



# Spinal fractures from high-speed powerboating

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**Vertebral compression fractures are a risk in high-speed boating and should be considered in a patient presenting with back pain after having been adventure jet boating.**

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One of the advantages of doing regular shifts as a GP in an emergency department in a major hospital is that you become part of the whole team. This includes discussing cases and hearing and aiding the research and audits that are a large part of emergency medicine training and practice.

Recently you reviewed a CT scan of the thoracolumbar spine and mentioned to the emergency medicine registrar that the patient was another tourist who had major back pain from a powerboat hitting a wave. The registrar said that she had recently looked after two sisters from the USA with such injuries. Overhearing this, a couple of the other doctors also remembered similar cases.

A research project is born. The hospital services the main and busiest part of Sydney Harbour and sees many people with boating injuries. Cases are retrieved retrospectively as well as prospectively. A literature search reveals only a small number of case reports from the UK and New Zealand.

The series shows that jet boats are highly represented as the boats involved in these injuries, but compression fractures also occur in people riding in non-high speed private pleasure craft, such as aluminium runabouts. Many people take adventure jet boat trips on the harbour, and these boats have advertised speeds of 90 km/h and perform stunts such as slides, twists, spins, 'fishtails' and power-brake stops and wave riding.

The two cases described below illustrate well the clinical presentations.

## **CASE 1: A MIDDLE-AGED WOMAN WITH A BURST FRACTURE**

A 52-year-old American tourist took a trip on Sydney Harbour on a high-powered adventure jet boat. She had no significant medical illness, specifically no osteoporosis or previous injury.

The boat intentionally went over a large wave and she landed heavily in her firm plastic seat. The severe lower back pain was immediate.

At the wharf, the ambulance paramedics



Figure 1. Case 1. CT showing the T11 unstable fracture require a pedicle screw. a (left). Axial section. b (right). Sagittal section.

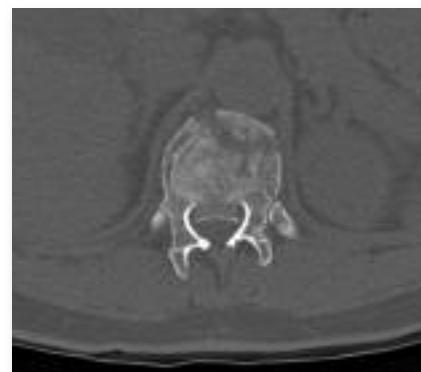


Figure 2. Case 1. CT, axial section, showing the T11 burst fracture.

gave her analgesia (methoxyflurane inhalation), checked her vital signs (all normal, including cardiac rhythm strip) and also noted no major neurological abnormalities. Using spinal precautions because of the history and thoracolumbar pain, they brought her to the emergency department. CT of her back showed a burst fracture of T11 that was unstable (Figures 1 and 2). She required neurosurgery – a T10 to T11 pedicle screw to stabilise the spine.

She had no neurological signs or damage and was discharged from hospital after eight days for rehabilitation before returning home.

### CASE 2: A YOUNG WOMAN WITH A WEDGE FRACTURE

A fit and healthy 25-year-old interstate tourist, whose only significant past history was a coccygeal injury three years previously, was riding in another commercial jet boat on the harbour. She was

seated towards the back of the boat. She described being launched some 40 centimetres out of her seat when the boat ‘jumped a wave’, and then landing heavily on her bottom with instant severe mid-back pain.

An ambulance was called and met the boat at the wharf. Her pain was 10 out of 10 but there was no leg weakness or paresthesia. She was able to move herself from the boat to the ambulance stretcher. Pain relief (methoxyflurane inhalation) was given. Her vital signs were normal.

On arrival at the emergency department, her pain had decreased to three out of 10. She was given 5 mg oxycodone orally. History and examination were remarkable only in that it was noted by the doctor that the patient did not have midline tenderness. No neurological abnormality was evident. CT of her back showed the typical injury of a stable T12 anterior superior wedge fracture with some 10% loss of vertebral height, with

no involvement of the posterior elements (Figure 3).

As the patient’s pain was well controlled with oral analgesia, she was able to be discharged for neurosurgical follow up and rehabilitation back in her home state.

### DISCUSSION

Although it is not well documented, security forces like the water police who use high-powered small boats such as RHIBs (rigid-hull inflatable boats) are well aware of the risks of high shock impacts and possible vertebral compression fractures when travelling at high speeds in rough water or across wakes from other vessels.

The design of high-speed powerboats is being continually improved, such as the inclusion of safety belts (lap sashes) and built-up footrests with or without stirrups so that passengers are not launched upwards and can brace their legs to cushion the force on the spine.

This small and informal research project showed that the injuries typically involved, rather predictably:

- postmenopausal women
- wedge or burst fractures
- T11, T12 or L1 location.

Of interest was that midline tenderness, with proven fractures, was not a reliable sign.

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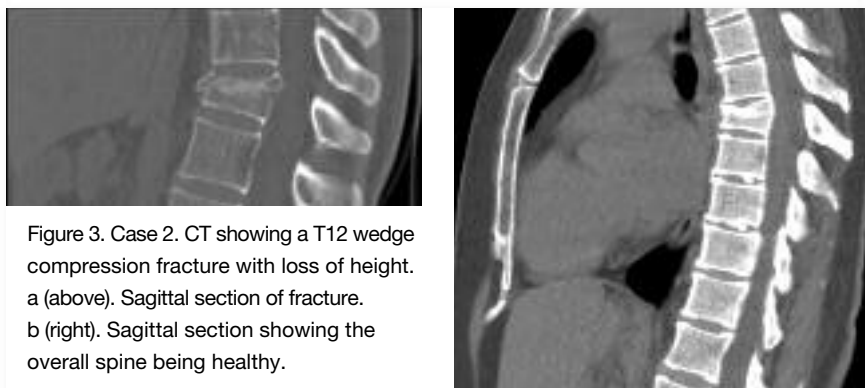


Figure 3. Case 2. CT showing a T12 wedge compression fracture with loss of height. a (above). Sagittal section of fracture. b (right). Sagittal section showing the overall spine being healthy.

COMPETING INTERESTS: Dr Fulde: None.  
Dr Sellors: None.