

# Ptosis of the submandibular triangle and the aging neck: a longitudinal study

Tareq Sawan, MD<sup>1</sup>; Neil A. Gordon, MD<sup>1</sup>

1. Department of Surgery, Division of Otolaryngology, Yale School of Medicine, New Haven, CT, USA

## Background/Objectives

- Submandibular gland (SMG) makes up a large component of the submandibular triangle.
- Prominence/ptosis of the submandibular triangle contributes to aging of the neck.
- We sought to evaluate SMG ptosis and how various factors such as changes in SMG volume, mandible, hyoid position, and BMI relate to ptosis. Data was obtained longitudinally using computed tomography (CT) imaging.



## Material/Methods

- Retrospective longitudinal study of adult subjects with multiple CT images of the neck at least 7 years apart.
- Exclusion criteria: salivary gland pathology, neck dissection, head and neck radiation, active infection or dental artifact .
- Measurements were obtained via Visage Image Viewer at image time points 1 and 2.

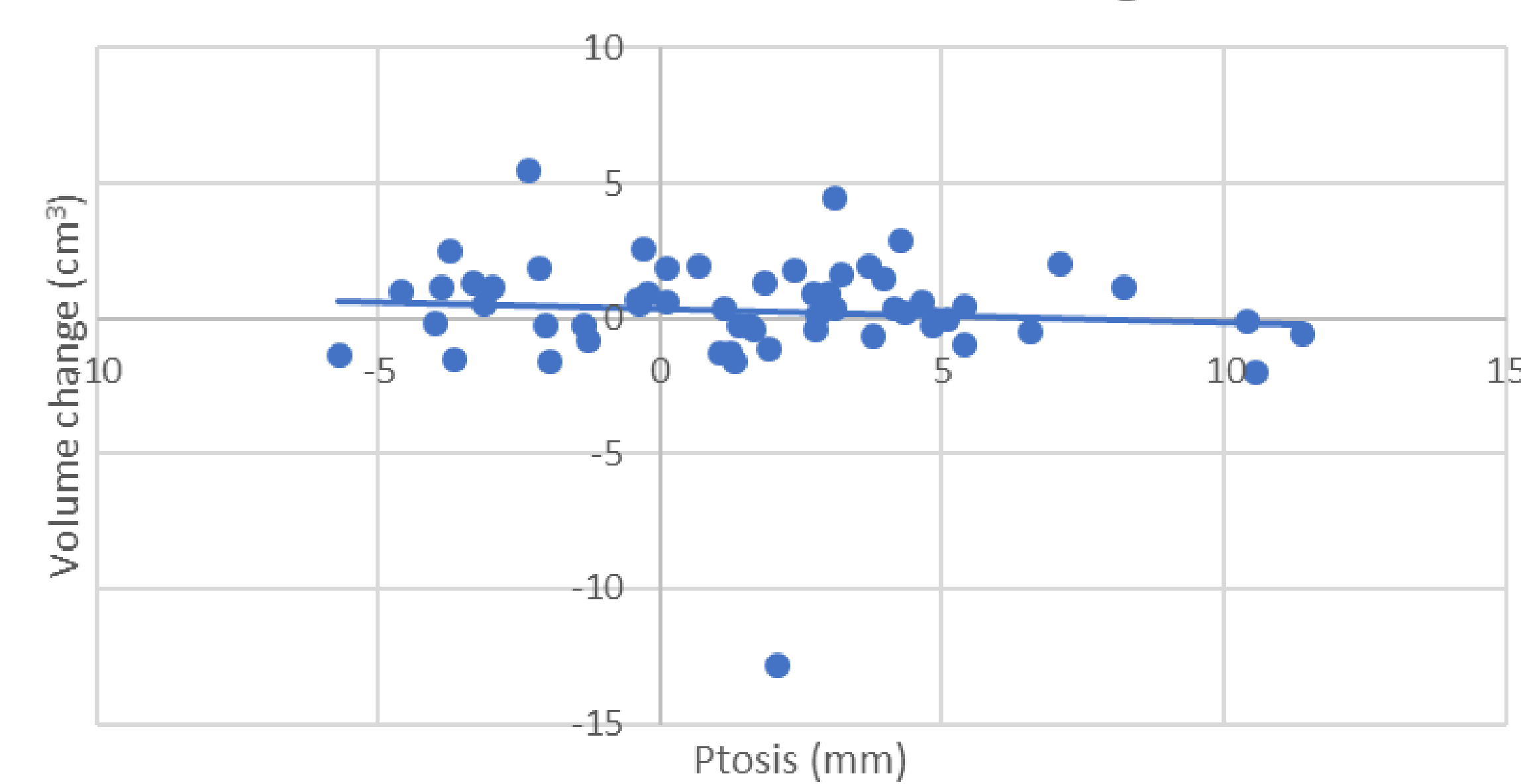
## Results:

- 68 patients over mean 11.34 years. (Females n=38; Males n=30)
- Mean age (year) of 47.1 and 58.4 at each respective time point.
- Mean SMG decent of 1.74mm (P= 0.001 CI:0.73 to 2.75) in an individual over time
  - Males had, on average, 2.59mm decent vs 1.05mm in females
  - Females <45yrs mean -.69mm ; 45+ years: 2.58mm decent (p=0.008; CI 0.91 to 5.65)**
  - Males <45 years mean 1.87mm; 45+ years: 3.56mm decent (p=0.297; CI -1.58 to 4.97)
- Ptosis vs volume changes: r= -.083; p=0.534
  - <45 years: r=-0.008 P=0.965
  - >45 years: r=0.005 P=0.981
- Ptosis vs BMI change: r= -0.358 P= 0.132
  - <45 years: r= 0.168 p=0.666
  - >45 years: r= -0.691 p=0.027.**
- Ptosis vs hyoid position change: r=-0.065 p=0.727
  - <45 years: r= 0.141 p=0.603
  - >45 years: r= 0.073 p= 0.795
- Ptosis vs inframental distance change r= -0.95 p=0.526
  - <45 years: r= -0.094 p=0.668
  - >45 years: r= - 0.088 p=0.683
- Ptosis vs mandibular body change: r= -0.019 p=0.902
  - <45 years: r= -0.192 p=0.393
  - >45 years: r= 0.002 P= 0.994
- Ptosis vs intergonal distance change: r=0.074; p=0.625
- Ptosis vs gonial angle change: r=0.121; p=0.417

## Total Cohort

	Mean difference	Standard Deviation	CI 95%	P- Value	Multiple linear regression (Age, Sex and BMI)
Average SMG volume (T1 vs T2)	0.54	1.45	0.17-0.90	<0.05	BMI had significant effect on gland volume.
Ptosis (SMG decent)	+1.74mm	3.84	0.73-2.75	<0.05	Only sex had significant effect on ptosis (male had more decent over time compared to females)
Supraplatysmal fat thickness	+0.75mm	3.03	-.09-1.58	0.078	Only BMI had significant effect on fat thickness.
Vertical Hyoid position	+0.68mm	6.99	-1.69- 3.04	0.564	Sex had significant impact (males had 4.8mm greater decent compared to females)
Anterior hyoid displacement	+0.71mm	3.50	-0.47-1.9	0.229	No factors predicted a change.
Gonial angle	-0.27 degrees	1.66	-0.73 – 0.19	0.239	No factors predicted change
Intergonal distance	0.61mm	1.32	0.25-0.98	<0.05	No factors predicted change.
Mandible body	-1.72mm	2.11	-2.31 – (-1.13)	<0.05	No factors predicted change.

## Ptosis vs SMG volume change



## Conclusion

- We demonstrate age related ptosis of the SMG. This change occurred mostly in the 45+ age group.
- When ONLY analyzing subjects with decent (n=39): Volume change, BMI change, hyoid decent and mandible bone changes had no correlation.

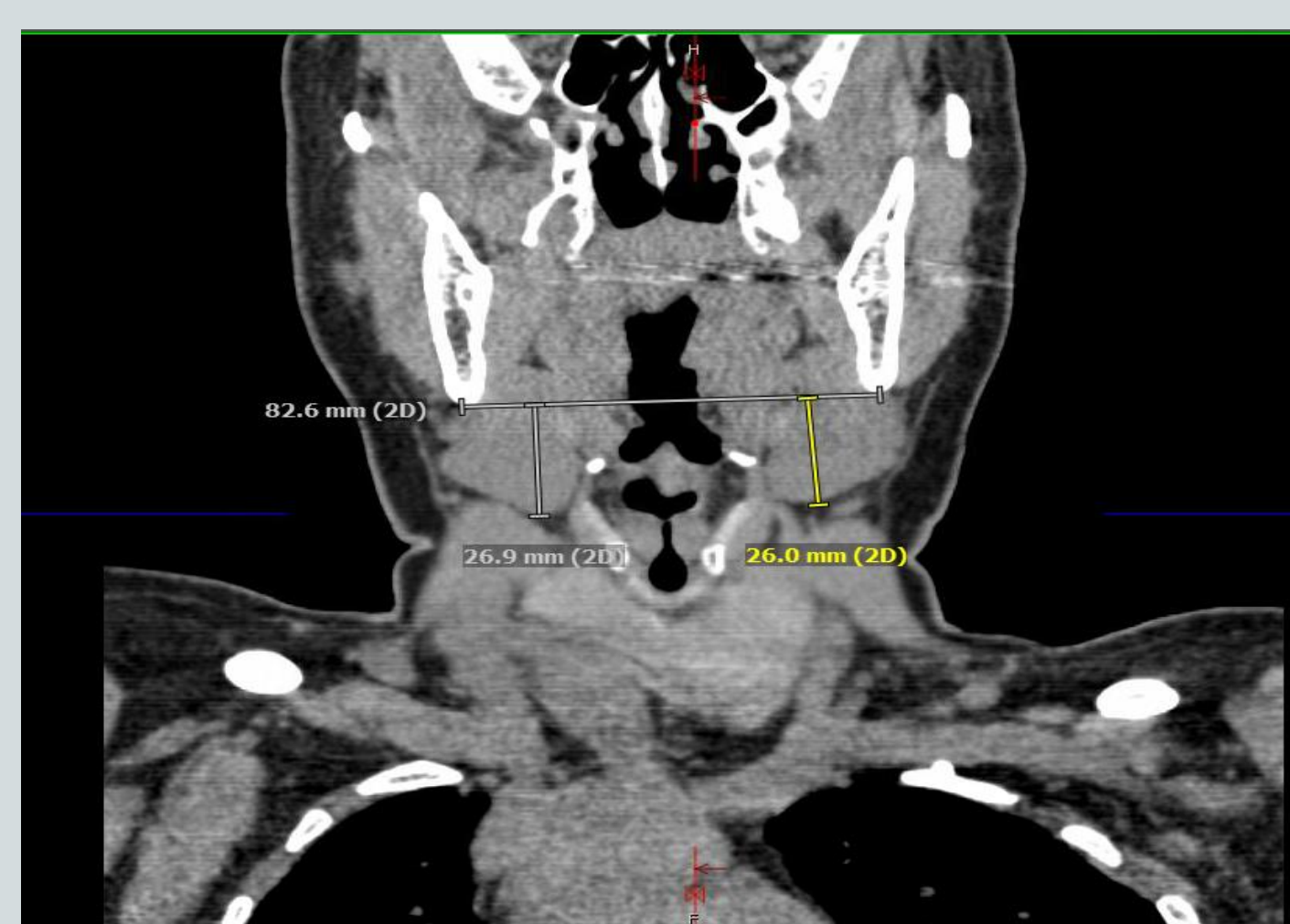
→We therefore hypothesize that other factors such as subplatysmal fat pad, digastric ptosis, floor of mouth descent or weakening of the soft tissue envelope accounts for ptosis of the submandibular triangle.

- These findings are relevant in treatment of the aging neck field as it provides evidence against surgical SMG volume reduction, a high risk procedure for the average plastic surgeon, in management of submandibular ptosis.

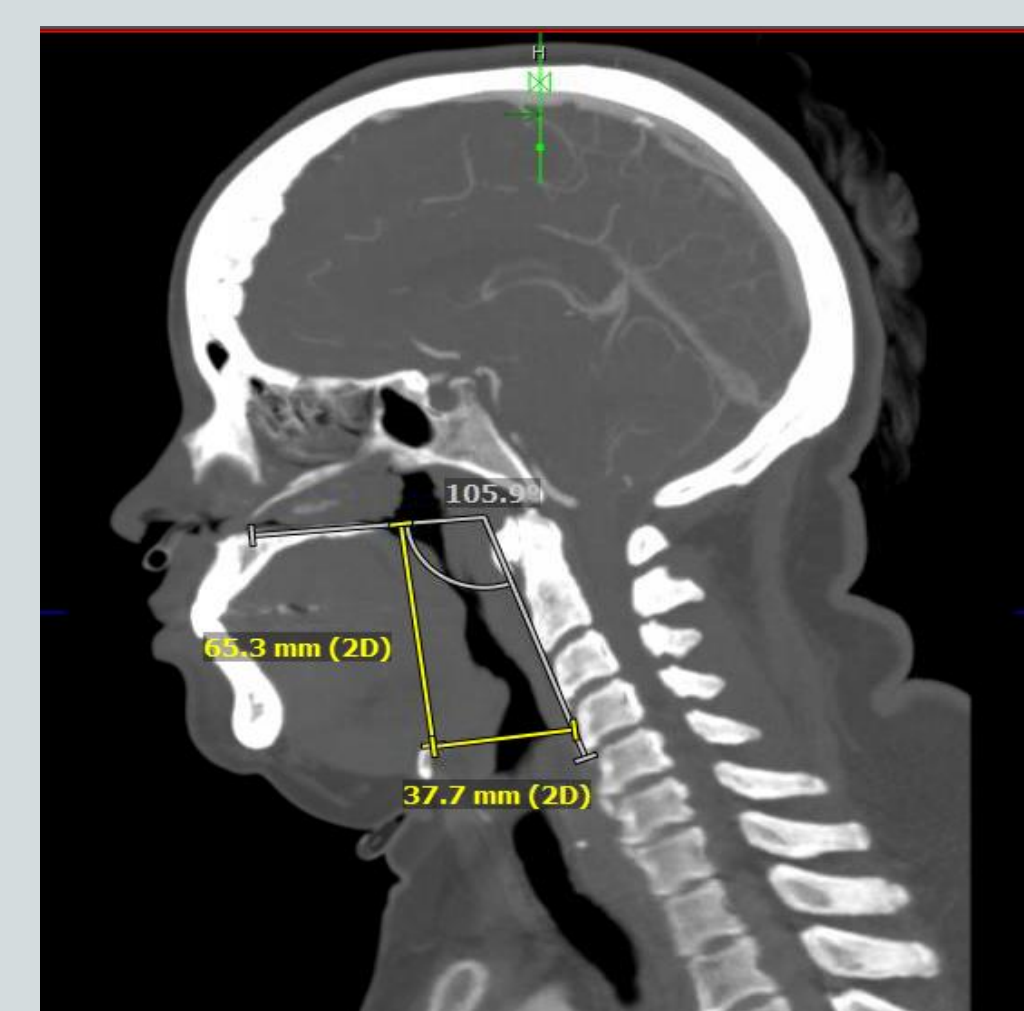
## Future directions:

→In the future, analyzing age related changes in the subplatysmal fat and digastric/floor of mouth musculature longitudinally using MR images will provide further evidence on factors contributing to ptosis.

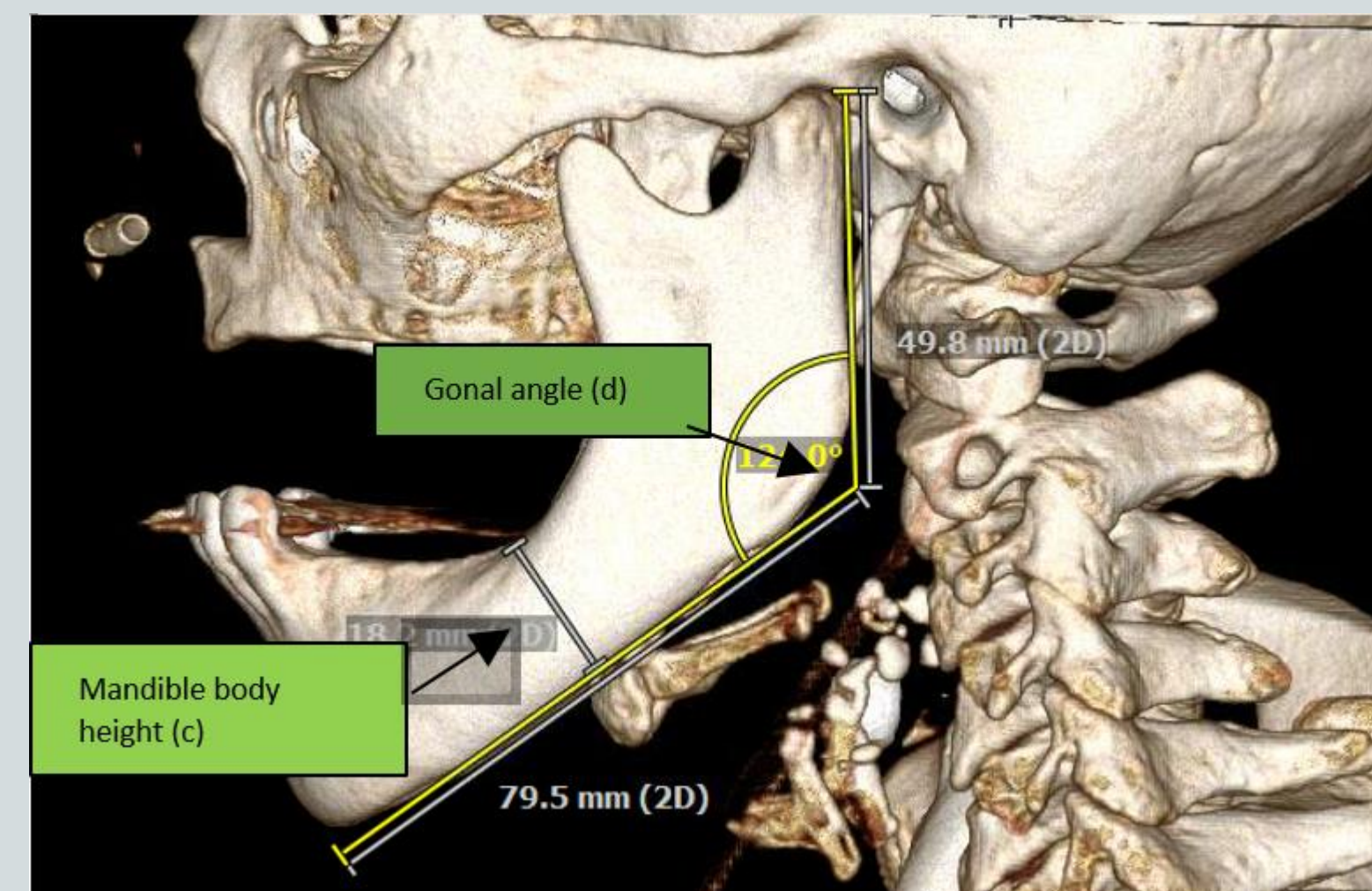
Most inferior portion of SMG relative to mandible.



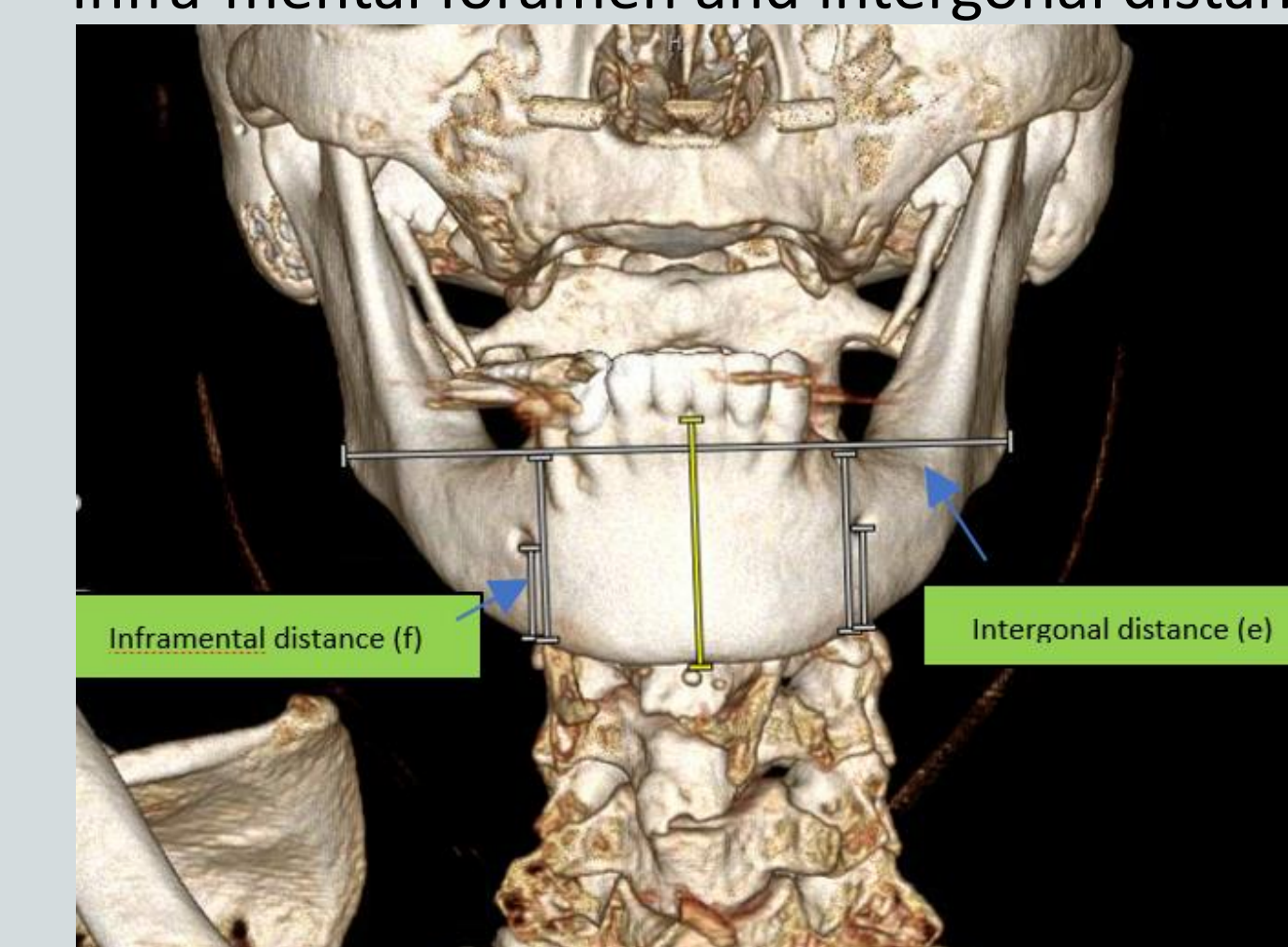
Vertical and AP position of hyoid



Gonial angle and body height



Infra-mental foramen and intergonal distance.



Yale

