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## UNCERTAINTIES

# Are hard collars necessary for older people with odontoid neck fractures?

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### What you need to know

- Patient age, frailty, comorbidities, and injury severity are important predictors of outcome after an odontoid fracture
- Surgical fixation improves bony healing, but not patient outcomes
- Hard collars can impair swallowing and mobility, and cause pressure sores

Neck (cervical) fractures can occur when older or frail people sustain a low impact fall. These fractures are

increasing in incidence as the population ages. The second cervical vertebra, whose bony protuberance is known as the odontoid peg, or dens, is most affected<sup>1</sup> (fig 1). More than 85% of odontoid fractures occur in people over 65.<sup>2</sup> In standard care in the UK and elsewhere, most patients with suspected cervical spine injuries are immobilised with non-padded trauma collars or blocks, possibly on spinal boards, on admission to the emergency department. A hard collar is usually applied once a cervical fracture is diagnosed.

This is one of a series of occasional articles that highlight areas of practice where management lacks convincing supporting evidence. You can read more about how to prepare and submit an Education article on our Instructions for Authors pages: <https://www.bmj.com/about-bmj/resources-authors/article-types>

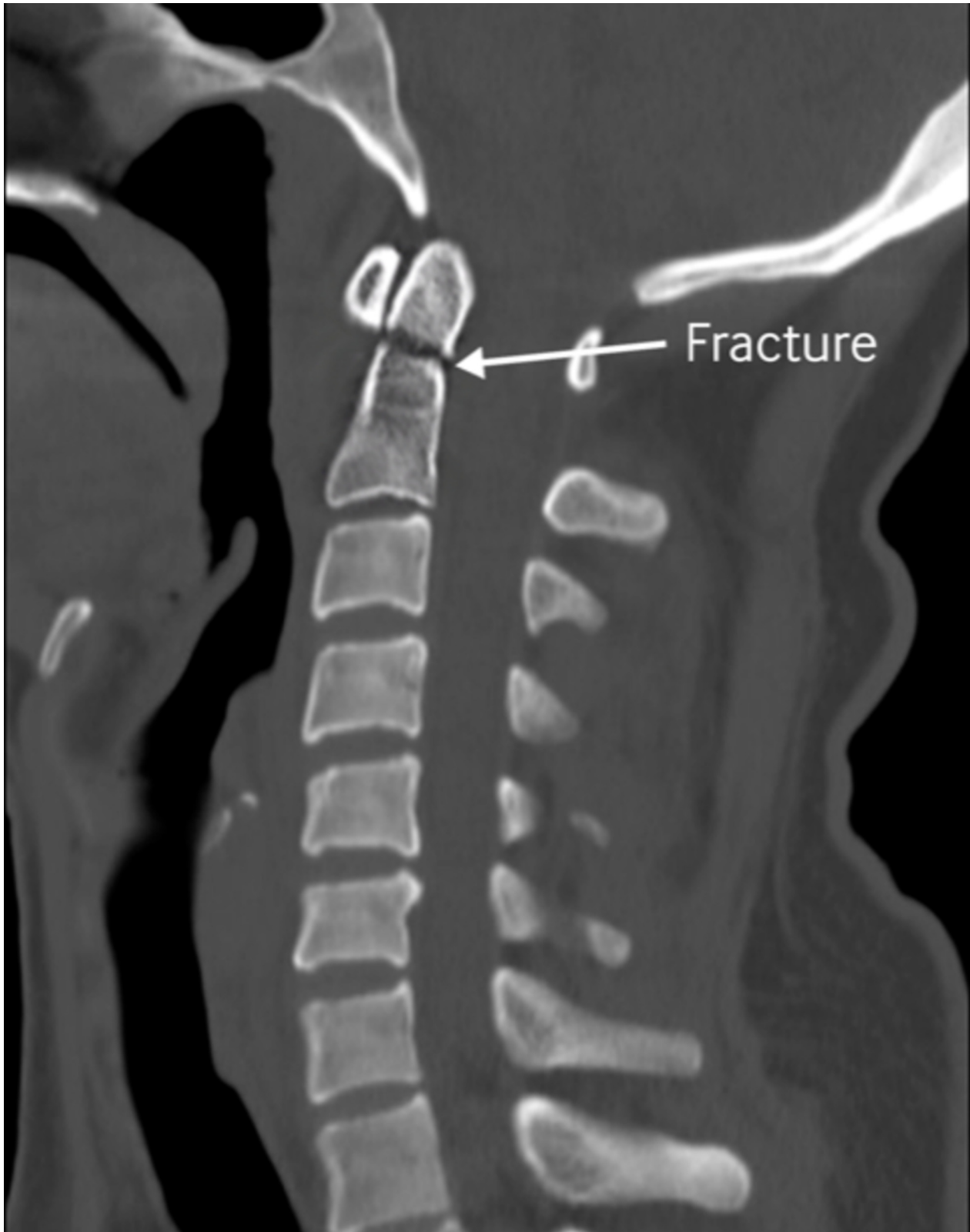


Fig 1 | Sagittal computed tomogram (CT) showing a minimally displaced fracture of the second vertebrae and odontoid peg

Surgical treatment is high risk for complications in older and frail patients,<sup>3</sup> so all cervical fracture types in these patients are commonly managed with six to 12 weeks' immobilisation in a hard collar. Compared with not wearing a collar, hard collars increase

the chance of bony healing at the fracture site.<sup>3</sup> Bony healing does not affect patient outcomes, however, because an effective non-bony fibrous union usually occurs that stabilises the fracture, even without wearing a collar.<sup>4,5</sup> It may therefore not be necessary to

wear a collar at all. Furthermore, hard collars are uncomfortable, and can lead to complications such as difficulty swallowing and pressure sores.<sup>3</sup> In older or frail patients, would outcomes including quality of life be better either without a hard collar or with early removal of a hard collar, and should this be offered as a management option?

### What is the evidence of uncertainty?

In older or frail patients, the two conventional management options for odontoid fractures are surgical fixation, or management with a hard collar for six to 12 weeks. In younger patients, surgical fixation is more commonly undertaken, but many are still offered a hard collar for a similar period. Evidence is lacking on how best to manage odontoid fractures in older or more frail patients. Older or frail patients with a high risk of complications from surgery are typically offered conservative management with a hard collar. Two cohort studies of older patients suggest as many as 20% die within a year,<sup>4,5</sup> reflecting their underlying health status and frailty, rather than the fracture itself.<sup>4</sup>

In one small cohort study, surgery produced better rates of radiological bone fusion (83%) compared with management with a hard collar (23%).<sup>5</sup> Hard collars restrict 40-50% of neck movements<sup>6</sup> and reported rates of bony fusion vary from 20% to 80%.<sup>7</sup> Most fractures instead heal with a fibrous, non-bony union. However, this does not appear negatively to affect quality of life. In a study of 34 patients aged over 70 treated with a hard collar, 88% had a fibrous union, and their functional outcomes and pain scores did not differ substantially from an age matched control group.<sup>8</sup> Hard collars can cause pressure sores and difficulties with swallowing, breathing, and personal care, which can all affect quality of life.<sup>3</sup> Patients may need additional input from health and social care services to assist with activities of daily living. No studies of older or frail patients with an odontoid fracture, managed with or without a hard collar, have reported differences in neurological outcome or mortality.

If bony fusion is not necessary for good patient outcomes, and hard collars negatively affect quality of life, it raises the question of whether early hard collar removal can be offered to patients with stable odontoid fractures.

### Is ongoing research likely to provide relevant evidence?

Five international trials are ongoing to compare surgical fixation with non-surgical management in older or frail patients with odontoid fractures. No completed trials have investigated management of these patients without a hard collar, however the Duration of External Neck Stabilisation (Dens) study<sup>9</sup> aims to do so.

The Dens study is a randomised controlled trial comparing early hard collar removal (as soon as possible after diagnosis) with treatment in a hard collar for 12 weeks, in older or frail adults with stable odontoid fractures. The primary outcome measure in the study is quality of life assessed using the EQ-5D-5L questionnaire—the most used preference based measure of quality of life in older adults—at 12 weeks following randomisation.<sup>10</sup> Secondary outcomes include the neck disability index, the numeric pain rating scale, adverse events, and mortality. Cost efficiency will be assessed.

### What should we do in the light of the uncertainty?

The Dens study is expected to provide definitive evidence about the role of hard collar immobilisation in older or frail patients. Until then, the standard care for older or frail patients with an odontoid

fracture is to wear a hard collar. Management of new odontoid fractures in these patients should consider their increased needs for care and social support resulting from the need to wear a collar. Consideration of why the patient fell is also important. The high 12 month mortality in older or frail patients with new odontoid fractures requires realistic clinical decision making that is shared with the patient and their family, and considers the impact of the treatment options on quality of life.

#### Recommendations for future research

- How does management without a collar affect social care needs?
- How does osteopenia/osteoporosis affect the decision to manage a fracture without a collar?
- Can older and frail patients with non-odontoid fractures also be safely managed without a collar?

#### Education into practice

- What increased needs might patients with odontoid fractures have, whether or not they wear a hard collar?
- How would you support a patient to make a decision about management options after an odontoid fracture?

#### Search strategy

We conducted a search of international clinical trials registries (ISRCTN, the EU clinical trials registry, and ClinicalTrials.gov), and reviewed published literature in PubMed and Google Scholar.

#### How patients were involved in the creation of this article

Two people with experience of neck fracture and trauma are part of the trial team for the Duration of External Neck Stabilisation study. One of them contributed to the style and content of this article, in particular emphasising the importance of considering the social care needs of patients and how that influences patient outcomes.

Advisers to this series are Nai Ming Lai, Win Sen Kuan, Paula Riganti, and Juan Franco.

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