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Levels of Prevention in Orthodontics and Their Value to Pedodontics

WILMA A. SIMÕES*
C.D.

Pedodontics and orthodontics are interlaced fields of dental knowledge. In this article, we classify prevention in orthodontics, suggesting proper levels according to their feedforward, which are a set of procedures in order to effectively accomplish prevention. Some clinical resources are included in the exclusive field of Pedodontics (e.g., selective grinding, Planas' direct tracks) and belong to specific levels of prevention in orthodontics.

Introduction

Prevention in orthodontics should be accepted as a basic requirement for implementing successful public health dentistry. There are several levels of prevention that need to be clearly defined, using up-to-date parameters of present-day orthodontics and pedodontics. In order to prevent, we must anticipate and consequently avoid the occurrence of malocclusions. Should malocclusions occur, preventive measures must still be utilized to avoid the condition from becoming even more critical and producing irreversible consequences.

Levels of Prevention and "Feedforward"

To prevent is to influence the development of a child by anticipating and thus avoiding the occurrence of occlusopathy. Attainment of this degree of early prevention is considered to be the "noble level of prevention" in orthodontics [30] and is essentially done by applying "feedforward." "Feedforward" is a set of procedures that is carried out when prevention is put into practice.¹

The "inferior level of prevention" is that more critical and regrettable condition when "feedforward" limits have been exceeded and occlusopathy has occurred. However, even at this point, "feedforward" methods are still applicable.

* Private practice, São Paulo, Brazil.

¹ Cavagna, "Growth," lecture delivered at São Paulo Dental Association, as part of long-term course given by W.A. Simões, April 18, 1980.

The term "feedforward" continues to be used as we are still anticipating and preventing conditions from worsening as time progresses. We prepare the stomatognathic system by feedback which is more advantageous to the performance of its functions [15] and produces better results.

By applying "feedforward" at the inferior level, we direct the open system which a living being [4, 19] is made up of, changing its feedback and outlining new possibilities with correct development as an end result.

Noble Level of Prevention

This is by far the most expedient socioeconomic level of prevention, depending on widespread dissemination of information within the community. Basic "feedforward" exists at this level.

Factor 1: "Feedforward" in Respiration

- (1) Children should be adequately dressed to protect them from harmful effects of respiratory problems caused by colds, bronchitis, etc. As a result of indoor heating or air-conditioning, proprioceptive reflexes of the skin are altered because children are often inadequately dressed for prevailing room temperatures with constant colds resulting. Children need to be protected and well taken care of [20].
- (2) Respiration by mouth should be discouraged. After the inevitable colds, breathing through the mouth should be disfavored by encouraging the child to breathe through the nose. If the child is not old enough to understand, obstruction of the mouth should be gradually and gently done, forcing the nasal respiratory function to perform since nasal respiration plays a significant role in the development of the face and occlusion [20].
- (3) If needed, treatment should be done by otorynolaryngologists or other odontology-related specialists.
- (4) Oral habits, such as thumbsucking, etc., should be corrected very early, to avoid duration, frequency, and intensity from overextending [10].
- (5) Physical exercise and sports as well as outdoor activities should be encouraged to stimulate correct

respiration and overall development of the child [17].

Factor 2: "Feedforward" in Nutrition

- (1) Breast-feeding is essential and should be maintained as long as possible for the overall development of the child. Correct positioning of the infant in relation to the breast is important [18].
- (2) Feeding bottles with preferably anatomical nipples should be used, and the changeover from liquid to solid diet should be done gradually. The bottle should also be held correctly in relationship to the infant [12, 18].
- (3) Solids such as vegetables, fruits, etc., should not be ground or blended too much, enabling the child to use its masticatory system. Natural foods, fibers, and dry foods should be offered [20].

Factor 3: Hygiene

Oral hygiene should be initiated at an early age. Teeth should be brushed correctly and with the right frequency.

Factor 4: Opportune Pedodontics

- (1) Prevention of caries—fluoride application, balanced diet, hygiene, etc. [6].
- (2) Treatment of caries—correct sculptures resulting in correct performance of mandibular movement [4].
- (3) Treatment of infections—elimination of infections in order to avoid loss of teeth [6].
- (4) Selective grinding should always be done before masticatory orientation in order to allow correct execution of mandibular movements [21].
- (5) Masticatory orientation—when vicious mastication occurs, unilateral compensatory mastication should be introduced inverting the sides [32].

Prevention at Inferior Level

At the inferior level, occlusopathy has occurred. Malocclusion has already developed at what is considered the "inferior level of prevention." The "feedforward" used is one of interference, preventing the development from continuing in the wrong direction, avoiding that the malocclusion turns into

Table 1

Nine Levels of Prevention in Orthodontics

NOBLE LEVEL:

FACTOR 1 - RESPIRATION

FACTOR 2 - ALIMENTATION	{	BREAST - FEEDING NURSING BOTTLE HARD FOOD
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FACTOR 3 - HYGIENE	{	CORRECT EXECUTION FREQUENCY
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FACTOR 4 - OPPORTUNE PAEDODONTICS	{	CARIES' PREVENTION CARIES' TREATMENT INFECTIONS' TREATMENT SELECTIVE GRINDING MASTICATORY ORIENTATION
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a magnified anomaly, and finally eliminating the malocclusion itself. Prevention at this level is attained when defective development has been altered and "feedforward" applied, resulting in full recuperation of normal conditions.

There are two aspects of prevention at the inferior level:

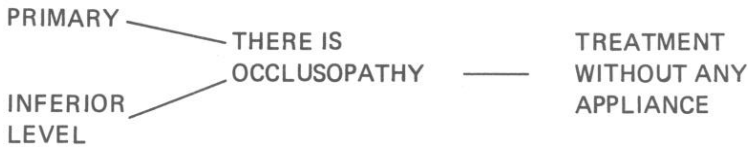
- Primary inferior level: "Feedforward" does not rely on appliances.
- Secondary inferior level: Prevention is basically carried out with help of appliances.

In early treatment cases, functional orthopedic techniques are highly recommended [26, 28] because dental support is not needed (specifically because anchorage is bimaxillary) and the percentage of extractions is reduced (also because treatment may be started at an earlier age) [27].

Primary Inferior Level

Factor 1: Selective Grinding

An example of selective grinding is a cross bite in the primary dentition.



Factor 2: Masticatory Orientation

Correct the vicious mastication by introducing exclusively unilateral compensatory mastication on the opposite side. In the example used under Factor 1 above, the child is asked to chew exclusively on the opposite side of the cross bite (which is the vicious side). Factor 2 complements Factor 1.

Factor 3: Vertical Dimension Care

Dentistry. Applying Planas' Law of Sagittal Transversal Development as well as Minimum Vertical Dimension [23], a diagnosis can be made for what would be the best situation for the mandible in relation to the maxilla. Restoration of teeth can be carried out, allowing mandible to assume position favoring the most convenient vertical dimension and using materials that retain the position for a reasonable length of time.

Planas' Direct Tracks (PDT). Continuing with Factors 1 and 2 cross bite examples, selective grinding alone is sometimes not enough. There are limits of how much grinding can be done. Planas, by adding bonding plastics (compounded resins polymerized by ultraviolet rays) directly onto dental surfaces of the cross side, regulates the vertical dimension [25, 30-31]. With this procedure, mastication is also stimulated to be done on opposite side of the cross bite. The height of the inferior tracks on the cross bite side should be higher on the lingual side than on the vestibule side; in the anteroposterior direction, it should be higher in front if the mandible is to be moved forward and lower in front if the mandible is to be moved backwards. In some cases, in order to adjust the maxilla-mandible relationship to be free of interference and provide more adequate lateral movements, direct bonding of plastics to occlusal surfaces of teeth on the opposite side should be done. However, on this side the height of the track in the vestibule-lingual direction should be contrary to that existing on the cross bite. The same criteria applies for the anteroposterior direction. Once the cross bite is corrected, bonding plastic is easily removable from surfaces of teeth [31-32].

Factor 4: Extractions

Extractions are infrequent and primary permanent or supernumerary teeth may be extracted. The need for tooth extraction must be critically evaluated and based on careful diagnosis. Faulty judgment can result in mutilation [29]. When tooth extraction occurs, the periodontal and periosteal proprioception are modified from tooth to tooth in the same arch or from inferior to superior teeth [11]. The mandible moves against the maxilla which received the impact through dental contacts [3, 5, 7-8, 9, 11, 16, 29-30] (Fig. 1).

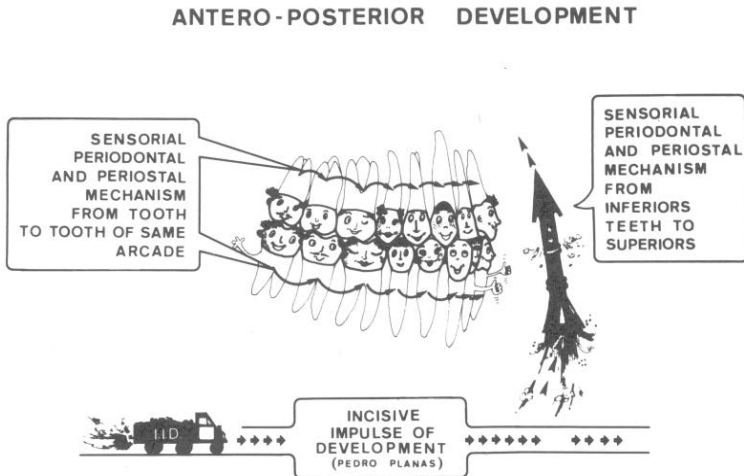


Fig. 1. IID (Inceptive Impulse of Development)—Pedro Planas. Anteroposterior development of maxillae obtained through stimulus transmitted from tooth to tooth in the same arch (incisors specially) and from contacts between maxillae (inferior-superior) achieved mainly through sensory mechanism, periodontal, periosteum, and TMJ.

Planas calls this an “incisive impulse” [22] to the anteroposterior development via neural excitation [1-2, 4] (energy from periodontum to periodontum → muscle to muscle → bone to bone, etc.). When extractions occur, our objectives are being directly influenced—either favorably or unfavorably. Careful diagnosis must be done in order to restrain or stimulate this impulse. In the case of extractions, there will be a reaction in all directions: anteroposterior, transversal, sagittal, and vertical (“new concept of serial extractions”) [29].

Table 2
Primary Inferior Level

- * FACTOR 1 - SELECTIVE GRINDING
 - * FACTOR 2 - MASTICATORY ORIENTATION
 - * FACTOR 3 - VERTICAL DIMENSION CARE
 - * FACTOR 4 - EXTRACTION
- DENTISTRY
PLANAS' DIRECT TRACKS

Secondary Inferior Level

At this level of prevention, appliances are necessary. Orthodontics offers a wide range of resources with the most diverse techniques possible²:

Orthodontic Techniques

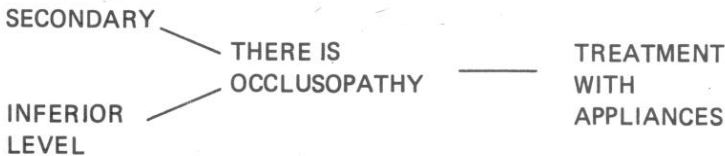
- Multiband* (fixed) (Rickets, Begg, Edgewise, etc.).
- Removable* (active plates, Schwarz, Hawley, etc.).

Orthopedic Techniques

- Mechanical* (palatine disjunctions, chin cups, extraoral traction, etc.).
- Functional* (Bimler's appliances, Balter's bionator, Frankel's function correctors or regulators, Planas' Indirect Tracks, activators, etc.).

After careful diagnosis, the most suitable technique should be selected, one that is tailored to the individual case. Sometimes not just one but a combination of techniques is advisable, so that multibands (fixed) as well as orthopedic techniques are employed.

Critical and sound judgment are paramount in making a correct evaluation and diagnosis of treatment requiring the use of one or more techniques, but the actual execution of these techniques is imperative for a successful treatment.



² Faltin, Jr., interview appearing in J.A.P.C.D., No. 219, São Paulo, June 1975.

First Category

Primary dentition. Appliances should only be placed in certain cases with anterior cross bite or pronounced dysplasia.

Second Category

Mixed dentition. Age for beginning treatment varies according to type of malocclusion. The more serious the case, the earlier the treatment should start. Mixed dentition can be divided into three stages [30], two of which fall under the following category:

First stage: mixed dentition. Approximately seven years old, all open bites diagnosed as skeletal structure and all dysplasias should be treated.

Second stage: mixed dentition. Approximately eight to ten years old, all malocclusions, with very few exceptions, should be treated.

Third Category

As applied in the following:

Third stage: mixed dentition. Approximately ten to thirteen years old, these are the remaining cases which only require minor dental movement.

Permanent dentition with good prognosis. The permanent dentition have a good prognosis of achieving a favorable occlusion.

Fourth Category

Permanent dentition with bad prognosis. Prevention applied to cases of malocclusion of patients with permanent dentition which have severe limits of success. Treatment may be considered preventative (TJM syndromes, periodontal disease, etc.) in spite of being at fourth category-secondary inferior level.

Functional Orthopedic Techniques are most suited for the first levels of prevention [26, 28]; this is clearly evident when you recall the fundamental principles and basic characteristics of these techniques [27].

Conclusion

The fields of orthodontics and pedodontics overlap when attempting to prevent or intercept malocclusion. The only

Table 3

Secondary Inferior Level

- FACTOR 1 - 1st CATEGORY: DECIDUOUS DENTITION (DISPLASIAS AND CLASS III)
- FACTOR 2 - 2nd CATEGORY: MIXED DENTITION - 1st STAGE - 7 Y
(DISPLASIAS AND CLASS III)
2nd STAGE - 8 - 10 Y
(ALL THE MALOCCLUSIONS CASES)
- FACTOR 3 - 3rd CATEGORY: PERMANENT DENTITION WITH GOOD PROGNOSIS
MIXED DENTITION - 3rd STAGE - 10 - 12 Y
- FACTOR 4 - 4th CATEGORY: PERMANENT DENTITION WITH BAD PROGNOSIS
(TREATMENT WITH SEVERE LIMITS OF SUCCESS)

Table 4

LEVELS OF PREVENTION IN ORTHODONTICS AND PERMANENT DENTITION



LEVELS OF PREVENTION IN ORTHODONTICS AND DECIDUOUS DENTITION

* NOBLE LEVEL



LEVELS OF PREVENTION IN ORTHODONTICS AND MIXED DENTITION



levels of prevention that fall outside of the area of pedodontic activities are the third and fourth categories with permanent dentition. Pedodontists are therefore responsible for the successful application of levels of prevention in orthodontics for they are the first to detect and intercept malocclusion problems even during the mixed-dentition stage. Pedodontists

should be familiar with all levels of prevention in order to satisfactorily treat and orient their patients.

The widespread application of "feedforward" will result in less actions on feedback, greater stability in dynamic equilibrium [32] and in overall improved efficiency, renovation [13, 14] and excellence in the fields of orthodontics and pedodontics, enabling an ever-increasing number of patients to benefit from these improvements.

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"To lift up a fallen man is good. To help him lift himself up is better."

—Frank Tyger