



Impact of mandibular distraction on hyoid position in patients with Pierre Robin Sequence

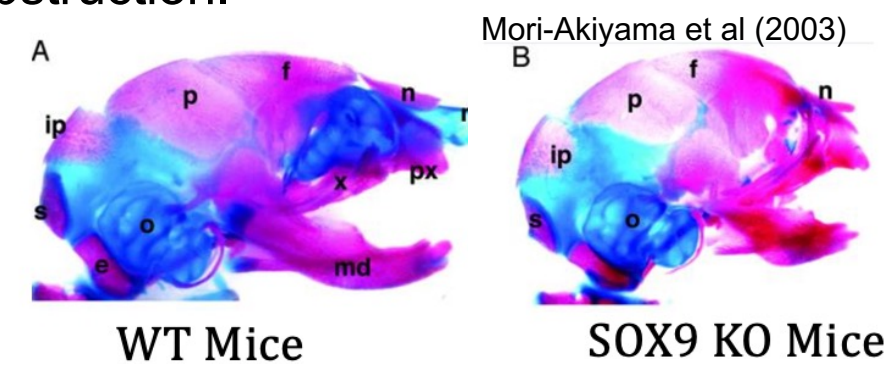
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Introduction

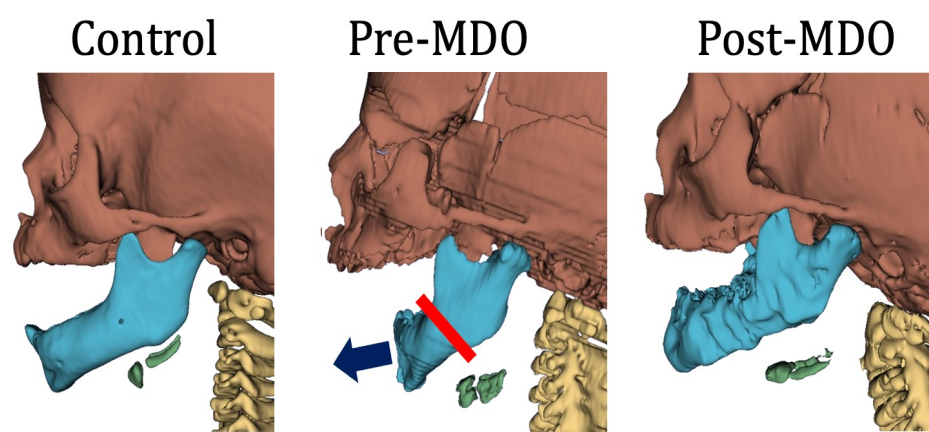
Pierre Robin Sequence (PRS): a congenital condition marked by micrognathia, glossoptosis and airway obstruction.

- 1 in 8500 to 14000 live births^{1,2}
- Correlation with PRS and reduced expression of SOX9 gene³⁻⁴



Mandibular distraction osteogenesis (MDO): lengthens mandible and enlarges the oropharyngeal space

- Bilateral osteotomies are made to posterior mandibular body and a distractor gradually displaces the bone forward⁵⁻⁶



MDO has been demonstrated to improve oropharyngeal volume.⁷

- Anterior shift in hyoid position and tongue base as muscles move forward with mandible^{5-6, 8}
- However, it is still not clear whether these observed changes are just a part of normal growth or an effect of MDO

How does MDO affect hyoid position in PRS patients? And how does hyoid position compare between PRS patients and pediatric controls?

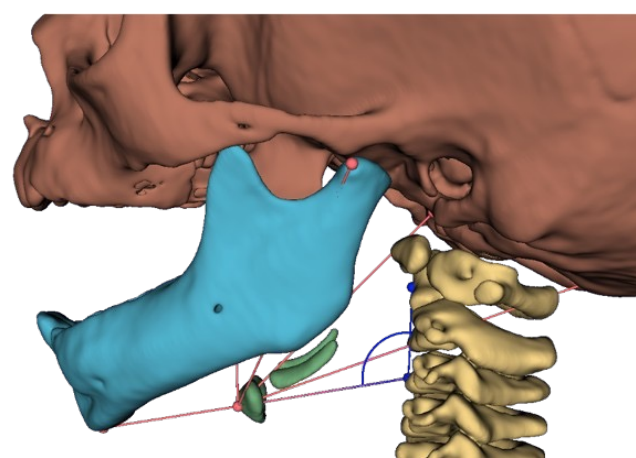
Methods

Patient Cohort

- 10 PRS patients (pre- and post-MDO scans)
- 14 control patients

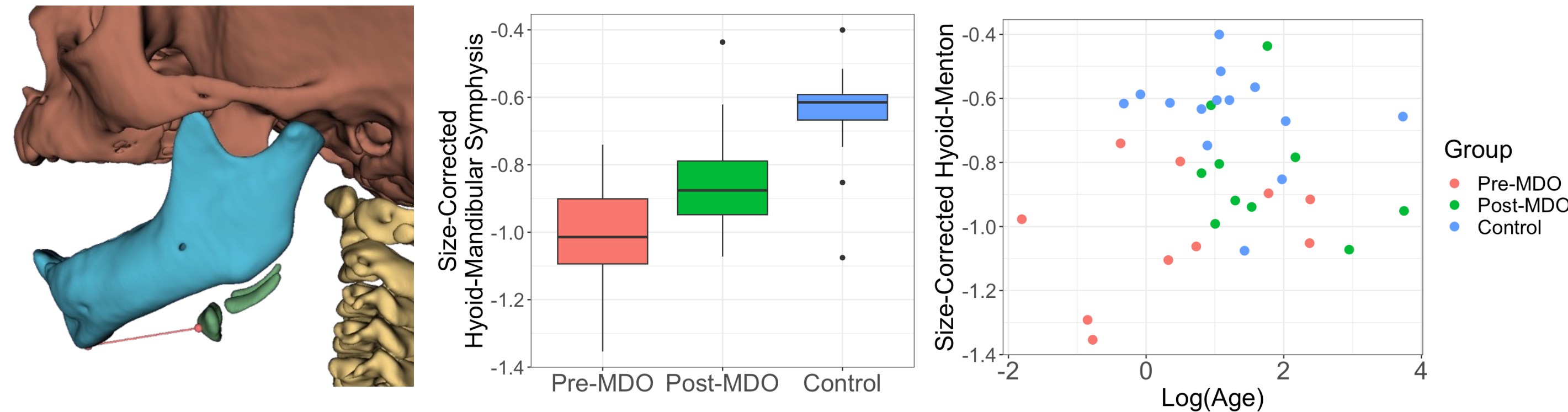
Methods

- 3D Slicer software characterized hyoid position relative to craniomandibular landmarks
- Size-corrected the data by calculating the log shape ratio of individual measurements

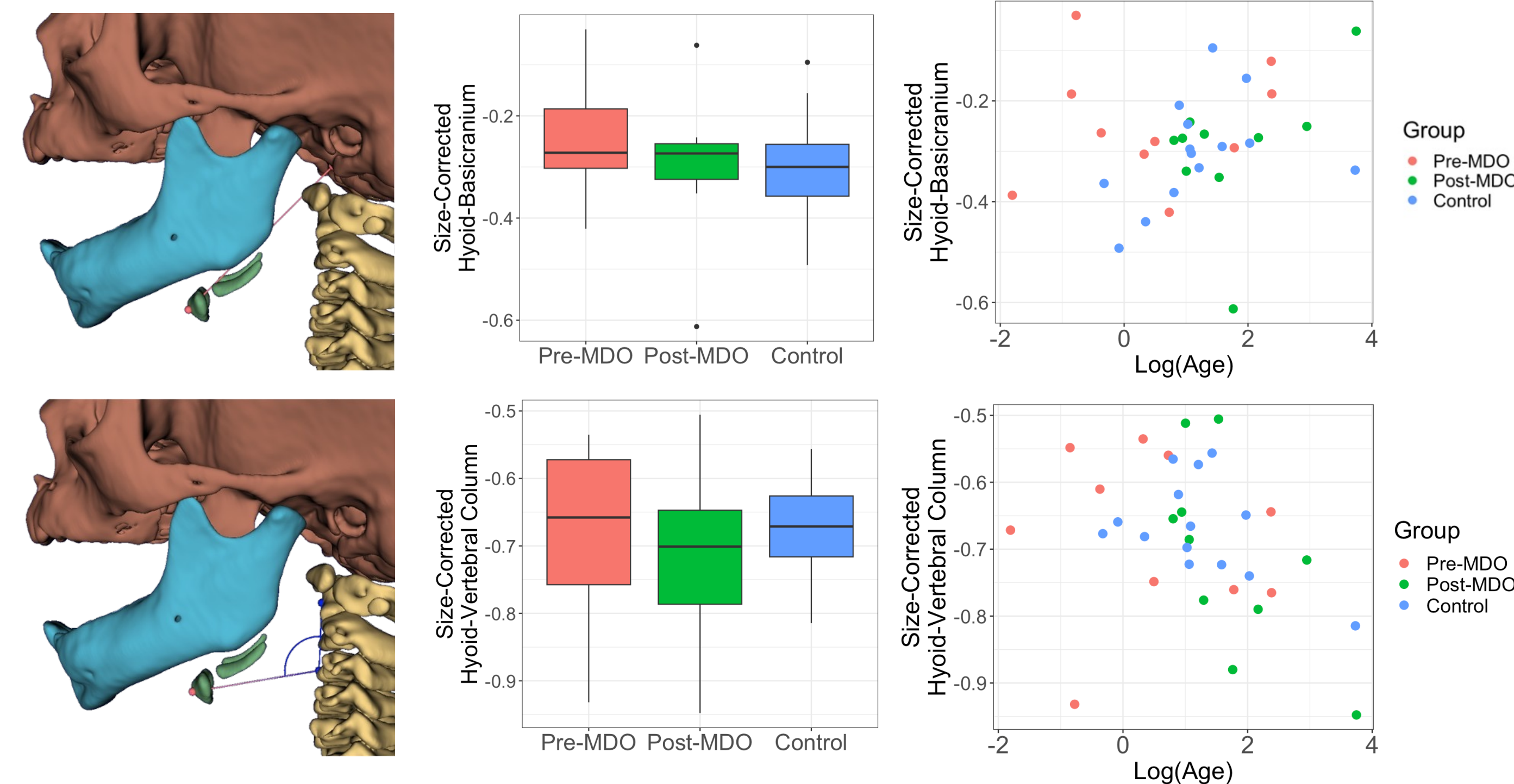


Results

Controls had significantly greater hyoid-menton distances than pre-MDO PRS patients (size matched with no significant correlations with age).

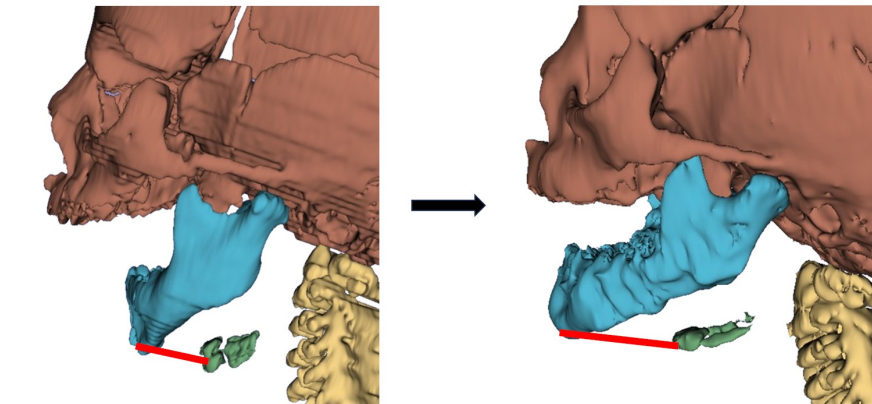


No significant difference between hyoid-basocranium and hyoid-vertebral distances.



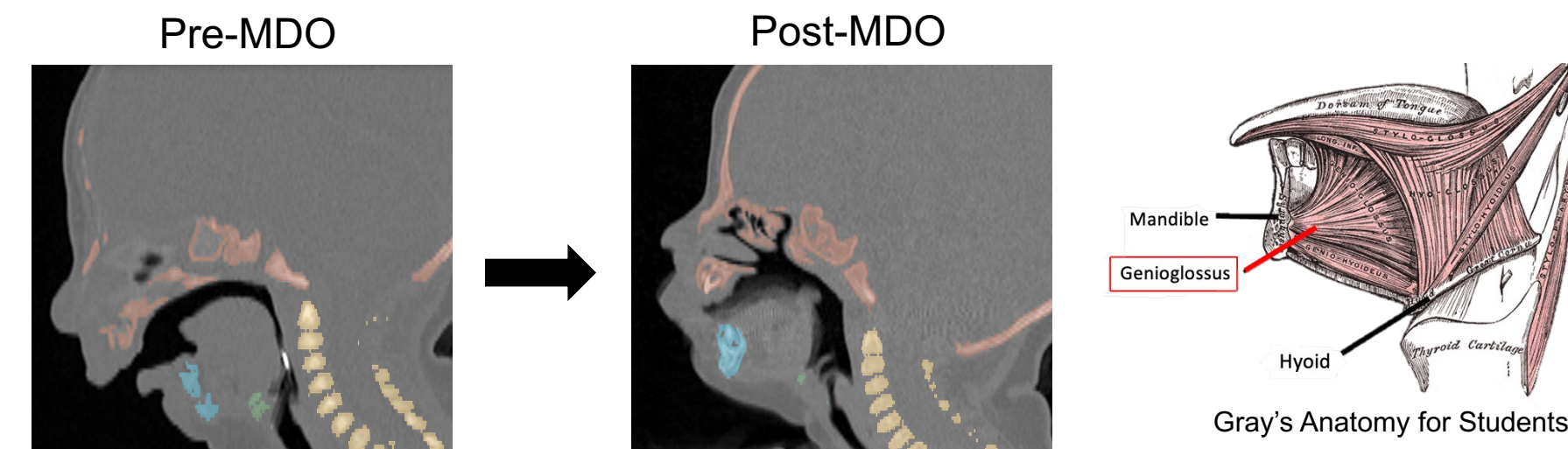
Discussion

- MDO increases hyoid-menton distance in PRS patients, but not to the extent to the controls
- MDO does not appear to move the hyoid forward relative to the pharyngeal wall



If not via the hyoid, how does MDO increase oropharyngeal volume?

- Possibly due to changes in tongue morphology
- Genioglossus attachment appears to shift forward relative to tongue base, changing geometry of tongue and anterior pharyngeal wall



Future Directions:

- Characterize tongue morphology
- Analyze significance of hyoid and tongue morphology with relation to breathing and feeding data (e.g., reliance on orogastric tube)

Acknowledgements

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