

Reviewer #1: Anterior cervical surgery can not only eliminate chronic neck pain, cervical radiculopathy or myelopathy, but also eliminate dizziness. Degeneration of disc is characterized by an elevation in levels of the inflammatory cytokines, which will stimulate these mechanoreceptors in degenerated disc and result in peripheral sensitization. The diagnosis of cervical discogenic dizziness can be challenging and can only be made after other potential causes of dizziness have been ruled out. In this review, the authors reviewed the literature and summarized their understanding of the impact of cervical disc degeneration on dizziness. This review is very well written, the distribution of mechanoreceptors in cervical disc, disc degeneration, inflammation, and nerve ingrowth, cervical spondylosis and dizziness, and the pathogenesis of cervical discogenic dizziness were discussed. The reviewer suggest to accept this review after a minor editing. Thank you very much.

Response to reviewer #1: Thank you very much.

Reviewer #2: This submission is a review of the literature pertaining to dizziness associated with degenerative cervical disc disease. The authors define cervicogenic dizziness, using that of Wrisley and colleagues, as “a non-specific sensation of altered orientation in space and disequilibrium originating from abnormal afferent activity from the neck.” The review attempts to provide up to the date studies on the pathophysiology behind dizziness and postural instability attributed to degenerative cervical disc disease regarding abnormal sensory input and potential management. Cervicogenic dizziness has a broad differential regarding potential mechanisms, currently, there are no good means to completely separate them from one another and, more importantly, find effective treatment. Here, the authors focus on one mechanism of cervicogenic dizziness: degenerative cervical disc disease. A few things to consider: 1. While the authors do a good job of reporting the most up to date studies relating to degenerative disc disease and dizziness, this diagnostic entity is usually specified by the affects cervical disc levels. The authors should further detail if and how certain levels of the cervical spine elicit dizziness/vertigo vs postural instability. For example, high cervical disc disease (C1/C2) has been reported as a cause of cervical vertigo and injury to associated alar ligaments may cause rotational instability in the cranio-cervical junction (Dvorak and Panjabi, 1987; Panjabi et al, 1991). Occipital neuralgia may also result from radiculopathy from C1/C2 disc disease. 2. The authors make mention of neck pain, is association to degenerative disc disease, and cervicogenic dizziness but do not discuss migraine nor acute cervical pain syndrome, which has been reported as possible overlapping entities to cervicogenic dizziness/vertigo (Thompson-Harvey and Hain 2019) or at least part of an internal model theory that explains sensory mismatch (Brandt and Huppert 2016) purported by the authors. 3. In the review, it would be useful for the authors to contrast the pathophysiology and workup of dizziness attributable to degenerative disc disease from other possible mechanisms (e.g., whiplash, cervical cord compression) 4. When reporting results from studies, the authors should be sure to avoid giving the notion of causation over correlation. 5. The authors make mention of ACDF as effective for

cervicogenic dizziness, yet, lacking other indications for surgery than dizziness or imbalance, the risks of this type of surgery do not seem to outweigh the benefits. When reporting results from these studies, the manuscript would benefit from denoting the background of patients involved in these studies (e.g., co-morbidities, indications for surgery). As well, post-operative management typically involves some type of pain regimen, which may confound results that show “significant reductions in neck pain and dizziness.” The authors should provide further details on this. 6. Unfortunately the sentence structure and grammar, while more stylistic points, make it difficult to understand the paper. The authors should have their manuscript reviewed for grammar and comprehension. In all, while this review makes a good attempt on focusing on the mechanism of degenerative disc disease as it relates to cervicogenic dizziness, a useful review for the literature would delve further into how it relates to other potential mechanisms of cervicogenic dizziness/vertigo.

Response to reviewer #2: Thank you very much for your very good comments on our manuscript. Our manuscript only deals with the relationship between cervical intervertebral disc degeneration and dizziness, and does not deal with the relationship between dizziness and lesions of the upper cervical 1/2 joints, nor does it deal with the relationship between migraine, acute neck pain and dizziness.

You make a good suggestion to compare the pathophysiology and examination results of dizziness caused by degenerative disc disease with other possible mechanisms, such as cervical nerve root or spinal cord compression. Indeed, the main indications for surgical treatment of cervical spondylosis are cervical radiculopathy and cervical myelopathy. After decompression, the conduction of cervical nerve root or cervical spinal cord will be improved, and the proprioception will also improve. This may be one of the mechanisms of anterior cervical decompression surgery to improve dizziness.

We have revised the manuscript according to your comments. Thank you!