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## Testing inter-teeth variability in adult individual age-at death estimate using cementochronology (TCA)

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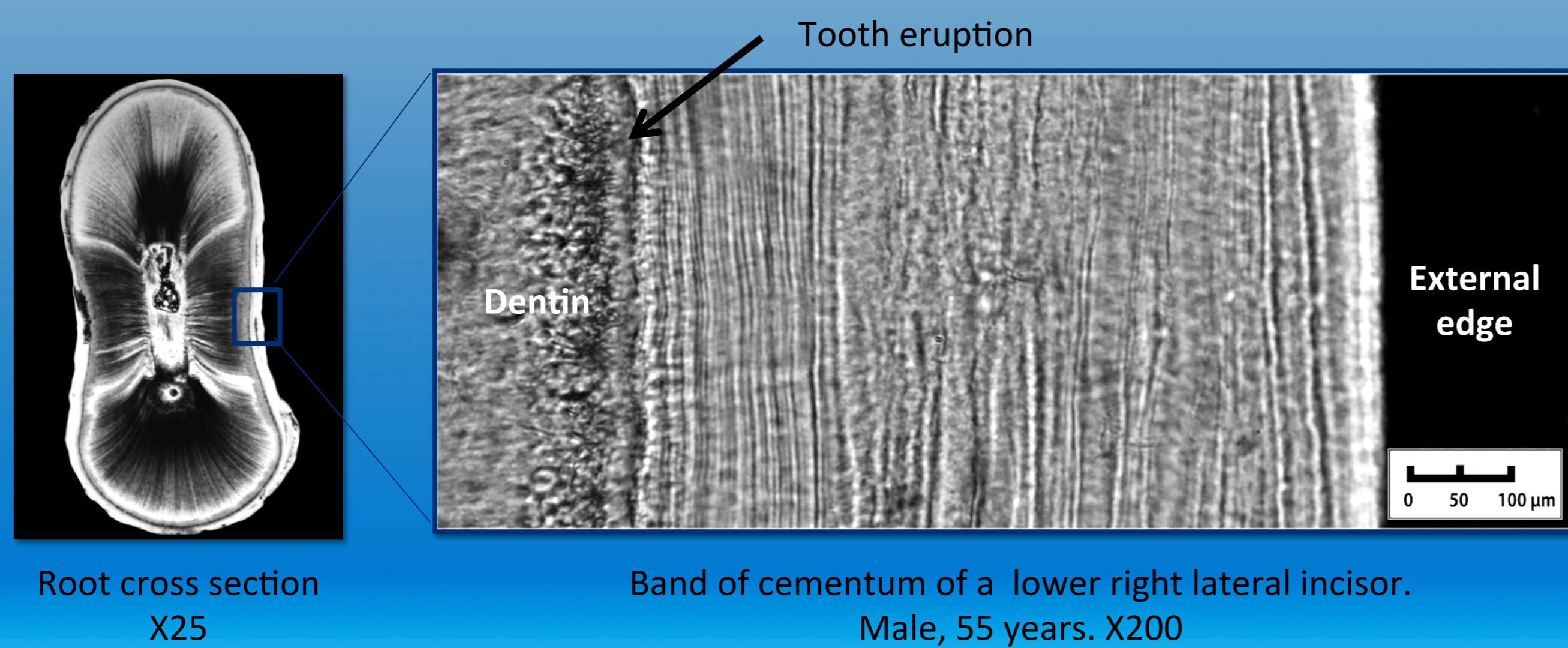
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## Introduction

### Do all teeth of one individual indicate the same age?

- Variability of cementum only mentioned by 2 studies:
  - Charles *et al.* (1986): 43% between canines and premolars
  - Wittwer-Backofen *et al.* (2004): "no consistent high error"



## Objectives

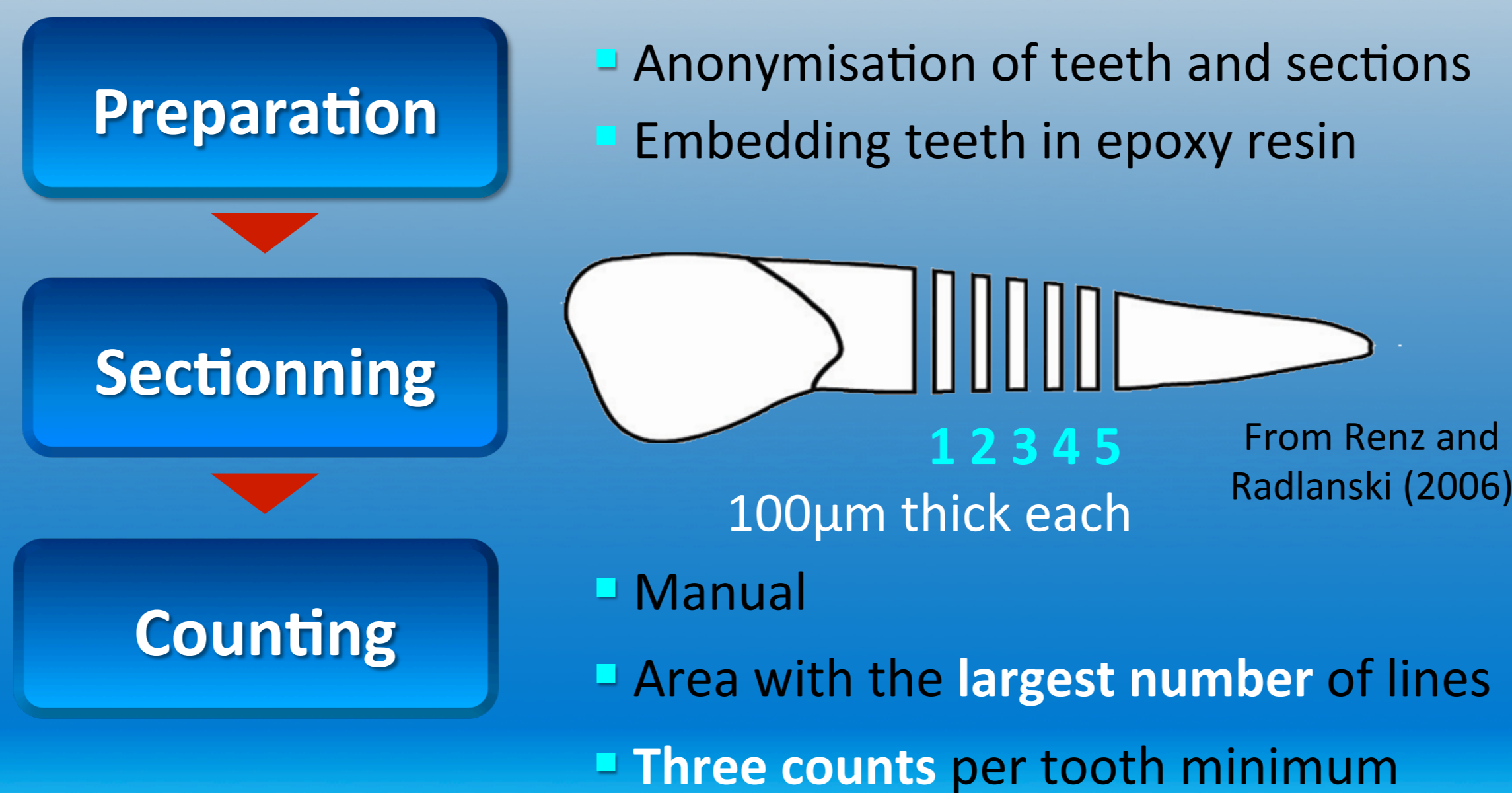
### Studying intra-individual variability of the dental cementum

- Repeatability and reproducibility of counts
- Between dental classes
- Between teeth of one individual

## Materials and Methods

- 51 modern single-rooted teeth
- 15 individuals (39 – 81 years old)
- Central and lateral incisors, canines and premolars
- Multiple extractions from 2 to 12 teeth per individual

### Protocol:

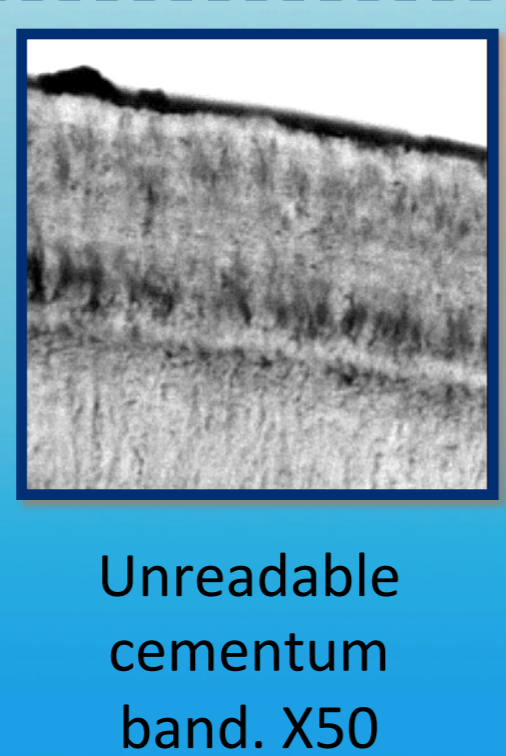


### Statistical tests:

- Intra and inter-observer variability
- Link between error and tooth class (Kruskal-Wallis test + paired comparison)
- Average and maximum number of counted lines

## Results

- 11 teeth excluded
  - Fragility
  - Unreadable
  - Insufficient number of counts (< 3/5)
- 4 individuals represented by 1 tooth



### Intra and inter observer variability

Intra observer	Inter observer
0.76	0.60

No link between error and class of teeth ( $p > 0.05$ )

### Between teeth of one individual

Sample: 36 teeth of 10 individuals

- Using maximum of the age estimations:

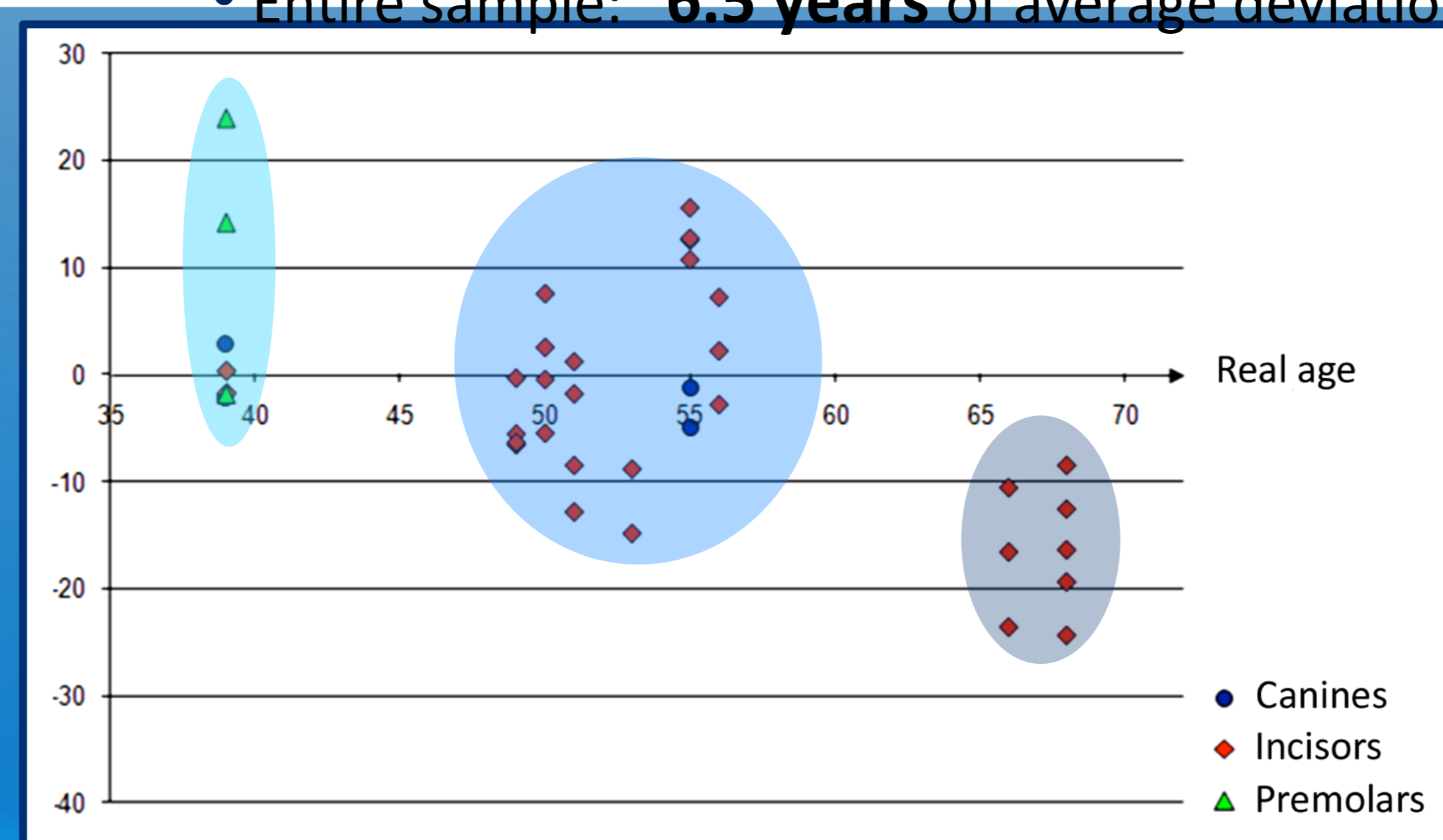
- Average deviation per individual:

2 – 13 years

- Minimal and maximal deviation per individual:

0 – 26 years

- Entire sample: 6.5 years of average deviation



Error (estimated age – real age) function of chronological age by teeth classes

### Between dental classes

Sample: 40 teeth of 14 individuals

Average error	
Maximum of the age estimations	Average of the age estimations
2.64 years	8.43 years

- Incisors (n=33) – lowest errors with:
  - Maximum of the estimations
  - Mandibular central incisors

## Discussion

- Repeatability and reproducibility of counts: "good" coefficients (0.76 and 0.60)
- Maximal estimation of age is more accurate than the average one
- Between dental classes:
  - Age structure: overestimation of age of younger adults and underestimation of age of older adults
  - Mandibular central incisors : the lowest error
- Between teeth of one individual:
  - Average deviation: 6.5 years (acceptable; similar to other methods)
  - Up to 26 years (premolars known to be problematic)

## Conclusion

- Proved presence of intra individual variability between dental classes AND between teeth of one individual, sometimes very high (26) protocol to improve further
- Maximal number of incremental lines provides more accurate and reliable estimations of age
- Prospects: greater number of teeth, intra tooth variability, sexual and pathological influences