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PEDIATRIC DENTAL PROSTHETICS

Edited by Professor P.S. FLIS

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The fundamentals of orthodontics and children's prosthetics are outlined in the textbook as basic elements of modern pediatric dentistry. Urgency of the edition is caused by the fact that despite the pressing need for children's dental prosthetics, textbooks on this important field of stomatology are scarce. The textbook deals with various aspects of prosthetic treatment in children: the psychoemotional status of children in different age periods, psychological preparation for treatment, diagnosis of defects of teeth and dental arches, indications and contraindications for treatment, types of prostheses and their application in different periods of occlusion. A separate chapter is devoted to teeth traumas and their treatment.

For students of higher medical education institutions of the 4th level of accreditation.

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У підручнику розглянуті аспекти ортопедичного лікування у дітей: психоемоційний стан дитини в різні вікові періоди, психологічна підготовка до лікування, діагностика дефектів зубів і зубних рядів, показання і протипоказання до ортопедичного лікування, види протезів тощо. Окремий розділ присвячено травмам зубів і їх лікуванню.

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PREFACE

Pediatric stomatology is one of the youngest areas of dentistry. In their research papers many dental scientists dwell on the development of dentognathic disorders in children.

Pediatric stomatology is quite a difficult specialty and includes pediatric restorative dentistry, all kinds of surgical treatment of the maxillofacial area in children, orthodontics and pediatric prosthetics.

The main problem concerns prevention of dentognathic anomalies and deformities because preventive measures are the most effective at early stages of masticatory apparatus development in children.

Pediatric prosthetics is part of routine oral cavity sanitation in children since early extraction of temporary teeth violates the integrity of dental arches. This leads to impairment of the masticatory function, development of dentognathic deformities, and also diseases of the digestive organs.

Defects of the teeth crowns and dental arches occupy a special place among dental diseases. This is connected with the characteristics of the children's organism which is actively developing. Unfortunately many professional dentists underrate the role of temporary teeth.

Children who have lost teeth for different reasons have long been considered not to need prosthetics. However, as early as 1937 Professor B.N. Bynin initiated prosthetics for children.

Pediatric prosthetic dentistry as part of general dentistry is certainly connected with adult prosthetic dentistry, though it is much younger. The independent development of this discipline in our country is associated with the name of Professor L.V. Ilyina-Markosian, who scientifically substantiated the necessity and expediency of pediatric prosthetics.

Despite the relevance of pediatric dental prosthetics there are virtually no textbooks on this important part of stomatology.

After L.V. Ilyina-Markosian, who in 1949 published the first textbook on pediatric prosthetics entitled *Dental Prosthetics in Children*, few scholars studied this important problem. Correspondingly, this discipline was not provided with enough textbooks, and those available contained a little information useful for doctors.

In 1972 there was published the textbook of A.I. Betelman, A.I. Pozniakova, A.D. Mukhina, and Y.M. Aleksandrova *Children's Prosthetic Dentistry*. The book contained 250 pages and only 25 of them concerned pediatric prosthetics.

The 75-page textbook of K.N. Shamsiyev *Dental Prosthetics in Children and Teenagers* (1985) again devoted only 25 pages to the problem of pediatric dental prosthetics.

T.V. Sharova and H.I. Rohozhnikova's textbook *Children's Prosthetic Dentistry*, published in 1991, provided more detailed information on pediatric prosthetics.

The fundamental work of Professor F.Y. Khoroshilkina *Orthodontics* was published in 2006. Still, out of its 540 pages only 11 were devoted to pediatric prosthetics.

There has been no such a book in Ukrainian.

Now who and where should get to grips with this problem?

Today we define **orthodontics** as a science studying the etiology, pathogenesis, clinical presentation, methods of diagnostics, treatment and prophylaxis of persistent anomalies and deformities of the dentognathic apparatus, and also **etiology, pathogenesis, clinical presentation, methods of diagnostics, treatment and prophylaxis of defects of the teeth, dental arches, jaws and face in children**.

Therefore the problems of pediatric prosthetics must be tackled by orthodontists, but all dentists are to possess certain knowledge and skills of this subject. Any ordinary person knows that at certain time a child is cutting temporary and later permanent teeth, though only doctors know the terms of teething, the time of the formation and resorption of the roots of temporary teeth and formation of the roots of permanent teeth. People appeal to orthodontists very late, because at first patients are treated by dental therapists, if necessary — by dental surgeons, but most persons do not even realize that untimely prosthetics in children may lead to severe consequences in maxillofacial area development.

We hope that the new textbook will help dentists and students of stomatological departments of higher medical educational establishments to master the knowledge of pediatric prosthetic dentistry.

Taking into account the existing gap in special literature on pediatric dental prosthetics, the authors will appreciate critical remarks.

*Professor
Flis Petro Semenovich*

PEDIATRIC DENTAL PROSTHETICS

1.1. CLINICAL AND BIOLOGICAL GROUNDS OF PEDIATRIC DENTAL PROSTHETICS

Prosthodontics is part of routine sanitation of the oral cavity in children. Early extraction of temporary teeth violates the integrity of the dental arches conditioning changes of the masticatory function. At first these changes are adaptive, later they play the role of etiological factors in dentognathic deformity development. Defects of the teeth crowns and dental arches are rather important stomatological diseases. This is due to the peculiarities of the actively developing children's organism, imperfection of the dentognathic apparatus and other physiological systems.

Among other things domestic health care concerns implementation of preventive measures directed at risk identification and elimination of dentognathic apparatus maldevelopments in different periods of occlusion.

Numerous factors provide the normal growth and development of children, among them correct formation of all the parts of the digestive tract and, particularly, masticatory apparatus, whose functioning largely depends on the preservation of the integrity of temporary and permanent teeth. Correct growth and formation of the dentognathic apparatus are influenced by three main factors:

1. Biological tendency to growth.
2. Teething.
3. Masticatory function.

Many dentists often underrate the role of temporary teeth. Still, these teeth play an important role not only in the correct development of the dentognathic apparatus, but also in provision of the growth and development of a child in whole.

Functions of temporary teeth:

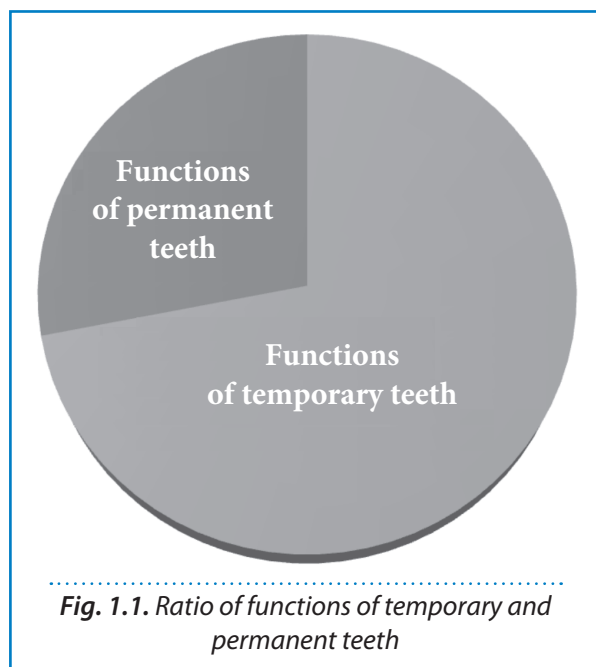
- biting and chewing;
- esthetic;
- phonetic;
- articulatory;
- swallowing;
- respiratory.

Besides, temporary teeth provide:

- stimulation of jaw growth;
- stimulation of teething;
- bite formation;
- formation of the physiological occlusion height;
- correct development of the muscular system;
- development and differentiation of elements of the temporomandibular joints.

In Fig. 1.1 you can see ratio of the functions of temporary and permanent teeth.

One should preserve temporary teeth in children because they play an important



role in the process of occlusion height formation, in the correct development of dental arches, in the provision of normal development of the jaws, timely eruption and correct location of permanent teeth in the alveolar process, normal development of speech, functions of mastication and swallowing, and in prevention of secondary dentognathic deformities in the form of dental arch shortening, dentoalveolar lengthening, displacement of the teeth limiting the defect, and also in the prophylaxis of intraosseous displacement of permanent teeth germs, which violates the process of age-related differentiation of elements of the temporomandibular joints,

functional morphological changes, prevents the formation of favorable conditions for the correct formation of the masticatory apparatus: there develops retention, some teeth change their location, pathological occlusion is formed.

1.2. CAUSES OF TEETH AND DENTAL ARCH DEFECTS

Having examined 200 children aged 2 to 5 years and 500 children aged 6 to 16 years from Kyiv nurseries and schools V.P. Vozniuk established that in the period of temporary occlusion the teeth of children aged 3—4 years were most affected by caries. Caries affection of permanent teeth in transitional occlusion increases gradually

in children aged 8 to 10 years. Caries affection of permanent teeth in children at the age of 12—14 years is practically identical, and after 15 years it increases considerably. One may observe complete destruction of the crown part of temporary teeth already in 2-year-old children. The majority of completely destroyed teeth are observed in children aged 5—6 years. This also concerns premature extraction of temporary teeth in children of this age. The cited data testify to the fact that 5—6-year-old children are the most susceptible to caries and its complications. Complete destruction of temporary teeth and their premature extraction, if teeth and dental arch defects are replaced untimely, will promote the development of dentognathic deformities, i.e. dental arch shortening, lack of space for permanent teeth eruption and their abnormal location, and also deformities of interocclusal relations. Complete destruction of the crowns of permanent teeth is already observed in 10-year-old children and is the most intensive in 16-year-old teenagers. This also concerns early extraction of these teeth. It has been found out that despite all the preventive measures aimed at reduction of stomatological diseases incidence among children, caries affection of the teeth and the number of its complications still remain rather high (Table 1.1).

Table 1.1

**Average Number of Teeth Affected by Caries and Its Complications
in Different Age Groups**

Group	Age of Children, years	Caries		Roots		Extractions		Number of Children	
		E	F	E	F	E	F	In the Age Group	In the Group in General
I	2	4.3		0.49				47	200
	3	4.31		0.48		0.5		58	
	4	4.31		0.39		0.22		51	
	5	3.98		0.59		0.25		44	
II	6	3.58	0.81	0.51		1.26		57	291
	7	2.34	0.21	0.37		0.9		38	
	8	1.56	0.56	0.33		1.05		43	
	9	1.08	0.7	0.12		0.62		50	
	10	0.49	0.76	0.04	0.02	0.43		49	
	11		0.76		0.04		0.04	54	
III	12		1.56		0.05		0.1	39	212
	13		1.15		0.04		0.14	51	
	14		1.81		0.03		0.31	32	
	15		1.28		0.04		0.22	50	
	16		4.73		0.3		0.45	40	