

# Craniocervical Instability as a Potential Driver of Styloid Process Elongation



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## Introduction

- The Styloid process is located inside the mastoid process and is attached to muscles such as the stylohyoid muscle.
- An elongation of 30 mm or more is considered excessive and can cause Eagle's syndrome\* in some patients, typically in their 30s and 40s.
- However, the factors determining the length of the Styloid process have not been elucidated to date.

### \*Eagle syndrome:

**Otolaryngology field;** pain during swallowing and dysphagia  
**Neurosurgical field;** internal carotid artery dissection

## Methods

Consecutive Young Patients (<50y.o.) admitted to our institution by the following disease  
Head trauma  
Untreated Chiari malformation  
Nonfunctioning PitNET

Excluded;  
Insufficient CT coverage to the tip of the styloid process, or severe trauma associated with cervical spine injury

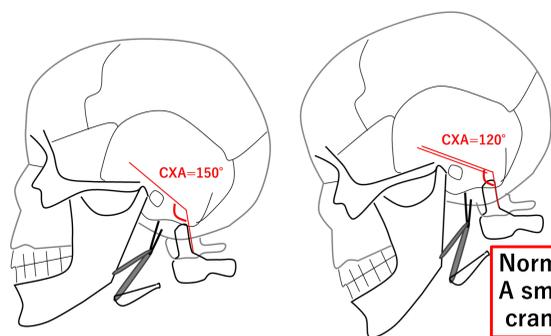
Head trauma (n=20)  
Untreated Chiari malformation (n=18)  
Nonfunctioning PitNET (n=45)

### Main variables:

- ✓ age, sex, mean length of the bilateral styloid process
- ✓ clivo-axial angle (CXA)

defined as the angle formed by the clivus and the C2 odontoid process on sagittal non-contrast CT images

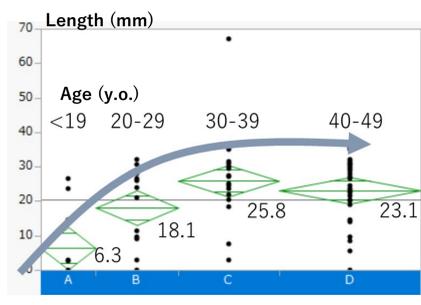
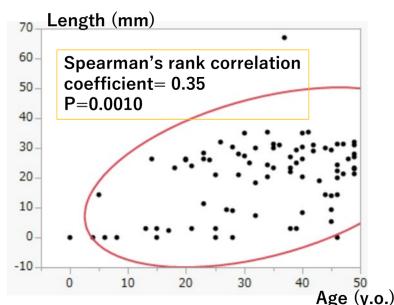
Reflects craniocervical junction instability



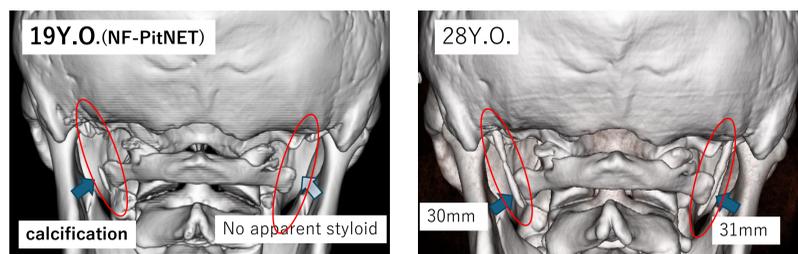
Normal: CXA > 150  
A smaller CXA indicates greater craniocervical junction instability

## Results

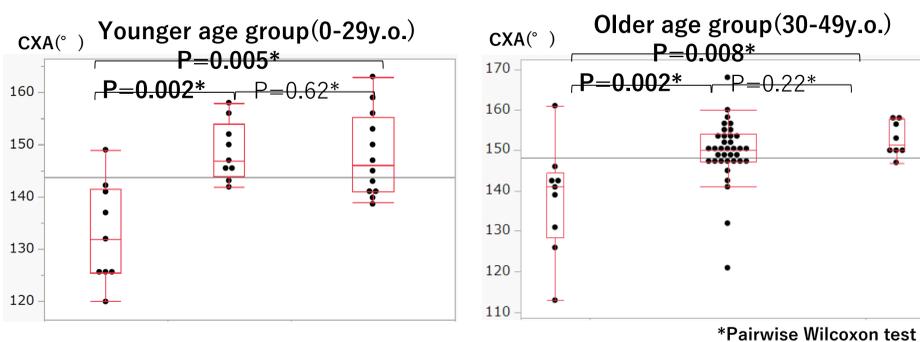
- Styloid process length shows a strong positive correlation with age and reaches a plateau after the third decade of life



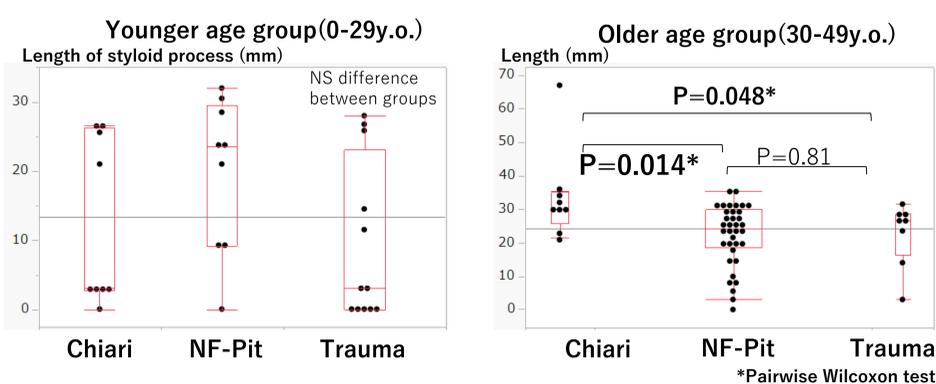
- A case demonstrating elongation of the styloid process even after reaching adulthood in the same patient



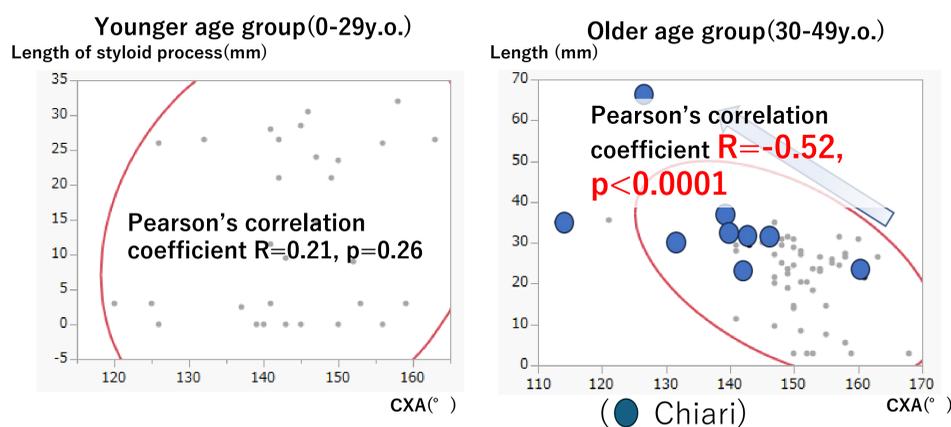
- Across all age groups, patients with Chiari malformation had smaller CXA values.



- Accelerated Age-Related Elongation of the Styloid Process in Chiari Malformation Compared with Other Disorders?

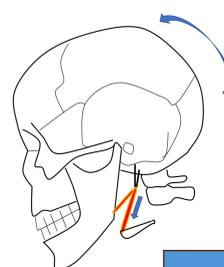


- In patients with Chiari malformation, progressive elongation of the styloid process may be related to a smaller CXA, indicative of craniocervical junction instability.



## Discussion & Conclusion

Pronounced craniocervical junction instability (reflected by a small CXA) persists from a young age over a prolonged period



Chronic mechanical stimulation of the styloid process and stylohyoid muscle

Progressive elongation of the styloid process??

## References

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