

Use of complex patches for the reconstruction of defects of soft tissue of the trunk and limbs caused by traumatic damage

The aim of the work: to expand the indications for the use of plastic reconstructive interventions for the early closure of soft tissue defects of the trunk and limbs of traumatic genesis.

Materials and Methods. The paper analyzes data of 242 patients with soft tissue defects of the trunk and limbs, which resulted from mechanical damage. 697 surgical interventions were performed to patients, whom 492 (70.6 %) operations for the restoration of damaged tissues from 2008 to 2016 were performed.

Results and Discussion. All patients were divided into 4 groups depending on the size, depth and degree of damage to the soft tissues and other structures of the trunk and limbs. Group I – 44 patients with a limited area of damage to the skin and underlying tissues to the deep fascia. 51 skin repair interventions using autodermoplasty was performed. Complex patches were not used. Group II (n = 67) – patients with an extensive wound surface and soft tissue damage below the deep fascia. In this group, 144 surgical interventions were performed, of whom 23 were complex flaps for the restoration of soft tissues. Group III consisted of 90 patients with defects in the epithelial tissues, which appeared together or as a result of damage to the osteoarticular apparatus. 272 operations were performed, of which 35 interventions using complex tissue complexes. Group IV (n = 41) – patients with a combined or multiple injury, accompanied by damage to the great vessels, nerves, partial or complete separation of the limb. In this group, 220 operations were performed, of which 47 operations were complex flaps.

Key words: trauma; soft tissue defect; wound surface; complex rags; limbs.

Problem statement, analysis of recent research and publications. Currently, the trauma remains the main cause of mortality among the population younger than 40 years, therefore, it occupies a leading position among people of working age and accounts for 45 % of the total mortality [1].

The intensive growth of modern communications entails an increase in the severity of the damage to the multiple and combined skeleton, high degree of disability and mortality [2,3]. Much of the early and late complications of the sufferers is due to underestimation of soft tissue damage and violation of the treatment protocol. The current level of development of society requires the most adequate adaptation of patients and their early rehabilitation [4,6].

The aim of the work: to expand the displays of using plastic reconstructive interventions on early closing of defects of soft tissues of the body and limbs of traumatic genesis.

Materials and Methods. In this work, data on 242 patients with defects of soft tissues of the body and extremities that arose as a result of mechanical damage were analyzed. 697 surgical procedures were performed on patients, 492 of them (70.6 %) were for restoration of damaged tissues. The research and treatment of patients was conducted at the Department of Disaster Medicine, Military Medicine, Anesthesiology and Intensive Therapy of Zaporizhzhia State Medical University, at the

clinical bases of the Regional Burn Department and Traumatology Department for the period of 2008–2016 years.

All patients were divided into 4 groups depending on the size, depth and degree of damage to soft tissues and other structures of the body and extremities. Group I – 44 (44/242; 18.2 %) patients with limited (up to 5 cm in diameter) areas of damage to the skin and subordinate tissues to deep fascia. 61 (61/693; 8.8 %) interventions were performed on them, of which 10 were primary surgical treatment of the wound at the hospitalization stage, 51 (51/492, 10.4 %) skin restoration intervention using autodermoplastic splitting skin grafts.

Group II – 67 (67/242; 27.7 %) patients with a large and with the largest wound surface and soft tissue damage below deep fascia. In this group, 144 (144/697, 20.7 %) of surgical interventions were performed, 28 of them were surgical operations involving primary wound healing, autopsy and hematoma drainage, 1 case of fasciotomy, 114 (114/492, 23.2 %) operations by closing of tissue defects, 23 of them are interrupted by complex flaps.

Group III was composed of 90 (90/242; 37.2 %) patients with defects in the covering tissues that arose together or as a result of damage to the bone and articular apparatus. 272 (272/697; 39.0 %) operations were performed, 31 of which were primary surgical wound surgery, 5 – autopsy and hematoma drainage, 1 case – fasciotomy, 43 – bone repair surgery, 1 –

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thoracoscopy, 3 – laparoscenesis, 189 (189/492, 38.4 %) – operations on the closure of wound surfaces and defects of the covering tissues, of which 35 interventions using complex tissue complexes.

Group IV – 41 (41/242; 16.9 %) patients with combined or multiple trauma, accompanied by damage to the major vessels, nerves, partial or complete secretion of the limb. In this group, 220 (220/697, 31.6 %) operations were performed, of which, in the first stage, the primary surgical treatment of the wound (24), 1 – hematoma drainage, 2 cases – audit of the wound, 6 – fasciotomy, 25 surgery bone recovery.

In 6 cases, laparosensis, 4 – thoracoclusion, 4 – drainage of the pleural cavity, in 1 case – brush – biopsy, 1 – section and drainage of the subdiaphragmatic abscess. Epicystostomy is performed in 2 cases.

138 (138/492; 28 %) of interventions were performed on restoration of vessels, nerves, closure of wound defects, 47 operations – with complex flaps.

Criteria for inclusion in the study: patients over 17 years of both fields with a diagnosed defect of the skin and subordinate soft tissues of the body and limbs, requiring the restoration of form and function of the body.

In the group I, there were 24 men, women – 20, and the average age was 54 years. In group II – 31 men and 36 women, and the average age was 54.4 years. In group III – 65 men and 25 women, and the average age was 46.8 years. In the group IV – 36 men and 5 women, the average age – 38.8 years.

In all four groups (I, II, III, IV), the greatest number of sick working-age people (young and middle / mature): 25–60 years, respectively – 137 (56.6 %) patients. Sufficient high numbers of patients

in the age group of late maturity and the elderly – 75 (31 %), which is due to a sufficient number of domestic injuries.

According to Table 1, the highest number of patients was traumatized at home – 99 (99/242; 40.9 %), almost equally, patients were injured as a result of road accidents (61/242; 25.2 %) and a drop of 69 (69/242; 28.5 %). In connection with the conduct of hostilities in recent years, the number of patients with gunshot wounds has increased – 13 (13/242; 5.4 %).

The nature of damage with acute injury on the one hand depends on the mass (size, volume, shape), speed, direction and duration of action of the traumatic agent, on the other – on localization, anatomical and physiological features of the damaged structures.

The most optimal goal of the study was achieved when using different types of shreds on the feeding stalk (Table 2).

In the group I of patients with limited (up to 5 cm in diameter) area of damage to the skin and subordinate tissues to deep fascia) complex wounds to cover the wound surface were not used.

The displays for plastic scraps were:

- the damage site is a functionally intense part of the body (projection of the joints) or subject to high mechanical stress (fifth, sole);

- bad blood supply to the defect area and the surrounding tissues around;

- depth of defect, at the bottom of the wound freely arranged bone, joint, tendon, vessel, nerve; elimination of contour defects of the trunk and limbs.

The choice of the donor site depended on the patient's age, concomitant pathology, features of

Table 1. Distribution of patients according to the etiopathogenetic factor to obtain a defect of soft tissues

Etiopathogenetic factor	group I (n = 44)(%)	group II (n = 67) (%)	group III (n= 90) (%)	group IV (n= 41) (%)
Accident	6 (13.6)	11 (16.4)	25 (27.8)	19 (46.3)
Catatrauma	10 (22.7)	21 (31.3)	29 (32.2)	9 (22)
Household injuries	28 (63.7)	30 (44.8)	32 (35.6)	9 (22)
Firearms wound	–	5 (7.5)	4 (4.4)	4 (9.7)

Table 2. Number of plastic flaps on the feeding stalk in patients with defects of soft tissues, depending on the area of damage

Groups of patients	Number of plastic flaps on the feeding stalk (%)	The total number of restorative surgical interventions (%)
Group I (n = 44)	–	51(10.4)
Group II (n = 67)	23 (21.9)	114 (23.2)
Group III (n= 90)	35 (33.3)	189 (38.4)
Group IV (n= 41)	47 (44.8)	138 (28.0)
Total:	105 (100)	492 (100)

regional hemodynamics in the area of injury. The main thing, when choosing a flap, was the principle of the distance to the damage zone – the closer to the defect, the better the result of surgical intervention. An important condition was that scarring in the donor

area did not cause functional disorders and had a minimal aesthetic deficit.

The percentage of plastic scraps on the feeding stalk in all groups (I, II, III, IV) of patients is given in Table 3.

Table 3. Number of plastic flaps on the feeding stalk in patients with

The region	group I (n = 44) (%)	group II (n = 67) (%)	group III (n = 90) (%)	group IV (n = 41) (%)
Damage	–	4 (17.4)	6 (17.1)	23 (48.9)
Upper limb	–	14 (60.9)	25 (71.5)	13 (27.7)
Lower limb	–	5 (21.7)	4 (11.4)	11 (23.4)
Body	–	23 (100)	35 (100)	47 (100)

The clamp on the feeding stalk from tissues that directly adhered to the defect (local shreds) gave the best results in transplantation, because its structure, color, thickness had the greatest similarity to the missing coat fabrics above the defect. Due to the feeding stalk, blood supply and innervation remained unchanged. The characteristics of transplanted tissues remained the same as in the donor area.

In the absence of conditions for plastering with local fabrics, scraps were used on the feeding stalk from adjacent anatomical sites. This technique is much more complicated than before, the results of intervention may be exacerbated by ischemic complications from transplanted tissues.

In the transplantation of non-free tissue complexes from distant anatomical distances to the defect, the limbs were provided with a forced position to provide a defect-binding linkage for the period necessary for the formation of sufficient vascular connections between the transplanted tissues and the wound surface (an average of 14–16 days). After that, the feeding stalk was cut off.

In the group I (n = 44), patients with limited (up to 5 cm in diameter) areas of damage to the skin and subordinate tissues to deep fascia, using scapula on the feeding stalk were not performed due to the lack of indications for reconstructive interventions.

Patients in the group II (n = 67) with large and large wound surfaces and soft tissue damage below deep fascia, 14 plastics were made with cloth fragments around the defect, of which 10 local plastics were flat slipping flaps, 3 – transposition flaps, 1 – rotary shred 6 surgical interventions were made by flap from the tissues adjacent to the defect of the anatomical sites: 1 – an islet scapula on the peripheral stalk, 2 – bridge-like flaps (a flap with two feeding stalks), 1 plastic with a flat scapular using a technique of dermatension (3 surgical interventions).

3 operations were performed by a tubular migratory classical shred (from a remote anatomical site).

Together 23 surgical interventions with complex flaps.

In group III (n = 90), 35 surgical interventions with flap on the feeding stalk were performed in patients with defects in the covering tissues that arose together or as a result of damage to the bone and articular apparatus.

6 plastic with local fabrics: 4 – slip shred, 1 – transposing, 1 – rotational shred.

2 surgical interventions were made by flap from the tissues adjacent to the defect of the anatomical sites: 1 – an islet shingles on the peripheral leg, 1 plastic with a flat scapular.

22 operations were performed with tubular migratory classical shreds and 5 flat flaps (from a remote anatomical site).

Patients of the group IV (n = 41) with combined or multiple trauma, accompanied by damage to major vessels, nerves, partial or complete secretion of the limb, 47 restorations were performed with flaps on the feeding stalk.

14 plastic with fabrics around the defect: 11 – slip shred, 3 – transposition shred. 11 surgical interventions were performed with flap from the tissues adjacent to the defect of the anatomical sites: 1 – an ischemic scapula on the peripheral leg, 6 plastic with a flat scapular, 4 interventions with flat flaps, which were formed by the method of tissue dermatension. 22 operations were performed by a tubular migratory classical shred (from a remote anatomical site).

Among the patients observed, there were no fatal cases. In 3 (2.9 %) cases, there was an ischemic necrosis of the scars, which required a secondary reconstruction

The criteria for evaluating immediate and long-term results were adherence of scarring, defecation of soft tissues, restoration of regional hemodynamics and innervation in the area of injury, elimination of trophic disorders and restoration of the stereotype of movement.

Conclusions. 1. The most effective reconstruction of the damaged segment with complex tissue complexes in the early stages after the injury (1–3 weeks). During this period, reparative processes after the traumatic and surgical alteration merge, irreversible degenerative – dystrophic processes develop, structural and functional stereotypes persist, the possibility of maximal restoration of the primary anatomy of the site of damage remains.

2. The use of complex scraps to close the defects of soft tissues in the area of injury allowed for a positive result in 97.1 % of the interventions.

The prospects for further research are in the field of introduction into clinical practice of plastic reconstructive interventions for early closure of defects of the covering tissues in urgent conditions as a stage in the treatment of combined damage to the trunk and extremities.

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Електронна адреса для листування: alena.ponomarenko@gmail.com

О. В. ПОНОМАРЕНКО

Запорізький державний медичний університет

ВИКОРИСТАННЯ СКЛАДНИХ КЛАПТІВ ДЛЯ РЕКОНСТРУКЦІЇ ДЕФЕКТІВ М'ЯКИХ ТКАНИН ТУЛУБА ТА КІНЦІВОК, ЗУМОВЛЕНИХ ТРАВМАТИЧНИМ ПОШКОДЖЕННЯМ

Мета роботи: розширити показання до використання пластичних реконструктивних втручань для раннього закриття дефектів м'яких тканин тулуба та кінцівок травматичного генезу.

Матеріали і методи. У роботі проаналізовано дані 242 хворих із дефектами м'яких тканин тулуба та кінцівок, які виникли внаслідок механічного пошкодження. Пацієнтам було виконано 697 оперативних втручань, з них 492 (70,6 %) операцій з приводу відновлення пошкоджених тканин за період 2008 – 2016 рр.

Результати досліджень та їх обговорення. Всі хворі розподілені на 4 групи залежно від розмірів, глибини та ступеня пошкодження м'яких тканин та інших структур тулуба й кінцівок. Перша група – 44 хворі із обмеженою ділянкою пошкодження шкіри та прилеглих тканин до глибокої фасції. Їм виконано 51 втручання з відновлення шкіри методом аутодермопластики. Складні клапті не використовували. Другу групу склали 67 хворих із великою та надвеликою рановою поверхнею й пошкодженням м'яких тканин нижче глибокої фасції. В цій групі виконано 144 оперативні втручання, з них 23 втручання складними клаптями для відновлення м'яких тканин, третю групу склали 90 хворих із дефектами покривних тканин, які виникли разом або внаслідок пошкодження кістково-суглобового апарату. Виконано 272 операції, з них 35 із використанням складних комплексів тканин. Четверта група – 41 хворий з поєднаною або множинною травмою, що супроводжується пошкодженням магістральних судин, нервів, частковим або повним відокремленням кінцівки. В цій групі виконано 220 операцій, з них 47 операцій – складними клаптями.

Ключові слова: травма; дефект м'яких тканин; ранова поверхня; складні клапті; кінцівки.

Е. В. ПОНОМАРЕНКО

Запорожский государственный медицинский университет

ИСПОЛЬЗОВАНИЕ СЛОЖНЫХ ЛОСКУТОВ ДЛЯ РЕКОНСТРУКЦИИ ДЕФЕКТОВ МЯГКИХ ТКАНЕЙ ТУЛОВИЩА И КОНЕЧНОСТЕЙ, ОБУСЛОВЛЕННЫХ ТРАВМАТИЧЕСКИМ ПОВРЕЖДЕНИЕМ

Цель работы: расширить показания для использования пластических реконструктивных вмешательств по раннему закрытию дефектов мягких тканей туловища и конечностей травматического генеза.

Материалы и методы. В работе проанализированы данные 242 больных с дефектами мягких тканей туловища и конечностей, которые возникли в результате механического повреждения. Пациентам было выполнено 697 оперативных вмешательств, из них 492 (70,6 %) операции по поводу восстановления поврежденных тканей за период 2008 – 2016 гг.

Результаты исследований и их обсуждение. Все больные были разделены на 4 группы в зависимости от размеров, глубины и степени повреждения мягких тканей и других структур туловища и конечностей. Первая группа – 44 больные с ограниченной областью повреждения кожи и подлежащих тканей до глубокой фасции. Им было выполнено 51 вмешательство по восстановлению кожи методом аутодермопластики. Сложные лоскуты не использовали. Вторая группа – 67 больных с обширной раневой поверхностью и повреждением мягких тканей ниже глубокой фасции. В этой группе выполнено 144 оперативных вмешательства, из них 23 сложными лоскутами по восстановлению мягких тканей. Третья группа состояла из 90 больных с дефектами покровных тканей, возникшие вместе или в результате повреждения костно-суставного аппарата. Выполнено 272 операции, из них 35 вмешательств с использованием сложных комплексов тканей. Четвертая группа – 41 больной с сочетанной или множественной травмой, сопровождающейся повреждением магистральных сосудов, нервов, частичным или полным отчленением конечности. В этой группе выполнено 220 операций, из них 47 операций сложными лоскутами.

Ключевые слова: травма; дефект мягких тканей; раневая поверхность; сложные лоскуты; конечности.