Concussion Video—Educating Schools

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Abstract

Concussion awareness became a priority for the Northern Sydney Local Health District as the increase in children, teenagers, and young adults with concussion, had an effect on emergency department (ED) presentations, follow-up, schooling and sports-related activities. Education in some of the local schools from the Neuroscience Clinical Nurse Consultant had been occurring, but the need far outweighed the in-person approach. Therefore, it was decided that the development of an educational concussion video for schools was required.

AIM: To produce a 5-minute educational video for use in schools in the PDHPE Program / Sport sessions, that could then be broken down into shorter 1-minute versions for social media bursts.

METHOD: A focus group was established and the process of devising and parenting this video took approximately 11months. It is pitched at a 12-year-old and combines animation and realistic scenes.

OUTCOME: The video can be found at - https://vimeo.com/674645370

It has been sent to and accessed by schools within the Northern Sydney Local Health District and has been integrated into the NSW Education Department teacher training as a tool for teachers and students. It has been accessed throughout NSW, other Australian states and accepted for use in the New Zealand schooling system.

Key Words: Concussion, mild traumatic brain injury, concussion education

Acknowledgements: Video funding sourced from Northern Sydney Local Health District.

Introduction

Concussion is an injury of force – to the head or body. It is an injury of signalling in the brain at a cellular level and is thought to be of greater significance in teenagers, as the teenage brain undergoes a growth spurt during adolescence (Baillargeon, Lassonde, Leclerc & Ellemberg, 2012).

The frontal lobe, paramount for working memory, is more fragile and susceptible to the effects of concussion in the teenage years. Multiple studies, including Baillargeon et al (2012), have identified that teens with a concussion have a worse working memory than children or adults.

Concussion is not always obvious, and symptoms may take up to 72hrs to manifest. Like all brain injuries, every concussion is different. However, they all do need to be identified and managed appropriately. Assessing brain function is subjective with current tools and assessing concussion requires evaluation and testing by qualified members of a multidisciplinary team (MDT).

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DOI: 10.21307/ajon-2023-007

Once a person has had a concussion, it can easily occur again, and will take less of a blow to cause injury and longer time to recover (Gornall, Takagi, Morawakage, Liu & Anderson, 2021). If not managed well, morbidities result, which in turn increases the burden of health costs.

Questionnaire – Fact Finding

For several years, there has been collaboration with a large private boy's school within the Northern Sydney Local Health District (NSLHD), regarding head injury assessment, treatment, prevention and school guideline development. It became apparent that there were many boys sustaining concussive head injuries at school, particularly in winter season sport, requiring monitoring in sick bay and several serious enough to be referred to hospital. It was decided that a collaborative approach to find out more about the boys' concussions was needed, to see in what numbers concussion was affecting this population and then, what could be done to lessen the numbers affected.

A questionnaire (Table 1) was collaboratively developed with school approval and distributed in class to 727 boys in Years 7-12 (excluding Year 11 as they had exams at the time). From that survey, 217 boys identified as having had a concussive head injury. Those 217 boys were given a further survey asking more in-depth questions about their concussion experience.

Not surprisingly, most injuries occurred during the winter sport season – rugby union and soccer, but also from school playground injuries and summer sports. Pleasingly, most identified that they were wearing mouthguards for contact sports. The symptoms most complained about included headache, visual disturbances, neck pain, and fuzziness/forgetfulness. Other symptoms identified were hearing issues, nausea, one who had a seizure and another, a bleeding nose.

58% came off the field but 25% stayed on playing. 76% reported the injury (school, family), but 24% did not report it. It is these two points – ¼ stayed on playing and ¼ did not report the injury, that is concerning. Two days after the injury, almost half still had headache (46%) and complained of fuzziness (23%), neck pain, visual and hearing issues.

35% reported this being their first concussion and pleasingly, 86% reported the incident to their teachers. Most returned to school the next day or day after. However, 10% returned to sport the same day, which was alarming. It is mandatory at this school to follow FIFA's guidelines (international governing body of football) of 19 days until returning to sport, and the majority were found to have complied. Unfortunately, there was a small number who were out for the season and one out for the rest of the year due to ongoing concussive symptoms.

Issues for consideration:

Under-reporting

It was found that under-reporting is a major concern. The students did not want to miss out on sport or let their team down. In larger studies, and not surprisingly in our smaller study, athletes often hide symptoms as the desire to play in the moment outweighs caution (Pengilly, 2021). Upon reflection, it was suggested that a survey at the end of the season possibly would capture more honest answers.

Doesn't show up on scans

Although classed as a mild traumatic brain injury, concussion, unlike a fractured skull or extradural haemorrhage, cannot be identified on Xray, CT or MRI. This creates public confusion as a concussion is an invisible injury. It is through a detailed neurological assessment, noting the mechanism of injury that allows a proper diagnosis of concussion to be made. The issue to scan or not to scan, particularly in children, is a medical decision weighing up age, mechanism of injury, neurological assessment, and expertise. A detailed discussion with explanation to parents is required.

Questionnaire Outcomes – What Next?

The questionnaire identified that there was an important need for further concussion education of the teachers, students, coaches, and parents. Education outlining what a concussion was, how to identify it had occurred, how to manage symptoms and importantly, the trajectory of returning to school and sport.

Whilst the Clinical Nurse Consultant undertook visits to many local schools, it was time consuming and not able to fulfil the need with so many requests. Therefore, it was decided that a video would reach more people and be more readily available.

Paediatric Concussion Questionnaire

This questionnaire is designed to obtain information on the effectiveness of concussion guidelines in the community and to obtain information on children who have had a concussion within the Local Health District, the actions taken to assist in their recovery and mechanisms in place to minimise any potential complications.

1. Age: _____
2. What sport were you playing at the time of injury? _____
3. Were you wearing a mouthguard / helmet at the time of injury? (Circle)
    a. Yes – mouthguard
    b. Yes – helmet
    c. Yes both
    d. No
4. What symptoms were you experiencing? (Circle all that apply)
    a. Headache
    b. Visual problems –double vision, sore eyes, blurry vision
    c. Hearing problems
    d. Neck pain
    e. Feeling sick / nausea
    f. Vomiting
    g. Forgetful
    h. Fuzziness
    i. Confusion
    j. Other_____
5. Did you come off the field / court following your injury? (Circle)
    a. Yes b. No
6. Did you go back onto play the rest of the game? (Circle)
    a. Yes b. No
7. What treatment were you given on the sidelines: (Circle all that apply)
    a. Told to sit down
    b. Asked questions about your memory, pain, how it happened
    c. Ice
    d. Analgesics (name of the medication) _____
    e. Given head injury advice information – verbally
    f. Given head injury advice information – written
    g. Parents / caregiver spoken to on sidelines or shortly thereafter
    h. No treatment given
8. At home after the game, did you experience any of the following: (Circle all that apply)
    a. Headache
    b. Visual problems –double vision, sore eyes, blurry vision
    c. Hearing problems
    d. Neck pain
    e. Feeling sick / nausea
    f. Vomiting
    g. Forgetful / Fuzziness
    h. Confusion
    i. Other _____
9. At home after the game, did you take any medications? (Circle)
    a. Yes (which medications?) _____ b. No
10. Did you go to the: (Circle)
    a. Hospital

b. General Practitioner / Medical Centre
c. Didn't go to either (go to question 13)

11. IF you went to the hospital or GP, did you have a: (Circle)
    a. CT scan b. Xray c. No scanning
12. IF you went to the hospital or GP, were you prescribed any medications?
    a. Yes (they were) _____ b. No
13. IF you went to the hospital or GP, were you given any further information on concussion? (Circle)
    a. Verbal b. Written c. Both verbal and written
14. The following day, did you experience any of the following: (Circle all that apply)
    a. Headache
    b. visual problems
    c. hearing problems
    d. neck pain
    e. fuzziness
    f. confusion
    g. other _____
15. When did you go back to **school**? (Circle)
    a. The next day
    b. 2 days later
    c. A week later
    d. Other_____
16. Did you go back to school for: (Circle)
    a. The whole day b. Half day c. Few hours
17. Did your school teachers know that you had a concussion?
    a. Yes – who told them?_____ b. No
18. When you came home from school did any of those symptoms come back?
    a. Yes – which ones?: _____
    b. No
19. When did you go back to playing **sport**? (Circle)
    a. The same day
    b. The next day
    c. 2 days later
    d. A week later
    e. Other_____
20. When you went back to playing sport, did you have any of the symptoms come back?
    a. Yes – Describe them:_____
    b. No
21. Did you report your injury to the: (Circle all that apply)
    a. School b. Coach c. Parents
22. Have you been given any information regarding concussion management and head knocks at:
    a. School b. Club c. Parents at home
23. Did you spend any time in the school sick bay or infirmary?
    a. Yes – sick bay (how long for? _____)
    b. Yes – infirmary (how long for? _____)
    c. No
24. Other comments:

_____

_____

_____

_____

Thank you for your time.

Concussion Video Objectives:

Aim:

To produce an educational video for use in schools, to educate teachers, coaches, students and parents on the importance of recognising a concussion, its treatment, management, and trajectory of symptoms in order to return to school and return to sport.
To produce one 5-minute video that could be broken into shorter 1-minute versions for social media bursts.

Method:

A Concussion Group was established, consisting of Neuroscience Clinical Nurse Consultant, Neuropsychologist, Emergency Department Specialists and Paediatric Specialists. The concept from the group was presented at the NSLHD Youth Forum (students 13-22-yrs). A wider presentation to First Nations and consumer representatives was also achieved.

The video was pitched at a 12-year-old level and combines animation and realistic scenes. The scenes were kept short to keep students engaged and the focus was placed on the learning aim, being conscious to dispel students' misconceptions as well. Misconceptions such as "It only happens to footy players" and "I didn't even bump my head" were highlighted.

After pitching the concept to the Chief Executive and team, the NSLHD provided the funding for the video, which was greatly appreciated.

The videographer's briefing included the "words on paper"/ script, as well as concepts for the video footage :

- A montage of pictures
- Cartoon drawings and real-life pictures
- Emphasis on Speech, Vision, Memory, Balance
- Does just happen in sport!
- Facts vs Fiction
- Male: Female
- The word Concussion to stand out throughout.

From the initial draft script (Figure 1), script version 6 was accepted. Devising and parenting the video took approximately eleven months from "words on paper" to fruition.

Figure 1: (Above): Concussion Video draft 1a

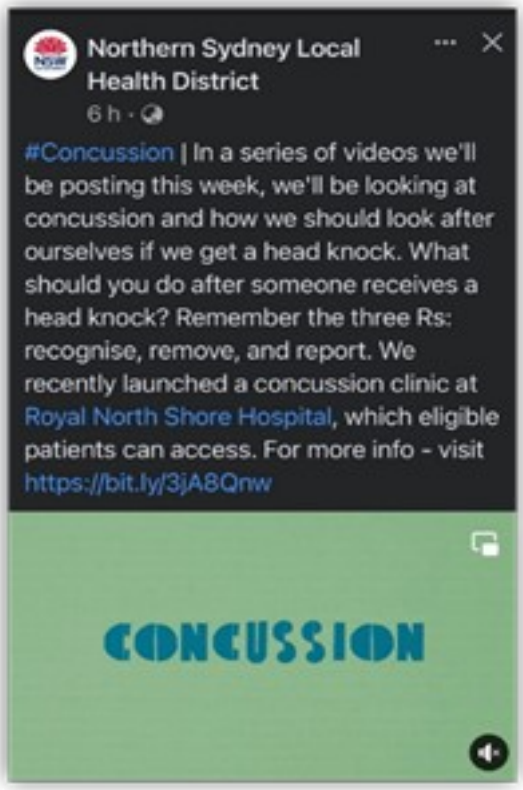
Outcome

The video can be accessed via https://vimeo.com/674645370

Social Media

From the 5-minute video, there were several shorter 1-minute segments for social media bursts e.g. Facebook and Instagram (Figures 2 & 3).

Figure: (Below): Example of the 1-minute social media videos



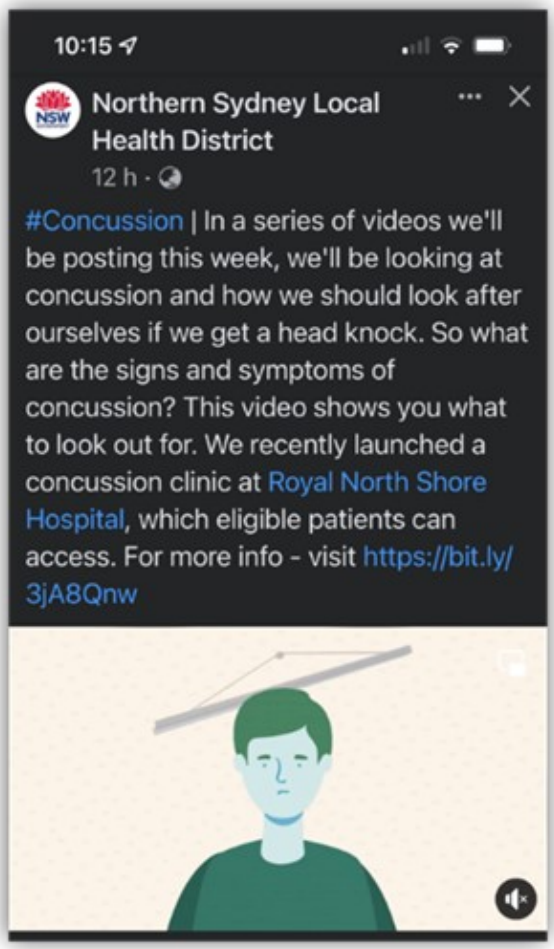


Figure 3: (Above): Example of the 1-minute social media videos

Evaluations

Many schools have written with positive comments, outlining how the video has been integrated into class learning and discussion. The Concussion Video has been included in the resources section of two of the NSW Education Department's 'Recognising and Responding to Concussion' e-learning courses as a resource that teachers are encouraged to share with their students (School Sport Unit, 2022). It has also been taken up by the New Zealand Public Health Unit for inclusion in school education.

Discussion

There is much discussion surrounding the risk of neurodegenerative diseases and complications associated with concussion and repetitive head knocks in sport, with rotational head motion as the primary contributor to brain injury (Tierney, 2021). Media saturation regarding Chronic Traumatic Encephalopathy (CTE) needs to be considered and properly understood. Public education needs to ensure that the threat of CTE does not overtake common sense. Already schools are seeing a move away from rugby to soccer, yet evidence shows that soccer is not necessarily 'safer', as concussions occur frequently in this sport as well.

Sport is synonymous with being Australian. It should be encouraged. However, so should the rules of the game, sportsmanlike behaviour, and in particular, neck strengthening exercises. Mouthguards and helmets (in rugby) should be mandatory. Although they will not wholly prevent a concussion, they will absorb some of the mechanical force, as well as protecting the teeth, skull, and jaw (Allison & Tamimi, 2020). Encouragement to 'look after your mate' should also be emphasised in schools – if your mate is injured, report it.

Similarly, concussion needs a higher educational presence in schools. Early injury identification, assessment and treatment produces better outcomes (Cassimatis, Orr, Fyffe & Browne, 2021). This video will assist in highlighting identification and management of concussion. As a video, it can be played whenever and wherever required.

Conclusion

With the rise of public concern regarding concussion, particularly in children and young adults, and the many presentations to school infirmaries and Emergency Departments, the need for concussion education was apparent. The NSLHD's Concussion Video is an ideal way to provide education and information to local schools and sporting groups whenever required.

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Table 2: (below): **Table of head knocks January – August 2018 obtained, with permission, from a large private NSLHD boys' school.**

21st January	YR 7	Head Injury
27th February	YR 10	Head knock
27th March	YR 8	Head knock
27th March	YR 8	Head knock
27th March	YR 8	Head knock
3rd April	YR 8	Head injury
4th April	YR 10	Head knock
6th April	YR 10	Concussion
7th April	YR 8	Head knock
7th April	YR 11	Head knock
7th April	YR 9	Head knock
7th April	YR 11	Head knock
9th April	YR 8	Head Injury
11th April	YR 10	Concussion - Hospital
7th May	YR 10	Head injury
7th May	YR12	Head injury
7th May	YR 10	Head injury
7th May	YR 12	Head injury
7th May	YR 8	Head Injury
9th May	YR 9	Head Injury
13th May	YR 7	Head knock
13th May	YR10	Head knock
13th May	YR 10	Head knock
13th May	YR 10	Head knock
13th May	YR 10	Head knock
15th May	YR 8	Head knock
16th May	YR 8	Concussion - Hospital
20th May	YR11	Head Injury
20th May	YR 8	Head Injury
20th May	YR 8	Head injury
21st May	YR 8	Head Injury
21st May	YR 8	Head injury
21st May	YR 8	Head injury
21st May	YR 8	Head injury
21st May	YR 10	Head injury
21st May	YR 12	Head injury
21st May	YR 8	Concussion - Hospital
21st May	YR 7	Head injury
21st May	YR 8	Head injury
22nd May	YR 11	Head injury
23rd May	YR 7	Head injury - Hospital
29th May	YR 7	Head injury
29th May	YR 10	Head knock
29th May	YR 7	Head knock
29th May	YR 10	Head knock
29th May	YR 10	Concussion - Hospital
5th June	YR 7	Head injury
5th June	YR 9	Head injury
5th June	YR 8	Head injury
5th June	YR 12	Head knock
17th June	YR 8	Concussion - Hospital
17th June	YR 9	Concussion - Hospital
17th June	YR 8	Concussion - Hospital
17th June	YR 7	Concussion - Hospital
17th June	YR 12	Concussion - Hospital
20th June	YR 8	Head injury
22nd June	YR 7	Head injury
25th June	YR 7	Head injury
28th June	YR 10	Head injury
28th June	YR 8	Head injury
28th June	YR 10	Head injury
28th June	YR 12	Head injury
28th June	YR 7	Head injury
30th June	YR 10	Head knock
4th August	YR 8	Head injury
4th August	YR 7	Head injury
4th August	YR 10	Head knock
6th August	YR 12	Concussion - Hospital
6th August	YR 10	Head injury
6th August	YR 8	Head knock
7th August	YR 8	Head injury
7th August	YR 8	Head injury
18th August	YR 10	Head knock
18th August	YR 11	Head knock
18th August	YR 12	Head knock - Hospital
18th August	YR 8	Head knock
18th August	YR 10	Head knock
18th August	YR 9	Head knock
18th August	YR 7	Head knock
18th August	YR 8	Head knock
18th August	YR 7	Head knock
18th August	YR 7	Head knock
18th August	YR 9	Head knock
20th August	YR 12	Head injury
20th August	YR 12	Head injury
20th August	YR 8	Head injury
20th August	YR 12	Head injury
20th August	YR 12	Head injury
20th August	YR 12	Head injury
20th August	YR 12	Head injury
21st August	YR 8	Head injury

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