



**Revolutionary,  
unparalleled R5  
Rugby  
Headguard**



# Innovate

Using science and technology to develop world-leading protective materials

# Educate

Working with globally-renowned experts in concussion recognition, prevention and recovery

# Protect

To better protect players and the long term future of rugby in the UK and beyond



**Hedkayse**

# Who we are

## Hedkayse

- Crafting the world's safest head protection since 2015
- World's safest repeatable (non-sacrificial) cycle helmets
- **Enkayse®** is our unique hybrid foam with unparalleled performance
- **Enkayse®** being licensed into multiple sports - think 'GORE-TEX' for head safety
- January 2023 we started the journey to create the world's safest rugby headguard
- We have featured in:



# Head injuries – 4 key issues

Skull fracture  
(extremely rare)

mTBIs  
(Concussions)

Non concussive /  
subclinical TBIs

CTE & other  
neurodegenerative  
diseases



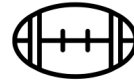
American  
Football



Military  
Service



Soccer



Rugby  
(Union & League)



Wrestling



Lacrosse



Ice Hockey



Boxing



Mixed Martial  
Arts



Australian  
Rules Football

# Brain injuries

mTBI (Concussion)



Non-concussive impacts



Repeated Head  
Impacts (RHI)  
/ Head Acceleration  
Events (HAE)

Causation

Chronic Traumatic  
Encephalopathy (CTE)

**The goal is to reduce total lifetime head injury debt**

*"Anything that can be done to reduce head impacts to a level below non-concussive threshold is to be applauded." Dr. Garrett*

# Brain injuries

## mTBI (Concussion)

Key focus – aim to reduce incidents – recognise & remove, Return to play protocols – ‘If in doubt, sit it out’.

## Non-concussive impacts

Non-symptomatic, often missed and / or dismissed. Balance of medical opinion is that RHIs / HAEs cause long term damage to brain health.

## RHI and CTE

Causation link between RHI and CTE & other neurodegenerative brain diseases. **CTE does not exist without a history of RHI / HAEs**

NOT a certainty that RHIs WILL lead to CTE etc. as there are other contributing factors, including genetics.

## The goal is to reduce total lifetime head injury debt

Cumulative number of concussive and non-concussive injuries sustained by an individual - think ‘compound interest’

Minimising total lifetime debt is the cornerstone of potential CTE & neurodegenerative disease mitigation

*"Anything that can be done to reduce head impacts to a level below non-concussive threshold is to be applauded." Dr. Garrett*

# Brain injuries: Cause & mitigation



## Direct linear impact

Direct impact to the head

**Mitigate with force diffusion / load spread headguard**



## Rotational impact

Glancing blow to the head

**Cannot currently be mitigated**



## Whiplash

Referral injury caused by contact elsewhere on the body

**Mitigate with neck strengthening**

A headguard can only offer mitigation for **1** of the 3 causes of brain injury  
Tackle height / safer tackling & reducing contact load all help mitigate the above

**No headguard can  
prevent concussions**

**R5 aims to mitigate  
non-concussive load  
& 'rugby incidents'**

*'Play like you are not wearing it'*





# Are headguards needed?

Independent research from BCOM

**176 parents & 131 coaches**

March-April 2023

What do parents  
of youth level  
players think?

**79%**

**OF PARENTS**

expressed concerns that  
their child may could suffer a  
potential brain injury from  
playing rugby

**36%**

**OF PARENTS**

believed traditional  
scrum caps protected  
the brain from  
concussion

Unsurprising 36% parents think headguards protect  
- they are designed to look like they do!



# World Rugby Regulations

## WORLD RUGBY REGULATIONS

World Rugby's Law 4  
Regulation 12:

***"When tested in accordance with the procedures specified in Section 4.3, the peak acceleration of impacts delivered to test locations shall not be less than 200g."***

## IMPLICATIONS

- Headguards are **not allowed to offer protection** that **reduces impact from 530g to below 200g**
- This is **above** the accepted concussion threshold of 95g.
- Ideally, head and brain protection should extend **below 95g** and as low as possible to mitigate the potential of brain injuries associated with impact.

# What is a realistic impact in rugby?

## CURRENTLY UNKNOWN...

530g has never been experienced

Equivalent of 2x 140kg people sprinting into each other at 12m/s and stopping head on head in 0.02s

(Usain Bolt's top speed was 10.44m/s)

It is a red-herring number.

## WHAT IS REALISTIC?

Current highest recording from an iMG is **190g**

**Medical community & head protection standards agree we should aim to reduce impacts below 250g and as low as possible.**

We built in some wiggle room and measured impact mitigation from **300g** at **body temperature**

# Headguards tested (best sellers / boldest claims)



Rhino Pro

"Rhino Pro Headguard provides **unbeatable protection against head injuries.**"



Body Armour Ventilator

"Offering the **best protection available. Protects major head impact zones.**"



Canterbury Raze

"...**more protection...** The durable 360 padding **absorbs high impacts from every angle.**"



Gilbert Air

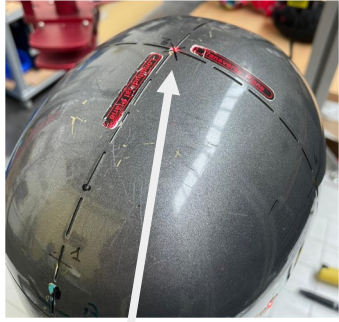
"...the **best high performance head guards available...**provides **excellent shock absorption** in key contact areas such as the temple"



N-Pro

"The only rugby headguard that **reduces impacts to the head by up to 75%. Impact protection that's 4x better.**"

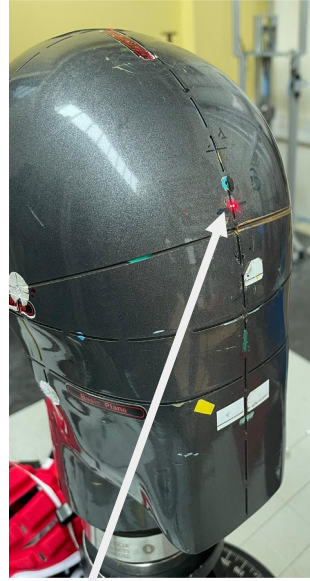
# Impact sites tested



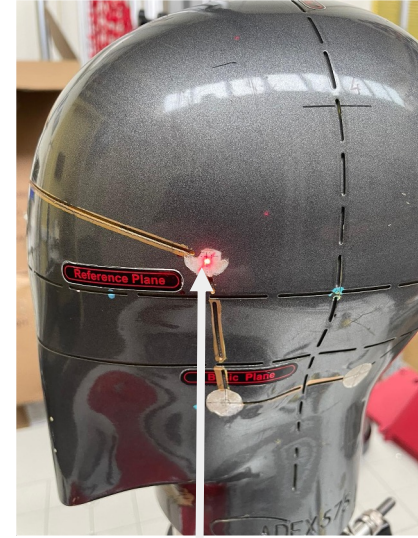
Vertex (crown)



Occipital lobe



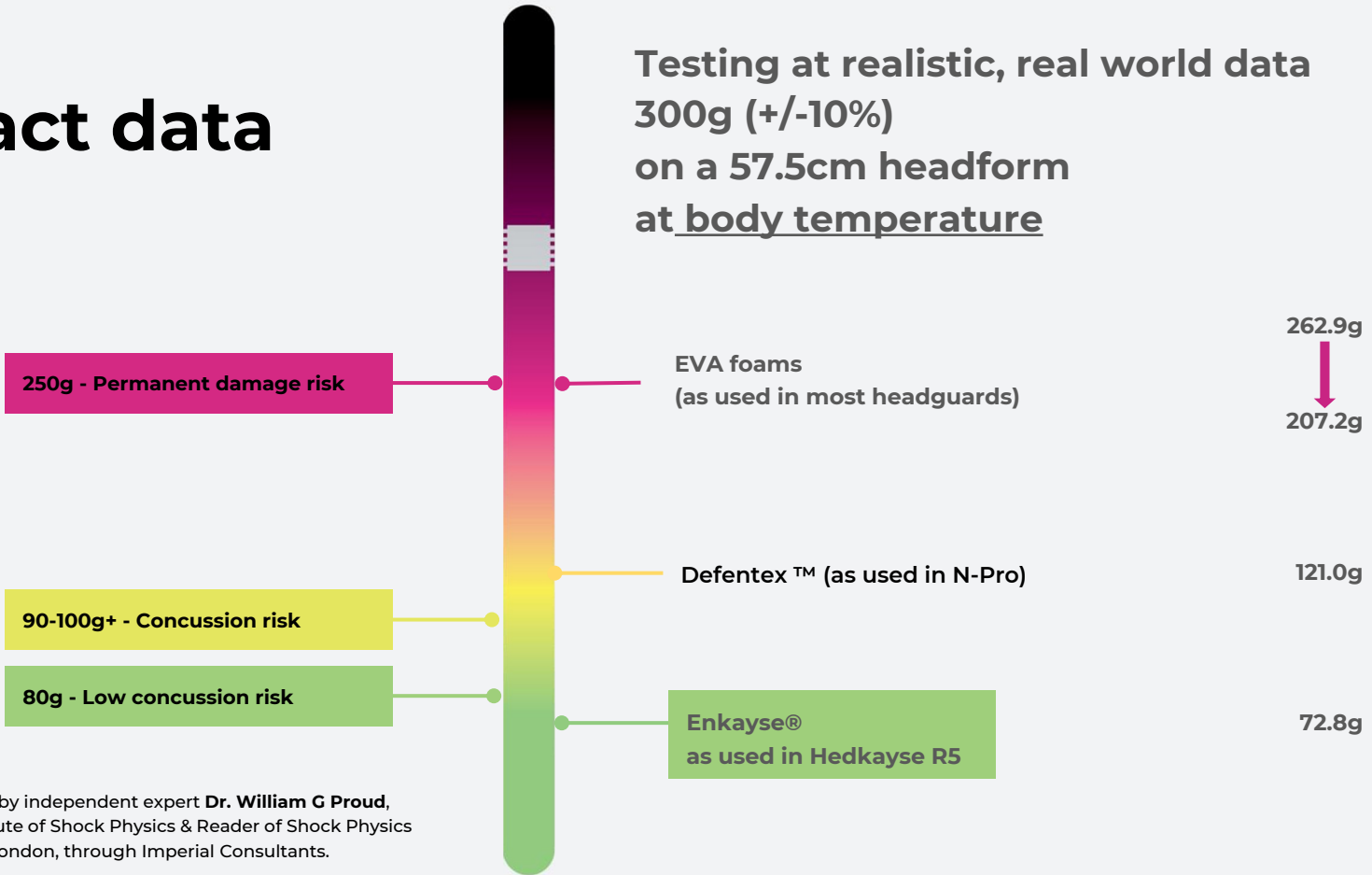
Frontal lobe



Temporal lobe (L&R)

# Impact data

Testing at realistic, real world data  
300g (+/-10%)  
on a 57.5cm headform  
at body temperature



Impact data verified by independent expert **Dr. William G Proud**,  
Director of the Institute of Shock Physics & Reader of Shock Physics  
at Imperial College London, through Imperial Consultants.

# The data: from 300g (+/-10%) @ Body Temperature

Headguard	Frontal Lobe	Vertex (Crown)	LHS Temporal lobe	RHS Temporal lobe	Occipital lobe	Avg g
EVA foams (as used in most headguards)	190.0	152.8	205.0	210.35	278.0	207.2
Defentex™ (as used in N-Pro)	57.8	97.7	89.4	129.0	235.2	121.8
Enkayse®5mm (as used in Hedkayse R5)	72.5	67.8	69.9	75.4	78.4	72.8

**Enkayse®** is the **ONLY** foam to **mitigate** to **non-concussive levels** everywhere.

Impact data verified by independent expert **Dr. William G Proud**,  
Director of the Institute of Shock Physics & Reader of Shock Physics  
at **Imperial College London**, through Imperial Consultants.



# Design may look good, but there is nowhere for the impact force to go.

Small, encapsulated foam doesn't allow load spread & force diffusion



# How we designed the R5

## The Design Concept

- If we design a protective headguard from scratch what are the key issues / features / benefits?

## The Design Council - all independent & unpaid

- Former & current players
- Coaches
- Referees
- Drs & Surgeons
- Designers
- Engineers

## Key issues

1. Repeatable, load spreading foam
2. **Body temperature.**
3. Largest possible surface area for optimal performance
4. Never expose an area of the head more than 10mm

+

- Machine washable
- No weak spots
- Excellent situational awareness
- Excellent ventilation

# Enkayse®

## OUR REVOLUTIONARY MATERIAL

6 years & 6,000 tests and iterations

Unique hybrid PU foam with  
temperature stability

Unparalleled performance + load  
spread ability at body temperature



R5 has 3 pieces of **Enkayse®**  
2 side pieces and a central Mohican strip

# How is the R5 different?

## OUR REVOLUTIONARY MATERIAL & DESIGN

No weak spots

Works at body temperature

Largest surface area

Unparalleled performance

Full head coverage

Unique load-spread foam



# Hedkayse R5 - World Rugby Approved



**HK R5 looks different...  
because IT IS different...**

**Unique design and unparalleled performance**

**PPE Cat I CE & UKCA certifications**

**Member of British Safety Industry Federation (BSIF)**

- Machine washable
- Anti-microbial
- Minimum 3 year life span
- Internal name tag



Feature	Benefit
World Rugby Approved	For training and matches
Occipital lobe coverage No lacing or weak spots	Full head coverage, no coverage reduction from weak spots
Superior ventilation	Feel & think better
Customisable design	Can be unique to your team
Zero hearing reduction	Always hear your teammates
Machine washable	Keep it fresh and clean
Min. 3 year life span	Durable and cost effective
Internal name tag	Name it, don't lose it
Personalise (3 characters)	Make it unique, make it yours



# What people think...

*"I can hear everything clearly"*

Adam Lamy U16

*"Having interrogated the data in the headguard market, I wouldn't want my child wearing anything else"*

Lt Col James Glossop – Director  
Bradford on Avon RFC

*"The headguards are incredibly well made and it is easy to see why they're so effective"*

Mr. Brunt, Head of Rugby,  
Orwell Park School

*"The Hedkayse headguard gives me so much more confidence when playing; I feel protected and it is really comfortable"*

Alfie – U13 Maldon RFC

*"The R5 not only protects my head, it feels incredibly comfortable and it's the lightest I've worn by a mile, it's easy to forget I'm wearing it"*

David Lamy U16



# Not a silver bullet



No headguard can claim to prevent concussions

Remember, **"If in doubt, sit it out."**

HK R5 is not **THE** solution to head impact concerns

It is **PART** of the solution...along with:

Education, awareness, tackle technique, neck strength, recovery protocols...+/+

HK R5 aims to mitigate against non-concussive impacts + the everyday rugby incidents



**"Play like you are not wearing it!"**

# Conclusion

Wearing an HK R5 does **NOT** make you:

- Faster
- Stronger
- Harder to tackle
- Improve kicking, passing, tacking or awareness

Nor does not wearing one

The R5 offers unparalleled performance and full head coverage...just in case you need it



**"Play like you are not wearing it!"**

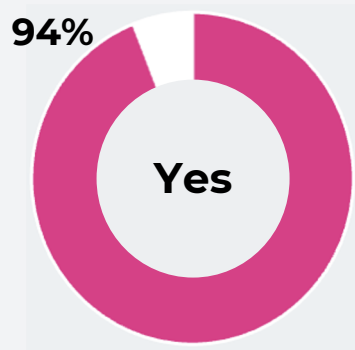
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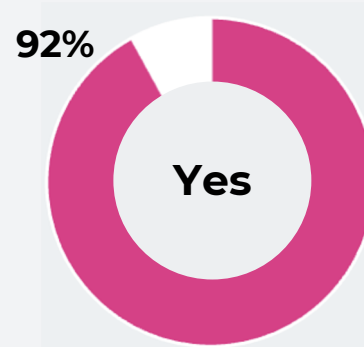
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March-April 2023

Would you recommend **your child** wears a headguard if it were proven to mitigate the risk of brain injury?



Would you recommend **your players** wear a headguard if it were proven to mitigate the risk of brain injury?





"Play like you are not wearing it!"

# Innovate Educate Protect



Hedkayse