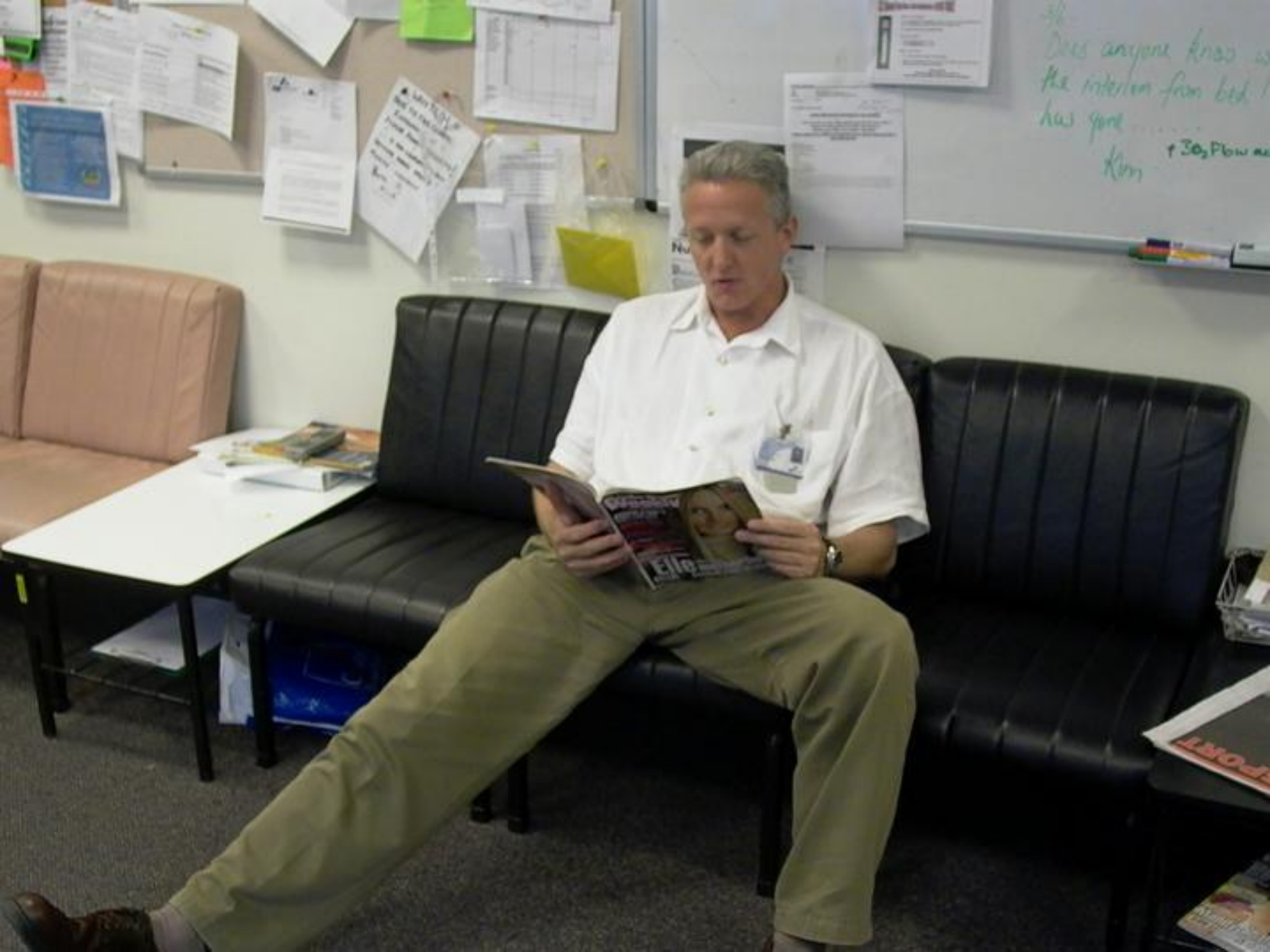
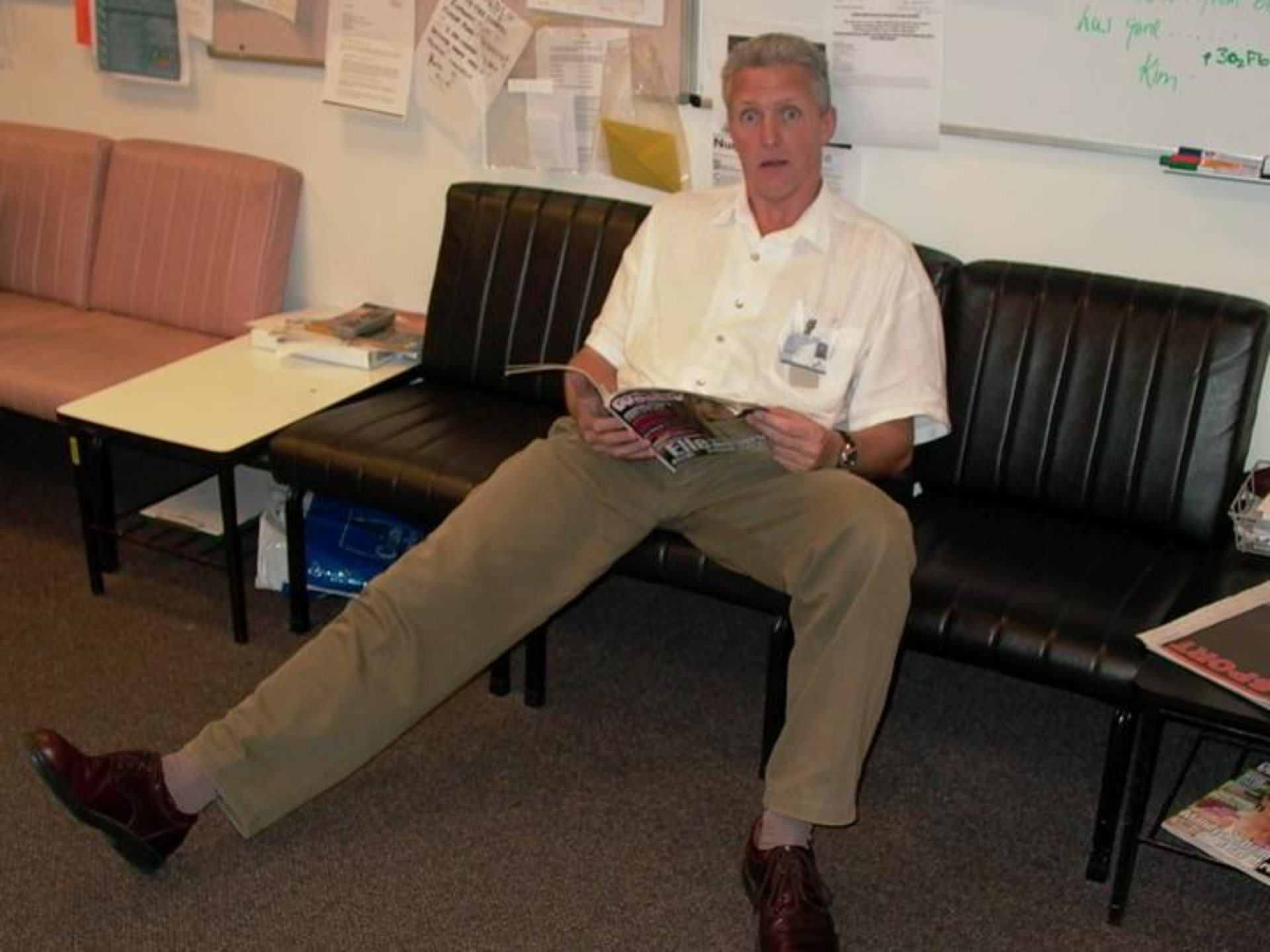
# MECHANISM

# OF INJURY

Still useful after all these years

Dr David Austin
Director
Intensive Care Unit





# DAVE AUSTIN

- Sole practitioner – typical of rural New Zealand
- No registrars
- Covered in blood
- Overworked

Need as much information as possible

# LOUIS PASTEUR

"In the fields of observation,

chance favours only

the mind that is prepared"

# A review of the literature in 5 areas

1. General MOI comments
2. Pelvic injuries
3. Cervical spine
4. Small bowel injuries
5. Aortic injuries

# 1. GENERAL COMMENTS

Centre for Disease Control: www.injuryprevention.com 2002

"Data users and providers are paying increasing attention to the mechanism of injury because evaluation of research indicates that passive protection through modification of products and environments is highly effective in reducing injury, regardless of intent.

"The Centre for Disease Control and Prevention recommends the use of the matrix approach (both simultaneous tabulation of intent and mechanism of injury) for presenting injury mortality data to provide more relevant information for injury prevention."

# JOURNAL OF TRAUMA, SEPTEMBER 2003

"Mechanism of Injury affects six month Functional Outcome in children hospitalised because of severe injury."

A.K. Macpherson et al, Sick Children, Toronto

- 4 year study
- Children 2-15 years
- 1995-1999
- ISS> 12 (= Severe Paediatric Multi System Trauma)
- MVA *vs* non MVAs

**Conclusion:**

"Mechanism of Injury is significantly associated with requiring assistance 6 months post discharge even after controlling for age, injury, severity and the presence of a CVS injury. This data is important both when discussing the prognosis for an individual patient and also when considering the population impact of childhood injuries."

# B M J 2004

"Changes in Injury Mortality by Intent and Mechanism of Injury in Taiwan. 1975-1998." Lu et al.

**Conclusions:**

"It is important to include the Mechanism of Injury with Intentional Injuries because it provides different profiles of injury patterns. Thus the simultaneous tabulation of injury mortality data by both intent and mechanism is a necessary step for identifying and prioritising injury patterns."

Journal of the American College of Surgeons 2003 Clinical Congress. "Mechanism of Injury predicts outcomes of treatment for traumatic injuries in children."

- 5 year study
- 26,000 children
- across USA

"The most important thing that came from this study is that we realise the mechanism of injury does have a major effect on outcome."

# 2. PELVIC INJURIES

Journal of Orthopaedic Trauma vo.11 No.2 pg 88-89, 1999, Whitbeck et al
Shock Trauma Centre, Maryland

- 43 patients with innominosacral dissociation (ISD) – complete anterior and posterior disruption of the pelvic ring
- 1986-1991

"This study also underscores the value of a pelvic ring classification in which the mechanism of injury serves as a predictor of the constellation of local and distant injuries, resuscitation requirement, morbidity and mortality."

# 3. CERVICAL SPINE

Journal of The American Surgeon 2002: R.Albrecht et al, Michigan

"Severity of Cervical Spine Ligamenton Injury Correlates with Mechanism of Injury, not with severity of Blunt Head Trauma."

- 125 patients
- 2 years

**Conclusion:**

"High velocity mechanism of injury and not the severity of the traumatic brain injury nor initial Glasgow Coma Score were statistically significant predictors of severe cervical spine soft tissue injuries."

# CERVICAL SPINE cont....

Canadian Journal Emergency Medicine 2001 (3) Stiel I.G et al

"How important is Mechanism of Injury in predicting the risk of Cervical Spine Injury?"

- 10 Canadian EDs
- 8,924 patients
- 30 months

"After adjustment for demographic and clinical characteristics, analysis found the following mechanisms to be independently associated with increased risk of cervical spine injury"

- axial load (diving)
- bicycle collison
- MVA
- Fall

"Specific injury mechanism put patients at much higher risk for cervical spine injury and emergency care personnel should carefully ascertain details of the injury situation."

Pre-hospital and Disaster Medicine 1996

Bitmand et al. Emergency Training Institute, Akeron, ISA

"The relevance of the Occult Cervical Spine controversy and mechanism of injury to pre-hospital protocols: A review of the issues and literature."

"We found no evidence to contradict the literature reports which associates specific mechanisms of injury with a high risk of spine trauma. There is additional evidence that suggests that for reliable selective immobilisation and even radiology, the criteria must include some indications that exclusively reflect specific mechanisms of injury."

# 4. SMALL BOWEL INJURIES

Lots of information regarding lap safety belts and small bowel injury

American Association of Surgery of Trauma 1961 Garret & Braunston
First description of seat belt as mechanism of injury causing small bowel injury.

Journal of Trauma 2000 Asbun et al
"The presence of a seatbelt sign across the abdomen should create a high index of suspicion for serious visceral injury."

American Surgeon 1997 Chandler et al
Seatbelt sign following blunt trauma is associated with increased incidence of abdominal trauma.
"The presence of a seatbelt sign is associated with an increased likelihood of abdominal and intestinal injuries and mandates a heightened index of suspicion."

Journal of Paediatrics and Child Health 2000
Holland A.J. et al

"Persistent tachycardia with an appropriate mechanism of injury following blunt abdominal trauma requires active exclusion of small bowel injury."

# 5. AORTIC INJURIES

Initial survival rate 10-20%

European Journal of Cardio-Thoracic Surgery 2002 Richens D, et al

"A known mechanism of blunt trauma to the thorax leads to relatively specific and in the case of the aorta, predictable injuries."

"Greater understanding of the mechanism of blunt traumatic aortic rupture could lead to a range of safety systems aimed at a reduction in it's incidence and severity."

Journal of Trauma 2000 Horton et al @ William Lehman Injury Research Centre, Miami

"Identification of trauma patients at risk of thoracic aortic tear by mechanism of injury."

- 295 patients
- 1995-1999

"Thoracic aortic injury after vehicular collision can be reliably excluded if near impact, if change in velocity of crash < 20mph or intrusion < 15 inches are not present. Mechanism of injury in the form of crash scene information may aid clinicians in identifying individuals at risk for thoracic aortic tear after vehicle trauma

# TWO OTHER SUMMARIES

Journal of American College of Surgeons 2001 Asensio, J, et al

"Insignificant" Mechanism of Injury: not to be taken lightly

Patients over age 55 with low level falls. Poor paper trying to convince us that mechanism of injury is not useful but it concludes with "……the possibility of significant injuries among them is low, but not zero."

Richard Hunt, Director Emergency Medicine, East Carolina University School of Medicine. Pre-hospital Emergency Care 1999.

"Is Mechanism of Injury Dead?"

"Is mechanism of injury dead? I think not: we need to keep mechanism of injury a living concept to be used in the care of today's patients and our future patients."

# FINALLY

**A clinical story.....**

Mr Peter Milsom – Clinical Director of Surgery, Whangarei

to a recalcitrant Radiologist refusing to CT scan a patient.

After a lot of arguing....

*Radiologist*: "The answer is no"

"Anyway, what are you looking for?"

"The answer is still no"

*Peter Milsom*: "He's had a f..... plane crash, for f..... sake.

Just do it".

# MARK DELANEY'S INJURIES

## HEAD

Pneumocephaly
Contusion frontal lobe
Confusion
Agitation +++

## FACE

# left orbital rim
multiple facial #
# frontal and ethmoid and maxillary sinuses
# mandible

## CHEST

Multiple rib #
Left pneumothorax
Right haemopneumothorax
Tear to right pulmonary artery

## SPINE

Multiple lumbar transverse process #
L5-S1 dislocation

## PELVIS

Open book pelvis
Left posterior sacro-iliac disruption

**NEUROVASCULAR**

Left ulna artery laceration
Left ulna nerve laceration
Right pulmonary artery tear
Para-psoas haematoma
Haematoma aortic root

**LIMBS**

# Right wrist
# Right calcaneus
# Left tibia and compartment syndrome
# Right ulnar compound
# Left ulna
# Left calcaneus

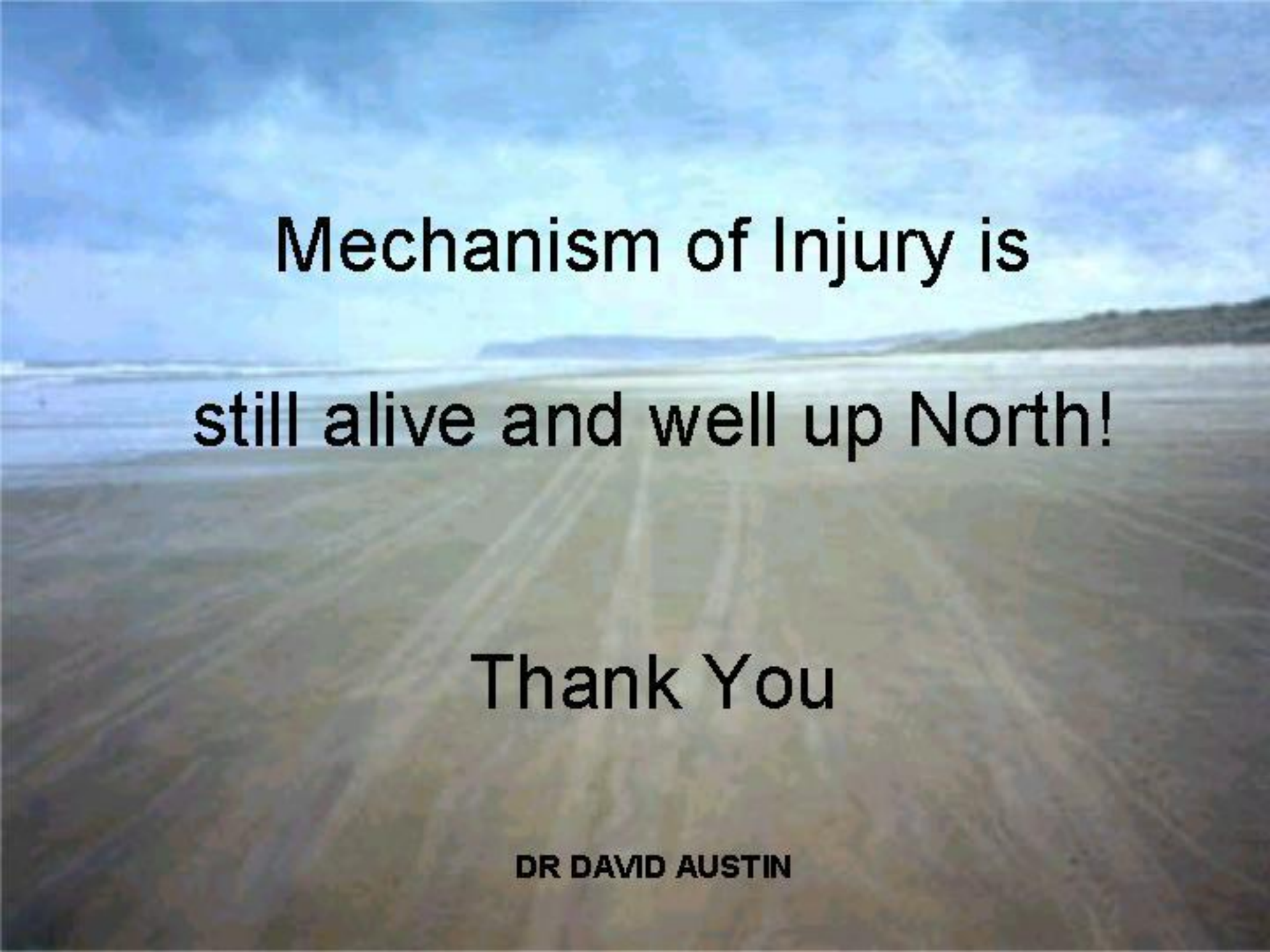
**SKIN**

Lacerations nose
Laceration left knee
Laceration left forearm
Lacerations face +++
Both thighs – grafting

**EYE**

Proptosis left globe
Traumatic abrasion

**CTs were completed**


Mechanism of Injury is
still alive and well up North!
Thank You
DR DAVID AUSTIN