

# Influence of magnetotherapy on various systems of the body and on the process of wound healing in children with cleft lip and palate

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**Abstract.** In this article we present the results of magnetic therapy on the wound healing process in children with cleft lip and palate after cheiloplasty surgery. At the same time, there is an improvement in metabolic processes in tissues, which contributes to their proper nutrition and restoration. Inflammation and associated soft tissue swelling are eliminated. Locally, blood vessels dilate and blood supply improves. The pain is relieved. Magnetotherapy is a method of physiotherapy that uses magnetic fields of varying strengths and frequencies for the treatment, rehabilitation or prevention of diseases. To carry it out, stationary and portable devices have been developed. The principle is simple: one or more electromagnetic applicators are installed on certain areas of the body, or the patient is placed in a large-diameter magnetic chamber or on a special mattress. The method is based on the fact that a magnetic field affects electrically charged particles moving in the human body. They are found in biological fluids - blood, lymph, cytoplasm of cells. Under the influence of a magnet, weak electric currents arise in these environments. They cause many responses: metabolism, blood properties, the speed of transmission of nerve impulses change, microcirculation and the delivery of oxygen and micronutrients improve. This leads to the following effects: reduction of tissue swelling, suppression of the inflammatory process, local anesthesia, reduction of blood viscosity, normalization of blood pressure, acceleration of healing and tissue restoration, stimulation of the immune system.

## 1 Introduction

In the treatment and rehabilitation of patients with a wide variety of diseases, therapeutic physical factors, both natural (climate, air, sun, water) and preformed or obtained artificially, occupy a large place [2, 3, 7, 10]. Being the most adequate environmental stimuli for the body, therapeutic physical factors have a homeostatic effect on various organs and systems, help increase the body's resistance to adverse effects, enhance its protective and adaptive mechanisms, have a pronounced (sanatogenic effect, increase the effectiveness of other therapeutic agents and weaken side effects). effects of drugs [4, 8, 12]. Magnetic therapy occupies a separate and important place in the field of physiotherapy [1, 5, 6, 9, 11]. The beneficial effects of magnetic fields have been known already to ancient peoples.

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## 2 Experimental part

The material for our study was the results of surgical treatment of children with congenital bilateral cleft lip and palate. During the period from 2014 to 2017, 31 patients with congenital bilateral cleft lip and palate, aged from 6 months to 6 years, were under observation and treatment in the department of maxillofacial surgery of the Bukhara regional hospital and in the ENT department of the regional children's hospital from 2014 to 2017. Of these, 19 boys, 12 girls.

Of the total number of children with congenital cleft lip and palate, 8 children were operated on using the Limberg method. Thirteen children with cleft lip and palate were operated on using the Millard method. The number of patients who underwent cheiloplasty using the Obukhova-Tennyson method was 10 children (Table 1.).

**Table 1.** General distribution of patients by surgical method depending on gender and age.

Method Operations	Floor	Up to 1 year	From 1 to 3 years	From 3 to 6 years	Total
Limberg method	boys	3	1	1	5
	girls	2	1	-	3
Millard method	boys	4	3	1	8
	girls	3	2	-	5
Obukhova-Tennyson method	boys	3	2	1	6
	girls	2	1	1	4
Total		17	10	4	31

### **The total number of patients is 31.**

The total number of girls is 12, the total number of boys is 19. Of these, children under one year old - 17 (girls - 7, boys - 10), from 1 to 3 years old - 10 (girls - 4, boys - 6), from 3 to 6 years old - 4 (girls - 1, boys - 3 ).

### **1-method (Limberg)**

The number of girls is 3, the number of boys is 5. Of these, children under one year old are 5 (girls - 2, boys - 3), children under 1 to 3 years old - 2 (girls - 1, boys - 1), from 3 to 6 years - 1 (girls - no, boys - 1).

### **2-method (Billard)**

The number of girls is 5, the number of boys is 8. Of these, children under one year old are 7 (girls - 3, boys - 4), children under 1 to 3 years old - 5 (girls - 2, boys - 3), from 3 to 6 years - 1 (girls - no, boys - 1).

### **3-method (Obukhova-Tennyson)**

The number of girls is 4, the number of boys is 6. Of these, children under one year old are 5 (girls - 2, boys - 3), children under 1 to 3 years old - 3 (girls - 1, boys - 2), from 3 to 6 years - 2 (girls - 1, boys - 1).

In the postoperative period, magnetotherapy with a constant magnetic field (wave intensity 2, frequency 10 Hz, exposure time 8 minutes) was used as a physiotherapeutic procedure. The studied patients were divided into two groups of 15 and 16 people (Table 2.).

In the preoperative period, all patients underwent a general clinical examination, consultations with a pediatrician and anesthesiologist, and in case of concomitant pathology, doctors of relevant specialties (otolaryngologist, neurologist, cardiologist, etc.).

**Table 2.** Distribution of patients according to the use of magnetic therapy.

Floor	Those who have taken magnetic therapy	Have not taken magnetic therapy	Total
Boys	10	9	19
Girls	5	7	12
Total	15	16	31

Laboratory tests included: general blood and urine analysis, biochemical blood test for total protein, enzymes, residual nitrogen, urea, bilirubin.

All patients were photographed from the frontal view in 2 positions and in profile. Photographs were taken of the vestibule of the oral cavity and the alveolar process of the upper jaw. Photographs were compared before and after treatment.

**Table 3.** Assessment of the course of the wound process in the early postoperative period was determined by scores,

1 point	2 points	3 points	4 points	5 points
Severe hyperemia	Hyperemia persists	Hyperemia decreases	Hyperemia decreased	Hyperemia absent
There is a hematoma	The hematoma persists	Hematoma is minor Naya	Hematoma absent	Hematomas absent
Severe swelling	Swelling persists	Edema Decreased	Edema decreased	No swelling
Purulent inflammation	Purulent inflammation	There is no purulent inflammation	There is no purulent inflammation	There is no purulent inflammation
The condition of the seams is unsatisfactory adjective	Condition of seams unsatisfactory adjective	Condition of seams unsatisfactory adjective	Condition of seams unsatisfactory adjective	The condition of the seams is satisfactory

We divided all the patients into two groups: group 1 - those who received magnetic therapy (15 patients) and the second group - those who did not receive magnetic therapy (16 patients).

The results of our studies show that in the first group, wound healing occurred 1-2 days earlier than in the second group. This result indicates a reduction in healing time by 20-30% relative to the control group that did not receive magnetic therapy. Observation of the course of the wound process during the week using three different methods is shown in Table 4.

**Table 4.** Results of the wound process.

	Obukhova-Tennison method									
	Traditional treatment (observation days)					Traditional treatment + magnetic therapy (observation days)				
	1	2	3	4	5	1	2	3	4	5
Hyperemia	5(100%)	5(100%)	5(100%)	4(80%)	4(80%)	5(100%)	4(80%)	4(80%)	3(60%)	3(60%)
Hematoma	5(100%)	5(100%)	5(100%)	4(80%)	3(60%)	5(100%)	4(80%)	4(80%)	3(60%)	2(40%)
Edema	5(100%)	4(80%)	4(80%)	4(80%)	3(60%)	5(100%)	4(80%)	3(60%)	3(60%)	2(40%)

Continuation of Table 4.

Purulent inflammation	2(40%)	2(40%)	1(20%)	1(20%)	1(20%)	2(40%)	1(20%)	1(20%)	1(20%)	0(0%)
The condition of the seams is poor.	2(40%)	1(20%)	1(20%)	1(20%)	1(20%)	2(40%)	1(20%)	1(20%)	1(20%)	0(0%)
	<b>Millard DR method</b>									
	Traditional treatment (observation days)					Traditional treatment + magnetic therapy (observation days)				
	1	2	3	4	5	1	2	3	4	5
Hyperemia	6(100%)	5(83%)	5(83%)	5(83%)	4(67%)	7(100%)	6(86%)	6(86%)	4(57%)	3(43%)
Hematoma	6(100%)	5(83%)	5(83%)	4(67%)	4(67%)	7(100%)	6(86%)	5(71%)	4(57%)	3(43%)
Edema	6(100%)	4(67%)	4(67%)	4(67%)	3(50%)	7(100%)	6(86%)	5(71%)	4(57%)	3(43%)
Purulent inflammation	2(33%)	1(17%)	1(17%)	1(17%)	1(17%)	2(29%)	1(14%)	1(14%)	1(14%)	0(0%)
The condition of the seams is poor.	2(33%)	1(17%)	1(17%)	1(17%)	1(17%)	2(29%)	1(14%)	1(14%)	1(14%)	0(0%)

### 3 Conclusion

The use of a constant magnetic field in the postoperative period improves the wound healing process, which reduces the time patients stay in the hospital and prevents postoperative complications.

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