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ROENTGEN-CRANIOMETRIC AND ROENTGEN-CEPHALOMETRIC ANALYSIS OF POINTS ON THE GERMAN SHEPHERD DOG BREED

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Viscerocranium condition and development teleroentgen analyses have been avoided for quite a long time, mostly due to the technical impossibility of proper fixation of animals during recording and numerous differences in defining reference proints for linear and angular measurements. Since the available literature offeredus such field data only from research on monkeys, and since there is no ideal standard for the German shepherd dog breed but only numerous variations, we have attemated to standardize elements (points) which relate the skeleton structure and teeth to other cranium bone elements. A total of 15 German shepherd dogs, 12 months old and of body mass 25-30 kilograma, was examined and the results of teleroentgen analyses were checked on skull preparations after killing the animals.

The most important radiocraniommetric points on the profile x-ray of a 12 months old German shepherd dog which could be used as reference parameters in the teleroentgenogram analyses are Nasion - N, Spina nasalis anterior - SnA, point A, Prosthion - Pr, Infradentale - Id, Pogonion - Pg, Gnathion - Gn, Menton - Mn, point Sella - S, Basion - Ba, Spina nasalis posterior - SnP, Porion -Po, Orbitale - Or, Gonion - Go, Articulare - Ar and Condylion - Co. Dog head point H and point Iv were taken as typical points for the mesocephal type of dog without analogy with human medicine. Studying the x-rays in sagittal or frontal dog head projection, we determined the most important radiocraniometric points of importance for the formulation of regular interrelationships of certain regions of the neuroviscerocranium: Zygion - Zy, Eurion - Eu, Ectomaxillare - Em, Ectomalare - ecm, points Eim, Ein, and the points Ecm, Ecp, Ecl and En were characteristic only for veterinary radiocraniometry. The following soft tissue points were detemined after analysis of the dog head skin profile by the radiocephalometric

method. Glabela -G, Nasion - Na', Pronasale - Prn', Labrale superior - Ls', Labrale inferior - Li', Supramentale - Sm', Pogonion - Pg', Gnathion - Gn', and the following points were derived for the first time without any analogy with human radiocephalometry: Dorsum - D', Prosthion - Pr', Menthon - M' and the point in the Iv' vasorum incisure. The derived radiocephalometric points on the dog head frontal x-ray were: Zygion - Zy', Eurion - Eu', ectomalare - ecm', point en' and Rostrum - R'.

Key words: teleroentgen, dog, radiology, radiocraniometry, radiocephalometry.

INTRODUCTION

Assessment of the human shape of the face, head and profile made the subject of interest to anthropologists at the time of the first analysis of various races and types. The personal sense of beauty was the fundamental criterion for certain standards in the determination of harmonious and the most ideal face proportions. The analysis of the neuro and viscero-craniumm became, first of all, a procedure that served to explain the origin and development of numerous clinical malocclusions. As the most approximate experimental model to man, Rhesus monkeys were the ideal form for use during the collection of information about the harmony or disharmony of the maxillofacial complex and the face and head structural shape. The relationship between the upper and lower jaw, where we measured the profile restricted by the position of the viserocranium in relation to the neurocranium, teeth position, diagnosing changes of the head bone structure during growth etc, were aimed to make a typization and to determine the ideal type.

In the available literature we found data from that field only from research on men and monkeys, and for that reason we considered that it would be of interest for veterinarian medicine, both from the scientific and from the practical point of view, to determine the most ideal standards or conditioned norms which a pure bred dog should fulfil, in order to approach in quality the perfect or fictitious type which was created by selection. It would be also of importance to use the head profile roentgenogram in the diagnostics, prevention and therapy of various malocclusions in dogs (prognathism, retrognathism, cross-bite, different development defects-micrognathia, palatal fissure, polyodontia, etc).

Concerning the choice of breed, used in our experiments, we were guided in the first place by experience from our clinical practice and by already published works about the frequency of the appearance of such anomalies in the various dog breeds. Therefore we chose the German shepherd as the most appropriate and the most representative breed. Moreover since the majority of changes on the teeth and their bone fundament develop in the period of origin of the permanent dentition, we considered that the age of 10 to 12 months was most optimal for research. Although there is no ideal standard for the German shepherd dog breed, but only numerous variations, we thought

it would be necessary to make a roentegencraniometric and roentgene-cephalometric typization of elements which represent the balance of the skeletal structures and teeth in relation to other bone structures.

The selection of craniometric and cephalometric reference points that would give us proper insight into the roentgenmorphoimetrical testings of dog heads is of importance for the obtaining of precise data about the type of a certain breed skull, and is exceptionally difficult. Although roentgencraniometry and roentgencephalometry have been used in human medicine for more than 60 years (Hofrath, 1931, Broadbent, H. 1931) even today scientists do not use a unique method for the selection and position of points, but they employ combinations of certain parameters, obtained from various authors (Korkhaus, 1936, Schwartz, 1966, Bjork, 1947, Steiner, 1953, Ballard, 1948, Downs, 1948) for a successful morphological - statistical and development-dynamic analysis. Analogy among data from the literature that relates to the parameters used in roentgencephalometry and roentgencraniometry in human medicine (Tweed, 1954, Whyllie, 1947, Hoffer, 1954, Sassouni, 1955, Bimmler, 1967, Ozerović, 1968, Goldstein, 1988, Gans, and Sarnat, 1989) with the same anatomic entities on dog heads is possible only partially. Specific or different positions, form and size of individual organs of a dog head (ear, eye, snout, lips, etc) require, therefore, a special selection of points, relevant for the assessment of morphological characteristics and harmonization of relationships of certain anatomical regions (Kraut, 1990).

MATERIALS AND METHODS

ANIMALS AND PROCEDURE

Animmals - Fifteen German shepherd dogs were used for the roentgencraniometric analyses. They belonged to a homogenous group from two litters and were 12 months old, of the same sex with body mass from 25 to 30 kilograms. All recordings were made on animals under full anesthesia. In order to check the results and to confirm them to a maximumm degree, that is to say - to avoid methodical error (eventual head inclination in the course of work with a dog), the experimental animals were sacrificed and decapitated, and cephalometric records in both projections (LL and DV) were carried out afterwards. Craniometric x-rays were obtained after the removal of all soft tissues from skulls of the tested group of dogs. During the preliminary testing, we determined the most suitable x-rays for the recording of head and jaws (65 kV and 24 m A), Exposure time amounted to 0.03 seconds and the film focus distance was 1.5 m.

Analyses. Profile records have mostly been taken during teleroentgen analysis and for that reason the animals were recorded in the lateral (side) projection. Therefore, they were fixed in a bone-abdominal position. The head of the experimental animals was placed above the marker on a recording table (white line, parallel with the table edges), so that it divided the mandibula into two symmetric parts and coincided with the body edial level.

The film cassette was fixed in a metal handle and placed directly on the animals face, but care was taken that it should be parallel with the medial - sagittal head level. The head horizontal position was determined by a line that connected the skin points orbit and tragion. In spite of all that, the mandibula peak had to be raised gradually from the table by handles which lest no traces on the film and did not press its lower edges. Checking of such a head position and of the said horizontal line was carried out by a lighting sight, mounted on the roentgen device, which had drawn coordinates placed so that the central x-ray could always pass through the middle point of the system. Such an animal position control system decreased the possibility of rotation of the head and of its inclination sidewards to the smallest extent.

For dorsoventral (DV) - (norma ventralis) ecordings, the animal was placed in a bone-abdominal position, with its head placed on a cassette, above the market on the recording table the direction of which coincided completely with the body sagittal level was used for the orientation plain for the horizontal position of the neuroviscerocranium. The line connecting orbit skin points and tragion. The biporion plane was normal in relation to the film, at the distance of 15 cm, and the x-ray beam was directed over a lighting sight at right angles to the middle of the forehead bone. Ffo (anodal focus-film distance) was 150 cm, as for the profile record.

RESULTS

Points. In the roentgencraniometric and roentgencephalometric analysis of the German shepherd dog head we used the points already known in anthropological testing. Some of them exist as skull prominent anatomical entities, while the others are not emphasized as special skeleton anatomical details, but are visible, first of all, as a roentgen record (teleradiogram). Besides the points determined by bone configurations, we marked also the ones which we found through geometric construction on the head roentgenogram, or which were projected on the cross-section of shadows of various bone elements.

All points used in the present work, were defined as central or medial ones, and they were odd and located in the sagittal plane, or lateral - even points, distributed left and right of the medialplane, at various distances from it. Both sorts of points were given certain symmbols, and when the same symbols had to be used both for a cephalometric and craniometric point, then we added a dash to soft tissue points.

Profile radiocephalometric points. Studying a head profile record, beginning from the forehead and to the ventral direction, we defined the following soft tissue points.

Nasion - Na' - represents a skin point on the head face profile, projected contrary to the nasofrontal sutura. It represented the nose root deepestpart that was not particularly expressed in 10-month-old German shepherd dogs. In our drawings, that skin point did not coincide with the bone nasion, but was situated somewhat lower to it (Figure 1).

Pronasale - Prn - We used that point to define the most prominent part of the nasal mushroom and it was particularly emphasized in our experimental dogs. It needs to be pointed out that both the nasal mushroom and the upper lip made a snout on our drawings, so that the transition of those two anatomical parts was almost imperceptible. The specific shape, structure and form of the nasal mushroom demand a precise statement of parameters which are of importance for the formation of the face relationships and sizes. For that reason, we marked the most dorsal point of the rostrum with Dorsum - D', and the most prominent ark of the groove that separates the upper jaw from the nose with Pr' - Prosthion (Fig. 1).

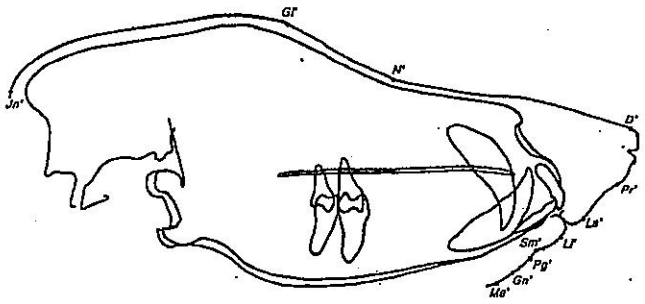

Figure 1. Profile radiocephalomemtric points

Labrale superior - Ls' - was the most prominent part of the upper lip. On the profile record we noticed that the upper lip was divided by a groove along its middle.

Labrale inferius - Li' - designated the most proinent point of the lower lip. On our drawings we noticed that it was very difficult to characterise that point because the lateral angle of the lower lip was loose and cogged so that the x-ray showed shadows of irregular outline.

Supramentale - SM' - Although the transition of the lower lip to the chin skin was poorly ephasized on the roentgen record in all experimental dogs,

we noticed a slight concavity in the area where the Sm' point made the deepest zone of the chin skin profile (Fig. 1).

Pogonion - Pg' - That skin point was constructed at the most convex part of the chin when we noticed that it did not correspond completely to its bone pair, because it was placed in front and behind it. That is to say, the position of that point depended directly upon chin muscle development.

Gnathion - Gn' - It deserbed the makes of lowest point of the chin in the middle line. That cephalometric point was constructed with the projection from the bone gnathion. The skin Gn' did not coincide completely with the bone one, because it was located somewhat below and in front of the bone Gn.

Besides the mentioned points which could be derived from human cephalometry, we also formed some which were specific for veterinarian cephalometry.

On our drawings, we determined with the point Me' - menthon the transition of the chin soft tissue shadow to the shadow of the mandibula lower edge, and the slight concavity of the skin profile in the area incisure vasorum was marked with the point Iv'.

Radiocraniometric points in profile projection

In veterinary roentgenographic craniometry there was a large number of points which were of essential importance in the formulation of regular interrelationships of single parties and regions of head and face. The following were constructed from odd or central points.

Nasion - N - That bone point was designed on the cross section of the nasofrontal sutura with the skull middle. We determined it on the exocranial - exopermanent surface, of the junction of the frontal and nasal bone. That sutura was in our experimetanl animals completely closed, and for that reason we determined the nasion point in the following way: we joined the head rostrum points Gl and D (glabella and dorsum) with a line, and the nasion point on the bone fundament was the most distant part from that line (Fig. 2). Point H - It was the most prominent part of the oss nasale, and it was easy to us to define it on the profile roentgen record of the head of experimental dogs, because the anatomic detail which corresponded also to the roentgencraniometric entity was very outstanding.

Spina nasalis anterior - SnA - That point was represented on the profile record of a dog head as the top of the nasal thorn. It formed the upper jaw extension and was situated in the medial plane. Point A - That point was constructed at the deepest part of the upper jaw or premaxilla bone profile and it was situated between the points Sna and Pr - prosthion. It was localized in the medial plane and did not correspond to any anatomical detail. Thus, it was a pure roentgencraniometric point. The place where we defined that parameter was named the apical basis and it denominated the transition of the alveolar continuation into the upper jaw body. That was haw we determined that its actual position was on the front exterior part of the medial sutura of the incisal bone.

Prosthion - Pr - We defined it also both as a morphological and a roentgencraniometric point. It was the most prominent, or lowest point of alveolar continuation on the upper jaw in the medial plane.

Infradental - Id - That point was similar to the previous one but we determined it on the roentgen film as the highest part of the alveolar continuation of the lower jaw, We represented it also as a morphological and roentgencraniometric one. The points Pr and Id are the further most lower and the furthermost upper part of the aalveolar continuation of the maxilla and mandibula respectively.

The two following bone points were described by us both from the anatomical and craniometrical aspect. They were very similar in position and we established that their precise determination depends, first of all, upon the position of the head during recording. Pogonion - Pg - The front part of the chin bulge was marked with that point. On the profile record of the head of the experimental dogs there was also something anatomically above the second important craniometric point, marked as Gnathion. The Pogonion point was graphically constructed by joining the points Infradentale and Gnathion, and we drew a parallel which tangented the exterior edge of the chin bulge. We represented it in another way as the most prominent point of the front edge of symphysis shadow.

Gnathion - Gn - That point was marked roentgencraniometrically as the chin lowest point in the medial plane. Its exact position was determined with a geometrical construction. Which was the most reliable criterion. This showed us that the Gnathion was located at the front edge of the symphysis shadow, cut by an angle symmetral between two planes of the face front height and the mandibula basic plane. That point could be obtained on the symphysis shadow curve between the most prominent and the most distal part of the mandibula.

Menthon - Me - In our radiographic analysis it was represented as a pure roentgencraniometric point without any anatomic determination. We constructed it on the profile head record at the place where the shadow of the lower edge was connected with the chin round bone shadow, or on the lower rear edge of symphysis. Menton was situated on the interior part of the lower jaw body, behind the chin,or localised somewhat more caudally from the really lowest part of the lower jaw.

Point Iv - We constructed it at the most concave part of the lower jaw body, in the region of the incizure vasorum. Regarding the medial points, the following one listed.

Point Sella - S - It was a geometrical projection in the middle part of lighting which denominated the hypophyseal pit (sella trucika). They were both determined as a simple inspection and a line connecting dorsum (processus clinoideus posterior) and tuberculum sellae t. so that the points was located in the middle between the denominated line and the deepestpart of the hypophysed pit bone outlines (Fig. 2). Sella turcika was located somewhat cranially from the sphenooccipital synchrondosis. The point S was used as the reference value, particularly at the construction of the line N- S which made up the basic line of the front skull pit.

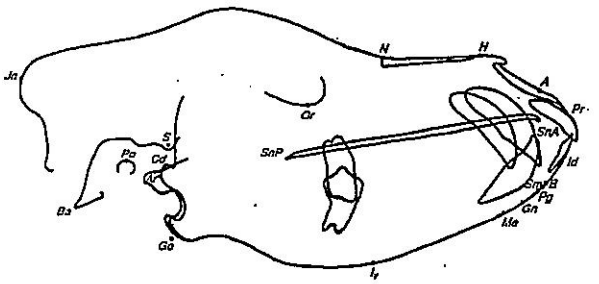

Figure 2. Radiocraniometric points in profile projection

Basion - Ba - The said point was monitored both as a morphological and as a rentgencraniometric feature. On the profile recording of the experimental dog head it represented the lowest point of the occipital bone shadow. It was located in the medial plane on the front edge of the large occipital bone hole (Fig. 2). Spina nasalis posterior - SnP - marked the top of the nose rear thorn. It was situated at the aboral, rear part of the hard palate in the region of the medial plane.

Out of the even lateral points which were symmetrical in relation to the medial plane, we list here the following:

Porion - Po - On the experimental dogs profile record it represented the highest part of the upper edge of the external ear channel (porus acusticus externus), so that it was a pure bone morphological point. We determined its position in the way that we determined the upper edge of the jaw head, because it was situated at the same level as the bone perion.

Orbitale - Or - It was determined by us from the profile record of the experimental dog heads as the lowest point of the orbit bone shadow. That morphological point was localised on the orbital part of the zygomatic bone.

Gonion - Go - The position of that point was difficult to establish. On our drawings, we defined it as the most distal, lowest and the most lateral point of the mandibular angle, at the place of contact of the mandibula body lower edge and the rear edge of its branch.

The constructional position of that point was determined also as the place where the angle symmetral made by the body lower edge tangent line

and the ramus rear edge cut the mandibula angle contour. Regarding the points which determine the mandibula in the roentgenographic radiocraniometry, it would be necessary to point out two ore which were, laterlal or even in poisition: Articulare - Ar and Condylion - Co.

Ar - is the bone point by which we marked the border of the mandibula head bone shadow with the shadow of the occipital bone external surface.

Co - is the mandibula head highest point (Fig. 2).

Radiocraniometric and radiocephalometric points in sagittal projection

In spite of the fact that DV (frontal) records have been used more seldom in roentgencraniometry and roentgencephalometry than the profile ones, they are still indispensible for the determination of regular relationships of the, first of all, viscerocranium (normal occlusion), but, after that, also for adequate analysis of the balance of skeletal parameters, indispensable for the assessment of dog head morphological characteristics.

In our work, the following bone even points were determined on the German sheepherd dog skull (Fig. 3 and 4):

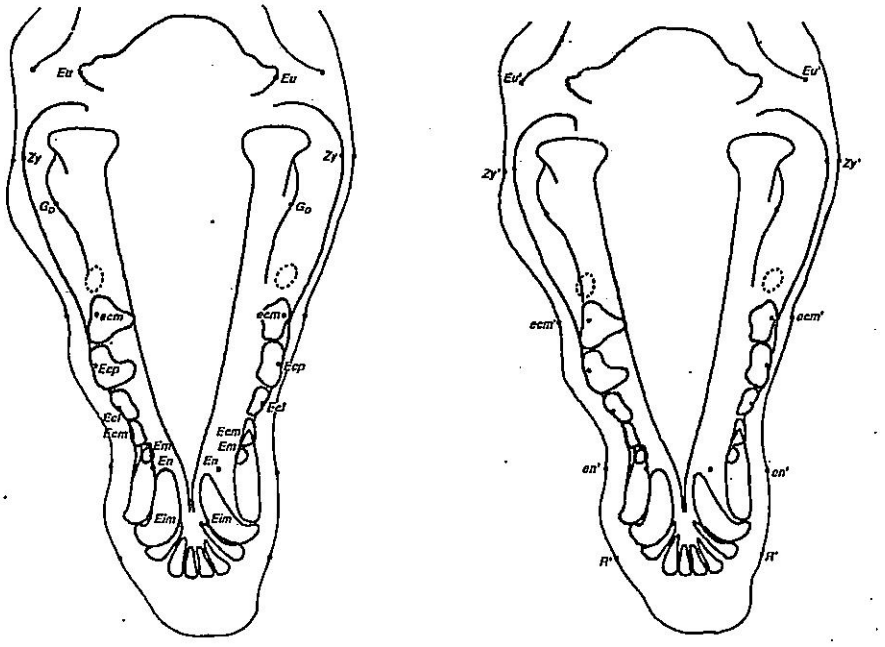

Figure 3. Radiocraniometric and radiocephalometric points in sagittal projection
Figure 4. Radiocraniometric and radiocephalometric points in sagittal prejection

Zygion (Zy) - The point on the most lateral part of arcus zygomaticus and its skin parallel Zy', was used to define the face upper height because it was most prominent in relation to any point of the frontal record.

Eurion (EU) - Even points, situated at the most lateral and the most prominent part of the parietal or temporal bones. There were individual variations in their position. The skin points were arked with the symbol Eu'. The position of the Eurion point was important also because the skin in that region was firmly linked with the bone foundation and because it give us the best insight into the actual size of the skull vault.

Ectomaxillare (Em) - The bilateral point on the narrowest part of the upper jaw body in the DV projection.

Ectomalare (ecm) The bilateral point was determined at the vestibular surface of the alveolar continuation towards the middle of the first permanent molar in the upper jaw. The roentgencephalometric point was ecm'. It was important because its precise determination defined the biggest width of soft tissues (skin points) of the upper jaw, or a regular occlusion with the lower jaw.

Eim - That even point was defined to be at the end of the maxilla incisive bone teeth arch aborally from the third incisor.

Ein - That craniometrical parameter was constructed as an even point at the cross section of the third incisor apex and the mandibula external bone shadow. That point, described the biggest width of the lower jaw dental angle, that is to say - the proper relationship of a bite with the upper jaw.

Ecm - We marked that even point at the aboral part of the alveolar continuation of the upper jaw second premolar.

Points Ecp and EcL - Those points were situated on the aboral parts of the alveolar continuations of the upper jaw fourth and third premolar. The three points (Ecm, Ecp and Ecl) Were important for the determination of the biggest and optimal upper jaw body width. They should be placed more laterally from their members on the mandibula in order to create a proper occlusion. Moving all three points in a linqual direction designated full overfolding of the teeth biting surfaces (premolars and molars) of the upper and lower jaw, and, therefore, also faster wearing out En -It was situated in the region of the alveolar continuation of the mandibula first premolars, and the symbol en' was used to determine the skin even point which was derived from the previous one. Its importance was reflected in the fact that we can define by it the smallest width of the lower jaw body width. It should be always overfolded by the upper jaw premolars, in order to enable the teeth to be in a regular occlusion. The lateral protrusion of that point is characteristic for a pug-dog jaw.

The even roentgencephalometric point R' is situated at the mostprominent lateral part of the nasal mushroom (Fig. 3 and 4).

DISCUSSION

We will list the points which could be easily determined on roentgen records because the bone shadows which determine their position belong to the group of so-called anatomical and craniometrical points: Nasion (N), Spina

nasalis anterior (SnA), Spina nasalis posterior (SnP), top of os nasale (H), Prosthion (Pr), Infradentale (Ir), Fossa incisurae vasorumm (I).

The following points belong to the group of points which are also situated on the bone base, but it is difficult to see their place at a specific region: Pogonion (Pg), Gnathion (Gn), Menthon (Me). Sella (S), Bassion (Ba), Articulare (Ar) and Condylion (Co).

In roentgenography, there is also the third group of points or the, so-called, construction points. They are the ones which can be defined on a roentgen record primarily with the help of geometrical construction: point A, Gonion (Go), Gnathion (Gn), etc. In the cephalometry application there are differences in position among skin and bone points although many of them bear the same name, except for the points Glabela (G), Dorsum (D) and the point Rostrum (R). Many individual characteristics of the development of the subcutaneous connective and fat tissue as well as of the musculature have an influence upon the position of these cephalometric points. For that reason, also individual variability of the position of those points in relation to the craniometric pairs is great - Pogonion (Pg'), Gnathion (Gn').

The following points have been introduced by us for the needs of roentgen morphometry in veterinary medicine particularly for the dog: Dorsum (D), Rostrum (R), Incissura vasorum (Iv), nose bone top (H).

The skin points D and R are not on the profile records of the human head because the human head has a clearly profiled nose and upperlip. but in dogs.the nose and the upper lip are joined in the nose mushroom (planum nasi) which is divided vertically by a groove. In human medicine there are no bone and bone poins (Iv). In dogs, it is visibly determined, stressed and it gives the possibility for construction of a line that determines the face middle height. That point (Iv) takes part in the formation of the angle Iv, made by the lines MeIv and GoIv, an important participant in the sumary of polygon angles.

The point (H) represents the most prominetn part of nasal bone and it could be easily defined on the profile roentgen record of a dog head, as a very expressed bone anatomical detail for dolichocephalic and mesocephalic breeds. In human medicine, that point could be used for the assessment of forms of the face (nose) middle third.

Regarding the central and medial points, it is mostly important to metnion the point Sella (S) which is constructed in the middle part of englighting (Sella turcika), and we can say that it is a spacial point because it is not defined on any bone structure. According to data from human medicine (Krogman, Sassouni, 1957), the hypophyseal pin moves forward and upward during the growth period, but it could be said that the position of the point No. Is quite stable. Postnatally, the resorption at the saddle rear wall and the thickening of lime shadows at the sphenoidal surface of the sphenooccipital synchondrosus is visible for a long time.

In human medicine (Muller, 1962), the points Porion (Po) and Orbitale (Or) have been used for the definition of the so-called Frankfurt horizontal line, a line that determines the head horizontal position at the time of recording in order to enable olivae cephalostata to fix the head. That horizontal line cannot

be used as a destination point for dog head fixation because dog ears are located more dorsally and the placement of oliva cephalostata in the outer ear hole would be of no use.

The chin shape (roundish, oval, square, etc) determines on DV record the points Gnathion and Menthon. Gnathion represents the most prominent point of the protuberantia mentale in the region of the chin triangle base on the medial line. Although the trigonum mentale is only slightly expressed in dogs if studied on the isolated part of the lower jaw that parameter could be precisely observed on a roentgen record when the head is situated horizontally. That point is not always the mandibula front part lowest point. With wide, square chins, it could be lower than the middle part or median.

The Menton point is situated on the internal part of the lower jaw behind the chin, so it should not be confused with Gnathion, although those two points could be represented at the same position. In fact that is not possible because the symphysis shadow on the head roentgen record is obtained by the tangential flow of x-rays along the mandibula internal side, so that Menton is actually localised somewhat caudally from the lowest part of the lower jaw body.

Besides the points which determine the vertical line, there are also even points which participate in the formation of transversal proportions of the face and head. They are of particular importance for cynology, because we can then determine various combinations of the relationships of neuro-viscrocraniums of certain regions. It supplements to a great degree the considerably subjective and approximative method for the assessment of harmony and disharmony of a complete canine head, which exists within official cynology now. Further investigations in that direction may also enable the determination of changes which are manifested during the growing period and the development of each individual separately. Besides that, it is indispensable to carry out such an investigation for each dog breed separately.

However, such roentgencraniometrical and roentgencephalometrical points which could offer us a number of details for the assessment of breakdowns in the skull and face outlook, are not of special importance in orthodontics.

CONCLUSIONS

After the detailed, systematic, experimental, radiocraniometrical, radiocephalometrical and morphological explorations, the following conclusions could be made:

1. The most important radiocraniometirical points on 12-month old German shepherd dog head profiles which could be used as reference parameters in the analysis of teleroentgenograms are: Nasion - N, Spina nasalis anterior - Sna, point A., Prosthion - Pr, Infradentale - Id, Pogonion -Pg, Gnathion - Gn, Menton - Me, point Sella - S, Basion - Ba, Spina nasalis posterior - SnP, Porion - Po, Orbitale - Or, Gonion - Go, Articulare - Ar and Condylion - Co. The points H and Iv were determined as typical for the mesocephal type of dog without any analogy in the marking of points in human radiocraniometry.

2. By analysing the records of sagital or frontal projection of the dog head we determined the most important radiocraniometric points of importance for the formulation of proper interelationships of certain regions of the neurovis-cerocranium: Zygion - Zy, Eurion - Eu, Ectomaxillare - Em, Ectomalare - ecm, points Eim, Ein, and the points Ecm, Ecl and En which are characteristic only for the examined animal type.

3. Analysing the dog head skin profile by the method of radiocephalometry we have established the following important points for soft tissues: Glabela - Gl, Nasion - Na', Pronasale - Prn', Labrale superior - Ls', Labrale inferior - Li', Supramentale - Sm', Pogonion - Pg', Gnathion - Gn', and for the first time, without any analogy with human radiocephalometry, are the points: Dorsumm - D', Prosthion - Pr', Menton - M' and the point in incisura vasorum Iv'.

4. The radiocephalometrical points on the frontal record of a dog head are; Zygion -Zy', Eurion - Eu', ectomalare - ecm', point en', and the point Rostrum - R', which has been defined in veterinary medicine only.

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RENDGENKRANIOMETRIJSKA I RENDGENKEFALOMETRIJSKA ISPITIVANJA PASA RASE NEMAČKI OVČAR

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SADRŽAJ

Telerendgenske analize stanja i razvića viscerokranijuma bile su dosta dugo izbegavane najčešće zbog tehničkih nemogućnosti pravilne fiksacije životinja prilikom snimanja i brojnih razlika u definisanju referentnih tačaka za linearna i angularna merenja. Pošto smo u dostupnoj literaturi pronašli podatke iz ove oblasti samo kod istraživanja na majmunima a poznato je da idealni standard glave psa rase Nemački ovčar ne postoji već samo brojne varijacije, mi smo u našem radu izvršili tipizaciju elemenata (tačke) koji se odnose na ravnotežu neurovisceralnih skeletnih struktura i zuba u odnosu na ostale koštane elemente glave. Eksperiment je izveden na 15 pasa rase Nemački ovčar, starosti 12 meseci i telesne mase od 25 do 30 kg, a rezultati telerendgenskih analiza su provereni na preparatima lobanja posle žrtvovanja životinja.

Najznačajnije radiokraniometrijske tačke na profilnom snimku glave psa rase Nemački ovčar uzrasta od 12 meseci, koje se mogu koristiti kao referentni parametri u analizi telerendgenograma su Nasion - N, Spina nasalis anterior - SnA, tačka A, Prosthion - Pr, Infradentale - Id, Pogonion - Pg, Gnathion - Gn, Menton - Me, tačka Sella - S, Basion - Ba, Spina nasalis posterior - SnP, Porion - Po, Orbitale - Or, Gonion - Go, Articulare - Ar i Condylion - Co. Kao tipične za mezocefalni tip pasa bez analogije sa humanom medicinom na glavi psa odredili smo sledeće tačke: tačka H i tačka Iv.

Posmatrajući snimke u sagitalnoj ili frontalnoj projekciji glave psa određene su najbitnije radiokraniometrijske tačke od značaja za formulisanje pravilnih međusobnih odnosa pojedinih regija neurovisceralnih kranijuma: Zygion - Zy, Eurion - Eu, Ectomaxillare - Em, Ectomalare - ecm, tačke Eim, Ein, a tačke Ecm, Ecp, Ecl i En su karakteristične samo za veterinarsku radiokraniometriju. Analizirajući kožni profil glave psa metodom radiokefalometrije ustanovljene su na mekim tkivima sledeće značajne tačke: Glabela - Gl., Nasion - Na', Pronasale - Prn', Labrale superior - Ls', Labrale inferior - Li', Supramentale - Sm', Pogonion - Pg', Gnathion - Gn', a kao prvi put izvedene bez analogije sa humanom radiokefalometrijom su tačke Dorsum - D', Prosthion - Pr', Menton - M' i tačka u incizuri vazorum Iv'. Izvedene radiokefalometrijske tačke na frontalnom snimku glave psa su: Zygion - Zy', Eurion - Eu', ectomalare - ecm', tačka en' i Rostrum - R'.