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"OVIDIUS" UNIVERSITY CONSTANŢA

FACULTY OF MEDICINE

DEPARTMENT OF PRECLINICAL DISCIPLINES

DEVELOPMENTAL DISORDERS OF THE DENTO-MAXILLARY APPARATUS AND POSSIBILITIES OF RECOVERY

- PhD THESIS SUMMARY -

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CONTENTS

INTRODUCTION

Being integrated more and more deeply into the general medical disciplines, the dentistry, and especially its branch, the orthodontics, benefit permanently of the discoveries in the field of fundamental sciences and of those of the general medicine, radically changing its approach and treatment method of the processes of normal and pathological growth and development of the dento-maxillary apparatus.

The last decades brought, for the orthodontics, very important developments related both on investigation and a re-evaluation of the clinical signs and on the evolution of the treatment techniques, the improvement of treatment techniques having as a result the extension of the field of activity for the whole facial skeleton. The new discoveries at the level of biomaterials allowed the evolution to arches, substances, collage systems, as well as a new design of the brackets. All these issues made orthodontics more efficient from the technical point of view, as well as much easier to be borne by the patient.

The modern orthodontics extended its preoccupations, dealing with occlusive anomalies, dento-maxillary, dento-alveolar anomalies, etc., having the scope of differentiating all that is beyond normality. It also studies the deviation from normality of the process of formation and development of the dento-maxillary apparatus, having the capacity to forecast its growth and development. Even with the newest developments of the orthodontic techniques, the practitioner must control very well the classical techniques which allow a strict approach of all that is new, both in the field of investigations and especially in the field of therapy. It is good to know that, even in the case of almost identical anomalies, the age and the behaviour of the patient can determine different choices related to the therapeutic attitude.

At present, the orthodontics is called ***maxillofacial orthopaedics*** (ODMF), the term suggesting the clinical, etiopathogenic study, the development and intermaxillary relations, functional disorders, as well as the profilaxy and treatment of dento-maxillary, skeletal and non- skeletal anomalies (D.M. An.). This context entitles Chateau to assert that the term of functional orthopaedics depreciated in its original sense (the recovery of growth) and that maybe the term of ***orthognathia***, in the sense of the art of changing significantly the facial architecture by the modification of growth is more correctly used.

The development of the dento-maxillary apparatus on the whole, as well as its components, is under the permanent modelling influence of the environmental factors and the stimulating action of the energetic contribution functions of the apparatus, which offers to this apparatus particular morphological and functional characteristics, individualized, which are different from one person to another, fact that led to the name of ***functional morphology***.

The development disorders incurred as a result of some general, local, environmental, genetic, alimentary, mechanical factors lead to the apparition of various functional, pathological disorders and esthetical disharmonies. The facial aesthetics and the smile play an important role in the life of every person. Nowadays, when the physiognomic factor plays a determinant role, it is also possible that the orthodontic objectives be decisively influenced by the functional requirements at all levels f the dento-maxillary apparatus and of these, especially the facial aesthetic conformation, but also the occlusive one. The dento-maxillary anomalies are an impediment in the present social integration, and the activity of the orthodontist must focus mainly on recovering the optimal physiognomic conformation of the patient and the confidence in him/her in the relationships with his/her peers.

The prevalence of these anomalies is high. Studying a group of children with the age between 5-15 years old, Garllner notices that the population is affected in 65% of the cases, Told finding a frequency of 63% at the age of 11-12 years old, while Foster and Day, for the same age group, communicates a percentage of 44,3%.

Considering all these, especially the high frequency of dento-maxillary anomalies, as well as the importance of these anomalies for the general health of the body, but also for its social integration, I have chosen as subject of study the development disorders of the dento-maxillary disorders and its possibilities of recovery, my conclusions being drawn as a consequence of the cases solved at the level of personal consulting room, correlating them with those described in the specialty literature consulted.

The results obtained have been developed by scientific communications that I held at the Xth National Congress of the Society of Anatomists of Romania, Tîrgu-Mureş, 13-15 May 2009 and the XIth Congress of the Society of Anatomists of Romania, Constanţa,17-20 May 2012, with summaries published in the volumes of summaries of these manifestations; 91e Congrès de l'Association des Morphologistes, Bruxelles, 21-23 May 2009, with a summary published in the volume of summaries of the manifestation; at the congresses of the European Society of Clinical Anatomy 2009 Istanbul and 2011 Padova, the summaries being

published in the magazine Surgical &Radiologic Anatomy, Springer Publishing House, vol. 31 suppl September and vol. 33 suppl, June. There can be added 3 works in extensor, one published in the Annals of "Ovidius" university, Series Medical Sciences, Constanţa in 2010 and the other two in the Romanian Magazine of Functional and Clinical, Macro and Microscopic and Anatomy and of Antropology, no. 4, 2012 and no.1, 2013.

At the end, I would like to express my gratitude to all my colleagues who helped me, especially to type the thesis (PhD Associate Professor Iliescu Dan and Dr. Ionescu Constantin) and especially to the scientific coordinator, Mister Professor Bordei Petru, who, for 5 years was my best advisor, hence exactly as a guide must be.

PERSONAL SECTION

WORK MATERIALS AND METHODS

The study of the morphology of the maxilla and the mandible has been carried out on 50 pieces for each bone and on the iconography and casuistic of the anatomy discipline of the Faculty of Medicine, Constanţa. For the exterior morphology of the maxilla and the mandible I used the classical measurements of the anatomic reference points, studying the dimensions of all these osseous reference points (length, width, depth), describing their form and location at the bone level. The measurements have been carried out by the tools of the anthropometric kit from the endowment of the anatomy discipline. The maxillary sinus has been studied in what concerns its dimensions, form, the extensions it can send into the processes of the maxilla, the thickness and the continuity of its walls. At the level of the mandible body, I carried out 4 vertical sections for each hemi mandible, in order to study the structure of the components.

The clinical study has been carried out during a period of 5 years 2006-2011, on the basis of the casuistic of the Clinic of Dentistry-Orthodontics „Fils Plus", from Izmail, Ukraine, those presented being cases solved on own patients.

The study material was formed by:

1. a number of 320 study models for setting the diagnostic, as well as the setting up of the treatment strategies ;

2. orthopantomogram;
3. the Damon system and the facial modelling;
4. the ”Optodan” laser;
5. the contention – maintaining the result obtained.

The study models have been obtained by the impression of the alveolar arcades with standard spoons.

The most used impression materials were those of the group with rapid setting (e.g. Ypeen Premium Spofa Dental, Cehia), but in special situations there can also be used silicon type materials.

The casting of the mould has been carried out immediately in the laboratory of dental technique and I used the gyps of IIIrd generation, which is a β- sensihydrated calcium sulphate.

The orthopantomogram was performed for all patients of the group of study, being carried out before and at the end of the treatment, being completed by retroaleolar films, in case of need. The information obtained helped us to intervene in the performance of the orthodontic treatment.

The whole group of patients has been submitted to the orthopantomographical investigation by an O.P.T. device, Orthophos CD (Siemens) with 16 programs. Subsequently, the films were transformed in digital format by a scanner type hp scanjet 4470c with the film scanning device.

Among the aesthetic criteria provided by *Damon 3* and up to the solidity criteria offered by *Damon 3MX*, Damon brackets create a friction significantly reduced in comparison to the fix conventional equipments or to those with active auto ligation. The brackets with passive auto ligation of the Damon system remove the necessity of using the elastomeric ligatures. The elastic and stainless steel conventional ligatures make impossible the application of the optimal forces, due to the friction. The elastic rings loose half of their elasticity a few days after ligation, compromising thus the control over the tooth.

The metallic fix dental apparatus is the solution chosen by a great part of the patients who need orthodontic correction. The great advantage of this apparatus is its price. This time the phrase *“cheap and good”* really functions.

The ceramic orthodontic apparatus is the solution to which I resorted most often when the patient needed an orthodontic apparatus, but he/she wished that is was “more discrete” than the classical metal apparatus or the Damon dental apparatus. During the treatment using the dental apparatus, I recommended to the patient to use the intermaxillary elastics. I used the Ni-Tile alloy Damon arches for all the treatment stages. I recommend that upon the initiation of the treatment to be used a wire of

copper with Ni-Ti alloy of 0, 14 for a period of up to 10-20 weeks. The copper addition into the composition of the copper with nickel-titan alloy accentuates the thermo sensitivity of the nickel-titan alloy, providing optimal forces and ensuring an unequalled efficiency of the movement of the tooth.

For the photoploymerisation, I used the CoolBeam lamp with the product, because it reaches 80% of the adhesion force in only 5 seconds, and in less than 2 hours, the percentage exceeds the value of 90%. The laser used was of more types (He-Ne, with Ar, YAG and CO2), representing a photonic emission (bright), with various wave-lengths (according to the constructive type).

PERSONAL RESULTS AND DISCUSSIONS

MAXILLA – PERSONAL CONSIDERATIONS

I found **the alveolar bone** (not mentioned in T.A.) very visible in 80% of the cases, and in the other 12% of the cases, very little prominent or even absent (in 8% of the cases). In 48% of the cases the left alveolar bone is greater than the right one. In 12% of the cases I found the anterior wall of the alveolar bone dehiscent on an area greater than half of its height. Most often (almost 2/3 of the cases) there is a bilateral prominence in front of the first premolar, more accentuated on the left side. For (1,2,3,4,5), it corresponds to the root of the canine, being situated between the two pits: canine and myrtiform. I call (6,7,8) the *canine prominence*. (9) is called *canine jugulum*, representing a vertical osseous prominence which separates the incisive and alveolar bones.

Fig.55 – Maxilla – anterior view; the alveolar bones have a very thin anterior wall; the right myrtiform pit is oval-shaped, and the left one is round; unequal infraorbital holes and of various shapes; the right heteronymous infraorbital hole is located laterally from the supra-orbital hole of the same side.

The myrtiform pit (also not mentioned in T.A.) had the same

bilateral dimensions in 60% of the cases. In 2/3 of the cases it was visible (more deep) on the right side. We should notice the difference of dimensions according to its shape: it is greater when it has an oval shape. In approximately 10% of the cases it features a much reduced depth, almost flat. For (1,10), it is situated medially from the alveolar bone, and (11) homologates it with the canine fossa. (6,7,8,9) call it ***incisive pit***.

The canine fossa has variable shapes. For (6), the canine fossa extends in the upper side up to the lower extremity infraorbital foramen. For (7) the canine fossa is situated in the lower part of the infraorbital foramen and at its level is inserted the lifting muscle of the oral commissure. At the level of the canine fossa, the maxillary sinus is trepanned, the Caldweel-Luc operation (7).

Fig.56 – Anterior view of the maxilla; the anterior walls of the alveolar bone are very thin; the maxillary sinus, which has the walls very thin, features malar and orbital extensions

Fig.57 - Deep canine fossae, the right one being very prominent; osseous crest between the infraorbital fossa and the canine fossa; large and round infraorbital holes, osseous prominence corresponding to the first premolar.

The canine fossa is like a more or less profound depression and circumscribed by the infraorbital fossa. Its surface features an irregular, pleated appearance on which the lifting muscle of the oral commissure is inserted. This description allows the differentiation between the infraorbital fossa, constant element of the maxilla, and the canine fossa, inconstant element.

I found the **infraorbital hole** being circular or oval-shaped**,** in equal proportions. We should notice the difference of shape on the same cranium: circular on the left and oval-shaped on the right (situation more frequently found) or inversely. Compared to the infraorbital margin, the hole is in the lower part situated in the left side in 65% of the cases. I found 5 cases with double infraorbital hole, of which 3 cases on the left side,

aspect quoted by (12,13,14).

Fig.59 – Anterior view of the maxilla; osseous crest prominent between the infraorbital fossa and the canine fossa; two left infraorbital apertures distanced one against the other.

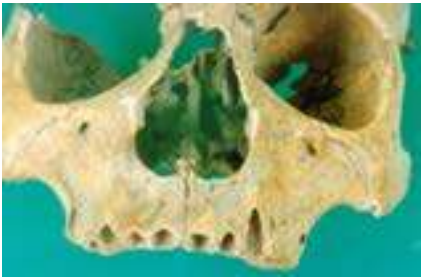

Fig.64 – intermaxillary suture deviated to the right and slightly irregular, going to the level of the lower edge of the alveolar process; unequal infraorbital holes, with the division into two of the left infraorbital hole.

Posterior nasal apertures. The main aperture in 80% of the cases was oval-shaped, being larger on the right side. Sometimes, it can be incompletely confined, its posteromedial margin lacking. The dimensions and the number of these apertures are similar to those presented by (12,15,16).

Fig.63 – The palatine arch viewed from the lower side; two right main nasal apertures, the posterior one having very great dimensions; the left nasal aperture is incompletely delimited medially (palatine notch); the lower aperture of the incisive channel is massive, rhomb-shaped.

Fig.65 – Symmetrical palatine arch, viewed from the lower side; regular, rectilinear antero-posterior interpalatine suture; three lower aperture of the incisive channel

The additional palatine apertures are also variable in number (1-4), the most frequent having two apertures on both sides.

The palatine process features in approximately 20% of the cases a hilly, rectangular or oval prominence, situated in the vicinity of the alveolar margin of the palatine process. The dimension of the palatine process from the alveolar margin to the horizontal edge of the palatine is between 2,5-4cm.

Fig.66 – The palatine arch viewed from the lower side, with unequal and slightly asymmetrical palatine processes; irregular and deviated to the left antero-posterior interpalatine suture; irregular and curved horizontal palatine suture, with concavity posteriorily; the lower aperture of the incisive channel is oval-shaped and with large dimensions.

Fig.71 – Septated maxillary sinus.

These morphological features of the palatine process are quoted, but without mentioning percentages, by (1,6,12,15,16).

From the total of variations that the maxillary sinus features, I found: 4 stenoses of maxillary sinus, 13 extensions of the sinus into the malar bone and the alveolar process, 15 sinuses with shape variations, 13 structure variations with incomplete division of the maxillary sinus and 2 with complete division.

PERSONAL RESULTS RELATED TO THE MANDIBLE MORPHOLOGY

The mandibular symphysis is very visible, having the appearance of suture only in 1/3 of the cases. As for the rest, its appearance was under the form of a flattened and slightly rounded prominence. The direction of

the symphysis is vertical, perpendicular on the inferior margin of the body, in almost 40% of the cases. As for the rest of the cases, I found oblique in the lower part and to the right (in 35% of the cases) or to the left (in 25% of the cases). We should notice that in the case of all mandibles, there are found vascular holes on its both sides and almost in half of the cases I found vascular apertures even on the symphysis. I found my acknowledgments described at (5,6,22,23,24,25,26).

Fig.72 – Mandibular symphysis prominent in the lower half. Large oval-shaped mandible pit. The mandible hole is medium (in what regards the dimensions) and oval-shaped.

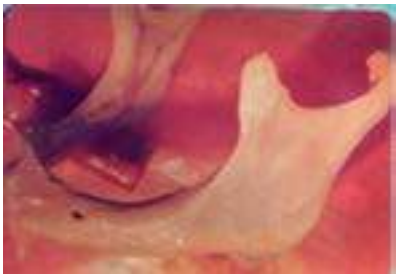

Fig.73 – Oval-shaped mandible hole. The coronoidian process has two proeminences (notches) on its posterior margin.

I found the ***symphyseal angle*** comprised between 80 and 85^0 and only in 10% of the cases it was of 90-94^0 (orthogonal type), (26) finding it smaller by 10-12^0.

The mandible hole is oval-shaped, with the great postero-superior axis being oblique in the majority of the cases, or almost horizontal, parallel with the margins of the mandible body, but it may also be rounded (in 30% of the cases), aspects also signalled by (1,6,9,10,25). In what concerns its shape, it may be oval-shaped on both sides, but it may be oval-shaped on one side and rounded on the other side. I found it rounded on both sides only in 10% of the cases. The inequality of the dimensions and the asymmetry of the mandible holes is also mentioned by (1,9,1011,12).

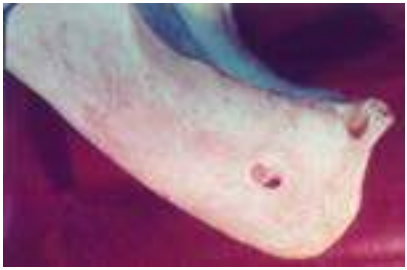

Fig.74 – The mandible apertures divided into two.

Fig.75 – Round and central mandible hole.

I found only one case in which the mandible hole was divided into two on the right side, in its middle portion featuring an osseous lamella which was incomplete in the lower part, dividing it into two halves.

Fig.76 – Mental spine reduced with the mergence of the four genial apophyses which cannot be individualized.

Fig.77 – The superior and inferior genial processes separated, being united by an osseous crest.

I found ***the superior and inferior mental spines*** in 40% of the cases, being clearly separated, the superior ones being separated from the inferior ones and the right ones from the left ones, and in 10% of the cases all the four processes were united, forming a rugose osseous prominence, on the surface of which, nevertheless, small osseous crests which represent the genial processes could be individualized, issues signalled by (4,5,6,22). At the level of the genial processes, I always found vascular apertures, but their position is very variable.

At the level of the left hemi-mandible, structural differences in relation to the right hemi-mandible can be found. Thus, at the level of the second section, the medial cortical is thicker than the lateral one only in the upper half, the tow corticals having equal thickness in the lower half. Subsequently, at the level of the third section, the medial cortical is thicker on all its length than the lateral cortical, and at the level of the fourth section

being again thicker than the lateral cortical in the upper half, but thinner than this in the lower half.

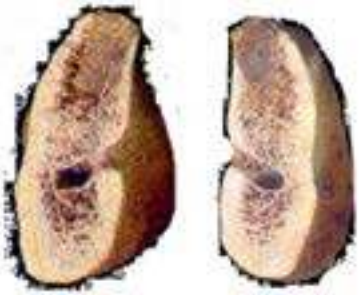

Fig.84 – The right third section.

Fig.87 – The left third section.

The alveolar septa, which on section are triangular with the point downward, are composed of compact osseous tissue which forms a skeleton and a support for the adjacent spongious osseous tissue (29,30,31).

The mechanical structure of the mandible can be thus studied using the technique, being compared to that of a airplane wing, but the bone characteristics are different from those of the aluminium used for the construction of the airplane (27,28).

CLINICAL CASES

Of the total of cases studied, I described only 16 cases, 14 cases with DMAn and 2 cases of dentiger cyst.

THE CLINICAL CASE NO.1. Patient M.R., male, 15 years old, who was diagnosed with *D-M An. of* II/I class, according to the American school and *dento-alveolar disharmony*, according to the German school.

Fig.91. Fig. 92.

Fig.93. Fig.95.

The treatment plan took into consideration the fact that the osseous substance is reduced that imposes the stimulation of the osseous growth, the broadening of the osseous sub layer and the distalization of the lateral group. That is why a self ligating bracket Damon 3 has been applied, which met these requirements. The treatment began with the set up of the Damon 3 self ligating stable system on the upper arcade. The arch CoNiTi 0,14. After 2 months, the lower part was also set up, to which an additional arch was set between 4.3 and 4.1, and 4.2 was bound by the arch CoNiTi 0,14 with a metallic bound. After 5 months from the beginning of the treatment, the arches CoNiTi 0,14× 0,25 were replaced for the both arcades. After 9 months from the beginning of the treatment, on the upper arcade there was applied SS 0,19×0,25, on the lower arcade SS 0,16× 0,25. The treatment lasted 14 months. Before removing the apparatus, there was intervened by fibrotomy in the area of the tooth 1.3 and 4.3. The patient refused the extraction 3.8 and 4.8. The splint was stable.

The examination of the patient 3 years after the completion of the treatment. During the objective examination, the retainer was partially kept, there can be noticed a vestibular shift at 1.3. On OPTG 3.8 and 4.8 in horizontal position, the immediate extraction of these teeth has been decided.

Fig.98. Fig.99.

Fig.100.

Fig.101.

Fig.102.

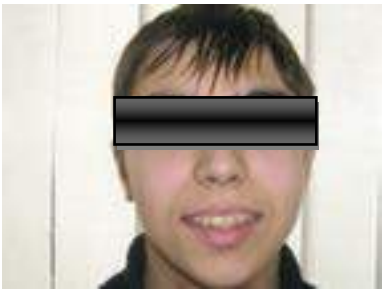

Fig.104.

Fig.105.

Fig.109.

Fig.110.

THE CLINICAL CASE NO. 2. Patient D.V., male, 13 years old, diagnosed with *DM An. Class II/I* , according to the American school and *mandible compression syndrome*, with pro-dentition, according to the German school.

Fig.113.

Fig.115.

Fig.116.

Fig.117.

The planned treatment consisted of: muscular functional adjustment at the beginning of the growth period; the set up of the Demon 3 stable orthodontic apparatus on both arcades, starting with the set up of the Damon 3 stable self aligating system, for the upper arcade being used the arch CoNiTi 0,14, and for the lower arcade being used the arch CoNiTi 0,16. In the front area for the teeth 1.1,2.1, there was used Ortobite (for the

provisory lifting of the occlusion). In the lateral area from 4.7 to 1.6 and from 3.7 to 2.6, there was used intermaxillary traction elastic on a smaller section with the force of 4-½Oz, called Bear, for a slight anterior shift of the mandible and, at the same time, the distilization 1.6, 2.6,1.7,2.7. A month and a half after the treatment, for the lower arcade there was replaced the arch CoNiTi 0,14×0,25, in order to increase the intermaxillary traction from 4.3 to 1.3 and from 3.7 to 2.7 and, at the same time, to avoid the vestibulization of the frontal lower group. After 3 months, the arch CoNiTi 0,14×0,25 of the upper arcade was replaced. These arches were held 6 months, after which I passed to the both arcades with CoNiTi 0,16×0,25 in order to set elastics with a greater force, Moose type (5/16) 6 Oz which are fixed between 1.7 from below 4.5 and 4.4 and the stopper between 1.3 and 1.2, on the left side between 2.7 from below 3.5 and 3.4 and the stopper between 2.3 and 2.2. At 9 months, I passed to the stage of the last arch TMA 0,19×0,25 on both arcades. On the arch of the upper arcade there were performed bendings of the III degree. The splint is mobile in order to control the growth, which shall be replaced at 9 months. The treatment lasted 14 months. Due to the beginning of the growth period under treatment, we could obtain a neutral result at the molar and canine level, without the extraction 1.4; 2.4, which was questionable. The frontal supra covering was obtained at 1/3.

Fig.119.

Fig.120.

Fig.122.

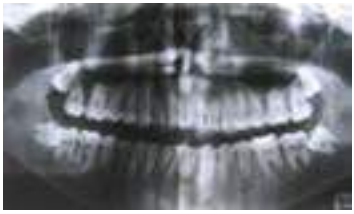

Fig.123.

THE CLINICAL CASE NO. 3. Patient T.Al., male, 13 years old, diagnosed with *dento-maxillary anomaly Class II/III*, *subdivision 2*, according to the American school, and *covered deep occlusion syndrome,* according to the German school.

Fig.127.

Fig.128.

Fig.129.

Fig.130.

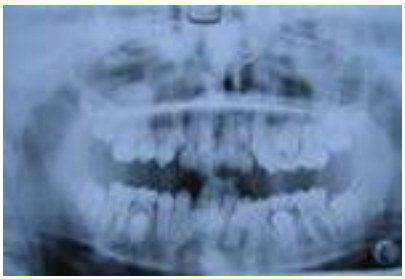

Fig.131.

Fig.132.

Treatment. The classical system Roth-mini was used, followed by the extraction of 1.4 and 2.4, taking into consideration that it is a skeletal genetic anomaly, not taking into consideration the growth.

- **Ist Stage.** The upper arcade: CoNiTi 0,16 small, lower arcade: CoNiTi 0,16 large, with arch for the opening of the space between 4.1 and 4.3.

- **IInd Stage** -3 months. The upper arcade: SS 0,18, the arch for the closure of the spaces after the extraction of 1.4 and 2.4. The space is closed by the sliding method with elastic chains without space. The upper arcade: that arch is maintained, the space opened at 6mm, we passed to the surgical intervention for the detection of the included tooth, with the fastening of barb button. By the metallic barb button and the arch, the migration of the lateral incisive to the occlusion plan began.
- **IIIrd Stage** – 9 months. The upper arcade: TMA 0,17 ×0,25. The lower arcade: CoNiTi 0,16 and the fastening on the tooth of the bracket for 4.2, with the final de-rotation of this tooth.
- **IV Stage** -12 months.The upper arcade: TMA 0,17×0,25 small.The lower arcade: CoNiTi 0,17×0,25 large.
- **V Stage** – 15 months.The upper arcade: TMA 0,17×0,25. The lower arcade: TMA 0,17×0,25.
- **VI Stage** – 18 months. The removal of the apparatus. The splint was double (stable and mobile). *Stable*- the upper arcade – in order to avoid the opening of the spaces after extraction; the lower arcade – in order to avoid the jam of the included tooth. *Mobile*- it was performed to avoid any displacement accident of the stable retainer. The treatment lasted 18 months.

Fig.133.

Fig.134.

Fig.135.

Fig.137.

Fig.138.

Fig.139.

CASE No.4

Patient B.M., female, 18 years old, who was diagnosed with the *IIIrd class skeletal anomaly, in vertical occlusion,* according to Angle and with the *real progenic syndrome*, *with opened occlusion,* according to the German school.

Fig.142.

Fig.143.

Fig.144.

Fig.145.

The treatment is carried out with the Damon 3 stable self ligating system.

- **I Stage**. The upper arcade: CoNiTi 0,13, with opening arch between 1.6 and 1.4. The lower arcade: CoNiTi 0,14, intermaxillary elastics from 3.3 to 2.7 and from 4.3 to 1.7 of 3 –1/2 Oz Fox.

- **II Stage**-6 weeks.The upper arcade: the set up of the bracket on 1.5 and the closure of this tooth into the apparatus. The lower arcade: CoNiTi 0,16.
- **III Stage**- 12 weeks.The upper arcade: CoNiTi 0,16. The lower arcade: CoNiTi 0,16×0,25 and the extraction 3.8 and 4.8.
- **IV Stage** – 24 weeks. The upper arcade: CoNiTi 0,14 ×0,25.
- **V Stage** – 36 weeks.The upper arcade: TMA 0, 19 ×0, 25.

The lower arcade: TMA 0, 19 ×0, 25. It is the stage the work with elastics begins, on the right and left lateral sides, from 4.7 on 1.5, 1.4 and up to the stopper between 4.3 and 4.2 and from 3.7 above 2.5, 2.4 and up to the stopper between 3.3 and 3.2. The anterior part: this trapezoid shaped elastic shall be used: up 1.3- 2.3 and down: 3.2 – 4.2. The treatment lasted 12 months; the patient was pleased with the aesthetic aspect and decided to remove the apparatus. The splint was double, stable and mobile.

Fig. 146.

Fig.147.

Fig.148. Two lingual frena above the first premolar, right and left, well developed, the median one, corresponding to the inter-incisive space, being atrophyated.

Fig.149.

CAZUL NO. 5. Patient R.M., female,18 years old, who was diagnosed with *Dento-alveolar anomaly Ist Class*, according to Angle, with anterior frena on the upper arcade, *single dental anodontia 1.2,2.2 with the rotation of the teeth 4,33,43.*

Fig.150.

Fig.151.

Fig. 152.

Treatment. It was decided the opening of the spaces, hence to enlarge them in the area 1.2, 2.2, to fix the prosthesis on implants. A Damon

3 system has been set on the upper arcade, we began with the distilization 1.3 and 2.3.

Fig. 153

Later on, the apparatus has been set on the lower arcade, in order to remove the rotated teeth and the supra-occlusion of the tooth 3.3. Proportional spaces of 7mm were opened; a quantity of the alveolar bone was obtained. It was also taken into account to avoid the protrusion of the upper incisive teeth with the distal bending, bend back type, behind the last molar. 6 months before the removal of the apparatus, the set up of the implant of the surgical part was carried out in two stages, provided that almost at the end of the treatment, the osseointegration be produced. In parallel, it was adapted a Ist degree occlusion with bendings on the arch. The apparatus was removed, the healing blunt was applied, by screwing up and after two weeks the porcelain coronets were fastened on the implants. The splint is stable, at the upper arcade being divided into 3 sections 1.4 and 1.3, 1.1 and 2.1, 2.3 with 2.4. At the lower arcade it is from 3.3 la 4.3.

CASE NO. 6.

Patient O.A., female, 16 years old. Diagnosis: *Distal occlusion* (dentoalveolar, IInd Class II, according to Angle), with the frenum between 1.3 and 2.2., *dental incrongruity at the lower arcade with anodontia of 1.2 and 2.2.*

Fig.154.

Analysing the intercuspidation cuspid-cuspid of the IInd Class lateral occlusion, the position of a canine tooth (13) on the location 1.2 and the anatomy of the small canine crown, we arrived at the treatment plan with the migration of the canine tooth 2.3 in the location of 2.3, with the mezialization of the whole lateral group from the upper arcade. The dental apparatus has been set up on the upper and lower arcade. On the upper canine teeth there has been fastened the bracket of the central incisive teeth, on the premolars the bracket of the canine teeth, in order to give these teeth the natural shape and the palatine cuspid has been rasped. The meziliation of the upper teeth and the consolidation of the occlusion have been performed unidentally with the use of elastic chains and IIIrd class elastic. The active treatment ended with the closure of all spaces. The cuspid occlusion has been obtained- pit, on the lateral side and a frontal aesthetics. The splint was stable.

DISCUSSIONS

The dento-maxillary anomalies and the distorsions occupy the first place in the dental diseases, before the dental decay and the parodonthopathies. The general frequency is comprised between 23-80%. The epidemiological study of dento-maxillary anomalies has a very special importance, both scientifically and practically, consisting fundamentally of: the appreciation of the health condition of the population and its evolutionary directions; the elaboration and implementation of the health preventive programs; the assessment of the results obtained in the preventive and curative orthodontics.

It is noticed a tendency of growth of dento-maxillary anomalies, with variations from one group to another. The literature results evidence a difference between the frequency and the spreading of dental and dento-alveolar anomalies. The cause of the difference is the different level of research, the professional training of the physicians, interpretation errors. The lack of a uniform method of analysis (study) and different diagnosis classifications lead to a defective result.

For the clarification of the frequency and the spreading of the dental, dento-alveolar and skeletal anomalies, I had at my disposal a consistent material, in the period 2006-2011, in my individual consulting room being treated 320 patients. The analysis of the treatment stage showed that the largest group, 26 patients (39, 38%), were the patients with the age comprised between 8-10 years old, the second group, 98 patients (30, 62%) were aged between 12-14 years, following the age groups of 19-20 years old, 46 patients (14, 38%), and then the group up to 8 years old, 50 patients, 15,62% of the cases.

Correlating these with the literature data, it results that in the case of temporary dentition the percentages vary a lot in various countries of the world.

It is noticed the very variable percent of the temporary dentition disorders, this being comprised between 11% in Iceland and 15,62% in Ukraine (percentage resulted from the personal cases) and 75% in USA (37) and 76,9%, in Romania (43). We should notice that in USA this percentage reaches 75% (37), noteworthy and the percentage of 51% from Italy, (36) mentioning that it represent definitive anomalies. The reduced percentage signalled in some countries is due to the fact that the addressability to the physician is high, in these countries existing national programs which support financially the treatment of dento-maxillary anomalies. The high Romanian percentage given by (43) is the maximal one, (43) giving a percentage comprised between 38,5-76,9% and only at the age of 3-5 years old. In what concerns the percentage of 75% given by (37), it I due to the fact that it also includes a segment of the mixed dentition.

TABLE NO. 2 – THE FREQUENCY OF DM An ON AGE GROUPS AT THE LEEL OF THE TEMPORARY DENTITION

AGE GROUP	AUTHOR	COUNTRY	PERCENTAGE %
3-5 years old	Dorobăţ	Romania	38,6-76,9
7 years old	Hekinheino	Finland	23-34
-	Miotti	Italy	51
temp dent.	Horosilkina	Russia	24
temp.dent.	Magnuson	Iceland	11

6-11 years old	Proffit	U.S.A.	75
Up to 8 years old	Mocanu	Ukraine	15,62

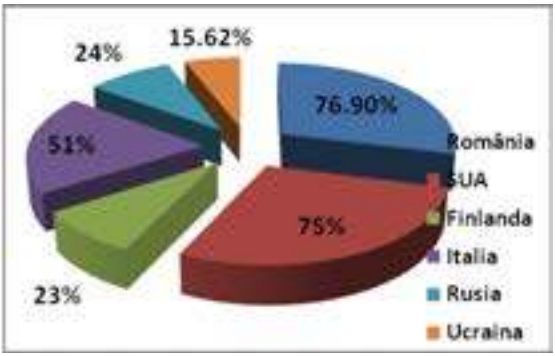

CHART NO. 1 – THE FREQUENCY OF DM An ON AGE GROUPS AT THE LEVEL OF THE TEMPORARY DENTITION

Mixed dentition has more reduced percentual variations, being of 38,9% in Finland, 39,38% in Ukraine (personal cases) and a little bit higher in Russia, 49% (38).

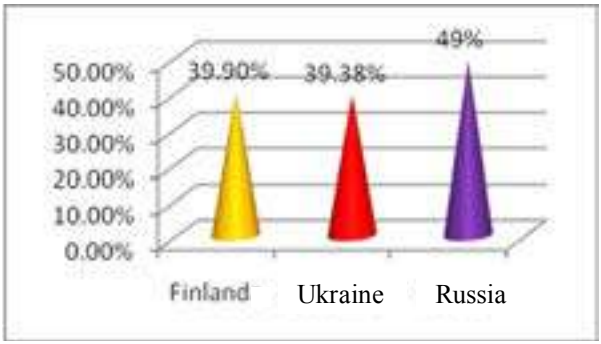

CHART NO. 2 - THE FREQUENCY OF DM An ON AGE GROUP AT THE LEVEL OF MIXED DENTITION

At the level of permanent dentition, it is also noticed an increased variability of the percentages quoted in literature.

TABLE NO. 3 – DM An FREQUENCY ON AGE GROUPS AT THE LEVEL OF THE PERMANENT DENTITION

AUTHOR	COUNTRY	PERCENTAGE %
Korkhaus	Germany	43,1
Taas Hana	Germany	52
Thylander	Sweden	74,5
Roling	Danemark	70
Grude	Norway	78
Myllarnyemi	Finland	58
Magnuson	Iceland	52
Haynes-Foster	United Kingdom	58-59
Horosilkina	Russia	35%
Bhalajhi	India	19,6-90
Mocanu	Ukraine	55

At the level of the permanent dentition, the DMAn frequency is comprised between 43,1 in Germany (32) and 90% in India (Bhalajhi). We are surprised by the high percentage of the DMAn in the Countries of Scandinavia, being comprised between 58% in Finland (after Myllarniemi) and 78% in Norway (after Grude), high percentages in comparison to other countries (excluding India) being also in Sweden, 74,5% (after 34) and Denmark, 70% (Roling), while in the rest of the Europe, these percentages are of 43,1-52% in Germany (32,33), 52% in Iceland (Magnuson), 58-59% in the United Kingdom (35), Russia having the lowest percentage (35%). In Romania, the statistics is comprised between 41,9% (39) and 73,6% (43), a high percentage also having (42), of 72%, while (40,41) have a percentage of 46,7%, respectively 50-60%. It makes me presuppose that outside the geographical area, race, ethnicity, the geographical area, as well as the time period within which the statistics was carried out. It is best visible in India, where Bhalajhi has a very high interval, comprised between 19,6-90% of the cases.

Amongst the anomalies, the most representative were the distal occlusion (46,3%), the mezial occlusion (6,6%), the open occlusion (1,5%), the occlusion deeply covered (21,6%), the crossed occlusion (9,8%), shape anomalies (3%), included teeth (4%) and supernumerary (1%),the diastema (1,5%).

The anodontia can be unidental, multidental or total. These clinical forms can be found both in the milk dentition, as well as in the permanent one, in that of milk being found very scarcely. The aetiology of this disorder is evolutionary, hereditary or caused by some unfavourable factors. The primary anodontia is a sign present in the hereditary anomaly such as the

trisomy 21, the ectodermic dysplasia and it can be the result of the phylogenetic evolution or the decrease in the number of teeth. I have found the anodontia in a percentage of 4,7% of the cases, 1,22% in the temporary dentition and 3,48% in the case of the permanent dentition.

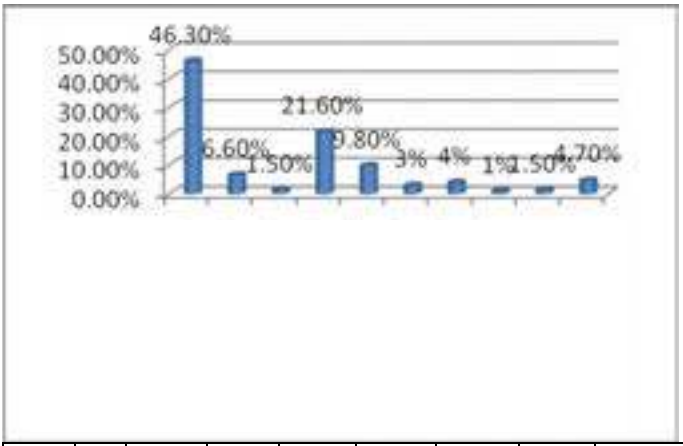

CHART NO. 3 – DMAn FREQUENCY ACCORDING TO ANOMALIES

According to the literary data, the primary anodontia is found with a frequency from 0,08–1,55% in the temporary dentition and from 2,3-11,3% in the permanent dentition. This percentage differs according to ethnicity and race. There is also a difference in percentage according to the teeth category. Thus, in the upper lateral incisive it is found in 25% of the cases, in the upper premolars in 20% of the cases, in the central lower incisive in 6,5 %, and the anodontia of the lower premolars in 40–50 % of the cases. The relation female-male is of 3/2. The clinical aspect inanodontia is different and depends on the absent teeth and on the topography of the dental arch aperture. For example, in the absence of the upper lateral incisive, the treatment methods are the following: the approach of the teeth from the anterior section with the mezialization of the lateral group, in order to close the interdental space and the interdental gap; the opening of these spaces for the future prosthesis, mobile or stable by implant, adhesive bridge, or classical bridge. Taking the decision firstly on

the skeletal and interarcade dento-alveolar composition, the presence/absence of interdental spaces, incongruity, proportionality, form, colour, the position of the canines and of the upper central incisive teeth.

THE DENTIGER CYST. During the period of carryning out my study, I had the occasion to diagnose and treat two cases of dentiger cyst, for the first, being more recent, having a more reduced documentation.

The first case is a female patient, having 22 years old, who came to the clinic from physiological considerations. On the basis of the elements observed during the clinical and radiological examination, she was diagnosed with ***follicular cyst, with the third molar inclusion 3.8.***

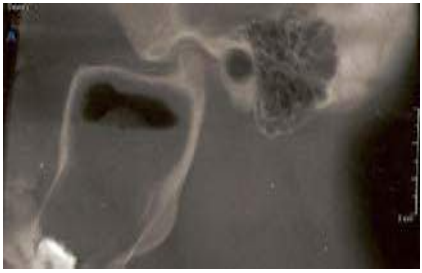

Fig.202.

Fig. 203

On the first tomography performed there were done 4 sections of the angle and of the left mandible branch, where the cortical was shaped on the whole surface and full with a content having a tension from+ 32 up to + 44y.H. In the lower section of the cavity, the coronary part of the tooth has been demarcated. The size of the cavity was 5.6 x 4.5 x2.3 cm.

On the second tomography (for examination), it was noticed an increase of the cyst size and the apparition of a tension in content from+47 up to +54y.H. the surgical intervention was scheduled.

Fig. 204

The treatment began with the assanation of the oral cavity, scaling and the obstruction of caries. It was practised, for the extraction of the included tooth, a trapezoidal incision, with the large base towards the alveolar-lingual sulcus. The flape lobe composed of periosteum and mucosa was grated, uncovering the cavity. The cystic content has been discharged (granulous, hemorrhagic liquid) so as the membrane be easier extirpated. A rigorous examination of the bone has been performed in order to detect the existence of the osteitic processes and the adherent membrane. The cavity has been filled by lyophilized bone. The plague of the mucosa has been completely sutured by the reapplication of the mucous flap lobe over the cavity. The healing of the cavity was done by the organisation of the intracystic hematom and of the lyophilized bone. The evolution as favourable, panoramic control radiographies were performed for the verification of the osseous healing, observing the favourable result of the treatment.

The second case of dentiger cyst was diagnosed in January 2013, in a female person, having the dimensions at half in relation to the first cyst, being surgically solved at the end of the month.

The dentiger cyst is found with a frequency comprised between 15,2%-33,7% of the total of odontogenic cysts, being found in the lowest percentage by (59) in 15,2% of the cases, and the highest percentages being quoted by (60), 33% and (61), 33,7% of the cases. In the consulted literature (70) gives a frequency of 16,6%, (62) 18,5%, (73) 18,8-19,6% of the cases and (74) 24,1% of the total of odontogenic cysts. They are relatively more frequently found in males, (62) finding for the female sex a percentage of 52,8% of the cases. I mention that the two cases diagnosed and treated by me were females. Even if the majority of authors assert that the frequency of dentiger cysts is more frequently found in the IInd-IIIrd decades of life,

being rare in children, (62) a statistics on 2944 cases, carried out in the period 1976-2004, finds out that of the 546 cysts, a number of 240 cysts (43,96% of the cases) were developed until the age of 15 years old.

Fig. 205. Fig. 206.

The radiologic appearance of the dentiger cysts is a radiotransparent, unilocular area, with well-defined sclerotic margins, excepting the case when there is an infection and, in that case, the margins are slightly defined, in association with the crown of a non-erupted tooth (56), aspects also observed on our radiographies. The dentiger cysts are far the most frequent lesions which often feature a marked shift of the non-erupted tooth t the jaw level. Due to the pressure o a cyst in expansion, a non-erupted tooth can be pushed against its eruption direction, for example, the upper canine or the incisive can be pushed cranially into the maxillary sinus or into the nasal floor. The odontogen cheratocysts and certain types of odontogenic tumours can feature a similar radiologic appearance, for the differentiation being necessary a histological examination.

CONCLUSIONS

Considering the central position of the two maxillas within the facial skeleton, they should be two bones perfectly symmetrical. This aspect is not achieved in many cases, noting frequent asymmetries especially at the level of the piriform aperture, but also asymmetries caused by the different dimensions of the maxillas on the whole. These asymmetries are also caused by the different proeminence, more or less exaggerated of the anterior side of the maxillas and of the lower orbital margin. The osseous asymmetries are probably attenuated or cancelled by the manner of disposal of the soft parts. The right and left maxillary sinuses can be equal or almost equal, but their ratio with the other cavities and organs differ from one sinus to another on the same cranium. Referring to this ratio, the volume of the maxillary sinus cannot represent a precise indication in order to exclude the hazard of achievement of the oral-sinusal communication during dental extractions, because both in the maxillary sinuses with great volumes and in the small ones, the roots of the sinusal teeth can penetrate into the sinus.

At the level of the mandible, I first notice the rich vascularisation it features, highlighted by the multiple vascular apertures on its surface, more frequently being found on both sides of the mandible symphysis, at the level of the digastric fosses and the genial processes, at the level of the edentated mandibles the vascular apertures being in a smaller number than on the edentulous mandibles. The predominance or the accentuation of certain anatomic reference points on the right and on the left sides, or their disposition under the same dimensions and aspects on both sides of the mandible are related to the type of mastication, unilateral (right or left) or bilateral. In what concerns the structure of the mandible, it seems to be exclusively dependent of the form and organisation of the osseous material. The thickness of the corticals is not constant; the lingual cortical (of the mandible skeleton) is thicker in the ventral region. This explains and makes us understand easier the mandible complex twisting phenomena.

At the end of the presentation and analysis of the clinical cases I had treated I could observe a series of conclusions that I consider being a good guide for the practicing doctor.

- The orthodontic treatment comes to respond to the desideratum of each dental treatment, that of re-establishing the morpho-functional integrity and the functions of the dento-maxillary apparatus, with a minimal biological sacrifice.
- The remarkable results are related to the team work of the medical

disciplines (ENT doctor, endocrinologist) and dentistry (periodontal treatment, prosthetic).

- Many difficult situations find their solution in the precursory orthodontic treatment, the one that allows the performance of some conditions for an optimal achievement of the efforts of the other specialists.
- The direction and the rate of growth of skeletal structures can be changed by the use of orthopaedic, orthodontic, surgical methods, obviously taking into account the fact that a genetic predetermined pattern can be influenced in a low percentage.
- There are more arguments entitling us to appeal to orthodontia, namely, in the following order: 1. Biomechanical. Normally, the occlusive forces must act in the long axis of the teeth. If, from various reasons, the teeth suffer modifications (inclinations, rotations), the forces auctioning on them become non-physiological, consequently, sooner or later the teeth and their periodontal support are lost. The comprehension of the application of this principle allows us to avoid certain complications and the increase of the effect of the treatment, by the application of the appropriate apparatus. 2. Biologic. The dental tissue sacrifice is minimal or absent. We can quote the solution of some frontal or lateral inverse interlocking by prosthetic grinding means. The correction of the axes of abutments with a view to perform some prosthetic works in order to avoid the retention areas (false periodontal pockets). 3. Aesthetic. The modification of the position of some frontal teeth, with disagreeable effect (rotation), it can be also solved by prosthesis, but it is not successful in time. 4. Prophylactic. It aims to avoid the subsequent periodontal disorder. By orthodontic means, the lost contact points are rehabilitated, preventing the formation of some real periodontal pockets. 5. Occlusive. The preservation of the normal occlusive curves. The techniques of the stable orthodontia have as a first stage of treatment the levelling and the alignment of teeth, and if they are well managed, the treatment may achieve ample modifications of the guidance (closing, opening).
- The more realist impression as possible on the level of the sanitary education is vital for the choice of the moment of starting the treatment and of the application of the apparatuses, the decision being taken also according to the possibility of formation of an oral hygiene skill.
- In children, the practise of certain vicious habits (oral respiration, infantile deglutition, suction, interposition, biting) must be investigation according to the duration, intensity and frequency ratio of

the respective practise. Not less important is the knowledge of some defective bodily attitude at rest and during an activity.

- The general clinical examination must estimate approximately the constitutional type of the child, obviously with influence on the treatment. Thus, the frail type responds promptly to the orthodontic treatment, but it is exposed to relapse, while the picnic type responds slowly but the relapse produces very scarcely, the splint being short.
- Establishing the form of the cephalic extremity is important, this correlating to a great extent with the form of the dento-alveolar arcade, because: the brachycephal features a broad maxillary (in which case a therapy by expansion shall be predominantly prescribed), while the dolichocephal features a narrow (the existence of the dento-alveolar incongruity in this case imposes the choice of an extraction therapy).
- One of the difficult tasks of the doctor in the mixed dentition period is that of preserving the existent space. It imposes the rigorous consignment of all dental malpositions and their degree evaluation, estimating the ration between the malposition degree and the space. It is not allowed the diagnosis on the basis of a visual examination, without estimating precisely a possible incongruity by the mild or severe qualifications.
- The positive and differential diagnosis must be completed by the necessary complementary explorations for the prognostic and treatment of the case. A correct and complete clinical diagnostic which has at its basis the experience, the ability and the clinical flair of the doctor can confer the medical act the necessary effectiveness, efficiency and the economy, creating thus the possibility to prevent or treat as early as possible the disease condition.
- The occlusion is characterised only by neutral relations and it shall be defined as neutral occlusion: The occlusion is characterized by at least a changed ratio and it shall be defined as “malocclusion”, enumerating the changed ratios in the order of the three directions (sagittally, transversally and vertically) it was examined.
- The removal of the cause leads to the annulment of the effect, obtaining the balance between form and function, representing the criteria ensuring the evolution of the components of the dento-maxillary apparatus, the function playing a well defined role in the orthodontic treatment.
- The functional therapy acts by virtue of the principle according to which the removal of functional disorders or the change of the functional lead also to the spontaneous balancing of the form-function

balance; the active-mechanical therapy and the stable one change the form on which the functional matrix shall adapt.

- The orthodontic treatment is strictly individual; the measurements and methods of treatment differ from one patient to another, according to the individual characteristics and the development stage of the child.
- The patients treated by stable orthodontic apparatus had a more painful reaction in comparison to the patients treated by the Damon system apparatus. The characteristic during the treatment of the disorder was continuous, while in patients with Damon, the pain is pronounced only in the case of biting and mastication of foods.
- At the beginning of the splint period, it could be noticed an increased mobility of the incisive teeth. This is connected to the fact that during treatment the mobility was limited by this stable apparatus. The diminution of this mobility begins gradually, with the functional recovery of the periodontal tissue, starting with the third month and being normalized after 12 months. It results that the splint duration cannot be shorter than one year, regardless the age of the patient and the initial condition of the anomaly.
- The duration of treatment is according to the achievement of the anticipated results, but it must not exhaust the patient; the monitoring of the results is performed after the eruption M_2 and M_3. The guarantee of success is given only by the control of the stability after splint. The splint solves only the problem of stability of a correct treatment; it cannot solve an incorrect active or incomplete treatment.
- After a correct treatment, the stability of results is dependent on the duration of the splint. The longer the duration, the more stable the result.

In what concerns the dentiger cysts, it has been observed that they habitually are all benign, but at a local level they can have an aggressive and destructive characteristic, which may favour a mandible fracture. Some cysts, after the surgical intervention, may recess. It is signalled the possibility of existence of dentiger cysts bilaterally, cases mentioned by Eidinger, Mc Donnel, O'Neil, Crinzi, Swerdloff, some double cysts can also be present in children, Sands describing a case with multiple dentiger cysts in a child. Periodically, a control radiography is necessary. Any lesion greater than a dental follicle is excised and sent to anatomopathology in order to establish exactly the diagnostic. We should not forget the fact that there is the risk of neoplasic transformation in a mucous-epydermoid carcinoma, ameloblastoma or cellular squamous carcinoma.

In conclusion, I would like to end with Merrifeld's assertion: "***The anomaly was originates in the functional box and there should be found its solution".***

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