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INDIVIDUAL DIFFERENCES IN THE MENTAL REGION ACCORDING TO MACROANATOMICAL STUDY DATA

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Abstract:

Objective: Anatomizing the mental spine area, nutrient foramen system, and mandibular canal to discover anatomical and radiological features of the mandibular mental region.

Materials and Methods:Research involved an anatomical study, namely manufacture of gross specimens stained by in-house methods to detect the vascular-nervous tract. It involved craniometric measurements of 200 corpses aged 50-70 without maxillofacial pathology. Using a Gigli saw helped obtain and examine 200 mandibular fragments. The resulting defect was replaced, using an alginate fragment and mimicking denture teeth. The tract was anatomized under the binocular loupe MBS-2, using microsurgical instruments. Bone specimens with the separated vascular-nervous tract were examined by macro- and micro-preparation methods.

Results: Comparison of anatomical and radiological findings revealed correlation between the skull type and the mental foramen shape. Macroanatomical and radiological findings showed 3 types of the mental spine canal.

Conclusion: The results of the work conducted provide a fair presentation of the peculiar structure of the mental cavity and the intra- and endoosseous branches of the mental nerve, and the canal of its end correlates with the mental spine canal.

Keywords: *mental spine, vascular-nervous tract, mandibular canal, mental nerve*

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INTRODUCTION:

As known, there is a single or double mental spine – spina mentalis (the start point of the geniohyoid and genioglossal muscles) inside the mandibular body near the median line. The International Anatomical Terminology (FCAT, Moscow, 2003) distinguishes both the upper and lower mental spines, but there has been no evident existence of a canal network from the spine penetrating the mandibular bone.

Hypotheses about the presence of a vascular-nervous tract (VNT) inside the canal suggest cross innervation and blood supply of the mental region. An anatomical study of the mental spine area [5] discovered a canal surrounded by compact substance lying behind the canal of the intraosseous part of the mental nerve and separated from it by this compact substance [3,7]. Of interest is research [3] focusing physicians on the peculiar interior of the mandibular anterior with account of the topography of mental nerve canals and on a safe entry zone. Such an approach largely reflects current trends in personalized medicine [6] and should be considered by restorative GPs and maxillofacial surgeons [1,2,9]

This study aimed to discover anatomical and radiological features of the mandibular mental region.

MATERIALS AND METHODS:

Research involved an anatomical study, namely manufacture of gross specimens stained by in-house methods to detect the VNT (RF Patent No.2438307). Research followed ethical standards under relevant documents. It involved craniometric measurements of 200 corpses (Table 1) aged 50-70 without maxillofacial pathology. Using a Gigli saw helped obtain and examine 200 mandibular fragments. The resulting defect was replaced, using an alginate fragment and mimicking denture teeth. The VNT was anatomized under the binocular loupe MBS-2, using microsurgical instruments. Bone specimens with the separated vascular-nervous tract were examined by macro- and micro-preparation methods.

Table 1: Distribution of corpse material by skull age and type

Skull type	Dolichocephal		Mesocephal		Brachycephal	
Age/Sex	50-60	61-70	50-60	61-70	50-60	61-70
Male	23	22	17	13	14	12
Female	24	21	11	17	13	13
Total: 200	47	43	28	30	27	25

Histodiagnosis involved VNT sections 0.1-0.2 cm long from the mental spine canal area. The material was impregnated with silver nitrate by the Christensen method. The shape, size, and number of vessels and nerves in the resulting tracts were examined under the eyepiece MOV-1-15x. The confidence table helped calculate Student's P coefficient: if $t>2$, then $P>95\%$. If the calculated t-criterion is above or equal to 2 ($t\geq2$), which matches the accurate prognosis P as equal to or above 95% ($P\geq95\%$), the difference should be considered statistically significant, i.e. conditioned by some factor, which will also occur in the population.

Findings were statistically processed in the Microsoft Office 2000 PC suite.

RESULTS:

The area of transition of the inferior alveolar nerve into the intraosseous mental nerve part is located on the mental foramen interior inwards and upwards and is mostly an oval foramen. Mental cavity interior is a hemisphere with a usual depth of 2.9±0,56 mm. However, it is hardly a question of two isolated branch parts separated by a bone barrier 1-2 mm long, and in 5% of specimens with an extra foramen the depth was 1-2 mm for the main foramen and ~1 mm for the extra foramen.

The inferior alveolar nerve exits the mental foramen inside it through the mandibular canal opening located inside and below, turning into the mental nerve. The canal opening diameter is 2 mm in 80% of meso- and dolichocephal cases and 3 mm in 20% of brachycephal cases.

The extraosseous mental nerve part, exiting the mandibular canal opening, forms the transition area above the bone barrier indicated above. The canal opening of the intraosseous mental nerve part is inside and above, diagonally relative to the mandubular canal opening. The average opening diameter is 1-2 mm in 70% of cases, whereas 25% feature a choanoid opening 1 mm in diameter, and 5% of cases feature cellular texture in the opening area. Thus, the mental foramen itself is a cavity or a

2.9±0.56 mm deep hemisphere with 2 interior foramens divided by the barrier.

Comparison of the anatomic features of mental foramen location with orthopantomogram data also revealed matching foramen opacities. However, although mental foramen outlines turn somewhat fuzzy, they are distinct enough to measure its shape and position.

We have found that 55% of dolichocephalic patients (97 roentgenograms) feature an oval foramen opacity. In 36% of mesocephals (56 roentgenograms), the shape of the mental foramen opacity is comparable to the specimen result and is oval. As a result of overlaying the mental foramen opacity on the beginning of the canal of the intraosseous mental nerve part, 50% of brachycephals (59 roentgenograms) revealed a slot-like form of the foramen opacity (fig.1).

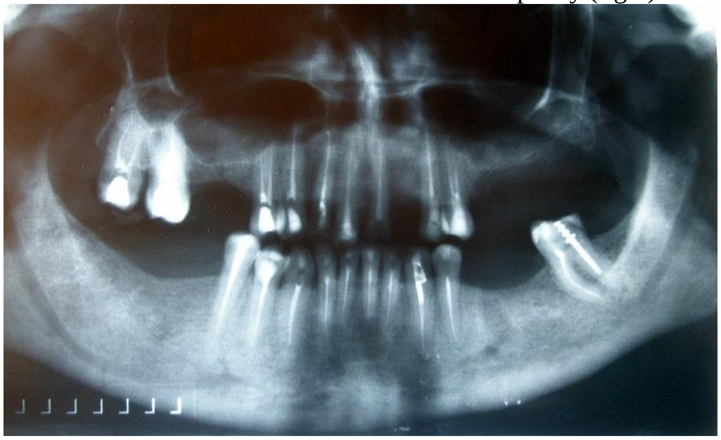

Fig.1: Mental foramen as a cleft open upwards in a 50-year-old female patient with brachycephaly.

The extra mental foramen was noticed on 4 orthopantomograms of dolichocephals (2 roentgenograms) and mesocephals (2 roentgenograms). The extra foramen is conditionally confirmed by radiography in all the 3 groups, as the opacity edges have no sharp outlines and may be artifacts.

In the samples impregnated by the Christensen method, the stereomicroscope MBS-9 with 12x zoom helped observe 3-6 fiber bundles and 1-3 vessels composing the VNT that penetrates the mental spine bone canal.

CONCLUSION:

The results of the work conducted provide a fair presentation of the peculiar structure of the mental cavity and the intra- and endoosseous branches of the mental nerve, and the canal of its end correlates with the mental spine canal.

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