

Postmenopausal bone loss in human skeletal remains of a historical population of southeastern France

B. Mafart · J. Fulpin · P. Y. Chouc

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Dear Editor,

The existence of osteoporosis in past populations is controversial. In archeological samples, age-dependent bone loss is considered as less frequent [1], similar [2–4] than nowadays or not determinable [5]. We have hypothesized that age-related bone loss was present in the past populations and can be evaluated by comparing the bone density of young and elderly women.

We studied 90 skeletons from the cemetery of the crypt of the Notre-Dame-du-Bourg cathedral in Digne, Alpes-de-Hautes-Provence, France, burial place of the inhabitants of the city from 11th to 17th century without known social discrimination. The sex was determined by the morphology of the coxal bone. We selected two clearly separated age groups samples, i.e., under 30 years (juvenile sacral joint or incomplete fusion of the iliac crests, and/or ongoing eruption or no wear of the third molars), over 50 years (compatible sacro-iliac joint features).

We studied the femurs of 17 young and 40 elderly women and 9 young and 24 elderly men selected within two periods of the cemetery (i.e., 11th–13th: 7 young

women, 10 elderly women, 4 young men, 10 elderly men; 16th–17th: 10 young women, 30 elderly women; 5 young men, 14 elderly men). All femurs were devoid of traumatic, pathologic lesions and postmortem deterioration.

Bone mineral density was measured at the femoral neck (BMD neck) and at the Ward's triangle region (BMD Ward) using a LUNAR DPXL dual energy X-ray absorptiometer. The femurs were supported at the head and lesser trochanter and scanned immersed in a water tank at a depth of 15 cm.

Statistical analysis was performed using the Mann-Whitney test (conventional level : 0.05).

Duplicate measurements on 22 femurs indicated good reproducibility (coefficient of variation : Neck : 4.5% ; Ward : 7.6%). For 30 pairs of femurs BMD values were not different between the two sides (Neck: $p=0.24$, Ward: $p=0.16$).

The BMD neck and Ward of the elderly women were statistically lower than those of the young women (Table 1). The BMD of the elderly men was only lower for the neck.

Most of elderly women had BMD lower than the mean less two standard deviations of the young women (neck: 27/40; Ward: 28/40). Corresponding comparisons for men showed relatively lower densities for only 2 of 24 for the two sites.

These results support our hypothesis of a significant bone loss among the elderly women in this historical sample and confirm recent studies [2–4]. Opposite results are related with smaller samples and/or methodological differences. The soil contact was not a confounding factor considering the similar repartition of the femur samples through time and that this study was only focused on the gap between young and elderly. The sample size reduces the likelihood of other demineralizing diseases.

The gap between young and elderly females appears greater than nowadays, but the osteological methods used

B. Mafart

Antenne de l'Institut de Paléontologie humaine,
Europôle de l'Arbois, Département de Préhistoire,
Muséum National d'Histoire Naturelle,
UMR 5198 Aix-en-Provence, France

J. Fulpin · P. Y. Chouc

Service de Rhumatologie, Hopital Laveran,
Marseille, France

B. Mafart (✉)

Antenne de l'Institut de Paléontologie humaine,
Europôle de l'Arbois,
Batimen Villemin BP 80,
13145 Aix-en-Provence, France
e-mail: bertrand.mafart@univ-u-3mrs.fr

Table 1 Summary statistics of bone mineral density measured at the neck and the Ward's triangle of the femurs of the archeological sample, Notre-Dame-du-Bourg, 11th to 17th century

BMD (g/cm ²)		BMD Neck				BMD Ward's triangle			
		<i>n</i>	Mean	SD	<i>p</i>	<i>n</i>	Mean	SD	<i>p</i>
Women	Young	17	0.942	0.107	<10 ⁻⁶	17	0.919	0.142	<10 ⁻⁶
	Elderly	40	0.686	0.137		40	0.569	0.144	
Men	Young	9	1.213	0.192	0.026	9	1.116	0.355	NS
	Elderly	24	1.051	0.244		24	0.945	0.354	

identify more easily the oldest individuals as aged more than 50 years. No specific analysis of postmenopausal osteoporosis can be done. Consecutively, in historical Western populations, like nowadays, an important age-related bone loss going until osteoporosis could occur for the women who were lucky enough to live a long life.

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