



BIOMECHANICAL AND HYGIENIC ASPECTS OF FACIAL MASSAGE, RISKS AND HOW TO MINIMIZE THEM

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Abstract

This paper examines a number of biomechanical and hygienic aspects of facial massage, which are common methods of cosmetology and preventative treatment. Based on an analysis of the anatomical and physiological characteristics of the skin, muscle, and connective tissue, the nature of the mechanical effects of massage techniques is substantiated. The influence of massage on microcirculation, lymphatic drainage, and the functional state of facial muscles is examined.

The key hygiene requirements for the procedure are covered, including skin preparation, compliance with sanitary standards, selection of cosmetics, and organization of massage conditions. The main risks associated with improper technique and violation of hygiene standards are discussed, including skin damage, vascular disorders, and infectious and allergic complications.

Scientific Novelty. The scientific novelty of this work lies in its comprehensive examination of facial massage as an object of interdisciplinary analysis, combining biomechanical and hygienic approaches. Unlike traditional cosmetology descriptions, the emphasis is on systematizing the mechanical factors affecting facial tissues, taking into account their anatomical and functional specifics, including the role of lines of least skin stretch, the characteristics of facial muscles, and connective tissue structures.

The study clarifies the mechanisms by which massage influences the microcirculation and lymphatic drainage in the context of dosed mechanical stimulation, allowing for a more accurate interpretation of the physiological effects of the procedure. Additionally, a structured classification of risks arising



from improper technique and hygienic standards is proposed, identifying mechanical, vascular, infectious, and allergic factors.

Another innovation is the integration of hygiene requirements with biomechanical parameters of the massage, allowing the safety of facial massage to be considered not only as a function of compliance with sanitary standards but also as a result of the correct dosage of mechanical load. Based on this, risk minimization principles have been formulated, focusing on the professional training of the specialist and the individualization of the procedure, taking into account the condition of the facial tissues.

Purpose of the Study. The purpose of this study is to comprehensively analyze the biomechanical and hygienic aspects of facial massage, followed by an assessment of its physiological effects, as well as to identify and systematize the main risks associated with the procedure. This study provides a detailed examination of the anatomical and functional characteristics of facial tissues that determine their response to mechanical stimulation, as well as the identification of optimal conditions and principles for performing the massage to ensure its effectiveness and safety.

Keywords: facial massage, biomechanics, hygiene, facial skin, facial muscles, microcirculation, lymphatic drainage, Langer's lines, cosmetology, connective tissue, risks of procedures, infectious safety, allergic reactions, mechanical action, prevention of complications.

Introduction

Facial massage is one of the most ancient body care practices, with deep historical roots. Even in the cultures of ancient Egypt, China, and India, manual techniques for the skin and underlying tissues of the face were used to improve appearance and maintain skin health, and later to slow the aging process. In China, facial massage was used to harmonize energy flows, and in Ayurvedic medicine, to restore balance. In Europe, interest in facial massage increased in the 19th century with the development of physiology and anatomy, when the scientific foundations of manual therapy were laid. In the 20th and 21st centuries, facial massage has



become the subject of interdisciplinary research, including biomechanics, dermatology, cosmetology, and hygiene.

Massage is currently a method of non-specific pathogenetic therapy. It is a readily available, inexpensive treatment that has a multifaceted physiological effect on the body through the natural activation of adaptive and compensatory mechanisms, restoration of altered functions, increased non-specific resistance, and improvement of functional status and physical performance. Massage increases blood flow to the massaged areas of the body, improves venous blood and lymph flow, stimulates cutaneous respiration and metabolic processes, improves the function of sweat and sebaceous glands, and removes dead skin cells. At the same time, the skin becomes elastic, and ligaments and muscles become more flexible [1]. A modern approach to facial massage is based on an understanding of the anatomical and physiological characteristics of the skin, muscles, and connective tissues, as well as an assessment of the risks associated with improper performance of the procedures. This article discusses the biomechanical and hygienic aspects of facial massage, and analyzes potential risks and ways to minimize them.

Biomechanical principles of facial massage. It is known that chronic tension in the facial and masticatory muscles can be a consequence of both physiological and psychosomatic factors, including stress, anxiety disorders, sleep disturbances, and autonomic dysfunction. The face thus becomes a kind of indicator of overall neurophysiological imbalance, making it a target for targeted non-pharmacological interventions [2].

The various layers of facial skin tissue, such as the epidermis, dermis, and hypodermis, contribute to the development of vascularity, elasticity, and strength of the face. The dermal layers contain collagen and elastic fibers. How the skin responds to mechanical stress and restores its shape after exposure to external forces is part of skin biomechanics. The mechanical effects of cosmetic massage include compression, stretching, and shearing. These massages also stimulate circulation, lymphatic drainage, and metabolism.



Massage should be performed in the direction of the least resistant areas of the skin to prevent the formation of early wrinkles. These "Langer lines" indicate areas and directions where the skin is less susceptible to damage from stretching and tearing [3].

The facial muscles have some unique characteristics. The facial muscles are not attached to the shoulder blades or bones, but to the skin instead. Therefore, they have relatively little mass but relatively high mobility [4]. The face can become more symmetrical by normalizing facial muscle tone through massage. However, excessive pressure can cause microtrauma to the muscles, which impairs their function.

Superficial connective tissue includes fascia and adipose tissue located just beneath the skin. By working with deeper layers of tissue, massage therapists can stimulate fluid movement throughout the body and, consequently, reduce swelling [5]. However, with improper technique, the opposite can occur—damage to capillaries and the development of hematomas.

Table 1 - Biomechanical effects of facial massage

Influencing factor	Physiological effect
Tissue compression	Increased microcirculation and local blood flow
Skin stretching	Activation of fibroblasts and improvement of dermal elasticity
Shifting tissue layers	Stimulation of lymphatic drainage and reduction of swelling
Mechanical vibration	Reduction of muscle hypertonicity and improvement of nervous regulation
Light pressure along Langer's lines	Reduces the risk of injury and slows down the formation of wrinkles



This table systematizes the main biomechanical effects of massage on facial tissues and their physiological consequences. It is used to clearly explain the mechanisms of action of the procedure in the section on the biomechanical principles of facial massage.

Hygienic aspects of facial massage. Hygiene is of paramount importance during facial massage, as facial skin is sensitive and susceptible to external factors. Failure to observe proper hygiene can lead to the development of infectious and inflammatory processes [6].

Before the massage, it's important to thoroughly cleanse the skin. It's important to remove any impurities, including makeup and sebum. The therapist should use hand sanitizer.

It is also necessary to use disposable materials, such as towels and napkins. The massage should be performed using skin-friendly, hypoallergenic cosmetics. Low-quality or inappropriate cosmetics can cause skin irritation, allergies, and damage to the skin's protective barrier [7]. The conditions under which the procedure is performed are extremely important.

The room must meet sanitary standards for air purity, temperature, and humidity. Regular disinfection of surfaces and instruments reduces the risk of contamination by pathogenic microorganisms.

The physiological effects of facial massage. The overall effect of facial massage is improved microcirculation. This means better delivery of oxygen and nutrients to the skin [8].

Furthermore, activating the lymphatic system helps eliminate swelling and metabolic waste. Massage also affects the nervous system. Stimulating skin receptors reduces stress levels and improves emotional and mental well-being. Anxiety may decrease, and sleep quality may improve.

Massage improves skin tone. It can also improve skin tone and texture. However, to achieve these benefits, proper technique and hygiene are essential.



Risks Associated with Facial Massage. Despite the numerous positive effects of massage, there are some risks that need to be considered [9]. Skin damage is one of the most common problems. Microtrauma and skin stretching caused by excessive pressure or improper movements can lead to wrinkles.

Infection is the primary problem that may arise. To avoid it, the therapist must sanitize their hands and wash them thoroughly, but this step is often overlooked by both clients and massage therapists. Sensitive skin is especially vulnerable to pathogenic microflora, which can lead to irritation and more serious problems, such as the spread of demodex. It's important to ensure that the therapist thoroughly cleans their hands and instruments before beginning the massage.

Vascular disorders also pose a significant risk. Increased capillary fragility can lead to the development of rosacea or exacerbation of existing vascular networks [10]. Incorrect massage can provoke the development of bruising and swelling.

Another common problem is skin stretching. This is a serious risk, especially if performed by an inexperienced therapist. Facial massage should be performed along specific massage lines with precise pressure. Failure to follow these guidelines can lead to skin stretching and the development of early ptosis. Most facial massage therapists undergo ongoing training, but there's always a risk of encountering an unprofessional therapist, especially if you're new to the massage field.

Infectious complications arise from poor hygiene. Bacteria coming into contact with the skin can cause acne, dermatitis, and other inflammatory conditions. The risk is especially high in the presence of damaged skin.

Allergic reactions can be caused by cosmetics. Symptoms include redness, itching, and swelling. In severe cases, contact dermatitis may develop.

Contraindications to facial massage should also be considered. These include acute inflammatory skin diseases, herpes outbreaks, cancer, and certain vascular conditions.



Table 2 - Hygienic and risk aspects of facial massage

Risk factor	Possible consequences
Failure to comply with hand antisepsis	Infectious dermatitis and inflammatory processes
Use of inappropriate cosmetics	Allergic reactions and skin irritation
Excessive pressure during massage	Microtraumas, hematomas, increased wrinkles
Violation of hygiene of instruments and materials	Bacterial contamination and acneiform eruptions
Ignoring contraindications	Exacerbation of vascular pathologies and skin diseases

This table outlines common hygiene and massage technique violations, as well as potential negative consequences and preventative measures. Recommended for the section "Risks Associated with Facial Massage."

Ways to Minimize Risks. Minimizing risks during facial massage requires a comprehensive approach. First and foremost, it's essential to conduct a preliminary assessment of the client's skin condition and overall health. This allows us to identify any contraindications and select the optimal technique.

Training is crucial. A qualified massage therapist must have knowledge of anatomy, physiology, and hygiene, as well as master proper massage techniques. Regular training helps reduce the likelihood of errors.

Maintaining hygiene standards is essential. Using sterile materials, disinfecting hands and instruments, and maintaining a clean workplace significantly reduce the risk of infection.

Cosmetics should be selected based on individual skin characteristics. Allergy testing is recommended before using new products.

Controlling the massage intensity and technique helps prevent mechanical damage. Movements should be smooth, targeted, and tailored to the facial contours. Pressure should be moderate and adjusted to the skin's sensitivity.



Client education is also important. Clients should be aware of potential risks and post-procedure skin care guidelines. This helps increase the effectiveness of the massage and reduce the risk of complications.

Conclusion

Massage is a universal method of influencing the body, which can be used both for disease prevention and to restore tone after fatigue and physical exertion. Classic facial massage provides an overall improvement in health, while restorative massage helps the body quickly recover from overexertion. Each of these types of massage has its own specific features and focus, but they all share a common goal: maintaining and improving human health. Regular use of massage, combined with a healthy lifestyle and physical activity, can significantly improve appearance. Based on the information obtained, it can be concluded that massage is an effective technique that can be successfully applied both for medical purposes and in everyday life. Its versatility and accessibility make it one of the most popular methods of wellness and rehabilitation. Facial massage is an effective method for influencing the skin and underlying tissues, providing both cosmetic and therapeutic benefits. Its biomechanical action improves microcirculation, normalizes muscle tone, and activates metabolic processes [11]. However, the success and safety of the procedure directly depend on adherence to hygiene standards and proper technique. Ignoring these aspects can lead to various complications, including mechanical damage, vascular disorders, and infections.

A comprehensive approach, including professional training of specialists, individual selection of methods and equipment, and strict sanitary control, minimizes risks and ensures maximum effectiveness of facial massage. Therefore, further development of this field requires the integration of scientific knowledge and practical skills aimed at improving the safety and quality of procedures.



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