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THE DESCRIPTION AND INCIDENCE OF THE STAFNE IDIOPATHIC BONE DEFECT IN SIX AVAR PERIOD POPULATIONS

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Abstract

The high incidence of the Stafne Defect found in Avar materials from Hungary particularly the sample of Fehértó-A, has led to an analysis. The material is described in terms of the size and shape of the defect, including its location in the mandible, and the age and sex of the individuals displaying this defect. The conclusion of the present authors is that this defect is developmental and most probably the result of some pressures caused by the sublingual or submandibular gland and that it is not due to trauma as it is easily distinguished from traumatic or hemorrhagic cysts of the mandible as pointed out by many authors.

Introduction

Since the first report of the idiopathic defect of the mandible by STAFNE (1942) some 250 cases of this kind of defect have been reported in the clinical literature. The review of the clinical and osteological literature dealing with this defect is in our earlier study (FINNEGAN and MARCSIK, 1980). Most of these clinical cases have been studied from radiographic evidence or operative surgery with supporting histological examination. Although the etiology of this defect still evades us, a number of authors have projected etiologies as seen in various synonyms used as descriptive of this defect: static bone defect or cavity (BERNSTEIN et al., 1958; GLAHN and RUD, 1962; MENZEL, 1969) aberrant salivary gland defect (AMARAL and JAKOBS, 1961; HAYES, 1961; RICHARD and ZISKING, 1957), idiopathic bone cavity (SENNO et al., 1969; THOMA, 1942), ectopic salivary gland of the mandible (FORREST, 1974; SUGARAWA, 1972) lingual mandibular bone concavity (ALVARES et al., 1969; OLECH and ARORA, 1961), and latent bone cyst (FORDYCE, 1956; NISHIJIMA et al., 1969; YOSHIGA et al., 1973).

The first study done on maserate specimens in observation of the Stafne idiopathic bone defect was reported by Harvey and Noble in 1968. More detailed studies with larger sample sizes were then conducted by KAY (1974) with a number of individual defects noted in small series by a number of authors (FINNEGAN, 1978; FINNEGAN and WITTY, 1977; KEITH, 1973, 1975; LANGLAIS et al., 1976).

The purpose of this paper is to present the descriptive characteristics of the idiopathic bone defect of the mandible in ten cases derived from Avar period material.

Materials and Methods

In July of 1977 data was collected on 300 crania from six Avar period populations housed in the Department of Anthropology, Attila József University, Szeged, Hungary. During the analysis of non-metric traits on this basic data sample set, a number of Stafne idiopathic bone defects were noted. At the end of the data collection it was noted that ten STAFNE idiopathic bone defects had been observed (295 mandibles) and that the frequency for this defect was exceedingly large relative to either or other archaeological literature (FINNEGAN and MARCSIK, 1980).

When found, each defect was recorded for the age, sex, size, and side of the mandible and other non-metric traits associated with that mandible (mandibular foramen, mental foramen, mandibular torus and mylohyoid bridge, (FINNEGAN and MARCSIK, 1979). Additionally, a frequency was generated for the number of defects in each of the six sample populations. The basic data was followed up with a photograph and roentgenogram of each defect.

Case Description of the Avar Period Material

Case 1: An adult male (5931), age 50 to 60 years, from the Kunszállás sample. The defect is located on the left side below the space between M2—M3 near the inferior border. It is more or less circular in form measuring 10 mm in diameter with a smooth floor. Although this defect is easily noted in the maserate specimen, the borders of cordical bone are rather beveled and diffuse and is all but lost in the *x*-ray.

Case 2: A male individual (6860), 40 to 50 years of age, from the Mélykút—Sáncdűlő sample. The defect is found on the right side between M3 and the angle, it is circular, and the floor of the defect is smooth. It is 10 mm in diameter and ca. 5 mm deep from the surrounding bone. The posterior margin of this defect is somewhat better developed than the anterior margin, with the x-ray showing a well developed posterior margin and a diffuse anterior margin. (Fig. 1, 7)

Case 3: A female (1775), age 30 to 40 years, from the Fehértó-A sample. The defect is located on the left side below the M3 space near the inferior border. The defect is well defined and has a cor-

Fig. 1. Mélykút-Sáncdűlő (6860)

Fig. 2. Fehértó-A (1679)

Fig. 3. Fehértó-A (2434)

Fig. 4. Fehértó-A (1869)

rugated floor measuring 8×4×ca. 3 mm deep. Anterior to this defect, as seen on the maserate specimen, is another defect which is probably due to erosion of the bone, which often happens in archaeological material. Anterior to this, and below the space between M2—M1, is an erosion area, involving the cortical bone, showing a tumor or eroded underlying hemorrhagic cyst. This shows up quite well in the x-ray as does another radiolucent area more anterior in the mandible. The Stafne defect itself barely shows as a radiolucent area near the inferior border of the mandible.

Case 4: A female (1679), age 30—35 years, from the Fehértó-A sample. The defect is located below the M3 space and measured 10×6 mm, and is at the inferior border of the mandible. The floor of the defect displays both smooth and granular bone. (Fig. 2.) The x-ray shows a well defined border superiorly, anteriorly and posteriorly, but the inferior border is quite diffuse and coincident with the inferior border of the mandible.

Case 5: A male individual (2434), age 50 to 60 years, from the Fehértó-A sample. The defect in this individual is found on the right side below the M3. It measures 25×8 mm and is bilobed, conjoined, and the floor of the defect is granular in both lobes. The posterior portion of this defect is quite definitive, becoming beveled and more diffuse as it moves anteriorly. The borders seem sclerotic and are well defined in the x-ray. (Fig. 3, 8)

Case 6: A male (1869), 40 to 45 years of age, from Fehértó—A sample. This defect is located on the right side of the mandible below the M1—M2 space. It measures 15×8 mm and the floor of the defect varies from smooth to granular and in some parts the granular-corrugated nature of the floor appears stellate. (Fig. 4) All borders are fairly diffuse and the interior of the defect seems composed of well developed cortical bone which is radio-opaque and does not allow the defect to show up well on the x-ray.

Fig. 5. Fehértó-A (1725)

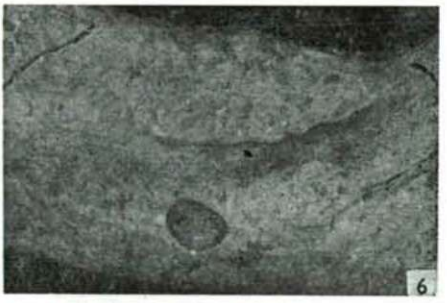

Fig. 6. Szeged-Kundomb (836)

Fig. 7. Mélykút-Sáncdűlő (6860) x-ray picture

Case 7: A male (1725), age 35 to 45 years, from the Fehértó-A sample. The defect in this individual is found on the left side below M2. It is 20×7 mm and has a corrugated floor. (Fig. 5) The sides of the defect are somewhat beveled and therefore diffuse in the x-ray, but the defect is deep enough and the floor covering light enough that is shows up well on the x-ray.

Case 8: A male (1808), age 40 to 50 years, from the Fehértó-A sample. This individual displays a defect on the right side of the mandible below M3. It measures 8×5 mm and has a granular-corrugated floor. At the inferior border of this defect there is good definition, but because of the beveled and diffuse nature of the defect anteriorly and superiorly this defect cannot be seen in the x-ray.

Case 9: A male individual (755), age 55 to 65 years, from the Szeged—Kundomb sample. This defect is found on the right side and is bilobed to the point where two separate defects can be noted. The anterior defect found below M2 near the inferior border of the mandible measures 9×5 mm and the second defect located posteriorly 10 mm has major and minor axises of 5 and 3 mm. In each ca the defect lies close to the inferior border and the floor contents of each defect is granular, corrugated and irregular. Again, this defect, although it is well displayed on the maserate specimen, shows borders diffuse enough and floor dense enough, that the defect does not show in the x-ray.

Case 10: A male (836), age 30 to 35 years, from the Szeged—Kundomb sample. The defect in this individual is located on the right side below M2. The borders are well defined and the defect measures 8×5 mm. The floor of the defect is granularcorrugated. Although this defect is small the borders are adequately defined and the defect can be seen on associated x-rays. (Fig. 6, 9)

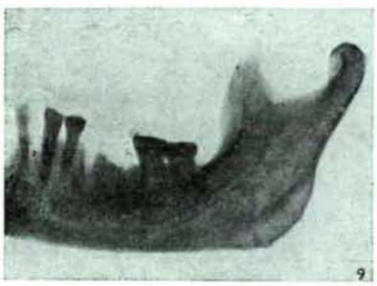

Fig. 8. Fehértó-A (2434) x-ray picture

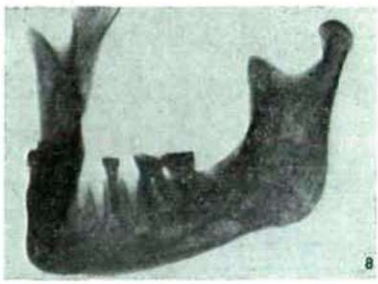

Fig. 9. Szeged-Kundomb (836) x-ray picture

Results

Considering our earlier study (FINNEGAN and MARCSIK, 1980) and this study the location of the Stafne idiopathic bone defect is usually found below the M3 or between the M3 and the angle of the mandible. It appears that as the location of the defect moves anteriorly the frequency of cases falls off almost in direct proportion, with six cases below M2, four cases below the space M1—M2, two cases below M1 and one case found below PM2. (It must here be noted that the defect below PM2 from Finnegan's Smithsonian data might well be an anterior defect, although the morphology of this particular defect agrees with Stafne idiopathic defect located more posteriorly on the mandible, the location itself is in the region which starts the incidence of anterior mandibular defects.).

In total 59 defects were found in the literature search and actual observation of mandible in this study. The total number of mandibles considered was 5519 which shows an incidence frequency of the Stafne defect of 1.069% based on the mandible. However with the defect occurring either on the left or the right side, or bilaterally, the frequency becomes .5345% defects per side of mandible.

With respect to sides, we find that the defect is more frequent on the left than on the right. With respect to sex dimorphism we find the males display the STAFNE idiopathic bone defect more often than the females.

Discussion

As pointed out above, a number of researchers have suggested various etiologies for the Stafne idiopathic bone defect. The conclusion of the present authors is that this defect is developmental and most probably the result of some pressures caused by the sublingual or submandibular gland and that it is not due to trauma as it is easily distinguished from traumatic or hemorrhagic cysts of the mandible as pointed out by many authors (FRIDMAN, 1964; GUALDI et al., 1971; HOREJS and PAVEK, 1972; KILLEY, 1963; MOSS and LEVEY, 1966; PHEMISTER and GORDO, 1926; WHINERY, 1955).

HARVEY and NOBLE (1968) suggest that the oldest known case of the Stafne defect is from Tennessee dating 750—500 B.C. We are now aware of two older finds one female skeleton dated by radiocarbon to 1600 years B.C. (material is discussed by BASS and HEAD (1974) and the oldest STAFNE defect on record is that from a male individual from the Early Bronze II age of Jordan, radiocarbon dated to 2624 B.C. (SI—2499) as reported by FINNEGAN (1978).

The size, shape, and location of the STAFNE idiopathic bone defect as seen in both archaelogical material and clinical cases suggest that they are developmental and might follow some other prescribed course of development than normally seen in terms of early developmental defects.

Additionally, a number of mandibles, particularly in the archaeological literature, show bilateral development with one side of the mandible displaying better development than the other side of the mandible. Indeed, the possibility of two defects on the same side of a mandible showing differential development has been noted by FINNEGAN (1977). From the clinical reports we only find one Stafne idiopathic bone defect that histologically produced contents which may be considered pathological in nature (SIMPSON, 1965).

With this low incidence of pathology and not knowing if the pathological entity found was directly caused by the Stafne idiopathic bone defect we must suggest that in the majority of cases (FINNEGAN and MARCSIK, 1980) the STAFNE idiopathic bone defect is not pathological in nature.

As shown by some of the archaeological material the STAFNE idiopathic bone defect can be seen on the dry maserate specimen, but not in an x-ray of the same specimen. The primary reason for this is that the defect has not developed far enough to show a definite margin of normal or increased bone density with a depressed floor showing a more radiolucent picture for diagnosis. This suggests that in the clinical literature many Stafne idiopathic bone defects would be found except they have not developed to the extent of showing up on panoramic or other x-ray techniques. With various new techniques in radiography and sialography these bone defects could probably be found in more clinical cases. However, if the defect does not show up on a general panoramic x-ray these further x-ray techniques would probably not be undertaken (JOHNSON, 1970; PHILLIPS and SHAWKAT, 1973; STAFNE, 1953; UEMURA et al., 1976).

The etiology of the Stafne idiopathic bone defect might stand a better chance of analysis if more information were supplied with the clinical case studies and the archaeological studies of this defect. In the future the information we should like to receive in order to better document the incidence of the Stafne idiopathic bone defect would

be the following: age, sex, race, size, side, and provenience of the sample, other non-metric traits associated with the defect, the condition of the dentition, and other pathological evidence either from the mandible or maxilla and the remainder of the skeleton as well. If indeed we had a large enough sample with all of this information we might then be able to make some association with this defect and the general health of the individual or show the increased incidence of the defect in various populations which may allow study of the genetic or nutritional basis of the defect based on the environment of the populations under study.

Conclusions

The word conclusion to head this section may well be somewhat premature. We suggest no "conclusions". However, what we have done is shown the incidence, age, sex, size, location and side relationships of the Stafne idiopathic bone defect and the fact that it can be readily distinguished from other pathological entities of the mandible. We have also shown that the sample populations from the Avar period in Hungary have a much higher incidence than reported elsewhere in either archaeological or clinical literature. We feel that the Stafne idiopathic bone defect, in light of the above discussion, warrants more research into the behavior and the exact developmental stages of this defect. While it is too early to suggest that this defect is genetic or due to nutritional deficiencies we think that this material lends itself to these possibilities and further research should be done in trying to determine the exact etiology of this bone defect.

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