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VALUE OF CLEPS LIP SURGICAL TREATMENT END ORTHODONTIC TREATMENT APPROACHING

PHD THESIS SUMMARY

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KEYWORDS : cleft lip, orthodontic strategies in operated cleft lip, orthodontic role, consonant pronunciation disorders, psychosocial stress.

THE GENERAL PART

CHAPTER I presents the etiopathogenesis and terminology of cleft lip, how clefts occur, cleft genetics, the international situation, cleft classification, management in the treatment of children with cleft lip, the role of the interdisciplinary team, and therapeutic protocols from birth to adulthood [1].

CHAPTER II presents the cheiloplasty techniques for cleft lip, as well as the advantages and disadvantages of the most used techniques. Techniques for unilateral labial cleft are divided into procedures that close the defect in a straight line and procedures that use plastics with local flaps [2].

II.1 Which technique do we choose?

Table 1 summarizes the main advantages and disadvantages of the most commonly used techniques for unilateral cleft lip, showing the superiority and popularity of the Millard technique.

Table 1. Comparison between Millard, Tennison and LeMesurier techniques

DLU TECHNIQUE	**LE MESURIER**	**TENNISON**	**MILLARD**
Cupid's bow	½ preserved + ½ rebuilt	kept and correctly positioned	kept and correctly positioned (best)
excision of tissues in the lateral segment	Yes	yes, but less	minimum
normal relief upper lip	yes, protrusion ½ lower	yes, protrusion ½ lower	da, tensiune în ½ superioară
preoperative landmarks	complicated but precise with predictable results	complicated but precise with predictable results	simple, without exact measurements, („cut as you go")
scar	unsightly: zig-zag and located on the midline, interrupts the filter	zig-zag, located laterally, on the filter ridge (but transverse In the middle portion)	well concealed in the filter ridge (most favorable), but linear and vertical with a tendency to retraction
the vertical length of the upper lip	Long (hypercorrection)	Long (hypercorrection)	Short (hypocorrection)
nasal malformation	wide nostril (hypocorrection)	wide nostril (hypocorrection)	nasal wing repositioning, reconstruct. nostril floor, elongate the columella, small nostril (hypercorrection)
changes in technique	Wang: preserves all of Cupid's bow and the scar on the side	Randall: more accurate measurements; Fisher anatomical subunit; Skoog: 2 triangles: indicated in very wide DLU> 5mm	Numerous: Mohler, Noordhoff, Salyer, (white line flaps,vermilion flaps, perialary incision, rotary incision, etc.)
indications	toate DLU, inclusiv cele largi	all DLUs, including wide ones> 3-4 mm	all DLU, not very wide; > 3-4 mm (requires modifications)

For bilateral cheiloplasty, straight-line techniques are preferred, unlike DLU unilateral labial clefts, where techniques with zig-zag scars are used. 3,4]) or even gave them up (eg Noordhoff technique [5,6]), using intranasal incisions instead.

CHAPTER III presents orthodontic techniques and strategies in operated cleft lip, presenting the stages of orthodontic treatment in patients with cleft lip and palate, as well as the role of the orthodontist - as an essential partner in the treatment of cleft lip and palate.

The role of the orthodontist in the treatment of patients with complete unilateral and bilateral cleft lip and palate, is from birth to the age of 20 being a long-term treatment, which the team will take into account in choosing techniques, sequences and treatment moments, achieving correlation with the effect on maxillofacial growth.

CHAPTER IV shows how the presence of cleft lip and palate can affect the child's ability to communicate effectively leading to significant social, emotional, and educational difficulties (American Cleft Palate-Craniofacial Association, 2009).

PERSONAL CONTRIBUTION

CHAPTER I describes the argument and objectives of personal research on the value of surgical treatment of cleft lip in the approach to orthodontic treatment. At present, there is no single, ideal, universally accepted therapeutic protocol and that is why it remains a major concern of orthodontists. In establishing a protocol, the four distinct phases of patient development will have to be taken into account: infant, temporary dentition, mixed dentition and permanent dentition. The presence of cleft lip and palate and repetitive surgical procedures can negatively affect the child's ability to communicate effectively leading to significant social, emotional and educational difficulties. Thus, the evaluation and management of communication disorders associated with cleft lip and palate with or without cleft palate is a critical aspect of the multidisciplinary treatment of these patients. The sound articulation abilities of children with cleft lip and palate are reported to be clearly inferior and mature later than those of children without these congenital malformations. The treatment of speech and language problems in patients with cleft lip and palate should move towards a model of prevention that addresses these problems before they occur. Also, the association between language deficiencies and school performance in children with cleft lip and palate indicates that language performance should be thoroughly assessed in these patients.

Another aspect that should be taken into account in establishing protocols for approaching cleft lip and palate, is the psycho-social implications by affecting interpersonal relationships and the existence of a greater degree of social inhibition or shyness.

II. OBJECTIVES AND FORECASTS

II.1 The main objectives of these studies were:

- evaluation of the value of surgical treatment in the management of orthodontic treatment;
- emphasizing the role of orthodontic treatment in the cleft lip or palate associated with or without cleft palate;
- evaluation of the incidence, at birth, of the cleft lip associated or not with cleft palate;
- determining the clinical-evolutionary peculiarities of patients with this malformation following the degree of occurrence and type of consonant pronunciation disorders and highlighting the link between the presence of splits, patient age and psychosocial stress, perceived as well as
- development of a possible therapeutic algorithm, specific for age categories.

II.2 The secondary objectives of these studies were

- distribution of cleft lip by clinical forms, sex, gestational age and socio-economic status;
- analysis and distribution of consonant pronunciation disorders depending on the form of cleft;
- the incidence of dento-maxillary anomalies and their impact on sound production and language skills;
- identifying the existence of a link between the presence of clefts, the patient's school age and the perceived psycho-social stress;
- emphasizing the connection between the type of cleft and the perceived psycho-social stress;
- identifying the connections between the presence of the cleft and aspects related to: friendship, social interaction, extracurricular participation, behavioral disorders, teasing / intimidation, speech disorders and disorders related to the aesthetic aspect**;**
- highlighting the main therapeutic features in patients with lip splits associated or not with orthodontic cleft palate.
- highlighting the role of the orthodontist as an essential member of the multidisciplinary team
- proposing an algorithm for the therapeutic management of orthodontic treatment of patients with cleft lip or palate associated or not with cleft palate, as an integral part of multidisciplinary treatment.

Forecasts

We anticipate that, following this study, we will be able to prove the value of surgical treatment of cleft lip in the management of orthodontic treatment and that this stage of treatment is mandatory to obtain optimal functional and aesthetic results.

The data thus obtained, statistically analyzed, will be used for the following purposes:

- identification of the frequency of cleft lip with or without palate cleft and the degree of damage depending on gender;
- establishing specific predictive factors for early diagnosis by evaluating genetic factors using genetic testing;
- the importance of paying special attention to the assessment of communication skills before the child begins to speak, focusing on language and sound production skills in development;
- the need for an interdisciplinary therapeutic approach, which should start from birth and continue into adulthood (therapeutic algorithm);
- considering the psycho-social implications associated with cleft lip and / or palate, as an important landmark in the multidisciplinary approach;
- the importance of parents' acceptance of orthodontic treatment despite the high costs, the long monitoring period and the need for regular check-ups.

III. Material and method

This paper is the result of retrospective studies performed on diagnosed cases and recorded over a period of 10 years (2005-2015), using data from archived medical documents of the County Emergency Clinical Hospital "St. Apostle Andrei ”Constanța. Patients diagnosed with or without a cleft lip associated with palatal cleft were considered.

In this paper, we looked at the incidence at birth of cleft lip and palate with or without cleft palate, analyzed the risk factors that could have occurred in the uterine period leading to these malformations and followed the evolution over time, both from a functional, aesthetic, emotional point of view of patients with clefts considering: the occurrence and type of consonant pronunciation disorders, the link between the presence of clefts, the patient's age and perceived psychosocial stress. Following the discussions with the parents, information was obtained about performing speech therapy, orthodontics and psychological counseling.

The existing information in the patient observation sheets was supplemented by data obtained by the questionnaire method.

Patient observation sheets comprise several sections: general patient data (name and surname, age, sex, address, telephone number), heredo-collateral history and personal history to which is added the patient's medical history or clinical examination.

The enrollment of patients in the study groups was done in compliance with **inclusion / exclusion criteria**. We opted for non-restrictive enrollment criteria, in the sense that they were included in the group:

Inclusion criteria:

- all cases with congenital orofacial malformations,
- children of both sexes,
- children who have benefited or not from surgical treatment

Exclusion criteria:

- non-compliant patients,
- patients in whom we did not obtain the consent of the family or the guardian

The enrollment of patients in the study groups was done with the consent of the family, and the study was performed with the approval of the Ethics Commission of the County Emergency Clinical Hospital "St. Apostle Andrei ”Constanța . The data analysis was performed in Microsoft Excel Office and CNAS-SIUI Portal (Integrated Information System). Given the descriptive nature of the study; the results are presented in frequency and percentage. P values less than 0.05 were considered statistically significant.

Three studies were performed:

1. In the first study, the medical files of children born in the period 2005-2015 were examined, in order to investigate the incidence at birth, of cleft lip with or without cleft palate, in the southeastern region of Romania, in order to corroborate data obtained with the correct management of orthodontic treatment in children with cleft lip.
2. Two studies based on a group of 49 participants, patients with or without cleft lip and palate, in whom the occurrence and type of consonant pronunciation disorders and the link between the presence of clefts were analyzed, the patient's age and perceived psychosocial stress.

IV RESULTS

IV.1 Incidence at birth of cleft lip with or without cleft palate. The first study aims to present the situation of cases in the County Emergency Clinical Hospital "St. Apostol Andrei "from Constanța, in the period 2005-2015, diagnosed with cleft lip with or without cleft palate, which were treated in this medical unit. The purpose of examining medical records was to provide information about the risk factors involved in the etiology of cleft lip and palate, to draw attention to the impact of severity on fetal development, in order to corroborate the data obtained with management correct use of orthodontic treatment in children with cleft lip.

In conducting this study, the following aspects were taken into account: the presence of cracks in children born with congenital malformations, congenital malformations of newborns, sex distribution, gestational age (term or premature birth), socioeconomic status of the mother, presence or the absence of other associated factors, the presence or absence of these abnormalities in other family members.

In order to be able to draw up a database, data from the archived medical documents of the County Emergency Clinical Hospital "St. Apostle Andrei "from Constanța. Of the total newborns, 16 patients born with orofacial abnormalities were included in this study.

Results.

• The incidence of cleft lip was 1.18 per 1000 births of which 62.5% (10/16) were girls and 37.5% (6/16) were boys, although as a number of births the group of was dominated by boys.

• The distribution of patients according to the type of cleft was 8 (50%) with cleft lip and palate; 6 (37%) with cleft lip; 2 (13%) with cleft palate.

• Regarding the sex distribution of the type of anomaly, it was found that there were 4 cases with unilateral labial fissure - 2 girls (50%) and 2 boys (50%), 4 cases of rabbit lip with cleft palate fissure and soft, bilateral palate - 2 girls (50%) and 2 boys (50%), 2 cases of unilateral soft palate fissure - 2 girls100%, 2 cases of median labial fissure - 2 boys 100%; 1 case of rabbit lip with bilateral cleft palate - 1 girl 100%, 1 case of rabbit lip with cleft palate unilateral - 1 girl 100%, 1 case of cleft lip associated with soft palate cleft, unilateral - 1 boy 100 %, 1 case of rabbit lip with soft palate fissure and unilateral palatal vault - 1 girl 100%

• Depending on the socio-economic status - 12 (75%) were from rural areas and only 4 (25%) from urban areas, and most of them were multiples 13 (81%).

• Regarding the mother's age, it can be stated that: most of them were between 31-40 years old, 7 (43.75%), followed by those under 30 years old, ie 6 (37.5%) and followed by those

over 41 representing 3 (18.75%). The literature cites an increase in the risk of cracking by 28% in the case of mothers older than 35 years.

IV.2. Consonant pronunciation disorders in patients with or without cleft lip and palate.

The second study aims to evaluate the occurrence and type of consonant pronunciation disorders in patients with cleft lip or palate associated with cleft palate, in a group of 49 participants, 17 (35%) girls and 32 (65%) of boys aged between 6 and 17 years, at the time of the study, in order to corroborate the data obtained with the correct management of orthodontic treatment in children with cleft lip. At the level of the upper lip, all patients had retractable scars after cheiloplasty and changes in shape and volume in the alveolar bone, which caused changes in the position of the teeth of the upper dental arch. The presence of retractable scars on the lips and dento-maxillary anomalies had a direct and severe impact on the production of sounds and language skills, and plastic surgery to close the palate was performed in accordance with the surgical approach protocol. One of the patients was during orthodontic treatment.

The evaluation of the patients participating in this study was performed in a specialized hospital and their parents expressed their consent for voluntary participation in this study. In this study we looked at the correlations between the development of children with clefts, with: the age of diagnosis, the type of cleft lip and palate, if they received previous speech therapy, changes in sound production [p], [b] and [f], [v] in spontaneous and reproduced speech, if they have joint disorders of at least one sound, if the disorders in the articulation of sounds persist even if they have undergone speech therapy, the age at which the primary lip intervention was performed, if they benefited of orthodontic treatments, what type of dento-maxillary anomaly it presents, if there are some associated sufferings.

Results.

• In the second group, the distribution according to the type of labio-maxillo-palatal cleft was 22 (45%) cases of unilateral lip and palate cleft (UCLP), 22 (45%) bilateral cleft lip and palate (BCLP) and 5 (10%) cleft lip [CL (A)],

• In the case of girls 9 (53%) had bilateral cleft lip and palate, 6 (35%) unilateral cleft lip and palate and 2 (12%) cleft lip while boys 16 (50%) had cleft and palate unilateral lip and palate, 13 (41%) bilateral cleft lip and palate and 3 (9%) cleft lip.

• The most common sufferings 44 (89.79%) were represented by feeding difficulties followed by 22 (44.89%) respiratory difficulties, 15 (30.61%) chewing difficulties, 13 (26.53%) difficulties on swallowing and 7 (14.28%) nasal regurgitation.

• 24 (49%) performed primary lip closure at 6 months and 1 year, 10 (21%) before 6 months, 8 (16%) after 1 year, 7 (14%) over the age of 2 years

• 29 (59%) presented pseudoprognosis, 14 (28.57%) Class III dento-maxillary anomaly, 6 (12.24%) cross-lateral occlusion,

• Only 18 (37%) of the patients went to an orthodontic consultation, while 31 (63%) did not consult an orthodontist and only one patient underwent orthodontic treatment.

• 36 (73%) of patients have at least one change in the articulation of the consonants [p], [b] and [f], [v], 18 (50%) distorted sounds, 15 (20.12%) replaced the consonants that are more difficult to pronounce and replaced them while 3 (2.88%) presented both distortion and replacement situations.

• The number of subjects in need of speech therapy increased in accordance with the severity of cleft from 1 (8%) for cleft lip [CL (A)] to 7 (58%) for bilateral cleft lip and palate (BCLP) and it was bigger for the boys

• Boys with bilateral cleft lip and palate (BCLP) 13 (41%) had changes in the articulation of at least one sound compared to boys with unilateral cleft lip and palate (UCLP) 16 (50%) who presented more many changes in the articulation of sounds.

• 37 (76%) had a moderate sound disorder while 12 (24.48%) had a severe disorder, and of the patients with bilateral cleft lip and palate 3 (38%) also had sound articulation disorders even and after speech therapy.

IV.3. Social impact of the main types of cleft lip or palate associated with cleft palate.

The third study aims to highlight the link between the presence of clefts, the patient's age and the perceived psycho-social stress on a group of 108 participants. Participants in this study were divided into two groups:

• the first consisting of 49 participants - represents the group of those who presented lip splits with or without palace cleft,

• and a control group consisting of 59 participants - is the group of those who do not have clefts in order to demonstrate the connection between the presence of clefts perceived psychosocial stress.

To carry out this study, a cross-sectional population approach was used, in order to highlight the psycho-social aspects depending on school age and type of splits, in order to

corroborate the data obtained with the correct management of orthodontic treatment in children with cleft lip. The evaluation of the patients participating in this study was performed in a specialized hospital and their parents expressed their consent for voluntary participation in this study. A questionnaire with 29 questions was used, consisting of general questions related to the patient's identification data, sex but also age at the time of the study, as well as questions on the social impact of splits on children with splits. In this study I wanted to highlight the link between the presence of cracks and psycho-social stress by following the following aspects: children's behavior towards people around them, if they care about aesthetics, or phonatory ability, if socializing, if they are shy in the company of other children of his age, if they are teased because of the presence of the malformation or the way they speak. The questions in the questionnaire were in accordance with the significant aspects revealed by the studies in the literature, correlated with the socio-economic level of the parents, and the data processing was done according to the answers received.

Results.

• 10 (46%) children in middle school and 8 (36%) children in high school were more concerned about speech disorders compared to those in primary school 4 (18%).

• 10 (50%) of the children with splits in the gymnasium cycle were more concerned with the aesthetic aspect, compared to those in the other groups, 8 (40%) of the children in the high school cycle and 2 (40%) of the children in the cycle primary.

• 10 (50%) of the children with splits in the gymnasium cycle were more concerned with the aesthetic aspect, 2 (40%) of the children in the primary cycle and 8 (40%) of the children in the high school cycle

• 10 (53%) children with splits in high school responded that they often feel more teased / intimidated compared to those in other groups.

• Depending on the type of cleft, the speech disorders presented by the participants were distributed as follows - 5 (16%) BCLP, 4 (12%) UCLP, 1 (3%) [CL (A)] for the middle school cycle, 6 (20 %) BCLP, 2 (7%) UCLP, for high school, 1 (4%) UCLP, 3 (13%) BCLP for primary.

V. DISCUSSIONS

- The etiology of orofacial clefts is multifactorial, being determined by the interaction between environmental and genetic factors [7].

- Following the results obtained, it is observed that the incidence of orofacial clefts was 1.18 per 1000 births. In Romania, the prevalence at birth is 1: 800, but it is necessary to establish a national registry of congenital craniofacial malformations for a rigorous assessment [8].
- Most cases presented cleft lip and palate 8/16 (50%), the results being relatively similar to the values reported by the literature, which states that the most common forms are cleft lip and palate 50.53%, followed by palatine 25.05% and the labial ones 24.425% [9].
- Although the median cleft lip is a rare abnormality, 2 cases (13%) were found in this study.
- 7 of the 16 mothers (43.75%), were 31 and 40 years old at the time of conception, thus demonstrating that the mother's age is a risk factor involved in the etiology of cleft lip and palate. The literature describes that a mother's age over 35 years is associated with an increased risk (56%) of giving birth to a child with cleft lip and palate and a 28% higher risk of having a child with cleft palate. palatine, according to the literature [10].
- Smoking is a risk factor for the appearance of orofacial fissures. Of the 16 mothers who participated in the study, 14 (87.5%) were smokers and 2 were non-smokers.
- Orofacial clefts occur in both rural and urban areas, with the specification that in this study the number of cases in rural areas (75%) exceeds the number of cases in urban areas (25%), these results being consistent with the values obtained reported (53%) by the literature [11].
- In children with cleft lip and palate that cause disorders of growth and development of the jaw and upper alveolar arch [12,13], there are dentoalveolar incongruities with crowding and incomplete development of the middle floor of the face.
- 24 (49%) of the patients performed the primary intervention to close the defect until the age of 6 months, 10 (21%) after 6 months, 8 (16%) at the age of 1 year while a number of 7 (14%) patients performed the intervention over 2 years. In children who were operated on later 7 (14%), the postoperative aspect was not as expected, as stated in the literature [14].
- The dentomaxillary anomalies presented by patients with cleft lip and palate included in the study were Dento-maxillary anomaly of Class III Angle 14 (28.57%), cross-lateral occlusion 6 (12.24%), 29 (59%) had pseudo-prognosis. Due to the presence of dento-maxillary anomalies, patients with cleft lip or palate associated with cleft palate may distort "dental" sounds ([s], [z], [sh], [ch], [j]), may have difficulty in the production of sounds involving the use of the lips ([p], [b], [m]), the sounds that are additionally articulated by the teeth ([f], [v],) and the sounds made with the tip of the tongue ([t], [d], [n], [l]).
- Almost all participants 36 (73%) show at least one change in the articulation of the sounds [p], [b] and [f], [v]. The literature states that approximately 44% of patients with clefts have at

least one consonant joint change, 41% have distorted them, 5% have replaced them and 2% have both distortion and replacement changes.

- In this study15 (20.12%) of the participants in the study group replaced the consonants that are more difficult to pronounce and replaced them in pronunciation with other sounds (eg p, b) and 18 (50%) of the children they distorted the sounds in speech.

- Although they received long-term speech therapy 13 (26, 53%) patients still have at least one change in the articulation of the sounds [p], [b] and [f], [v], and of the 22 patients with bilateral cleft lip and palate (BCLP), 18 (82%) still had sound articulation disorders even after speech therapy.

- Speech difficulties during adolescence have a direct impact on the social integration of children with cleft lip and / or palate [15-17].

- Analyzing the answers to the questions related to the subdomains of friendship and social interaction, related to school age, the answers of the children in the group with splits were significantly different from the answers of children without splits, in the case of questions 7/29 for children in high school, 1/29 for primary school children and 2/29 for high school children, thus confirming the existing theories so far. The results are consistent with other similar studies on the psycho-social implications associated with cleft lip and / or palate, the most affected being those in high school.

- The answers to the questions on the occurrence of stress due to speech disorders showed obvious concerns in children in middle school and high school compared to those in primary school, as follows: 10 (46%) children in middle school, 8 (36%) children in high school students were more concerned about speech disorders compared to those in primary school 4 (18%), regardless of whether or not they have malformations.

- Analyzing the answers to the questions regarding the aspects related to friendship and social interaction, behavioral disorders, teasing / intimidation, aesthetic aspect, it was found that the psycho-social implications due to this aspect varied depending on school age, middle school children being more affected 10 (46%) children in the middle school cycle compared to their counterparts in the primary cycle 4 (18%) and those in the high school cycle 8 (36%), a fact also demonstrated by the literature [18], which states that observed significant changes in the social relationships of these children.

- Functional changes caused by the type of cleft can be an explanation of the psycho-social implications. The results of this study showed that the impact of speech in children with defects in the palate was greater compared to those without, being consistent with the results of a study by CLAPA (Cleft lip and palate association), which showed that in 1 of 10 children

speech disorders occur regardless of whether they have a cleft or not, ie 3 children in each form will have speech disorders which makes it difficult to communicate with others.

VI. CONCLUSIONS

- incidence of orofacial clefts 1.18 per 1000 births;
- the incidence of malformation is higher in girls 62.5% (10/16) than in boys 37.5% (6/16),
- smoking is a major risk factor in the occurrence of orofacial clefts (75% of mothers are smokers)
- out of the studied group only 18 (37%) consulted or followed an orthodontic treatment 1 (16);
- 12 (24%) of the children in the group presented a severe disorder regarding the articulation of at least one sound;
- from the study group, 24 (49%) of the children performed the reparative surgery until the age of 6 months, (21%) over 6 months, and 7 (14%) patients over the age of 2 years;
- the consequences of orofacial splits from a social and psycho-social point of view are difficult to evaluate and especially to quantify;
- Prenatal diagnosis of orofacial malformations is certainly a support in bringing the family for examination and specialized treatment immediately postpartum.
- the age at which the orthodontic treatment is initiated, the technique used and the treatment stages define the therapeutic algorithm regarding the orthodontic management.
- The orthodontist is an essential member of the multidisciplinary team needed in the complex treatment of cleft lip;
- the value of the surgical treatment before the orthodontic one brings benefits both for increasing the quality of the result from a functional and aesthetic point of view, at the same time facilitating the work of the orthodontist;
- The treatment of these malformations is not limited to the primary closure of the defect and possible secondary corrections, but also to orthodontic, speech therapy, interdisciplinary treatment, in order to obtain positive results.
- as limits of the present study can be mentioned the absence of the evaluation of the genetic factors being necessary additional studies in which to include also the genetic analyzes
- the limits of the present study are assumed, but we appreciate that it represents an opening in order to achieve a national therapeutic algorithm.

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