

## Cervical Collar Treatment for Geriatric Type II Odontoid Fractures

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### Introduction

Odontoid fractures are the most common of all spinal fractures for patients older than 70 years of age. These fractures typically present significant challenges as geriatric patients often have multiple clinical comorbidities that may adversely affect fracture management.

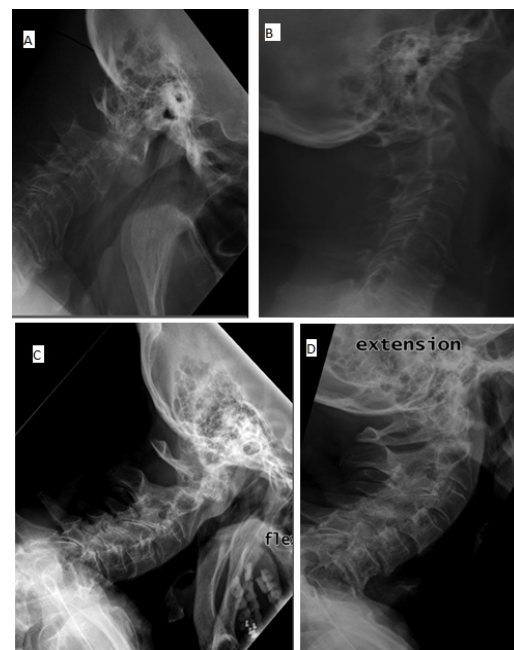
Treatment options for lesser-displaced odontoid fractures may be conservative or surgical. Alternatives include the use of a cervical collar, halo-vest, posterior C1-2 fusion with rigid fixation, and odontoid screw fixation. Presently, there is no consensus regarding which method is most efficacious. Elderly patients having surgery for spinal fractures have a higher risk of complications including mortality. High rates of morbidity and mortality have been published with the surgical treatment of geriatric odontoid fractures. External immobilization with a collar has had inconsistent reported results. Halo vest immobilization in the elderly is associated significant complications, increased morbidity and high rates of nonunion. Numerous studies have demonstrated high rates of mortality with these injuries in elderly patients regardless of intervention.

The management of geriatric odontoid fracture patients should be focused on rapid mobilization of the patient after whatever means is chosen for odontoid stabilization. Many spinal trauma specialists feel the halo-vest should be avoided in this population. Functional outcomes after surgical or collar management in this population have not been well-defined in the literature. Furthermore, outcomes for those patients who do not achieve fusion or fracture healing after treatment remain unclear. The morbidity of geriatric odontoid nonunion has also not been adequately researched.

There is a paucity of literature evaluating patient outcomes after the management of geriatric type II odontoid fractures. Schroeder et al. recently performed a systematic review of literature published between January 1, 2000, and February 1, 2015, related to the treatment of type II odontoid fractures in patients >60 years of age [1]. A total of 452 articles were identified, and 21 articles with 1233 patients met the review inclusion criteria. The authors concluded that the current literature suggests that well-selected patients >60 years of age undergoing surgical treatment for a type II odontoid fracture have a decreased risk of short-term and long-term mortality without an increase in the risk of complications.

We also recently published a study evaluating fracture healing rates, functional outcomes, complications, and mortality associated with rigid cervical collars for the management of lesser-displaced geriatric type II odontoid fractures [2]. Rates of type II odontoid fracture nonunion and instability were high in geriatric patients treated with a rigid cervical collar (Figure 1). However, more importantly, fracture healing and stability did not correlate with improved outcomes with respect to levels of pain, function and satisfaction. Levels of post-treatment neck pain and disability were low and did not differ significantly from aged-matched cohorts. Mortality and complication rates were low in our patients who are treated with a cervical collar and early mobilization.

The frequency, risk, and morbidity of odontoid fracture nonunion in the elderly population is not well-defined. Because of the risk of progressive myelopathy or sudden neurologic injury, many surgeons recommend operative stabilization for patients with mobile dens



**Figure 1:** Flexion (a.c.) and Extension (b.d) lateral radiographs of 2 separate geriatric odontoid fracture patients with mobile odontoid nonunion after collar treatment for 3 months. Both patients had minimal neck pain and excellent functional outcomes in their age group.

nonunions who are able to withstand an operation. The rates of odontoid nonunion for the patients in our study were higher than previously reported in the literature for cervical collar treatment. We were unable, however, to demonstrate a worse functional outcome in these patients. Additionally, we identified a high rate of mobile odontoid nonunion after collar treatment. However, the elderly patients in our study with extremely mobile odontoid nonunions after collar treatment did not have poor functional outcomes-even when compared to aged-matched control subjects.

The occurrence of catastrophic neurologic demise with spinal cord injury is a concern in those patients who do not achieve odontoid fracture healing. While our study can not eliminate this concern, we have defined a reasonably low mortality rate for elderly patients who were treated with a cervical collar. It is our opinion that the

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rate of occurrence of catastrophic neurologic demise in patients with hypermobile nonunion may be acceptably low after cervical collar management of geriatric odontoid fractures that present with less than 50% initial displacement. Mortality and complication rates are low when the rigid cervical collar is combined with early patient mobilization for the treatment of minimally displaced odontoid fractures in the geriatric population.

#### References

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