brain & sometimes stretching & damaging brain cells"

Concussion…

- Results in neuropathological change, largely reflecting a functional disturbance rather than a structural one (normal imaging)
- May or may not involve loss of consciousness
- Resolution of symptoms follows a sequential course

Not just for athletes…

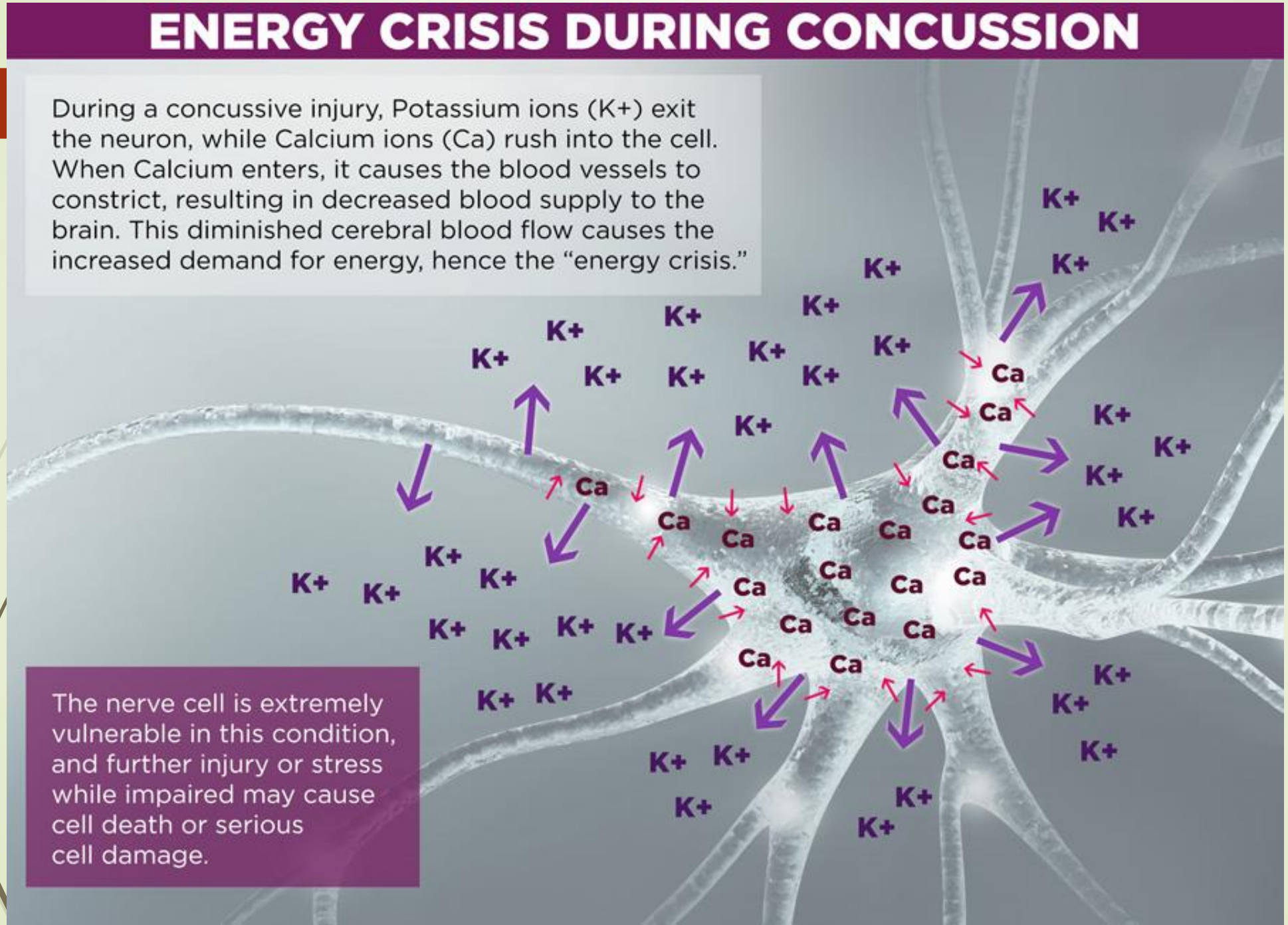
- Seen in persons post:
  - RTA (whiplash)
  - Fall
  - Other (Blast injuries, Abuse)

Mechanism of Injury

Giza 2001

- Blow to head or body, direct impact not necessary
- Acceleration/deceleration forces cause temporary deformation of axon (axonal stretching)
- Physiologic changes at cellular level
- Neurons are ‘dysfunctional’ not destroyed

ENERGY CRISIS DURING CONCUSSION



Courtesy of UPMC

Post Concussion 'Vulnerability'

- Demand/supply mismatch at cellular level
- Implication => Brain is less able to respond adequately to a second injury
- Physio Assessment designed to exacerbate symptoms therefore **advice** only in acute stage
- **Advise** on sleep, diet, fluids, mental activity, physical activity & stress management

Continuing to Play Doubled Recovery Time

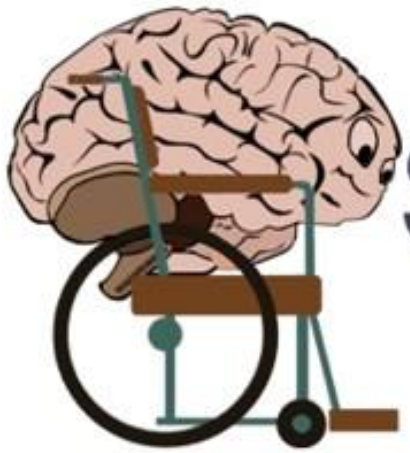
Elbin et al 2016

	Removed (n = 35)	**Played (n = 34)**
Date of Injury to medical clearance	Average: 21.97 days Range: 8 – 88 days	Average: 44.37 days Range: 10 – 164 days

Does it matter how long you continue to play?

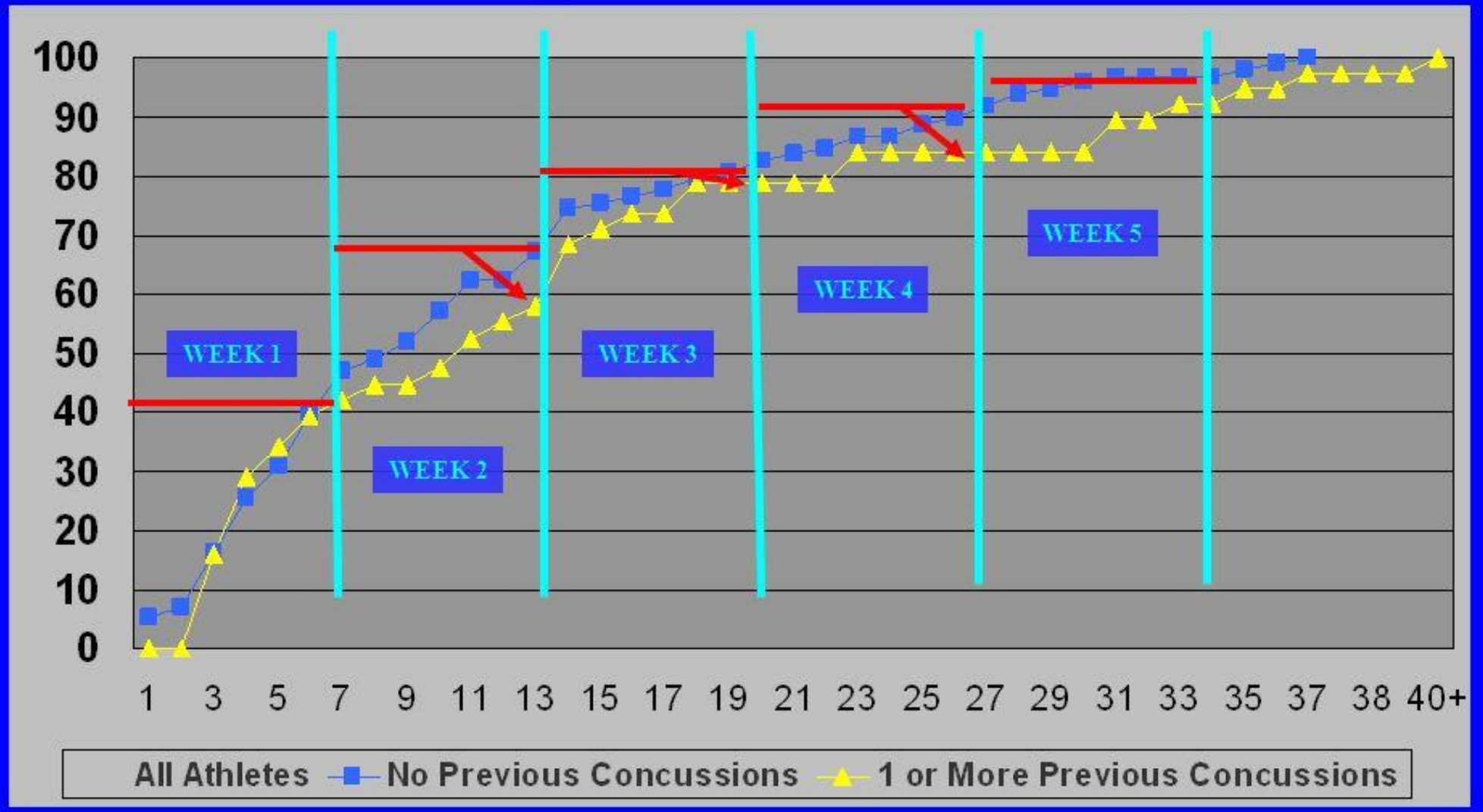
Elbin et al 2016

	Removed Immediately	3 - 15 minutes	> 15 minutes
Recovery time (days)	18.9	28.4	44.1



Sprained
Brain

Recovery From Concussion:
How Long Does it Take?



N=134 High School athletes

Collins et al., 2006, Neurosurgery

Most commonly reported Symptoms

Kontos et al 2012

	SYMPTOM	PERCENT
1	Headache	75%
2	Difficulty concentrating	57%
3	Fatigue	52%
4	Drowsiness	51%
5	Dizziness	49%
6	Foggy	47%
7	Feeling Slowed Down	46%
8	Light Sensitivity	45%
9	Balance Problems	39%
10	Difficulty with Memory	38%

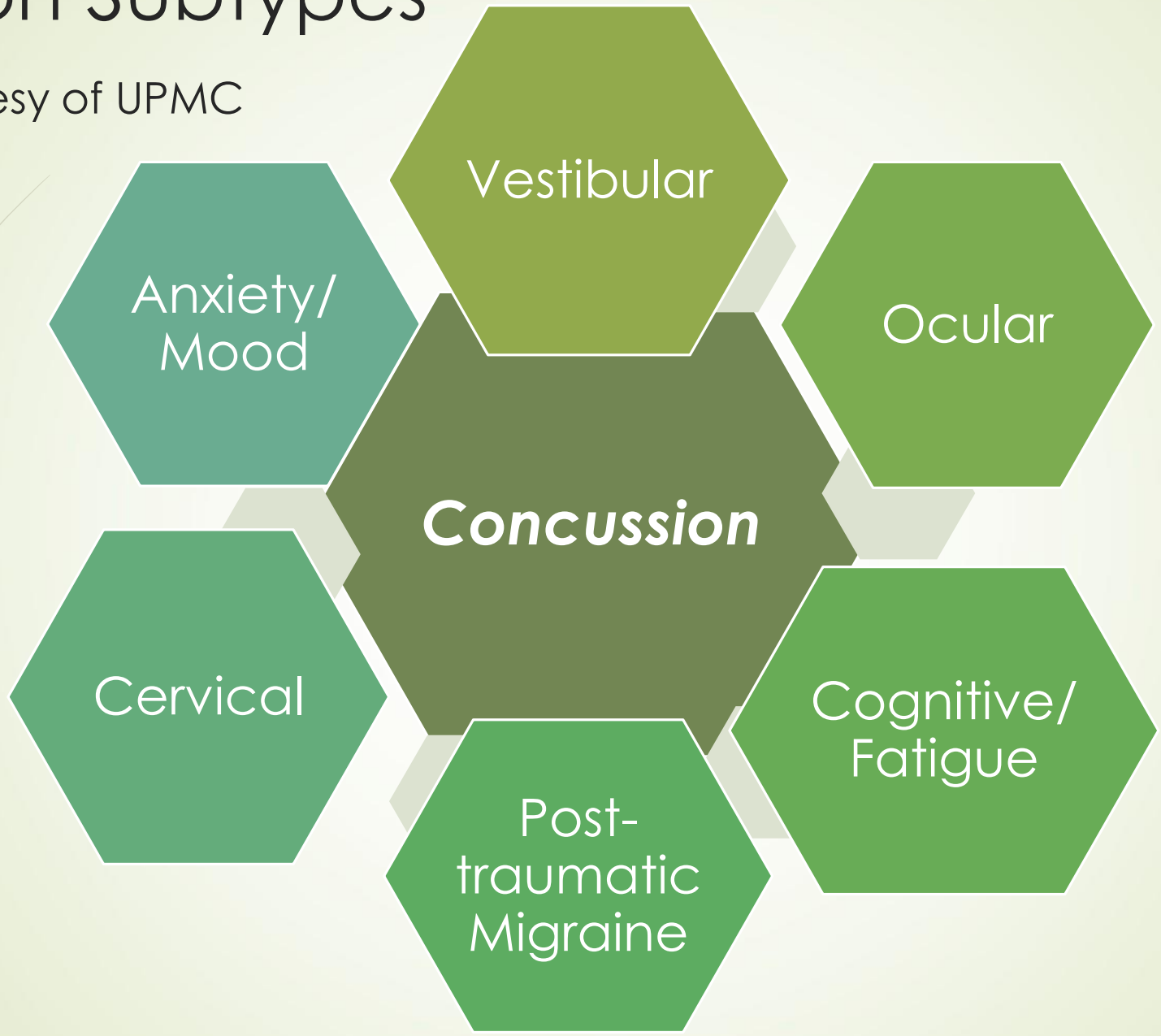
Symptoms….

- ≥4 symptoms doubled risk of being symptomatic at ≥ 1 weeks
- History of prior concussion doubled risk of concussion symptoms at ≥ 1 weeks
- LOC not significant *Chrisman et al, 2013*

- On-field symptom predicting protracted recovery = Dizziness *Lau et al, 2011*

Concussion Subtypes

Courtesy of UPMC



How are Physiotherapists involved in Concussion Management?

- Acute on-field evaluation
- Sub-acute assessment
  - Balance/Vestibular/Neurologic screen
- Rehabilitation/Return to Play/Activity
- Management of co-existing Cervicogenic issues related to Headache/Dizziness
- Return to Exertion

Subjective assessment

- **Rivermead Post-Concussion Symptoms Questionnaire,** Dizziness Handicap Inventory, ABC Scale
- Present symptoms – HA, Fogginess, Dizziness, Nausea, Sleep disturbance, Memory loss, Diplopia, Vomiting, Other
- Special Questions

Special Questions…

Previous History of ?

- Concussion
- Migraines
- Ocular issues
- Motion sickness
- Other – Learning difficulties, ADHD

Objective Assessment

- C-Spine Assessment
- VOMS (Vestibular/Ocular Motor Screening)

- Further Testing as indicated e.g. DVA test, Cover/Uncover test, Dix-Hallpike

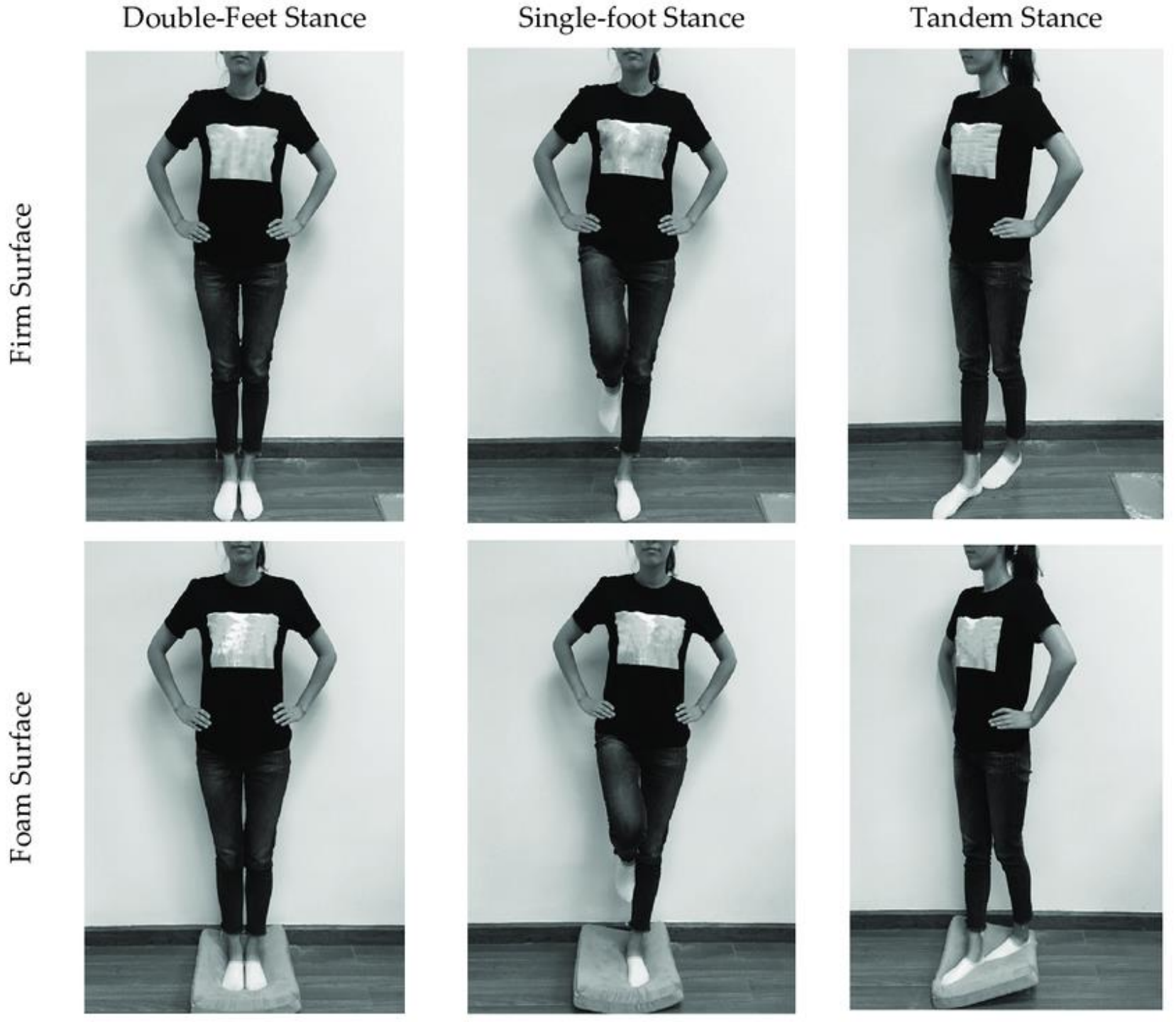
- BESS Test(Balance Test)

Objective Assessment "VOMS"

- "VOMs" – Vestibular/Ocular/Motor screening
- Rate 4 baseline symptoms – HA, Dizziness, Nausea, Fogginess 0-10
- Assess : Smooth Pursuits, Saccades, Near Point Convergence (NPC), Vestibulo-Ocular Reflex (VOR) and Visual Motion Sensitivity (VMS)
- Done in order, cumulative effect

VOMS

	Not Tested	Headache 0-10	Dizziness 0-10	Nausea 0-10	Fogginess 0-10	Total	Comments
Baseline symptoms		5	2	0	0	7	
Smooth Pursuits -Horizontal		5	4	0	0	9	
Smooth Pursuits - Vertical		5	4	0	0	9	
Saccades - Horizontal		5	5	0	1	11	
Saccades - Vertical		5	5	0	1	11	
Convergence Near Point (in cms)		8	5	1	1	13	Measure 1 **37** Measure 2 **39** Measure 3 **38** Average **38**
VOR - Horizontal		5	5	0	0	10	
VOR - Vertical		5	5	0	0	10	
Visual Motion Sensitivity Test		5	5	0	0	10	


Double-Feet Stance
Single-foot Stance
Tandem Stance
Firm Surface
Foam Surface

Treatment Options

- Advice
- Soft tissue techniques, Manual Therapy to C-Spine
- Vestibular Rehabilitation or specific Manoeuvres
- Exercises to Improve Ocular issues(NPC)
- Balance Re-education
- Return to Activity – individualised plan
- Onward Referral (Orthoptics)

- New evidence is now proposing multi disciplinary management of athletes with concussion

Leddy et al, Front Neurol, 2016

Exercises to Improve Ocular Dysfunction

- Convergence - Pencil push ups, Brock String Exercises
- Smooth Pursuit, Saccadic Eye Movement & Accommodative exercises

Activity Levels – How much or little?

- Student athletes engaged in high levels of activity had ↑ symptoms, worsened neurocognitive data, & significantly longer recovery time (Majerske 2008)
- BUT….sedentary athletes also did poorly, those prescribed strict rest after concussion had ↑ overall symptoms & slower time for complete symptom resolution (Thomas 2015)
- Encourage moderated level of activity based on presenting symptoms

Exertion Test

- Advise patient to participate in 30 minutes aerobic activity prior to appointment
- Rate symptoms during & after a series of high intensity aerobic activities which challenge balance, visual & vestibular systems
- On completion send report to referring Consultant or GP

Evidence

- *Schneider et al (2014)* - Cervicovestibular rehabilitation ↓ time to medical clearance
- Earlier time to aerobic exercise is associated with faster recovery

Grool et al, 2016; Lawrence et al, 2018

- Anxiety ↑ if removed from every day activities

Leddy et al 2011

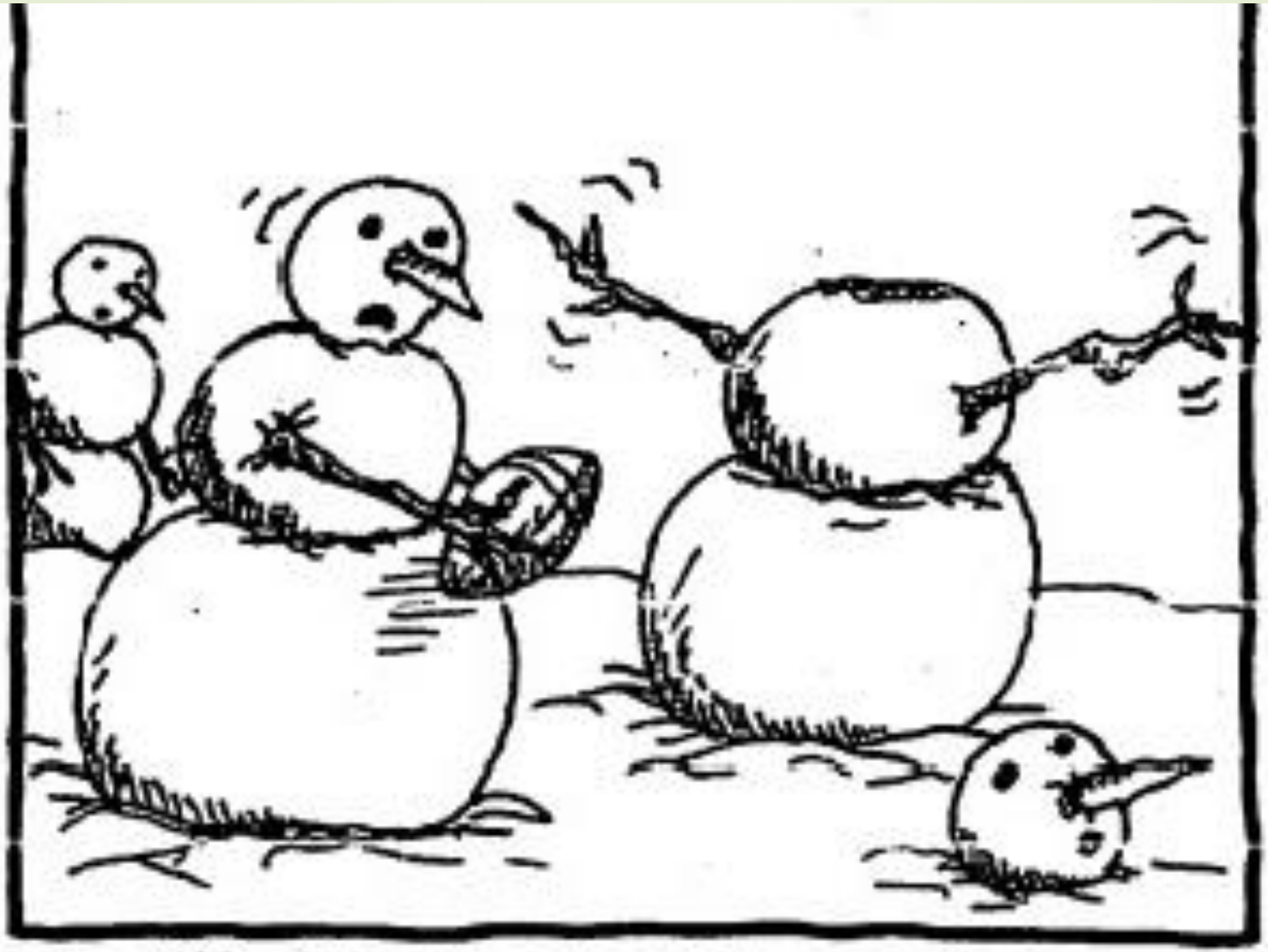
- Oculomotor & vision-related therapies post mTBI (*Ciuffreda et al 2008*) & post concussion (*Galloway et al 2016*) ↓ signs & symptoms

Keep Active!!

- Recent online poll found that 1 in 5 Irish parents have considered stopping their child playing sports entirely
- 1 in 4 have near-constant worry their child will sustain a concussion *UPMC Concussion Network in Ireland*
- In the UK as little as 6% of men & 4% of women, aged 16 or over, meet the recommended government guidelines
- Concussion is common & can occur outside of sport!
- Long term benefits of participation in sport outweigh the risks
- It is a **treatable** condition

Conclusion

- Patients present with different pre-existing risk factors, have different psychological characteristics & experience different injury biomechanics
- Uniform ‘recipe-based’ approach does not work
- Initial removal from play & high risk activity
- Active treatment based on presenting clinical profile
- Concussion is treatable!



"You'd better sit out the rest of the game. You might have a concussion."