Abstract

Our approach aims at presenting, based on clinical observations and complementary examinations, the effects of a treatment’s setting up during the mixed dentition period. The objectives include the identification of the optimal time of treatment of II/1, II/2 Angle malocclusions, as well as the therapeutic possibilities for the treatment of 2nd class Angle malocclusion during the period of mixed and permanent dentition. The study is based on data collected from 114 clinical cases (69 girls and 45 boys) with an age span between 7 and 18 years.

Key words: 2nd class Angle malocclusion, two-phase therapy

The treatment of 2nd class malocclusions is performed in relation with patient’s age of diagnosis, the determining cause and the severity of anomalies. The great variety of the clinical forms, the opposing character of manifestations (class II/2, Langlade) at skeletal, dental-alveolar and muscular level forces the physician to elaborate an as individualized strategy as possible, based on a correct and complete diagnosis. The 2nd class malocclusion, both the 1st and the 2nd subdivision, should be considered as “serious orthodontic issues” (Jack Dale) which, in the absence of a suitable treatment, will have a negative evolution throughout the whole period of growth.

That is why, the German Association of Orthodontics always recommends that “the treatment of 2nd class malocclusions in skeletal form should begin from the temporary teething phase”. It is known that worsening of the non-treated anomaly during growth involves a longer treatment and increased costs. All these elements, together with the conclusion of Korkhauss and Schwarz, who recommended the treatment of class II/2 in the phase of the incisor group, demonstrate, without any doubt, the value of the interceptive treatment of the 2nd class malocclusion. The debate rests valid, pertaining to the two-phase or one-phase treatment in permanent teething. In relation with this, each group of authors, sustaining one or another opinion, produce arguments provided by their clinical experience. The fundamental general postulate, according to which, by treating the causes we shall eliminate the effects, cannot be denied. From this point of view, an early treatment is based on the fundamental principle of discovering and eliminating the cause, which is unanimously considered as the key to success. Moreover, one cannot deny that, any interfering action at skeletal level, through either simulation or inhibition, can be performed only during the period of growth. At the same time, the use of the optimum moments of the phase of development of teething phenomena may be helpful for the guidance and influence of the direction and growth rates at skeletal level. The clinician’s interest is to discover, as early as possible, the growth patterns and the type of development with tendencies of evolution towards the 2nd class Angle.

Otherwise, it is wise to admit the opinion according to which, once identified all elements characterizing the 2nd class malocclusion, one should initiate the therapeutic methods. It would be unnatural to treat a child suffering from such an anomaly, until reaching final teething, knowing that the chance of auto-correction is reduced or does not exist at all. Worsening of the anomaly will certainly occur.

The motivation of this approach is found out in the large proportion in which the 2nd class Angle anomaly is represented in populations, on one hand, and, on the other, in the fact that ¾ of the orthodontically-treated cases are represented by this pathology.
We should add to this the large variety of clinical forms of the anomaly, raising serious issues related to diagnosis and treatment.

Goal

The goal of our approach is to present, based on clinical observations and complementary examinations, the effects of a treatment’s setting up during the period of mixed dentition.

Objectives

- Identification of the optimal treatment time of II/1, II/2 class Angle malocclusions
- Treatment of II/1, II/2 class malocclusions during the period of mixed and permanent dentition

MATERIALS AND WORKING METHOD

The study is based on data collected from 114 clinical cases (69 girls and 45 boys) with an age span between 7 and 18 years. The patients were examined by means of CEEX charts, and diagnosed by corroborating the clinical examination with the complementary examinations: intra- and extra-oral photostatical examination, plaster working and study models, orthopantomographies, retro-dental-alveolar radiographies, teleradiographies. When necessary, genetic, ENT and pediatric examinations were recommended for removing some doubts on the general health condition. The selection was carried out from a group of 1,018 patients.

The inclusion conditions in the group were:
- Diagnosis of 2nd class Angle malocclusion, II/1, II/2 sub-division
- Complete orthodontic file
- Good general health condition

Exclusion criteria:
- Absence of a complete complementary examination
- Discontinuation of treatment

The distribution of the 2nd class, on sub-divisions, is as follows: 70 patients in II/1 class and 44 patients in II/2 class.

Following the analysis of the group, significant clinical cases were selected for reflecting the goal of the present research. Besides functionality and stability, the physician is concerned with aesthetic aspects, a reason for which, in most cases, the patients request an orthodontic treatment. Since facial equilibrium is given by the harmony and proportion of the segments, they become important objectives in the treatment strategy.

RESULTS AND DEBATES

The treatment of 2nd class malocclusion is carried out depending on the age of the patient, on its cause and severity. This general principle is still valid but, without offering some keys to unlock its content, the result may not be the desired one. The cases in which no optimal and stable results were obtained in the first period of mixed dentition need a careful monitoring by controls carried out not later than three months, with a basic objective evaluation and programming for intervention by orthopedic and/or orthodontic means in the period of late mixed dentition and early permanent dentition. In these periods, orthopedic-orthodontic therapies based on biomechanical devices, and functional equipment (activators) were employed. The vertical plane was controlled by the association of Teuscher type activator with a headgear.

Treatment period. In current practice, as our approach proved it, in the 2nd class malocclusion, we refer to either 2nd class malocclusion subdivision 1 or to 2nd class subdivision 2, our principle being – as soon as possible, as also confirmed by the works of Proffit and Schooph. The interceptive treatment introduced in this stage allowed us to act on the dental-alveolar process in frontal and lateral areas. Intervention on the dental-alveolar processes in development also influences, to a certain extent, the skeletal basis (Phillipe).

The interventions carried out on this stage, in the II/2 class, led to: alignment of dental arches, mandible releasing, adjustment of anterior guide. In the II/1 class, the transversal component, the narrowing, the alignment of dental arches were solved, and the maxillary was prepared for the re-establishment of a correct relation with the mandible, of the anterior guide and
also for assuring the stability of the occlusion.

The beginning of the second period of mixed dentition should be free of issues related to the frontal area, anterior guide and 1st class molar relations. In some cases, treatment in the second stage was no longer necessary. In other cases, worsening of the anomaly, complication of the treatment schedule and increasing of costs in the second stage of the intervention could be avoided.

The detection of other disorders accompanying 2nd class malocclusion, such as those of odontogenesis presented in our study, modifies the treatment algorithm requiring, in most cases, an immediate inter-disciplinary approach or its programming for a later stage (prosthetic treatment) at the end of orthodontic treatment. Basically, the physician has to be aware of the importance of a correct and complete diagnosis that should be the basis of the treatment strategy, because only such judgement, applied into practice, should allow him to individualize the treatment schedule and to attain the desired result.

**CLINICAL OBSERVATION 1**

H.C., 7 year-old, male;

Motives of attendance: the patient is brought to the clinic by his parents for the delayed rash of 2.1., compared to 1.1. (which broke out 1 year ago).

AHC: The patient has two brothers. One of them suffers from malocclusion of the 2nd / 1 class, for which he was treated in two phases: mobilizable biomechanical device in the first period of mixed teething and rigid activator in early permanent teething, with good and stable results on the long term.

The clinical examination reveals mixed teething (the first period), and maintenance of 6.1. on the arch, while examination of the dental occlusion shows a distalized occlusion of the molar and canine teeth, and agood odontal-periodontal health condition.

Clinical diagnosis: 2nd class /1 malocclusion, retention of 6.1. on the arch.

**Fig. 1. Initial orthopantomography**

Initial orthopantomography indicates the phase of evolution of teething – the first period of mixed teething, retention of 6.1. on the arch, with the presence of an odontoma projected between the apex of 6.1. and the crown of 2.1. The retro-dental-alveolar radiography provides a detailed image of 6.1., which shows no radicular resorption, and the clear image of the odontoma, which blocks the rash of 2.1.

Diagnosis: 2nd / 1 class malocclusion, blocking of the rash of 2.1. through disorders in odontogenesis – the odontoma.

The case is approached from an inter-disciplinary perspective. In maxillofacial surgery clinics, extraction of 6.1., ablation of the odontoma, bridging with the liberation of the evolution path of 2.1. are usually performed.

**Fig. 2. Post-surgery orthopantomography (at 2 weeks)**

A comparative analysis of the two orthopantomographies evidences the alterations produced within the dental arch, the modified rash axis of 2.2., with a tendency towards certain mesial deformity, risking to block the evolution of 2.1. A biomechanical device was applied to carry out the circum-radicular expansion of the arch, also equipped with a space maintainer and...
with a secondary device (diapason arch), for a slow guidance of the rash path of both 2.1. and 2.2. throughout the evolution. The space maintainer was polished at repeated periods of time, until it was suppressed. The secondary device, the diapason, was activated until correction of the dental axis, then it was suspended, leaving free the rash path of 2.2.

Fig. 3. Front image

Fig. 4. Cross section image

Fig. 5. Upper arch

Fig. 6. Lower arch

Fig. 7. Right semi-cross section occlusion

Fig. 8. Front dental occlusion

Fig. 9. Left semi-cross section occlusion

Fig. 10. Orthopantomography at 11 year-old patients
Entrance in the arch and in occlusion of 2.1. may be observed, with an asymmetrical and unaesthetic discrete gum festoon, opposed to that of 1.1., to be corrected through the continuation of the treatment. The patient undergoes a treatment with a rigid activator.

**CLINICAL OBSERVATION 2**

Patient A.S., 7 year-old, urban environment. Motives of attendance: malposition of 1.1., 2.1. and 3.1.; AHC: the mother shows 2nd / 2 class malocclusion, with hypo-divergent facial pattern; Clinical examination reveals a good health condition.

Extraoral examination reveals a firm labial occlusion, a discrete reduction of the lower floor of the face, a slight deepening of the labial-chin band ridge, preeminence of the chin. Gum smile making visible the malpositions of 1.1. and 2.1. and a significant part of the gum – “the gum smile”, severely affecting the aesthetics of the smile.
Intraoral examination: from the point of view of teething evolution, initiation of the first phase of mixed teething could be observed, along with proximal-occlusal caries 5.4., 5.5., 7.4., 7.5. and radicular rests 8.4., 8.5.. Loss of 6.4. off the arch was also noticed.

The typical aspect of the anterior-posterior bent of the central incisor group should be also seen. The occlusive relations are molar-canine distalized.

A particularity of this clinical case was the formation, the slow and mal-positioned evolution (with tendency towards entropy) of 1.5., which actually prolonged the treatment. The activator permitted the accomplishment of all objectives, namely: mesialisation of the mandible, coordination of the development of the two arches, control of the vertical plan, so that the objectives of functionality, stability and aesthetics were achieved.

The result of the treatment at an age of 14 years met the expectations of the patient, of his family, as well as of the medical team.
BIPHASIC TREATMENT OF 2nd CLASS ANGLE ANOMALIES

Fig. 22. Front imagine
Fig. 25. Upper arch

Fig. 23. Profile imagine
Fig. 26. Frontal occlusion

Fig. 24. Smile in the end of the treatment
Fig. 27. Lower arch

Fig. 28. Right semi-profile
CONCLUSIONS

- In 2nd class malocclusions, the treatment should be applied in the period of temporary dentition and the first period of mixed dentition
- The intervention means in the growth stages are those specific to interceptive orthodontic therapy
- Initiation of mixed dentition should be carried out on balanced skeletal bases
- The orthopedic-orthodontic means are used with good results in late mixed dentition and early permanent dentition

References