INTRODUCTION

Age at death estimation is a major concern of the post-mortem identification and a central interest in paleodemography, by reconstructing age-at-death distributions, as well as in paleopathology by referring to mortality related to disease. The method of tooth cementum annulation (TCA) has allowed real progress on the accuracy of this field. However, the impact of periodontal disease is not a factor well-studied in terms of cementum development physiology. The objective of this study is to observe the impact of periodontal disease on cementum and its consequence on the reliability of cementum annulation. The aim is to improve the method when applied to teeth presenting periodontium damage.

MATERIAL AND METHODS

- 18 adults patients from the Dental Service of Lille University Hospital (average age = 55.2 years old) with no periodontal treatment.
- 41 teeth (17 incisors, 9 canines, 11 premolars and 4 molars) : 17 teeth with alveolysis of 1/3 (category 1), 13 of 1/2 (category 2) and 11 of 2/3 category 3 (figure 1)
- Inclusion teeth in resin epoxy.
- Completion of 6 cross section of 100 µm thickness : 2 in the upper third of the rooth, 2 in the middle third of the rooth and 2 in he lower third of the rooth.
- Observation with a polarizing light microscope coupled with a video camera.
- Analysis of images with Adobe Photoshop Elements 7.0 software
- Measure cementum thickness and counting of tooth cementum annulation in each third (figure 2)
- The actual calendar age of the individual was not known to the investigator while the lines were counted on the images.

RESULTS

- 14.6% of teeth must be excluded for diverse reasons : absence of cementum hypercementosis broken and split up cementum

- No correlation between cementum thickness and civil age (p > 0.05 and r < 0.5 in lower, middle and upper third)

- Correlation between estimated and civil age regardless of the degree of alveolysis :
  - at the middle third of the root : correlation coefficient r = 0.92 (graph)
  - at the upper third r = 0.84
  - at the lower third r = 0.57

- Correlation between estimated and civil age depending on the degree of alveolysis (table) :
  - strong correlation in the middle third for the all categories
  - correlation somewhat less pronounced in the upper third
  - little or no correlation in the lower third.

DISCUSSION

- No correlation between cementum thickness and civil age (p>0.05, r<0.5) throughout the root was observed (data in contradiction with Solheim 1990, Stein and Corcoran, 1994 who studied teeth regardless of periodontal disease). It would seem that periodontal pathologies do have a direct influence on cementum thickness
- These results confirm that the middle third of the root is the most reliable zone in the context of determining the age of the teeth associated with periodontal problems as demonstrated by GroBkopf et al. (1996) and Wittwer-Backofen et al. (2004). But these results contradict those of Dias et al. (2010) who find no correlation (r = 0.06) between estimated age and civil age for individuals with periodontal disease.
- These data suggest that cementum could continue its growth at a lower rate despite bone destruction due to periodontal disease.
- In conclusion, cementochronology can be applied to teeth presenting a damaged periodontium, by observing the middle third of the root.

BIBLIOGRAPHY