IS COLLAGEN FROM TEETH OR BONES EQUIVALENT FOR ISOTOPIC (^{13}C, ^{15}N) DIET INVESTIGATIONS ?

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Isotopic biogeochemistry (^{13}C, ^{15}N) of fossil collagen is nowadays currently used to infer extinct animals and prehistoric man diet, and a wide developement of this technic is expected in the near future. In prehistoric specimens, only parts of bones and teeth are usually available and we have to be sure that isotopic values from any part of a single skeleton do not differ significantly before comparing isotopic values from different specimens.

Isotopic investigations on recent lower jaws from several mammal species show that $\delta^{13}C$ values do not differ significantly between bone and teeth collagen but that $\delta^{15}N$ values present an enrichment (up to 2-3 ‰) in teeth collagen compared to bone in species with teeth that stop growing (reindeer *Rangifer tarandus*, sheep *Ovis aries*, bear *Ursus americanus*, wolf *Canis lupus*). On the contrary, species with continuously growing teeth (horse *Equus caballus*) present almost identical $\delta^{13}C$ and $\delta^{15}N$ values in bone and teeth collagen. Such $\delta^{15}N$ values variations are very probably linked to teeth replacement chronology and time of weaning in the different species and for each tooth. Species with continuously growing teeth show similar evolution of isotopic variations in teeth and bone collagen during their lifetime.

Quaternary mammals almost 45 000 years old from France present a similar variation pattern for isotopic values in bone and teeth collagen. Cave bears (*Ursus spelaeus*) from Aldene and Mialet caves present slightly more negative $\delta^{13}C$ values (-0.3 to -1.1 ‰) and significantly more positive $\delta^{15}N$ values (1.5 to 2.2 ‰) in teeth than bone collagen from same fossil individuals. On the site as a whole, collagen $\delta^{13}C$ values for definitive teeth are on average 0.7 and 1.1 ‰ more negative than for bone and $\delta^{15}N$ values for definitive teeth are on average 3.1 and 1.9 ‰ heavier than for bone in Aldene and Mialet caves respectively. In Aldene cave, collagen $\delta^{13}C$ values for deciduous teeth are on average 1.5 ‰ more negative than for bone and collagen $\delta^{15}N$ values for deciduous teeth are on average 4.4 ‰ heavier than for bone. In Marillac, reindeers (*Rangifer tarandus*) present collagen $\delta^{13}C$ values for definitive teeth almost identical than for bone and collagen $\delta^{15}N$ values for definitive teeth are on average 1.8 ‰ heavier than for bone. On the contrary, there is no significant difference between $\delta^{13}C$ and $\delta^{15}N$ values from horses (*Equus caballus*) bone and teeth collagen, for a single individual as well as on average of several specimens.

$\delta^{13}C$ and $\delta^{15}N$ values seem to be equivalent between teeth and bone collagen only for species where teeth grow continously during the whole lifetime. In species where teeth stop growing in adult life, teeth collagen $\delta^{15}N$ values seem to be significatly enriched in comparison with bone collagen $\delta^{15}N$ values (1 to 3 ‰), probably because of an ^{15}N-enriched diet (milk) during the first stages of growing and no subsequent renewal of teeth collagen. The enrichment seems to be even more important for deciduous teeth.

Further investigations on recent mammals teeth and bones are thus urged to obtain a more accurate estimate of intra-individual isotopic variations according to individual age in the most studied species, including man.