

Early orthodontic treatment in order to prevent bucco-maxillary-facial disorders

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Summary

Early orthodontic treatment is an important means for the easier achievement of a correct bucco-maxillary-facial equilibrium, which would be harder or impossible to obtain at a later period. In many cases it may also give us more complete and satisfactory results. For example, it may prevent the need to extract teeth in Class II malocclusions, which, if treated later in life, may create functional and aesthetic problems.

Key words: early orthodontic treatment.

Orthodontic practice is based on the clinical experience of individual professionals, who, starting from different opinions and philosophies, may sometimes employ contrasting methods and approaches.

Unfortunately, the clinical evidence deriving from the use of different philosophies in relationship to the choice of the most favourable time for starting treatment in children is not widely agreed upon. In fact, the various possible moments for the onset of treatment have not been fully and comparatively investigated, and there is still the need for further clinical studies. In this short paper I shall try to approach the problem of early orthodontic treatment in children on the basis of the opinion of some Authors and of my personal clinical experience.

Some Authors [18, 11, 17] recommend the use of functional and orthopedic appliances in order to modify cranio-facial growth early during deciduous dentition (3-6 years).

Among them, Hamilton demonstrated that a correct early treatment may facilitate harmonious development, including a correct dental change (**permuta**) optimized for functional occlusion. The ideal age he suggested was 4-6 years, which is somewhat innovative for American orthognathic culture. The rationale for this is that according to Petrović, in the period preceding the eruption of canines and premolars the collagen is still immature and not replaced by its mature form. Consequently, an immature periodontium offers a milder resistance to tooth movements.

The exploitation of a period when the potential for growth is at its maximum accords with what Wieslander (Philadelphia, 1997) stated about the need for the early orthopedic correction of most skeletal deviations.

The colleagues of the Florence School of Orthodontics particularly stress the advantages of an early beginning of treatment in order to avoid a worsening of the malocclusion in the following stage of growth.

Our personal experience in dealing with early orthodontic treatment leads to similar conclusions. In the following example cases I will try to show how simple and stable the malocclusion solutions are.

Case 1 (Figure 1)

V.G., female, 5 years, presented a Class II malocclusion with open bite. The facial balance was extremely distorted with a marked protrusive profile, deep sublabial sulcus, a retrognathic mandible and perioral strain musculature.

A preliminary cranio-facial-mandible-cervical analysis (Figure 1g) in this **early phase** indicated a morpho-functional deviation.

The treatment plan for all the reported cases was based on the analysis of the following points:

1. Skeletal parameter;
2. Soft tissue analysis;
3. Occlusal plane;
4. Midline deviation;
5. Teeth morphology and position;

- 6. Arch form and width;
- 7. Skeletal age and growth.

Based on this, an orthodontic appliance was used in order to reduce and resolve the structural imbalance, redirecting the natural growth vectors, at the right moment, for a short term.

The interceptive forces, at oral and perioral levels, transferred the flow of forces and reorientated them towards the parts where they were pre-

viously excluded, thus obtaining a stable change of the function and form [15]. In this way it was possible to influence the mid and lower facial contour through movement of the teeth, as seen in the *Figure 1 - a,b,c*. In *Figures 1 - c,f,i* (facial profile photograph, frontal endoral photograph, and lateral telerradiography, taken 4 years after the end of the second phase of active treatment) it is possible to see how stable the result was.



Figure 1.

Case 2 (*Figure 2*)

Fe.R., male, 8 years, showed a Class II malocclusion with skeletal deep bite.

In the frontal facial view a gummy smile was evident.

Given the presence of skeletal discrepancy associated with mandibular retrusion, the primary end-point was the advancement of the mandible, stimulated by a condilar growth obtained with functional appliance (*Figure 2e*).

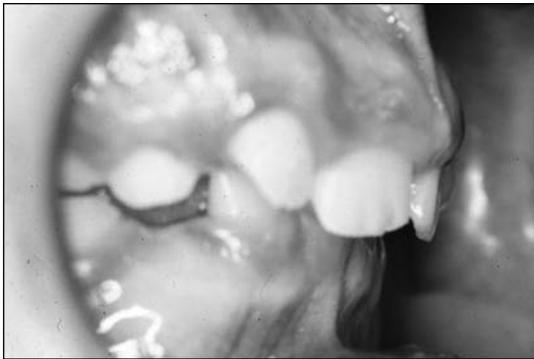
The mechanism of correction was:



a



b



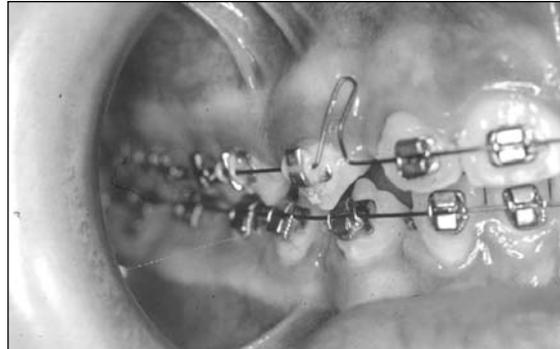
c



d



e



f

Figure 2.

a) The elimination of the interarch clench mechanism (*Figure 2c*) in order to allow autonomous development of the maxilla and mandible.

b) The repositioning of the condylar head within the glenoid fossa, previously distally situated. This also reduced diskal and joint pathology risks.

Functional technique influenced the rotational direction of growth and consequently mid and lower face changed (*Figure 2b*).

The facial aesthetics improved significantly when the directional changes of growth were controlled, leading to the Class II correction, as seen in *Figure 2*.

The treatment in the early stage of mixed dentition (*Figure 2e*) prevented worsening in the subsequent phase of growth and stimulated a favourable growth pattern.

This treatment of the skeletal deep bite with Class II dental relationship (*Figure 2e*), which avoids the usual bicuspids extraction used in similar cases, at a later stage can take advantage of the mandibular growth response after the dental compensations have been eliminated (*Figure 2d*).

Good facial aesthetics and the two stage techniques were compatible and fitted well with the functional treatment goals.

Case 3 (*Figures 3, 4*)

C.R., female, 8 years, presented a Class II hyperdivergent malocclusion with openbite and a severe overjet.

In this case the early therapy relied on:

- mechanics, which stimulated the favourable factors of growth, remodelled the palatal vault and changed the tongue posture. (*Figures 4 - c,d*);

- mechanics which blocked the unfavourable factors directing the growth towards the horizontal direction while blocking the vertical augmentation.

This orthognathic therapy, following the balance of the dento-maxillary structure (*Figures 3 - d,f,h*), also contributed to the correction of the **aesthetic facial morphology** (*Figure 3b*), considering the proportion of the face and the ideal facial profile.

The advantage of non-extraction treatment in these cases, aids the resolution of the antero-

posterior problems, even if mandibular response is insufficient or absent.

Case 4 (*Figure 5*)

E.L., female, 8 years, complained of a distorted facial aspect, rising from a skeletal Class II malocclusion with a severe overjet (*Figure 5e*).

The aim of the orthodontic treatment was the harmonization of the occlusion with:

- the neuro-muscular system;
- the temporo-mandibular joint;
- posture.

The improvement of the aesthetic aspect of the face is based on the changing of the soft tissue, following the change in the normal direction of growth in the mid and lower part of the face (*Figures 5 - a,b,c,d*).

Without the early elimination of the abnormal muscular function in this patient, the lower facial development would have been quite different.

Figures 5e and f illustrates how the normal directional changes of the mid and lower face, induced by functional orthodontic treatment, improved the sagittal relationship of the arches.

The main guidelines considered in planning the treatment of these cases were:

1. The relationship between malocclusion and facial morphology in the early phase of growth.
2. The elimination of one or more factors, which caused the malocclusion in order to allow a return to the natural model of growth.
3. The phase of growth of each single patient.

We should bear in mind that the various factors, which produced a malocclusion, may require a different approach in relation to the different phases of development. Therefore correct timing is fundamental in order to obtain good and stable results.

Furthermore, an early analysis and treatment of orthodontic and postural problems can prevent the need for more complicated treatment successively. In fact, early „orthopaedic“ dental induction in deciduous (*Figure 1*) or mixed dentition (*Figures 2, 3, 5*) can guide the cranium-mandibular growth and thus **reorientate** the dento-maxillary-facial development in a more correct way, modifying the function and posture.



a



b



c



d



e



f



g



h

Figure 3.

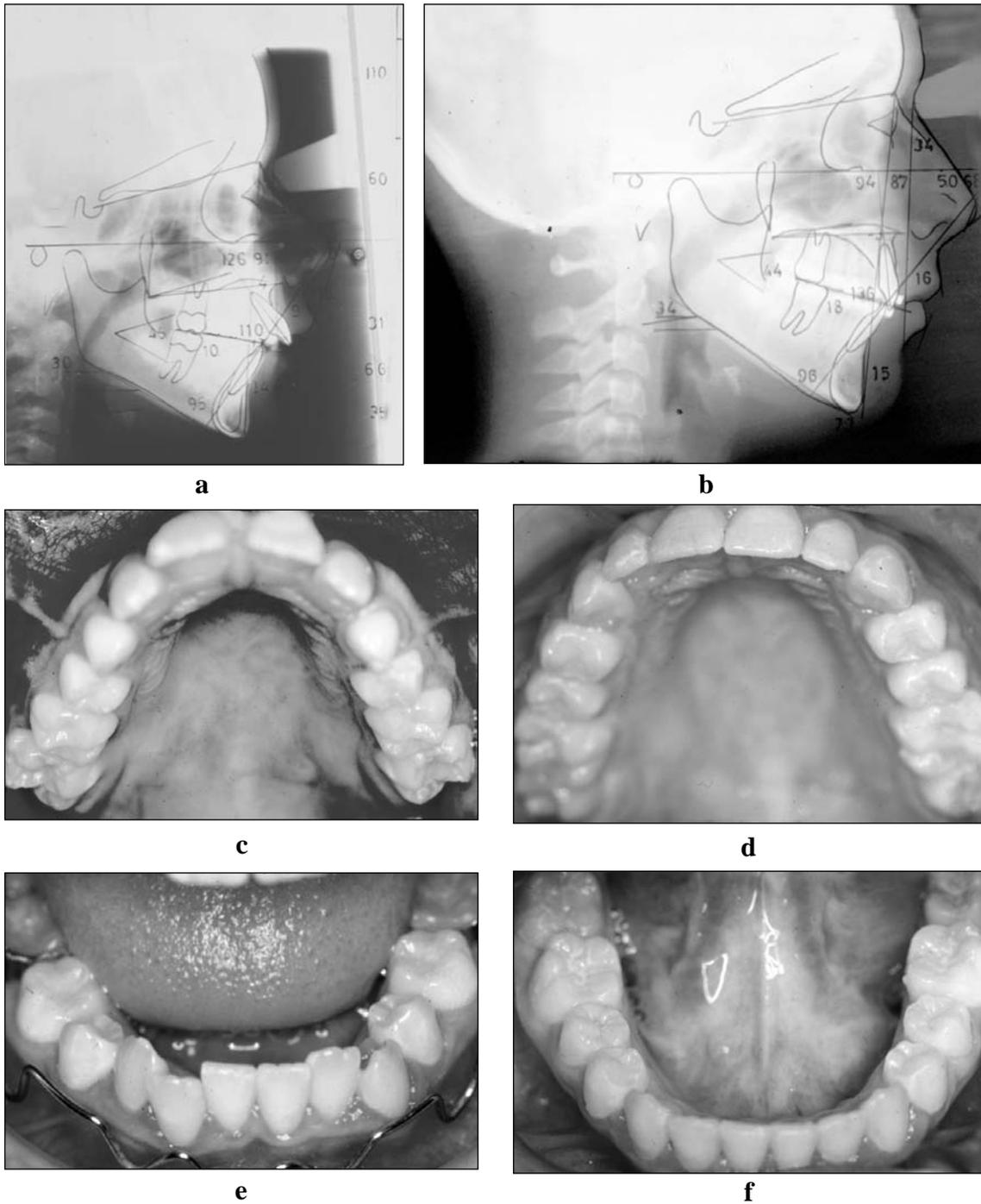


Figure 4.

When we have to treat a child aged 4-7 with a malocclusion or postural defect, the first step is to analyse the cranio-facial-mandibular-cervical complex [9].

The main reference is the auxologic model based on the analysis of facial, lip and dental arch

photographs. If necessary we add panoramic X-rays and teleradiographs.

In addition, we have to consider the aesthetic aspects, which are determining factors in orthodontic diagnosis and treatment. As a consequence of this, mechanics are based upon analy-

sis of profile and soft tissue. This is the reason why all the cases presented (*Figures 1-5*) were treated without extraction of the bicuspids.

The analysis and planning of cases often led us to *identify various therapeutic solutions*, which may vary in relationship with the various phases of



a



b



c



d



e



f

Figure 5.

growth. This is in agreement with Enlows [7], who sustains that so long as active growth continues, there is space for remodelling, sufficient to achieve a compromise of functional balance through compensatory mechanisms. A correct harmonisation of the orthodontic mechanics with the type of growth is crucial in order to achieve results, which are stable in time. Furthermore, the expected consequences of interactions between growth and treatment must also be carefully evaluated in relation to facial aesthetics.

In conclusion, early orthodontic treatment is not only feasible and effective, but in addition, has the advantage of exploiting the period of the child's growth, when biological mechanisms linked to development cooperate with our corrective efforts. All these factors make the treatment simpler and cheaper to perform. Therefore, independently of a possible need for consolidation of the results in a later period of life, the length and the cost of the cure will, in any case, result lower than that which we would expect without such preliminary treatment.

In addition to this aspect, which we could define "preventive medicine", other aspects

favour this therapeutic philosophy, such as better patient compliance, provided that the child is more able to tolerate the presence of a foreign object in the mouth.

The early treatment eliminates noxious habits, re-orientates dental-maxillary development and compensates for the structural discrepancy between teeth and bone. This leads to a timely correction of defects, which could have a negative aesthetic impact, therefore contributing effectively to a better harmonisation of the child with the human environment where he lives, and improving his feelings of acceptance within it.

Early treatment also represents an important contribution in the prevention of oral health, thus having an important social impact. From a financial point of view, it can prevent incurring major expenses in a later period of life, due to the need for dental care, which could have been avoided if early treatment had been carried out.

In consideration of all these factors, we are convinced that early child screening should, in the future, form part of management planning in public health.

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