

**MODERN METHODS OF PREVENTION AND TREATMENT
OF HEAD AND NECK PATHOLOGICAL SCARS**¹Danylo Halytsky Lviv National Medical University (Lviv, Ukraine)²Horbachevsky Ternopil National Medical University (Ternopil, Ukraine)³Private dental office "Esthet" (Poltava, Ukraine)

lutsenko_nv@ukr.net

Scars are a pathological consequence of the functions of recovery and reconstruction after tissue damage, which affect the patient's appearance, physical functions and cause deformities that have an impact on psychological burden, especially when the scar is located in the maxillofacial area. It is customary to include hypertrophic, atrophic and keloid scars in the pathological group. The purpose of the study: to highlight and analyze data on modern prevention methods and their impact on the formation of a pathological scar. PRP (injections of platelet-rich plasma) is one of the modern methods of preventing pathological scars. This is a new and modern method of prevention and treatment, which is constantly expanding, and shows great prospects in medicine. Emer J describes in his studies that PRP combined with hardware treatment reduces transepidermal water loss and reduces inflammatory hyperpigmentation. Wu W and the authors using hypoallergenic microporous tape in their clinical studies proved that it is able to reduce tension in tissues. Limmer EE and the authors used a painless alternative to corticosteroid injections in their studies, namely corticosteroid tape. A correctly chosen method of prevention and treatment improves a better aesthetic result, shortens the time of wound healing, and also reduces the percentage of recurrences in the postoperative period, which is a desirable result not only for doctors, but also for the loss.

Key words: head and neck, maxillofacial area, wounds, prevention of the formation of pathological scars.

Connection of the publication with planned research works.

The work is carried out at the department of surgical dentistry and maxillofacial surgery with plastic and reconstructive surgery of the head and neck and is a fragment of the complex scientific topic of the department of surgical dentistry and maxillofacial surgery of Danylo Halytsky Lviv National Medical University «Optimization of the diagnostic and treatment process of patients with bone and soft tissue defects and deformations of various etiologies, traumatic and inflammatory lesions of the maxillofacial area» (state registration number 0110U008228).

Introduction.

As is well known, traumatic, surgical and burn wounds or wounds caused by infectious agents can turn into pathological scars. So, if the patient or members of his family have a predisposition to the formation of keloids, the patient is at high risk. So, in the general structure of appeals of patients with scarring skin lesions, 27% are scars localized on the face and neck, this indicator is very large and increases every year, and pathological scars are primarily a cosmetic defect [1].

A scar (Cicatrix) is a secondary morphological element of the skin that is formed when it is damaged, and especially when the reticular dermis is damaged [2].

Some authors believe that scars appear only due to atypical wound healing, which changes the level of collagen in the dermis [3].

Thus, a scar is formed for about 12 months, during which time important processes occur in wound healing and the formation of a future scar [4]. Therefore, the care of scarred tissues should be continued for one year. The participation of the patient in the observation is important for obtaining an optimal result. Post-operative visits help to observe the dynamics and changes in the forming scar [5].

The aim of the study.

Highlight and analyze data on modern methods of prevention and treatment of pathological scars of the head and neck

Main part.

One of the modern methods of preventing pathological scars is PRP (Platelet-rich plasma injections). This is a new and modern method of prevention and treatment, which is constantly expanding, and shows great prospects in medicine. PRP is used not only in various areas of dentistry, but also in such fields of medicine as cardiac surgery, orthopedics, and continues to develop as a universal therapy in dermatology. Platelet-enriched plasma is an autologous serum containing a high amount of platelets and growth factors [6]. Thus, so-called alpha granules, which are found in platelets, are responsible for the remodeling of soft tissues and the regeneration of stem cells. These granules, in turn, contain many cells of growth factors, such as platelet growth factors (aa, bb, ab), vascular endothelial growth factor, epithelial growth factor, transforming growth factor beta, and insulin-like growth factor. Thus, with their help, such processes as the differentiation of monocytes, fibroblasts, stem cells, keratinocytes and endothelial cells take place. These growth factors are known to induce cell proliferation, angiogenesis, and chemotaxis, and they also contain serotonin, dopamine, histamine, adenosine, and calcium, which increases membrane permeability. [7]. Numerous studies by Zhu JT et al have shown that the use of PRP also improves the clinical course of scarring. A tomographic study found that using PRP with fractional laser therapy reduced scar depth, reduced swelling, and increased skin elasticity by increasing collagen and fibroblasts [8].

The combined use of PRP with laser therapy and microneedling is becoming an increasingly popular procedure in aesthetic dermatology every year. Thus, with the

help of fractional laser grinding and microneedles, the doctor creates small holes in the skin, which increase the effectiveness of PRP and increase the absorption of the drug. This technique improves healing and shortens the recovery time of wounds [9].

Emer J describes in his studies that PRP combined with hardware treatment reduces transepidermal water loss and reduces inflammatory hyperpigmentation. Patients who used the combined technique of PRP in combination with fractional grinding noted an improvement in skin elasticity. In addition, there is anecdotal evidence of improvement and reduction of wound healing time with PRP in combination with laser therapy [10].

Thus, one of the recommendations for the prevention and treatment of pathological scars is silicone materials. These are polymers with a silicone-oxygen or siloxane base with additional methyl groups that form polydimethylsiloxane links. Some products contain polytetrafluoroethylene for increased durability low cross-linking silicone elastomer for a product that is both strong and flexible [11].

Yang S et al describe in their study that the use of topical silicone gel to prevent pathological scarring reduces the need for intralesional wound modulation at the 1-month postoperative visit. Patients who underwent this method of prevention were less likely to develop postoperative scar deformities, which subsequently reduced the need for triamcinolone injections by 55%, which makes it possible to reduce the need for repeated intralesional modulation [12]. Surgeons who pay special attention to the prevention of pathological scarring may benefit from the use of a silicone-based cream, which has proven effectiveness in wound healing. This gives a significant advantage to patients who cannot undergo a post-operative examination due to various situations (travel, specifics of work), can benefit from the local application of the cream, which can reduce the possibility of the formation of scar tissue after surgical interventions [13].

Wu W and the authors using hypoallergenic micro-porous tape in their clinical studies proved that it is able to reduce tension in tissues. The tape is applied for a period of 5 to 10 days, it is convenient to use and replace. Based on this technique, there is evidence of the effectiveness of prevention on skin areas with greater tension, for example, scars located on the face (Langer's lines).. The key mechanism of this tape is hydration. It is due to the production of fibroblasts, collagen and glycosaminoglycans that the hydrated tissues are well restored. It has been proven that the paper tape imitates the stratum corneum and reduces the evaporation of liquid from the wound, thereby reducing the risk of pathological skin scarring [14].

Limmer EE and the authors used a painless alternative to corticosteroid injections in their studies, namely corticosteroid tape. For the prevention and treatment of pathological scars in the area of the head and neck, a tape with fludroxycortide was used. Participants in the clinical trial experienced a decrease in scar height and a decrease in itching and pain after 10-12 months. But there were also people who did not get the desired result, so the drug was changed to testosterone propionate, the first results could be observed after 6-7 months [15].

Barone N and co-authors obtained a positive result in the use of this tape and plaster, which provided the basis for the development of new protocols for the prevention and treatment of scars. Continuing the research of Japanese scientists, they recommend corticosteroid ointments and creams for the prevention and treatment of scar tissue. Because corticosteroid ointments and creams are easy to apply [16].

Mehta S et al., used pressotherapy for incised wounds and proved that stress relief is a powerful strategy to prevent pathological scarring in the head and neck area. It has been proven that applying force perpendicular to the skin surface or using a combination of both circular and perpendicular pressure has shown a likely reduction in scar thickness. In younger subjects, a significant decrease in pressure was observed after 30 days and a significant decrease between 30 and 60 days of use, resulting in lower therapeutic doses. Therefore, in order to increase the effectiveness of pressotherapy, it is necessary to develop new materials with a low level of traction. In addition, the applied pressure should be measured regularly during clinic visits [17].

Japanese scientists proposed photodynamic therapy in their research, the purpose of which is to use an optically active drug that is activated by light, penetrating the target tissues. The first and most frequently used photosensitive agent is 5-aminolevulinic acid. Another is methylaminolevulinic acid, a photoactive agent. When activated by light, reactive oxygen is formed, which leads to its penetration into tissues. This treatment technique remains current in various medical/surgical disciplines. There are reports in the literature that photodynamic therapy is used to treat various dermatological diseases and cancer. There is an evidence base that has shown the effectiveness of this method in the prevention and treatment of pathological scars [18].

Laser therapy is also used to prevent scarring, but the evidence for the effectiveness of laser treatment for surgical scars, hypertrophic scars, and keloids is somewhat mixed, but generally shows good results. Multiple studies report a significant reduction in the thickness of scars, with a correctly set program [19].

Scar massage is a form of pressure therapy that is believed to both accelerate collagen maturation and effect scar remodeling by breaking down fibrous tissue, improving flexibility, and reorienting collagen fibers. Despite this, because there are countless scar massage regimens, conflicting outcome measures, and few comparative studies, there is only weak evidence to support the use of scar massage [20].

Conclusions.

Thus, the correctly chosen method of prevention and treatment contributes to a better result, which in turn reduces the time of wound healing, reduces the likelihood of the formation of pathological scars of the head and neck, and reduces the percentage of recurrences in the postoperative period, which is a desirable result not only for doctors, but also and for patients.

Prospects for further research.

It is planned to conduct clinical, biomechanical and biochemical studies of the results of various types of conservative treatment of scar tissue.

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СУЧАСНІ МЕТОДИ ПРОФІЛАКТИКИ ТА ЛІКУВАННЯ ПАТОЛОГІЧНИХ РУБЦІВ ГОЛОВИ ТА ШИЇ

Огоновський Р. З., Погранична Х. Р., Луценко Н. С., Лоза Х. О., Нагірний Я. П.

Резюме. Як відомо, травматичні, хірургічні та опікові рани або рани викликані інфекційними агентами, можуть перетворитися на патологічні рубці. Деякі автори вважають, що рубці з'являються лише через атипове загоєння ран, яке змінює рівень колагену в дермі.

Рубець (Cicatrix) – це вторинний морфологічний елемент шкіри, який утворюється при її пошкодженні, а особливо при ушкодженні ретикулярної дерми. Таким чином, рубець формується близько 12 місяців, в цей час відбуваються важливі процеси у загоєнні рани та формуванні майбутнього рубця.

Мета дослідження: висвітлити та проаналізувати дані щодо сучасних методів профілактики та лікування патологічних рубців голови та шиї.

Одним із сучасних методів профілактики патологічних рубців є ін'єкції збагаченою плазмою на тромбоцитами (PRP - Platelet-rich plasma). Це новий та сучасний метод профілактики та лікування, який постійно розширюється, і демонструє великі перспективи в медицині. Комбіноване використання PRP з лазерною терапією та мікронідлінгом з кожним роком стає все більш популярнішою процедурою в естетичній дерматології. Emer J в своїх дослідженнях описує, що PRP в поєднанні з апаратним лікуванням зменшує трансепідермальну втрату води та зменшує запальну гіперпигментацію. Так однією з рекомендацій щодо профілактики та лікування патологічних рубців є силіконові матеріали. Це полімери з силіконово-кисневою або силосановою основою із додатковими метильними групами, які утворюють полідиметилсилоксанові ланки.

Wu W та автори використовуючи у своїх клінічних дослідженнях гіпоалергенну мікропористу стрічку довели, що вона здатна зменшувати напруження у тканинах.

Limmer EE та автори у своїх дослідженнях використовували безболісну альтернативу ін'єкцій кортикостероїдів, а саме кортикостероїдну стрічку.

Правильно обрана методика профілактики та лікування сприяє кращому результату, що у свою чергу зменшує час загоєння рани, зменшує вірогідність утворення патологічних рубців голови та шиї, та зменшує відсоток рецидивів у післяопераційний період, що є бажаним результатом не тільки для лікарів, а також і для пацієнтів.

Ключові слова: голова та шия, щелепно-лицева ділянка, рани, профілактика утворення патологічних рубців.

MODERN METHODS OF PREVENTION AND TREATMENT OF HEAD AND NECK PATHOLOGICAL SCARS

Ohonovskiy R. Z., Pohranychna H. R., Lutsenko N. S., Loza H. O., Nahirnyi Y. P.

Abstract. As is well known, traumatic, surgical and burn wounds or wounds caused by infectious agents can turn into pathological scars. Some authors believe that scars appear only due to atypical wound healing, which changes the level of collagen in the dermis.

A scar (Cicatrix) is a secondary morphological element of the skin that is formed when it is damaged, and especially when the reticular dermis is damaged. Thus, a scar is formed for about 12 months, during which important processes in wound healing and the formation of a future scar take place.

The purpose of the study: to highlight and analyze data on modern methods of prevention and treatment of pathological scars of the head and neck.

One of the modern methods of preventing pathological scars is PRP (Platelet-rich plasma) injections. This is a new and modern method of prevention and treatment, which is constantly expanding, and shows great prospects in medicine. The combined use of PRP with laser therapy and microneedling is becoming an increasingly popular procedure in aesthetic dermatology every year. Emer J describes in his studies that PRP combined with hardware treatment reduces transepidermal water loss and reduces inflammatory hyperpigmentation. Thus, one of the recommendations for the prevention and treatment of pathological scars is silicone materials. These are polymers with a silicone-oxygen or siloxane base with additional methyl groups that form polydimethylsiloxane links.

Wu W and the authors using hypoallergenic microporous tape in their clinical studies proved that it is able to reduce tension in tissues.

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Correctly chosen method of prevention and treatment contributes to a better result, which in turn reduces the time of wound healing, reduces the probability of the formation of pathological scars of the head and neck, and reduces the percentage of recurrences in the postoperative period, which is a desirable result not only for doctors, but also for patients.

Key words: head and neck, maxillofacial area, wounds, prevention of the formation of pathological scars.

ORCID and contributionship:

Ohonovskiy R. Z.: [0000-0003-0959-0863](https://orcid.org/0000-0003-0959-0863)^F

Pohranychna K. R.: [0000-0002-3366-0799](https://orcid.org/0000-0002-3366-0799)^{BC}

Lutsenko N. S.: [0000-0002-2309-4092](https://orcid.org/0000-0002-2309-4092)^D

Loza K. O.: [0000-0001-9671-8049](https://orcid.org/0000-0001-9671-8049)^A

Nahirnyi Y. P.: [0000-0002-1530-0271](https://orcid.org/0000-0002-1530-0271)^F

Conflict of interest:

The authors declare no conflict of interest.

Corresponding author

Lutsenko Natalia Serhiivna

Private dental office «Esthet»

Ukraine, 36011, Poltava, 23 Shevchenko str.

Tel.: +380997804674

E-mail: lutsenko_nv@ukr.net

A – Work concept and design, B – Data collection and analysis, C – Responsibility for statistical analysis, D – Writing the article, E – Critical review, F – Final approval of the article

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