

# Dysphagia After Occipitocervical Fusion: Are We Measuring the Correct Parameters?

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## Introduction

Recently, several publications have focused on dysphagia after occipitocervical fusion (OCF) and relevant radiographic parameters. Unfortunately, there is not a reliable way to prevent the occurrence at this time. This study introduces a new parameter that is easy to measure in the operating room and is unaffected by soft tissue changes introduced by endotracheal tube placement or positioning.

## Methods

We performed a retrospective chart review from a single institution from 2014-2018. We measured the O-C2 angle (O-C2a, Figure 1), narrowest oropharyngeal airway space (nPAS), and the distance between the posterior edge of the hard palate and the anterior inferior corner of C2 (HPC2, Figure 2).

## Results

We identified 28 patients that underwent OCF. Seven were excluded due to confounding injuries or lack of complete imaging. Post-operative parameters are summarized in Table 1. Only five patients from the non-dysphagia group and three patients from the dysphagia group had a full complement of pre- and post-operative imaging to enable calculation of changes in these parameters. Results are summarized in Table 2. In the group without dysphagia, there was a good correlation between both the changes in the O-C2a and HPC2 and the corresponding change in the nPAS (Graphs 1 and 2). Parameters involving the EAM were hard to identify in many cases.

## Conclusions

Despite the low number of patients with complete imaging in this study, we believe the magnitude of change of cervical spine parameters is more important than the absolute value in preventing post-OCF dysphagia. Measured parameters should consider both rotation and translation of the occiput relative to the spine. The HPC2 line is easily measured on intraoperative images and may add important information about translation when combined with the OC2a. The combination

## Learning Objectives

By the conclusion of this session, participants will be able to:

- 1) Describe the importance of cervical spine parameters in preventing dysphagia after occipitocervical fusion.
- 2) Describe the relevance of the changes in nPAS, O-C2a, and HPC2 to the development of post-operative dysphagia following occipitocervical fusion.
- 3) Appreciate that it is likely the magnitude of change from pre-operative measurements, rather than the absolute value of the post-operative measurements, that predicts the development of post-operative dysphagia.

## References

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Figure 1



Narrowest oropharyngeal airway space (nPAS) and occipito-C2 angle (O-C2a) shown in a post-operative occipitocervical fusion (OCF) patient.

Figure 2



Hard Palate to C2 distance (HPC2), the distance from the posterior aspect of the hard palate to the anterior inferior corner of C2, is shown in a post-operative occipitocervical fusion (OCF) patient.

Table 1

Group	nPAS (mm)	O-C2a (°)	HPC2 (mm)
No Dysphagia	12.42 ± 4.36	20.40 ± 10.39	64.96 ± 12.29
Dysphagia	11.68 ± 6.57	14.64 ± 13.18	51.96 ± 18.32