

### Introduction

The C2 nerve root occupies a challenging anatomic position when performing C1 lateral mass screws and often requires root sacrifice or retraction. There is debate about the contribution of nerve sacrifice to morbidity including the incidence of occipital neuralgia.

### Methods

Patients having undergone C1 lateral mass screw placement with C2 root transection between 2007 and 2016 at Maine Medical Center were retrospectively identified. In addition to clinical note review, delayed telephone interviews were conducted with completion of the American Chronic Pain Association (ACPA) Quality of Life outcome questionnaire and the International Classification of Headache Disorder (ICHD-3) questionnaire for occipital neuralgia type headache.

### Results

106 C2 roots were divided at the mid-portion of the C1 lateral mass in 53 patients. In addition to having no vertebral artery injuries, no infections, and requiring no transfusions, no patient had limiting complaints of pain consistent with occipital neuralgia during the first 3 months of routine follow up.

Delayed phone follow-up was attempted with 13 deceased, 5 declining participation, 2 not compos mentis and 9 lost to follow up. Of the 24 patients participating in delayed assessment at a mean of 2.3 years, the patient age ranged from 43-86 (mean 68). The ACPA QOL mean score was 7.44 (range 5.5-10), correlating to patients being able to comfortably work/volunteer for the majority of the day. Similarly, the mean ICHD-3 pain outcome score was 0.95 (range 0-4) indicated that complaints of zero to minimal occipital neuralgia pain symptoms.

### Conclusions

C2 nerve root sacrifice during C1 lateral mass screw placement is a safe and useful technique. The occurrence of occipital neuralgia postoperatively is rare and excellent quality of life outcomes are expected. This paper therefore represents a significant contribution to the nascent body of evidence in support of C2 root transection during

### Learning Objectives

- 1)C2 nerve root sacrifice is unlikely to lead to bothersome occipital pain
- 2)C2 nerve root sacrifice is helpful and safe while placing C1 screws
- 3)Quality of life is excellent with C2 nerve root sacrifice

### References

- 1) Sherman, Johnathan, et. al. Neurosurgery Concepts: Key perspectives on C2 nerve root transection following C1 lateral mass screw fixation, choroid plexus cauterization in infants with hydrocephalus, quality of life following treatment of vestibular schwannoma, dynamic magnetic resonance imaging for glioblastoma pseudoprogression, cost-utility analysis of lumbar spinal stenosis treatment. *Surg Neurol Int* 2015;6:108.
- 2) Squires, J. C1 lateral mass screw placement with intentional sacrifice of the C2 ganglion: functional outcomes and morbidity in elderly patients. *Eur Spine J.* 2010 Aug; 19(8): 1318–1324.
- 3) Dewan, Michael et. al. C2 Nerve root transection during C1 lateral mass screw Fixation. Does it affect functionality and quality of life? *Neurosurgery* Volume74, Number 5: 475-481, 2014. – 8 C2 roots cut, good QOL outcome
- 4)Yeom et al. Post-operative occipital neuralgia with and without C2 nerve root transection during atlantoaxial screw fixation: a post-hoc comparative outcome study of prospectively collected data. *Spine J.* 2013; 13 (7): 786-795 Epub 2103 May 24.