

7 Abstract

The diet of humans gives an insight into their way of living as well as environmental conditions. Furthermore, the nutrition is reflected by the chemical components of the bones. The objective of this thesis was to reconstruct the hitherto poorly known dietary habits of three populations from the Brandenburg district (rural Tasdorf, urban Brandenburg/Havel), Germany, and one population near the Baltic sea in Mecklenburg-Vorpommern (urban Anklam), Germany, from the 16th-19th century. The reconstruction of the nutrition base by analysing stable isotopes and trace elements was lacking until now for the east of Germany.

150 femoral and costal samples of animal and human bones of known sex and age of the three skeletal series were prepared for the analyses using the known methods. 15 trace elements (As, Cd, Co, Pb, Ni, Cu, Al, Sr, Zn, Mg, Fe, Mn as well as Ca and P) were measured applying atom absorption spectrometry (AAS). In addition the stable isotopes of carbon, nitrogen and oxygen were analysed by mass spectrometry.

The interpretation of the results found is based on the knowledge that vegetable and animal food differ in the composition of their trace elements. Vegetable food shows high contents of strontium and barium while animal food contains a higher amount of zinc. The stable isotopes of nitrogen and carbon show the position of a consumer in the food web. As a result of the “trophic level effect”, the consumer $\delta^{15}\text{N}$ -values are elevated by approximately 3-4 ‰ over dietary protein. It is possible to reconstruct, which dietary components an individual consumed. The accumulation from the food to its consumer is smaller for $\delta^{13}\text{C}$ (about 1 ‰). An evaluation of the human food sources is possible by comparing their results with those of herbivores and carnivores from the same food web.

Applying this method, the time of weaning of children can be estimated. Breast-fed children have $\delta^{15}\text{N}$ -values 2-3 ‰ higher than their mothers. During the weaning process, the consumption of complementary food results in a decline of infant nitrogen values. A fully weaned child shows a $\delta^{15}\text{N}$ -value nearly identical to that of its mother, indicating a similar diet.

In addition to the reconstruction of the staple diet of all three populations investigated possible distinctions between the sexes and different age groups were of

interest as well as the stress caused by pollutants.

This thesis showed an omnivorous nutrition for all three populations. It could be determined that more vegetable food was consumed in the rural community of Tasdorf than in the urban communities of Brandenburg and Anklam. The consumption of animal products like meat and milk was highest in Brandenburg town while people in Anklam ate a considerable amount of sea fish and invertebrates. At the sea, it is likely, that fish was cheap at the sea and easy to get. Women in Tasdorf consumed more vegetable food than men. It is possible that men had more meat at their disposal, because they were the head of household and because they had to work heavily on the field..

The diet of children from Tasdorf and Anklam showed food richer in proteins than that of men and women. In both populations, the weaning of children was completed when they were three years of age at the latest. It was not possible to determine the weaning age of the Brandenburg children, the data point to a earlier age at weaning than in Tasdorf and Anklam. Overall, the provisioning for the smaller children by their mothers was good. Urban juveniles consumed less protein than their rural counterparts. This might be due to the fact, that juveniles in rural areas often stayed at their parents' house while, as apprentices in the cities, they had to move into the household of their masters. Possibly, they were there badly provided for. In all three skeletal series the diet improved with age, and people aged 40-60 showed the best nutrition of all age classes.

People from the Middle Ages in Brandenburg and Mecklenburg-Vorpommern did not consume food richer in proteins than the populations studied. It can not be confirmed, that the populations analysed for this thesis had to starve for long periods of time, but there might have been a repeated but temporary deprivation of food.

The stress caused by heavy metals and other harmful substances was low. Merely in the Tasdorf population the concentration of lead was assessed as quite high for a historic community, but too low to be noxious.

Altogether, the analysis of trace elements and especially of stable isotopes proved to be good methods to determine the staple diet of populations. Thus they provide rather comprehensive information about their way of living.