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INTRAPOPULATION GROWTH VARIATION ANALYSIS USING FEMUR LENGTH: THE CASE OF MARTIGUES PLAGUE VICTIMS (SOUTH OF FRANCE – 1720-1721)

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• Individual’s living conditions influence his/her stature by 20% (Koepeke, 2016).
• Bioarchaeological context: stature analysis has been used to evaluate past populations’ living conditions.

Aims:
(1) evaluate whether all groups, divided according to age, gender and location at the archaeological site, were equally affected by these famines;
(2) investigate how differently men and women suffered from them;
(3) link age classes with starvation episodes in that region.

Material:
• In this work we analyse the skeletons of 95 adults:
  o victims of the Great Plague of Marseilles (1720-1722);
  o exhumed from mass graves located at the site of Martigues (Provence - France) (Tzortzis, 2009);
  o suffered several starvation episodes before the epidemic (Ségy, 2017).

Methods:
• Femur length analysis
  We directly examine femur length, instead of predicted statures, to avoid modelling errors.

  • Factorial Analysis of Mixed Data (FAMD)
    Variables: sex, age class, inhumation place and femur length.

  • Investigation of historical sources.

Results
(1) Variables: sex, inhumation place and femur length (FAMD)
  No pattern of stature variation linked to the inhumation place was observed.

(2) Variables: sex, age class and femur length (FAMD)
  • Significant difference between the mean of groups 1 and 3 (Student’s t-test)
    o Group 1: women (almost only) from age classes young-mature, mature and mature-old.
    o Group 3: women from age classes young and old.
  • Variation in women stature: the youngest and the oldest are taller than the others.
  • Variation of mean among male groups (2 and 4) is not statistically significant.
  • Considering both genders, the average statures of different age groups do not differ in a statistically significant manner (ANOVA test).

(3) Famines
  Victims of 1720-22 plague were born between 1702 and 1625 (90% between 1702 and 1655)
  1695 – 1702 – born period of individuals classified as “young”;
  1684 – 1710 – several episodes of starvation;
  Utérine life and development period during the penury;
  1625 – 1655 – born period of individuals classified as “old”;
  Both classified in the groups with higher statures (3 and 4).

Discussion
• Gender inequality hypothesis: women’s stature correlated with age, while male’s stature are homogeneous.
  • Our analysis suggests that women were the most affected by changes in life conditions.
  • “Osteological paradox” (Wood, 1992):
    - The youngest and the oldest were the most vulnerable during the penury period;
    - Younger: growing and development period;
    - Older: vulnerable because of advanced age.
  • Event though, they had higher stature than the other age group and survived the famines.
  • We hypothesize that:
    - they survived because they had better life conditions than their contemporaries;
    - differential life conditions made them taller than the other age group.

Future perspectives:
• Examine the occurrence of physiological stress markers in the bones and teeth and also the variation in dental microwear to verify the consistency of these results.
• Comparison with other populations from the same region and/or period.

References:

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