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# Optimization of Treatment Methods for Chronic Allergic Rhinitis in Workers Producing Glass-Plastic Structures

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**Abstract:** An open non-comparative clinical study was conducted to evaluate the effectiveness of the mineral-herbal remedy "DOLPHIN" for nasal irrigation in the treatment of allergic rhinitis among workers in the fiberglass construction manufacturing industry. The study involved 138 workers suffering from chronic allergic rhinitis. The results indicated a 72% reduction in nasal cavity complaints (itching, nasal congestion, discharge, sneezing) and a 64% reduction in eye complaints (itching, eye discharge) by the 30th day of using the remedy. Rhinoscopic data on the 30th day showed a 58% reduction in allergic rhinitis symptoms. The use of the "DOLPHIN" mineral-herbal remedy led to a 62% improvement in rhinocytogram data. The patients reported good tolerance (8.3 out of 10.0 points) and effectiveness (7.8 out of 10.0 points) of the remedy.

**Keywords:** allergic rhinitis, "DOLPHIN" mineral-herbal remedy, elimination therapy

## 1. Introduction

Occupational allergic rhinitis is an inflammatory condition of the nasal mucosa, characterized by intermittent or persistent symptoms such as nasal congestion, sneezing, rhinorrhea, and itching, along with changes in nasal breathing and/or increased secretion, which occur upon contact with allergens in the workplace. The connection between rhinitis and the professional environment can vary. There are two types: true occupational rhinitis, caused by allergens in the workplace, and rhinitis that already exists but is exacerbated by exposure to occupational factors. [1,3,6].

According to experts, the prevalence of occupational allergies worldwide ranges from 5% to 15% and continues to grow [1,12]. Information on the prevalence of occupational allergic rhinitis is quite contradictory [4, 11].

In Russia, about 9,000 cases of allergic rhinitis (AR) are recorded annually. However, according to Rospotrebnadzor, the number of newly diagnosed occupational AR cases is no more than twenty per year, indicating clear underdiagnosis of this disease. Therefore, improving the diagnosis of occupational AR both at the preliminary stage and in providing specialized occupational health care is a highly relevant task. [5,7].

The strongest impact comes from occupational hazards such as dust, fumes, gases, and organic substances in a dispersed state present in the inhaled air. [8, 10].

Occupational allergic rhinitis is an immune hypersensitivity reaction dependent on humoral or cellular immunity. It includes a latent period necessary for sensitization to the allergen. After the

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first reaction, symptoms may reoccur upon repeated exposure to the allergen, even at concentrations that do not cause any clinical manifestations in other people with similar exposure. [2,6].

Allergic rhinitis often occurs in conjunction with other allergic conditions such as allergic conjunctivitis, atopic dermatitis, and bronchial asthma. In Uzbekistan, between 20% and 50% of the population suffers from allergic rhinitis. [6].

There are two main approaches to treating allergic rhinitis: the first is to alleviate nasal symptoms and reduce their impact on the patient's overall well-being; the second is to prevent the onset of bronchial asthma. [9].

The treatment strategy includes both avoiding contact with allergens and the use of medications. [2,7].

Elimination or removal of significant allergens is part of the etiopathogenetic approach in allergy treatment. Complete avoidance of allergen contact is often impossible, but even partial avoidance can significantly relieve symptoms. The use of medicinal elimination is also important. Saline solutions based on sea water help maintain the normal state of the nasal mucosa, thin mucus, and regulate its production by goblet cells. These remedies improve the function of the ciliated epithelium, help remove dust, allergens, and haptens, reduce local inflammation, and provide hydration. [2,4,6].

**RESEARCH OBJECTIVE**

To reduce the clinical manifestations of occupational chronic allergic rhinitis in workers involved in the production of fiberglass structures using the elimination properties of the mineral-herbal preparation "DOLPHIN."

## 2. Materials and Methods

An open, non-comparative study on the effectiveness of the mineral-herbal preparation "DOLPHIN" in the treatment of occupational chronic allergic rhinitis was conducted at the ENT department of the Samarkand Regional Multidisciplinary Hospital, where the 2nd Department of Otorhinolaryngology of the Samarkand State Medical University is located. The study involved 138 male patients aged 25 to 55 years (mean age – 41.4 ± 8.2 years) working in the fiberglass structures workshop. Chronic allergic rhinitis in these individuals was diagnosed at our outpatient clinic in collaboration with allergists.

Inclusion criteria for the study: consent of workers involved in the production of fiberglass structures to participate in the study, age from 25 to 55 years, presence of rhinitis symptoms at the time of the first visit, and the patient's ability to follow the protocol rules. Exclusion criteria: age under 25 and over 55 years, presence of acute infectious diseases or exacerbation of chronic diseases, inability of the patient to follow the protocol rules. Patients with inflammatory changes in the clinical blood test or increased neutrophil counts in nasal secretions according to rhinoscopy data were also excluded.

**The drug**: The mineral-herbal preparation "DOLPHIN" is a set of otorhinolaryngological devices for rinsing the nasal cavity.

**Composition**:

- Sea salt — 1.6 g;
- Baking soda (sodium bicarbonate) — 0.2 g;
- Dry licorice extract — 0.1 g;
- Dry rosehip extract — 0.1 g.

**Included in the kit**:

- A soft irrigator bottle with a capacity of 240 ml;
- An endonasal nozzle;
- Mineral-herbal preparation "DOLPHIN" (in sachets of 30 pcs);

- Packaged in a cardboard box with 1 set.

The device is intended for individual use and can be used both in medical and preventive institutions and at home by adults and children from 12 years old.

When the mineral-herbal preparation "DOLPHIN" is dissolved, it produces a neutral solution, similar in composition to the physiological fluids of the human body. The solution prepared on the basis of sea salt does not irritate the mucous membranes, is suitable for daily use, has anti-inflammatory, anti-edematous, anti-allergic effects, and stimulates reparative and immunomodulatory processes in the mucous membrane. Rinsing the nose with the "DOLPHIN" device facilitates the mechanical removal of mucopurulent contents from the nasal cavity. The solution has a therapeutic effect on the nasal mucosa, reduces secretions and swelling of the nasal mucosa, promotes the mechanical removal of allergens, restores the patency of the nasal passages, improves nasal breathing, the outflow of mucus and pus from the paranasal sinuses, enhances the effectiveness of local medications, shortens the duration of vasoconstrictor use, and reduces the course of respiratory diseases.

Nasal rinsing with the preparation was carried out twice a day according to the step-by-step instructions.

Patients were examined on the 1st (visit 1), 10th (visit 2), and 30th (visit 3) days after starting the use of the mineral-herbal preparation "DOLPHIN". During each visit, complaints were collected and assessed on a scale from 0 to 3 (main complaints: itching in the nose, congestion, nasal discharge, sneezing, itching in the eyes, eye discharge). Objective examination was also performed, temperature was measured, and instrumental rhinoscopy was conducted using a nasal mirror. The condition of the mucous membrane was assessed according to the following criteria: 1) mucous membrane color (hyperemia — 1, pink — 0, pale — 1, cyanotic — 2); 2) mucous membrane swelling (none — 0, up to ½ of the lumen — 1, more than ½ of the lumen — 2); 3) secretion character (purulent — 2, clear — 1, absent — 0); 4) secretion amount (none/scanty — 0, moderate — 1, abundant — 2).

During the first visit, the patient's eligibility was assessed, and they were included in the protocol. At the second and third visits, the drug's tolerability was determined, and adverse events, including allergic reactions, were recorded. Tolerability and effectiveness of the drug were assessed by both the physician and the patient on a 10-point scale (0 points – poorly tolerated and ineffective, 10 points – well tolerated and effective).

Nasal secretions were collected for rhinoscopy during the first and third visits. Nasal sprays were not used 24 hours before the sample was taken. To obtain the sample, a sterile swab was sequentially inserted into the nasal passages. The nasal secretion was applied to a glass slide. The air-dried preparation was delivered to the laboratory for smear microscopy, stained using the Romanowsky-Giemsa method. The result was a description of the general cytological picture, with a count of leukocytes, eosinophils, neutrophils, ciliated epithelium, lymphocytes, macrophages, mucus, erythrocytes, yeast fungi, and flora.

Analysis of the results of rhinoscopy was carried out by the physician using a point system: 1) eosinophils: absent – 0; up to 5% – 1; more than 5% – 2 points; 2) mucus: absent/+ – 0; ++ – +++ – 1; more than ++++ – 2 points; 3) bacteria: absent/single – 0; more than 2 in the field of view – 1 point.

Statistical processing of data was performed using Microsoft Office Excel 2007.

During the analysis, dynamic changes in rhinoscopy data, symptoms from the nose and eyes, rhinoscopy results, and the assessment of drug tolerability and effectiveness from the patient's and physician's perspectives were taken into account. Analysis methods included calculating mean indicator values, percentage ratio, standard deviation, and determining the statistical significance of results using Student's t-test.

## 3. Results

A dynamic assessment of patients' complaints was conducted first. There was a 33% reduction in nasal complaints (itching, congestion, discharge, sneezing) at visit 2 compared to visit 1 ($p < 0.05$) and a 72% reduction at visit 3 compared to visit 1 ($p < 0.05$). The severity of eye complaints (itching, discharge) decreased by 26% at visit 2 compared to visit 1 and by 64% at visit 3 compared to visit 1.

Rhinoscopic evaluation indicated a reduction in the severity of allergic rhinitis symptoms: on visit 2, there was an 18% decrease in nasal mucosa pallor and cyanosis, edema, and secretions, while on visit 3, the reduction was 58% compared to visit 1.

Rhinocytogram analysis showed a significant ($p < 0.05$) reduction in allergic rhinitis signs: mucus and eosinophils in the smear decreased by 62% at visit 3 compared to baseline.

The average tolerance score of the remedy was 8.3 according to patients and 8.7 according to the physician, while the effectiveness was rated at 7.8 by patients and 8.1 by the physician out of 10 possible points.

## 4. Discussion

The study demonstrates the significant therapeutic benefits of using the mineral-herbal preparation "DOLPHIN" in treating chronic allergic rhinitis among workers in the fiberglass construction industry. The results highlight a notable reduction in both nasal and eye symptoms, with a 72% improvement in nasal complaints and a 64% improvement in eye-related complaints by the 30th day of treatment.

These findings are consistent with the role of nasal irrigation in reducing allergen load and inflammation in the nasal cavity. The mineral components of "DOLPHIN," particularly sea salt, provided a soothing effect, helping to clear mucosal secretions and reduce nasal congestion. The herbal extracts, particularly licorice and rosehip, likely contributed to the anti-inflammatory and immunomodulatory properties observed during the study.

Moreover, the reduction in eosinophils and mucus during rhinocytogram analysis reflects the preparation's efficacy in alleviating allergic inflammation. The use of "DOLPHIN" helped restore nasal function and improve overall mucosal health, supporting its potential as an alternative or adjunctive therapy in managing occupational allergic rhinitis.

The study further validates the importance of elimination therapy, particularly in occupational settings where complete avoidance of allergens may be challenging. While the study lacked a control group, the consistent and statistically significant improvements in symptom scores suggest that the observed effects are directly attributable to the intervention.

In summary, "DOLPHIN" proves to be an effective, well-tolerated treatment option for chronic allergic rhinitis in workers exposed to occupational allergens, offering both symptomatic relief and potential protection against further allergic complications.

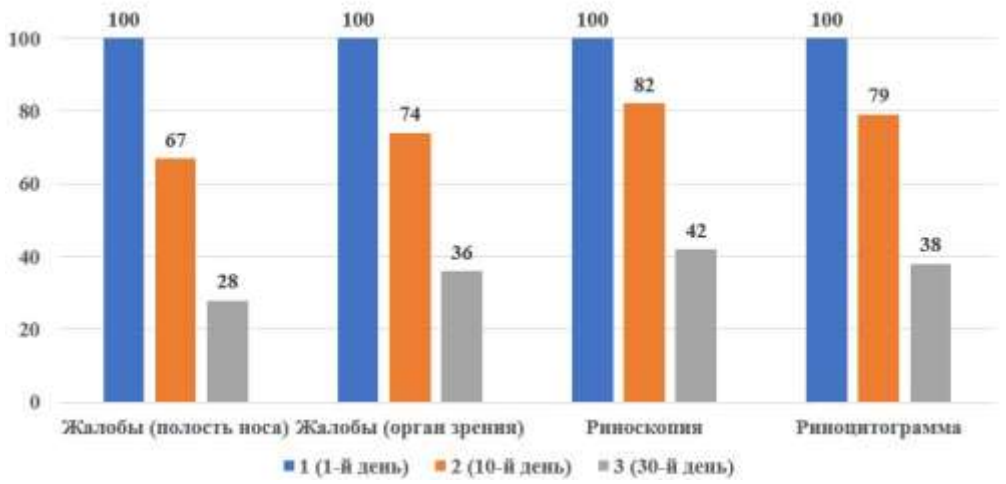
## 5. Conclusion

The study results showed a significant reduction in nasal complaints by 72% and eye complaints by 64% after 30 days of using the "DOLPHIN" mineral-herbal remedy.

Rhinoscopic examination showed a 58% reduction in allergic rhinitis symptoms, and rhinocytogram data improved by 62%. The remedy demonstrated good tolerance (8.3 out of 10) and effectiveness (7.8 out of 10) based on patient evaluations.

Thus, the "DOLPHIN" mineral-herbal remedy is recommended as elimination therapy for workers in the fiberglass construction industry suffering from allergic rhinitis and regularly exposed to chemical particles in the environment.

Appendix 1




Complaints (nasal cavity)
Complaints (eyes)
Rhinoscopy
Rhinocytogram
1st day
10th day
30th day

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