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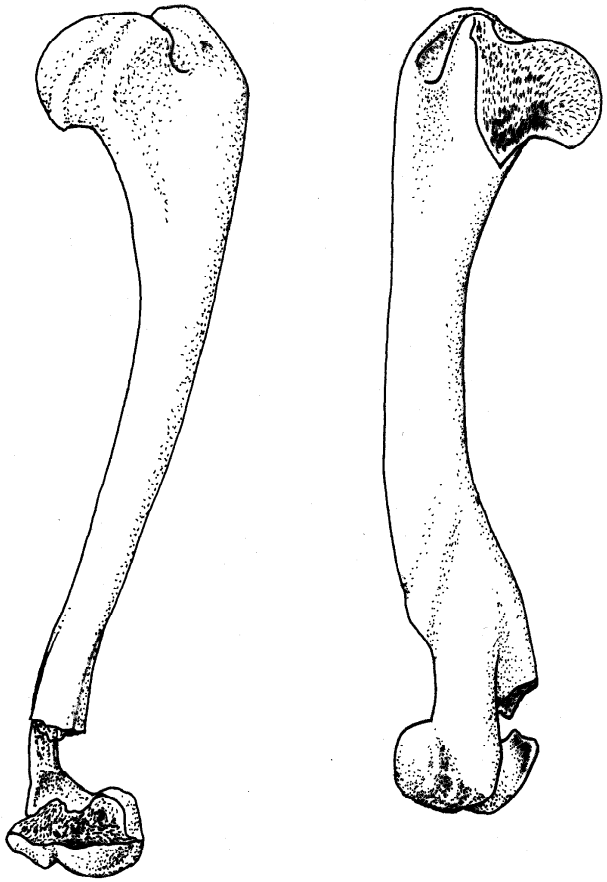

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3. A developmental anomaly of prehistoric roe deer dentition from Svodín, Slovakia

Marian Fabiš, Richard Thomas, Václav Páral and Dušan Vondrák

Abstract

*Archaeological excavation of an Eneolithic settlement in Svodín revealed two incomplete roe deer (*Capreolus capreolus *L., 1758) mandibles (*mandibula sinistra et dextra*) dated to the same period. Based on the wear stage of the dentition (both aged 13-15 months), the archaeological context, and the presence of the same morphological anomaly, it is likely that the two specimens belong to the same individual. The anomaly is a developmental condition represented by an extra tooth located on the dorsal edge of the diastema in front of the second premolar. The extra teeth have their roots oriented towards the second premolar while the crowns point towards the* pars incisiva *of the mandibles. Atavistic polyodontia/hyperodontia of the deciduous first premolar and permanent first premolar is suggested as the probable diagnosis.*

Introduction

The term 'oral pathology' covers a wide range of conditions located in the oral cavity (Baker and Brothwell 1980) and relates to all dysfunctions of both soft and hard tissue structures. Besides traumatic alteration of teeth, caries, neoplasia, and a number of other conditions (*e.g.* Davies 2005), developmental anomalies can also negatively affect the functional ability of the teeth and the whole oral cavity. Such dental anomalies can refer to the number, location, orientation, size and shape of teeth (*e.g.* Baker and Brothwell 1980; Miles and Grigson 1990; Šutta *et al*. 1986; Zendulka *et al*. 1987). *Torsio* (the rotation of a tooth around its longitudinal axis)*, deviation* (the rotation of a tooth around its transverse axis) and *diastasis dentium* (abnormally large spaces between neighbouring teeth in a tooth row) are a few examples of these anomalies. Another example is *transposition*, which refers to the relocation of a tooth to an atypical position (Zendulka *et al.* 1987). Malocclusion, (*i.e.* irregular wear of teeth) can also be caused by developmental disorders of jawbones, such as *brachygnathia superior* or *inferior* (Šutta *et al*. 1986).

Dental anomalies often occur in domestic animals (Šutta *et al*. 1986; Zendulka 1987) and in severe cases cause serious difficulties in fodder intake. Such disorders can even result in the slaughtering of an animal to prevent economic loss. Cases of dental anomalies in domestic species are occasionally reported in studies of faunal assemblages from archaeological sites (*e.g.* Maltby 1979; Baker and Brothwell 1980; O'Connor 1984; Kratochvíl 1986; Albarella *et al.* 1993; Thomas 2005; Fabiš 2004). However, anomalies of dentition also occur in wild species (*e.g.* Ratcliffe 1970; Meyer 1977), although reports on such conditions are virtually absent from the archaeozoological literature. This paper seeks to partially address this imbalance, by considering an anomaly identified in two roe deer (*Capreolus capreolus* L., 1758) mandibles from an archaeological site in Slovakia.

Materials

Between 1971 and 1983, the Archaeological Institute of the Slovak Academy of Sciences in Nitra undertook a series of archaeological excavations at an Eneolithic (fourth to early-third millennium BC) settlement in Svodín (Němejcová-Pavúková 1986). The site, located in south-western Slovakia (Fig. 3.1) produced a large number of animal bones representing settlement debris. Study of the faunal remains is still in progress; however, amongst the material analysed to date, two roe deer mandible fragments exhibiting a dental developmental abnormality were found (Figs. 3.2-3.7).

Figure 3.1: map of Slovakia with the location of Svodín indicated.

Both jaws (*mandibula dextra*, sample No. 1204 and *mandibula sinistra*, sample No. 1782, found in feature No. 406/77) date to the Lengyel Culture (first half of the fourth millennium B.C). The two samples were located approximately 50 cm from each other. The mandible fragments were analysed on a macroscopic level and radiographically. Estimation of the age of the individual(s) from which they derived was attempted using the eruption and wear of the preserved teeth following the criteria of Habermehl (1961). The samples are currently stored at the private veterinary laboratory of M. Fabiš.

Figure 3.2: *mandibula dextra*; lateral aspect.

Figure 3.3: *mandibula sinistra*; lateral aspect.

Figure 3.4: *mandibula dextra*; detail.

Figure 3.5: *mandibula dextra*; dorsal aspect.

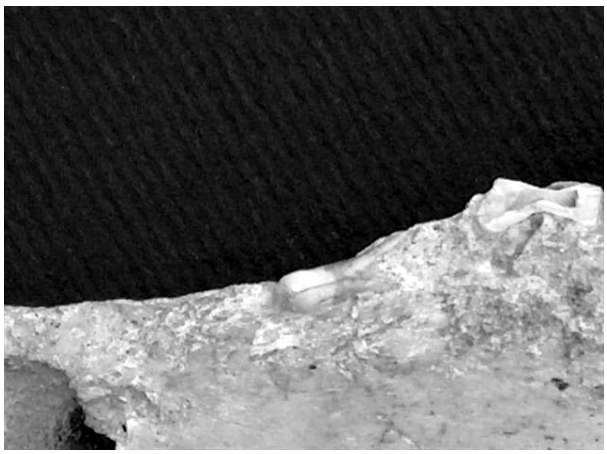

Figure 3.6: *mandibula sinistra*; detail.

Figure 3.7: *mandibula sinistra*; dorsal aspect.

Results

In both specimens, only parts of the corpus together with a portion of the cheek teeth and diastema are preserved. In the case of the right mandible no other teeth except the premolars (P2, P3, and P4) are present (Fig. 3.2). In the left mandible, the third and fourth premolar are preserved complete (Fig. 3.3). The crowns of the second premolar and first and second molars have been broken off, but their roots are fixed in their alveoli. *Pars incisiva mandibuale* is missing in both samples. The dentition of the two mandibles reveals a similar stage of wear. The premolars are permanent, with the fourth premolar still unworn. Applying the dental ageing criteria of Habermehl (1961), the wear stage indicates that both mandibles belong to individual(s) of 13-15 months age.

Regarding the dentition, an additional tooth closely anterior to the second premolar is present in each of the mandibles. In both cases the tooth is located on the dorsal edge of the diastema and is partially visible from lateral, medial, and dorsal views, although the majority of both teeth is located within the mandibular bone. The visible

portion of the tooth is club-shaped with a thin (and sharp) root section oriented towards the second premolar, while the rounded crown section directs towards the missing *pars incisiva* of the jaw. The long axis of the tooth runs parallel to the long axis of the *corpus mandibulae*. This description refers to both samples presented in the paper (Figs. 3.4-3.7).

Radiographic examination of the mandibles confirms the horizontal orientation of the long axis of the teeth with their roots oriented towards the second premolar. The radiograph of the left mandible (Fig. 3.8) shows that the crown of the supernumerary tooth is almost rounded, and the tooth has two closed roots. The radiograph of the right mandible (Fig. 3.9) shows that the crown of the supernumerary tooth is very similar in shape to the extra tooth in the left mandible; however, it has a single root that is open.

Figure 3.8: radiograph of the left mandible.

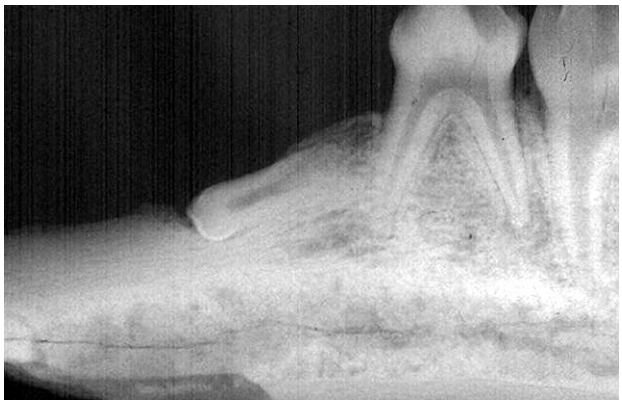

Figure 3.9: radiograph of the right mandible.

Discussion

The first question to address is whether we have got two different roe deer individuals showing the same dental anomaly or whether it is only one individual. Judging from the close spatial location of the specimens, their date, the fact that they are of the same physical age and similarly sized, the two specimens probably belong to the same individual. The fact that both mandibles exhibit the same dental anomaly supports this conclusion.

The tooth formula for roe deer permanent dentition is: 0I, 0C, 3P, 3M / 3I, 1C, 3P, 3M, while for deciduous dentition it is: 0Id, 0Cd, 3Pd / 3Id, 1Cd, 3Pd (Habermehl 1961; Komárek *et al.* 2001). Although the dentition of the two roe deer mandibles from Svodín has not been preserved complete, it clearly does not fit into the roe deer dental formula. It is certain that the described teeth located in front of the second premolar are supernumerary and according to their position they appear to be first premolars.

Our attempts to find any parallel for this condition in the archaeozoological literature failed. In this context it seems that we are dealing with a rare developmental anomaly of roe deer dentition. However, while there are no archaeozoological references of similar conditions reports of extra teeth in cervids have been identified in modern veterinary literature (Miles and Grigson 1990, 110-114). As early as the middle of the last century Wirchov (1940) reported on supernumerary teeth in lower jaws of roe deer. Chaplin and Atkinson (1968) have also reported on the occurrence of the upper canine teeth in roe deer male and female skulls collected from England and Scotland. Jackson (1975) provides results of a roe deer mandibular study in which two specimens out of 51 exhibited an extra tooth located in front of the permanent premolars. Prior (1968) has also noted extra premolars in two roe deer lower jaws, and Meyer (1985) has published an article on the presence of the first premolar in roe deer mandibles. In studies of roe deer from the former Czechoslovakia, the anomalies identified included polyodontia of the first premolar (Kratochvíl 1984; Zima 1988). A further study reported on the occurrence of the deciduous and permanent fist premolar in white-tailed deer (*Odocoileus virginianus*; Mech *et al*. 1970). In addition, a number of animal dentition studies have focused on the ontogeny of dentition in particular species (*e.g.* Kierdorf 1993; Witter and Míšek 1999). Kierdorf's (1993) study deals with dentition ontogeny in roe deer, describing and discussing supernumerary teeth in front of the mandibular second premolar.

Primitive artiodactyls possessed complete dentition (Musil 1987). During the course of evolution, particularly the phylogeny of mammals, quantitative and qualitative changes of dentition have occurred, a process evident in the palaeontological record. Among the changes, a reduction in the number of teeth occurred. For even-toed ungulates (artiodactyls), such as bovids and cervids, the upper incisors and first upper and lower premolars disappeared. The upper canines in bovids also disappeared, but for cervids this is not the rule since they can sporadically occur – as for example in roe deer (*e.g.* Kratochvíl 1984; Zima 1988) but also in some other cervids. Witter and Míšek (1999) studied the development of dentition in sheep foetuses and found that during ontogeny, rudimental primordia of upper incisors, upper canines and lower first premolars appear in the dental lamina. These primordia, however, soon disappear and the teeth do not develop. Similarly, Kierdorf (1993) reported that rudimental primordia of mandibular first premolars appear in roe deer foetuses. Normally, these primordia regress during further growth of the foetus. In the event that the primordia continue their development,

first premolars appear in front of the second premolar (*e.g.* Kierdorf 1993, Figs. 3-4). The occurrence of teeth formerly lost in the course of phylogeny is termed atavistic polyodontia and/or hyperodontia (Šutta *et al*. 1986; Zima 1988; Miles and Grigson 1990; Kierdorf 1993). According to Kierdorf (1993), single-rooted teeth with simple conical crowns represent the deciduous first premolar, while teeth with two roots and more complex crown morphology represent the permanent first premolar. As noted above, X-ray examination of the two specimens provides very important information regarding their form (Figs. 3.8 and 3.9). Firstly, the supernumerary tooth of the right mandible has a single root that is not closed, which is typical of deciduous teeth. Secondly, the supernumerary tooth of left mandible has two roots, which are closed, a feature characteristic of permanent teeth. This evidence, together with Kierdorf's criteria, suggest that the Svodín findings represent one or more individuals suffering from atavistic polyodontia having developed its first premolars – the right mandible with a deciduous first premolar and the left mandible with a permanent premolar.

Conclusions

Two roe deer mandibles found at the Eneolithic settlement in Svodín, which probably derived from the same individual, bear what appears to be an identical anomaly of their dentition; an extra tooth located on the dorsal edge of the diastema in front of the second premolar. Only a small part of the teeth had erupted out of the alveolus, while the remainder stayed buried within the mandible. The teeth are clearly supernumerary and their location and appearance indicate that they are first premolars. The condition is a developmental anomaly diagnosed as atavistic polyodontia/hyperodontia and seems to be the first and only case of this anomaly recognized and reported to date in the archaeozoological literature, at least of central-European origin.

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