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APPLICATION OF SILICONE IMPLANTS IN PLASTIC SURGERY IN CZECHOSLOVAKIA

J. JAKUBÍK, J. TREJBAL, L. HASMAN, R. KLUZÁK, J. POUPA

Implants made of medical silicone rubber (dimethylpolysiloxane) are now the most frequently used alloplastic material suitable for a variety of branches of medicine, even those outside surgery. According to need, the implants can be soft and flexible or hard. There is no change in their physical properties following implantation, except perhaps in cardiosurgery where imbibition of a silicone ball in a heart prosthesis was proved to be due to lipids with a subsequent change in the structure of silicone.

At the Department of Plastic Surgery in Brno, we spent five years exploring silicone. Having conducted experiments on a large number of laboratory animals (guinea-pig, rat, chicken, pig), we found the implanted silicone to be enveloped in a fine, thin capsule lined in segments by pseudoepithelial lining (Fig. 1). Similar results were obtained using implanted silicone tubes for sanitation and food industry use such as are made in Czechoslovakia by national enterprise Kablo-Kladno (Vrchlabí).

Silicone was also implanted experimentally to four human volunteers and then, after a planned period of time, gradually taken out of their bodies complete with the enveloping capsule. This, too, was fine, thin and lined with pseudoepithelium. The volunteers complained of no subjective or objective inconvenience throughout the period of silicone implantation.

Following the successful experiments on animals, the Ministry of Health of the Czech Socialist Republic granted permission for trying out silicone in humans. Four specialized departments of plastic surgery were chosen for the trial (Brno, Plzeň, Třinec and Prague). Silicone was used as a temporary tendon prosthesis (Fig. 2) in a total of 31 patients, in the form of a foil in 35

Fig. 1.: Capsule enveloping silicone implant. Pig, 180 days of implantation. ×360, HE

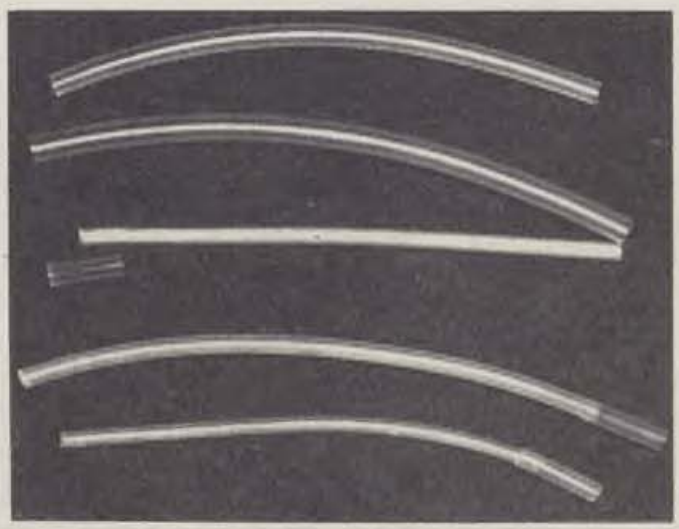

Fig. 2.: Silicone tendon prostheses, slip-on tubes. There is a central polyester textile core in the middle of the prosthesis

patients, and as an articular prosthesis in 9 patients (Fig. 3). The first and last groups of patients in particular often involved severely deformed hands with vascular and nerve supply disturbances.

After about 2—3 months, the temporary tendon prosthesis was found to have developed all around it a capsule — a canal which, in the second stage of operation, was used as an artificial tendon sheath to slide the tendon

autograft in (Fig. 4). The tunnel thus developed is firm enough and intimately connected with the underlying and surrounding tissues. This will prove to be of significant value in cases of severed transversal osteofibrous bands on the finger in that it will prevent the development of bow-string deformity of the finger due to the pull of the reconstructed tendon. In contrast, the foil improves the gliding movement of the tendon thus freed, pre-

Fig. 3.: Silicone articular prosthesis of Czechoslovak make

venting the development of connective tissue in between the sutured ends of the median or ulnar nerves. In some cases, the foil can also be used for the reconstruction of the missing band, so important for proper finger function.

Complications: out of the total number, three temporary tendon prostheses, three foils and two articular prostheses had to be removed, all of

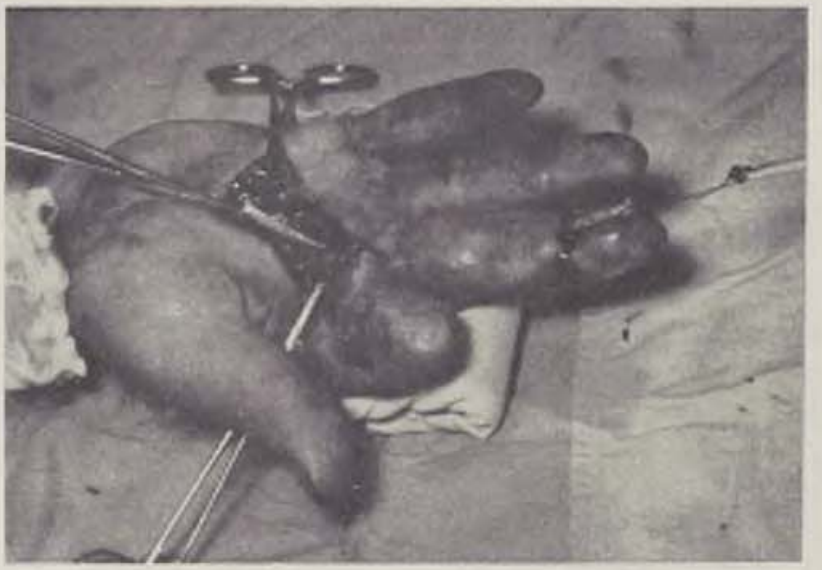

Fig. 4.: Insertion of tendon autograft

the cases involving implant infection. The total consisted of 32 excellent, 27 good, 7 satisfactory and 9 poor results. The above figures represent the outcome of a five-year departmental research assignment which was wound up towards the end of 1975, successfully defended and designed for publication in specialized journals.

So far, the research into and development of silicone articular prosthesis to replace finger joints has been going on at the Department of Plastic Surgery in Brno and the Department of Plastic Surgery in Plzeň. Having been granted ministerial permission once the project has come to an end, the prostheses will be used at five more clinical workplaces.

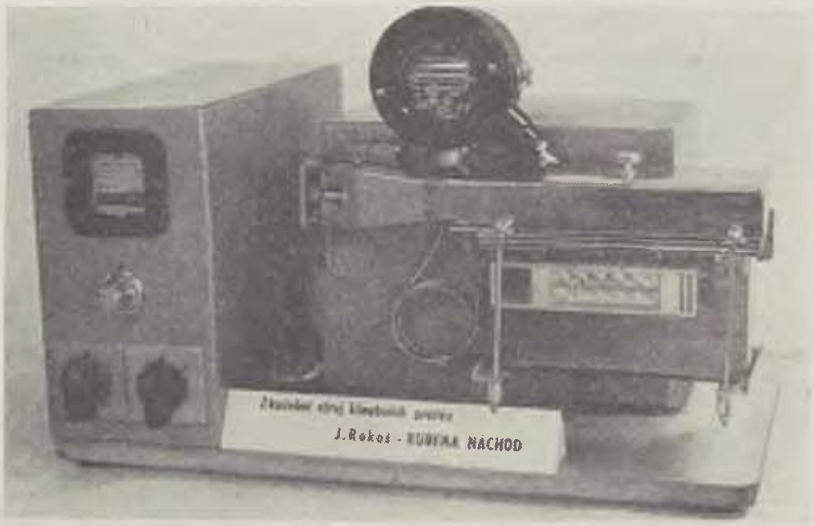

Fig. 5.: Bending machine for articular prostheses

The basic shape of the prosthesis is derived from Niebauer's prosthesis. The differences are a groove for the extensor on the dorsal area and the absence of textile netting on spines. The prosthesis withstood a stress test on a bending machine specially designed by Rubena - Náchod (Fig. 5) involving

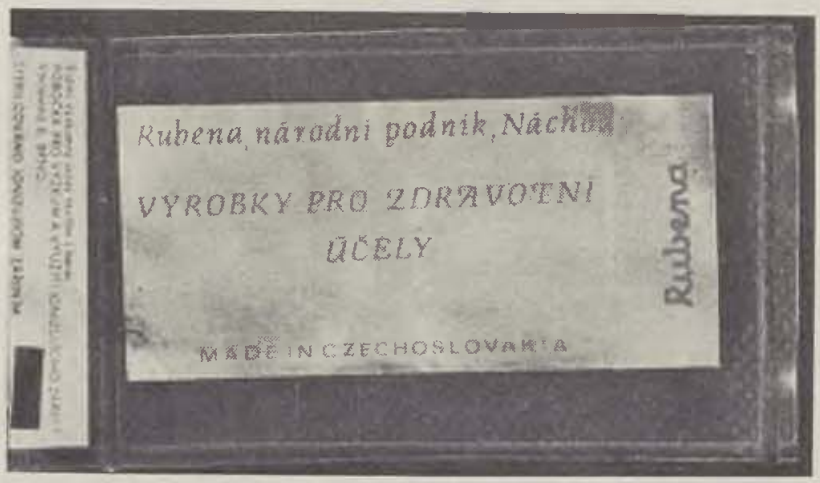

Fig. 6.: Articular prosthesis adjustment

30 million bends in a plasma-simulating bath at a constant temperature of 37 ^{0}C. It is distributed in sterile polyethylene bags (Fig. 6). Data about a larger number of patients are not yet available owing to the fact that the prosthesis has so far been worked on at no more than two clinics.

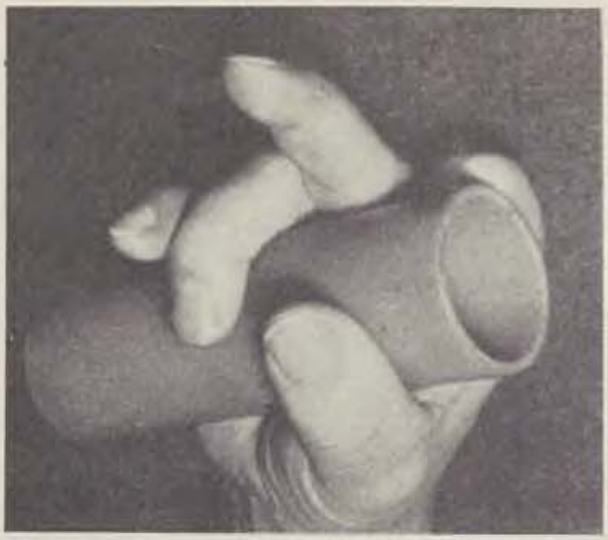

Fig. 7.: Patient prior to operation on 3rd finger flexor tendons. — Fig. 8.: The same patient as in Fig. 4 and 7. State following transplant operation of tendon m. palmaris into the canal developed after temporary tendon prosthesis

It is rather difficult to give an exact assessment of the advantages of silicone implants for reconstructive surgery of the hand, particularly as regards temporary tendon prostheses and foils. Any precise figures would probably prove to be a more or less truthful reflection of the fact that silicone is well tolerated by the tissues concerned and that it stimulates the development of a fine, smooth capsule lined with pseudoepithelium around it. According to the experience gained by each of the authors participating in the project, the application of temporary silicone tendon prosthesis helps improve the results of tendon transplant operations by about 25—50 % and this is a sober figure (Fig. 7).

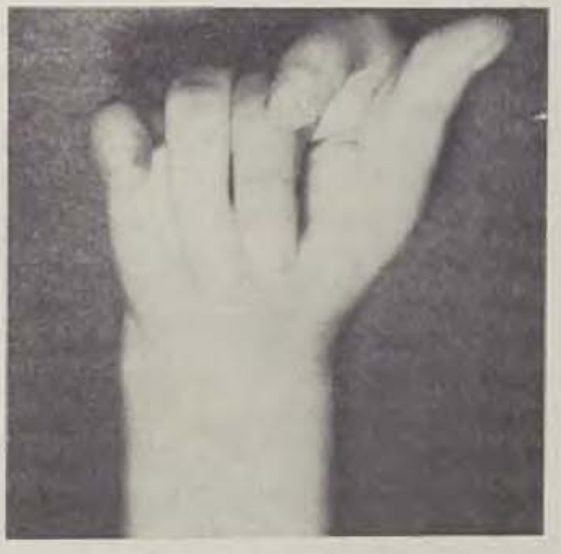

Fig. 9.: Rheumatic hands: articular deformity, flexion insufficiency. — Fig. 10.: The same patient as in Fig. 9. Functional improvement in 4th finger flexion following implantation of Czechoslovak silicone articular prosthesis into the proximal interphalangeal joint of the 4th finger

As regards articular prostheses, the results are even more striking. Judging by our small group of patients, we can, with a measure of caution, state that a silicone articular prosthesis restores the capacity of movement in an ankylotic joint within about half the physiological range. In indicated cases of rheumatic hands, it will rid the patient of pain, considerably improve the capacity of movement and make up for axial deviation (Fig. 9, 10).

There is similar experience abroad.

Flexible, soft and minimum-irritation implants of medical silicone rubber are likely to find ever more use in surgery.

The above silicone implants will be made available (pending Ministry of Health of the ČSSR permission) in the medical supplies network during 1976. The producer is Rubena - Náchod.

SUMMARY

Four specialized departments of plastic surgery (Brno, Plzeň, Třinec and Prague) were designated to try out temporary silicone tendon prosthesis in 31 patients, silicone foils in 35 patients, and silicone articular prosthesis in 9 patients. The application of silicone implants at each of the departments improved postoperative results by 25—50 %. There were 32 excellent, 27 good, 7 satisfactory and 9 poor results.

The above silicone implants will be available in the medical supplies network in 1976. The producer is Rubena, national enterprise, Náchod.

RÉSUMÉ

Utilisation des greffes de silicone dans la chirurgie plastique en Tchécoslovaquie

J. Jakubík, J. Trejbal, L. Hasman, R. Kluzák, J. Poupa

Il y a quatre lieux de travail spécialisés dans la chirurgie plastique (Brno, Plzeň, Třinec, Prague) où on a examiné les prothèses tendineuses de silicone provisoires chez 31 malades, les feuilles de silicone chez 35 malades et les prothèses articulaires de silicone chez 9 malades. L'utilisation des greffes de silicone à ces lieux de travail a amélioré les résultats postopératoires de 25 à 50 %. Au total, on a obtenu les résultats dont 32 étaient excéllents, 27 bons, 7 satisfaisants, 9 mauvais.

Les greffes de silicone ci-dessus mentionnées ont été introduites dans la distribution du service de santé au cours de l'année 1976. Leur producteur est l'entreprise nationale Rubena à Náchod.

ZUSAMMENFASSUNG

Anwendung der Silikonimplantate in der plastischen Chirurgie in ČSSR

J. Jakubík, J. Trejbal, L. Hasman, R. Kluzák, J. Poupa

An vier spezialisierten Arbeitsstätten der plastischen Chirurgie (Brno, Plzeň, Třinec, Praha) wurden provisorische Silikonsehnenprothesen an insgesamt 31 Patienten, Silikonfolien an 35 Patienten und Silikongelenkprothesen an 9 Patienten geprüft. Die

Anwendung der Silikonimplantate hat die postoperativen Ergebnisse an einzelnen Arbeitsstätten um 25—50 % verbessert. Insgesamt wurden 32 vorzügliche, 27 gute, 7 zufriedenstellende und 9 schlechte Ergebnisse erzielt.

Die beschriebenen Silikonimplantate werden im Verlauf des Jahres 1976 in das Distributionsnetz der Gesundheitsversorgung eingeführt werden. Ihr Hersteller ist Rubena, Nationalunternehmen, Náchod.

RESUMEN

Empleo de injertos de silikon en la cirujía plástica

J. Jakubík, J. Trejbal, L. Hasman, R. Kluzák, J. Poupa

Tendones artificiales provisorios de silikon fueron experimentados en 31 pacientes, hojas de silikon en 35 pacientes y articulaciones artificiales de silikon en 9 pacientes en cuatro departamentos de la cirujía plástica (Brno, Plzeň, Třinec, Praha).

El empleo de injertos de silikon en los diferentes departamentos contribuía al mejoramiento de los resultados postoperativos en 25—50 %. En total se consiguió 32 resultados excelentes, 27 buenos, 7 satisfactorios y 9 malos.

Los injertos de silikon mencionados estarán introducidos a la red del abastecimiento sanitario durante el año 1976. Su productor es Rubena, e. n. Náchod.

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EFFECT OF ULTRASOUND ON COLLAGEN SYNTHESIS AND DEPOSITION IN EXPERIMENTAL GRANULOMA TISSUE. POSSIBILITIES OF CLINICAL USES OF ULTRASOUND IN HEALING DISORDERS

J. POSPÍŠILOVÁ

INTRODUCTION

Any therapeutic employment of ultrasound is based on its physical and chemical effects. The physical effects, i.e. thermal and mechanical, are primary. The chemical effects develop as a result of its physical action, depending on the dose of ultrasound, particularly though, on the composition of the environment the ultrasound wave is to pass through. In the case of living tissue sonication, the chemical effects of ultrasound are likely to be manifested by a change in the dynamics of the processes going on in the tissue.

Going through a list of papers on ultrasound action on different biological structures one can come across a number of seemingly contradictory results. Thus, for instance, ultrasound is seen as demaging protein molecules in solution (Zorina, 1972), breaking polyribosomal synthetic cell centres, demaging DNA (Zhizhina, 1971), reducing mitotic activity as well as the survival time of cells in a culture medium, destroying tumour cells, causing tissue necrosis (Linke, 1973), or inactivating enzymes (Coakley, 1973). In contrast, a number of other authors found ultrasound doing no harm even to sensitive blood cells (Braeman, 1974), long-term exposure to ultrasound being without any negative effect on mammalian cell survival in culture medium (Todd, 1974), and free from inducing chromosomal aberrations in pregnant mice (Meyer, 1974). There are even data, according to which ultrasound should enhance enzymatic activity or stimulate tissue regeneration. On closer scrutiny in analyzing the contradictory results, we can see that damage to or impairment of biological function will occur if intensive ultrasound energy is used or during the sonication of substances dispersed in aqueous, low-viscosity environment. It is in such an environment that ultrasound cavitations develop involving enormous border energies with invariably destructive results.

Tab. 1: Timed chart of sonication and withdrawal of specimens for analyses

Acute phase of inflammation Sonication *			Chronic phase of inflammation Sonication *		
Days	Continual	Accumulated	Days	Continual	Accumulated
1.	–	–	16.	*	
2.	*	* *	17.	–	
3.	–	* *	18.	*	
4.	*	* *	19.	–	
5.	–	* *	20.	*	* *
6.	*	* * * *	21.	–	* *
7.	– †	* * – †	22.	*	* *
8.	*	* *	23.	–	* *
9.	–	* *	24.	*	* *
10.	* †	* *†* *	25.	– †	* * – †
11.	– †	– † * *	26.	*	* *
12.	*	* *	27.	–	* *
13.	–	* *	28.	*	* *
14.	*	* *	29.	–	* *
15.	– †	– †	30.	* †	–†* *
16.	*	* *	31.	-	* *
17.	–	* *	32.	*	* *
18.	*	* *	33.	–	* *
19.	–	* *	34.	*	* *
20.	*	* *	35.	– †	– †
21.	– †	– †			

† 8—16 animals were taken for analysis

The present paper provides information about our knowledge of ultrasound action on the synthesis of collagen and its deposition in newly formed as well as already stabilized connective tissue of experimental subcutaneous granuloma in rats. The aim of the experiments was to obtain facts about ultrasound control of connective tissue in various clinical indications.

MATERIAL AND METHODS

To serve as a model of connective tissue, we used experimental granulomata formed as a result of implanting 2 viscous prisms into the subcutis of Wistar rate males, aged 2 months, aver. b.w. 230 ± 16.5 g. The rats were kept in cages of 5 animals each. Larsen's diet and water were supplied ad lib. The technique of viscous sponge implantation as well as the advantages of the method were discussed previously (Pospíšilová, 1973, Pospíšilová, 1975). Exposure to ultrasound — US (0.8 MHz, 1 W/cm^2, 5 mins) was performed via a binding medium and skin to affect the granulomata immediately (Pospíšilová, 1975) in two ways (see Tab. 1). The term continual sonication signifies the employment of each time one ultrasound exposure in two days, a maximum of ten times, either in the acute phase of the inflammation from day 2 to day 21, or in the chronic phase of the inflammation from day 16 to day 35. The

term accumulated sonication signifies a 5-day application of each time two exposures during the first day (in the early morning and evening hours) with the sonication series at different points of time of granuloma development. Each of the animals used had 1 or 2 control and 1 or 2 experimental viscous prisms implanted symmetrically in the subcutis of the dorsal region. At the given point of time, the animals were destroyed, the sonicated granulomata cool-homogenized and biochemically treated.

Collagen (TC) and non-collagen proteins (NCP) were fractionated using a modification (Hurych, Pospíšilová) of a method described by Pikkarain. Refined neutrally soluble (NSC) and insoluble collagen (IC) were estimated as hydroxyproline, the other proteins by means of modified Kjeldahl's method. Desoxyribonucleic acid (DNA) extraction from the tissue was performed using the modified Schmidt-Thannhauser method, and estimated by means of the diphenylamine reaction.

Acid glycosaminoglycans (GAG) were isolated using a modified method of Calatroni et al., and hexosamine estimated quantitatively using the Boase method. Glycoproteins (GP) were estimated prior to papain digestion as sialic acid.

The values of different biochemical parameters are given in weight quantities per 1 granuloma. The statistical significance of the differences between experimental and control groups was determined by the Wilcoxon order test.

RESULTS

The chronological course of changes in the content of DNA and neutrally soluble collagen in an experimental granuloma, given continual or accumulated ultrasound treatment, increases DNA content in comparison with controls in almost the whole field under observation. There is a similar effect of the same dosage of ultrasound on NSC. In contrast, an accumulated US dose will reduce DNA and NSC contents. The reduction is particularly discernible in accumulated US treatment in the acute phase of the inflammation when the control granuloma can be found developing mitotic and synthetic activities

Tab. 2: Increase (↑) or decrease (↓) of basic substances in experimental granuloma in contrast to controls given different ultrasound treatment. For better idea, the average direction is represented at 3 time intervals

	US continual treatment			US accumulated treatment		
Time interval days	5—15	15—25	25—35	5—15	15—25	25—35
Dna	↑ ↓	↑	↑	↓	↓	↕
NSC	↑	↑	↑	↓	↑	↕
Coll. prot.	↕	↕	↓	↑	↑	↓
N.-coll. prot.	↔	↕	↑	↑	↑	↓
A-CAC	↑ ↓	↓	↓	↓	↓	↓
GP	↑ ↓	↑	↑	↓	↓	↑

in line with data indicating the incorporation of ^{3}H thymidine and ^{14}C proline (marked with a circle in the figure — Pospíšilová, unpublished).

Fig. 2 shows changes in the contents of collagen and non-collagenous proteins. Continual sonication has no substantial effect on collagen or non-collagenous protein deposition in the tissue, except on day 35 of the inflammation when non-collagenous proteins are seen increasing. However, an accumulated

Fig. 1—3: Mean values (± S. E.) of connective tissue basic substance contents in rat granulomata under different experimental conditions

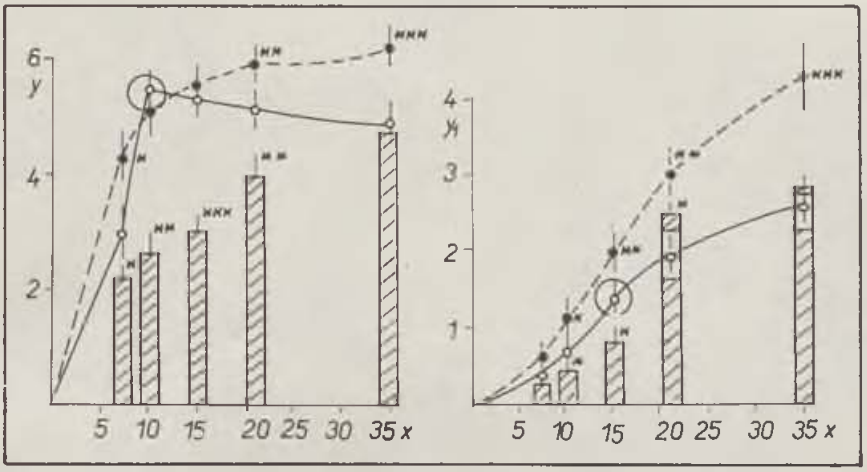

Fig. 1

y = deoxyribonucleic acid in 10^{3} μg/piece, y_1 = NSC-hydroxyproline in 10^{1} μg/piece, x = days, ○ control, ● US continual treatment, ≡ US accumulated treatment, *P = 0.05, **P = 0.02 against control, ***P = 0.01

dose does raise TC and NCP concentrations in the period of transition between the acute and chronic phases. On day 35 of the observation, however, the values of the two parameters are found decreased.

The effect of ultrasound on the GAG and GP connective tissue constituents can be seen in Fig. 3. GAG content is seen falling in both methods of ultrasound treatment, except on day 5 when continual ultrasound treatment is accompanied by an increase in the values. Glycoprotein content is down, given accumulated ultrasound treatment in the early phase of the development of granuloma. In contrast, continual sonication is responsible for an increase in glycoproteins in the chronic phase of the inflammation.

DISCUSSION

Subcutaneous granuloma induced by suitable material implantation into the subcutis appears to be a good model, on which to observe the dynamics of inflammatory healing processes. The technical advantages of this kind of approach are in the specimens for analyses being so well confined in space. The dynamics of the connective tissue growing into the granuloma is comparable with the healing of skin wounds. In the above-described experimental arrangement, the course of the acute and chronic phases of the healing process

was followed up within the range of 35 days. Approximately as from day 20, the implanted material will have been filled with fibrous tissue with the volume of fibrous tissue constituents typical of the acute phase being already on the decrease (fibroblasts — DNA, glycosaminoglycans, glycoproteins). Total collagen proteins go on increasing only negligibly with mainly non-collagen tissue proteins being responsible for the tissue weight increment by the 35th day of the experiment.

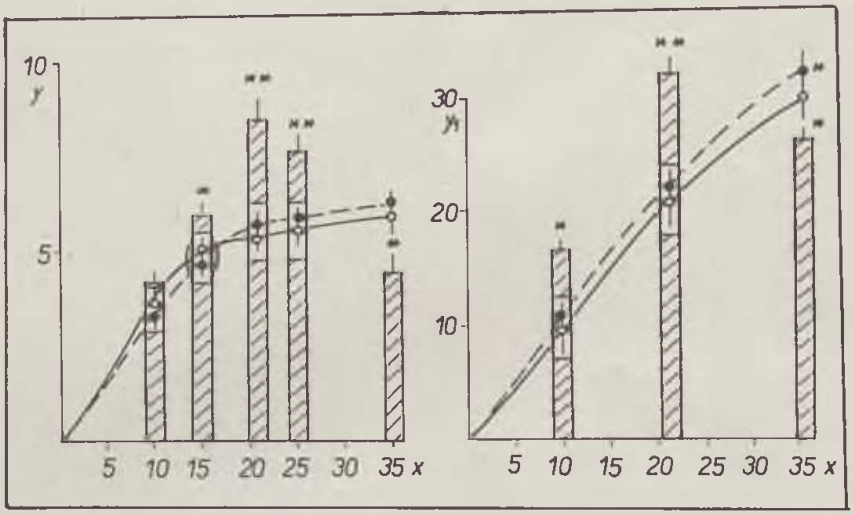

Fig. 2

y = total collagen in 10^3 μg/piece, y_1 = non-collagenous proteins in 10^3 μg/piece, x = days, ○ control, ● US continual treatment, ≡ US accumulated treatment, *P = = against control, **P = 0.02

Recognition of the basic dynamics of healing under experimental conditions is a necessary first step for any targeted control of the process. As will be known, even the biologically extremely effective energy of ionizing radiation can, under suitable conditions, be used not only to inhibit but also to stimulate protein metabolism (Loecker et al., 1975).

Throughout the duration of the experiment, ultrasound was used in doses low enough to prevent the animals from feeling pain so as to limit the body's general response to sonication. Any painful sensation is linked with a local sensation of intensive heat in the area under sonication. Implanted thermistors were used to make sure that after 5 minutes of sonication the temperature in the tissue would have risen by a maximum of 2.5 ^{0}C in the acute phase, and by no more than 0.8 ^{0}C in the chronic phase of healing (Pospíšilová, not yet published). A similar increase in temperature in the control animal can be induced by light massage. Any direct thermal effects of US can then be ruled out. Whatever changes in the dynamics of healing there are, after exposure to US, can be seen as a result of its mechanical action. In a solid structure tissue this may have the effects of direct radiation pressure, or that produced by friction in between two phases, or sound amplitude pressure. In

view of the highly viscous environment, the cavitation phenomenon can also be ruled out. Radiation pressure is more likely to affect the nerves and vessels in the sonicated region and, depending on the dose, to cause changes in their functions (from acute hyperaemia up to vasodilatation and capillary destruction). Amplitude pressure is more likely to be significant with respect to the structure of the tissue concerned. The spreading of positive and negative

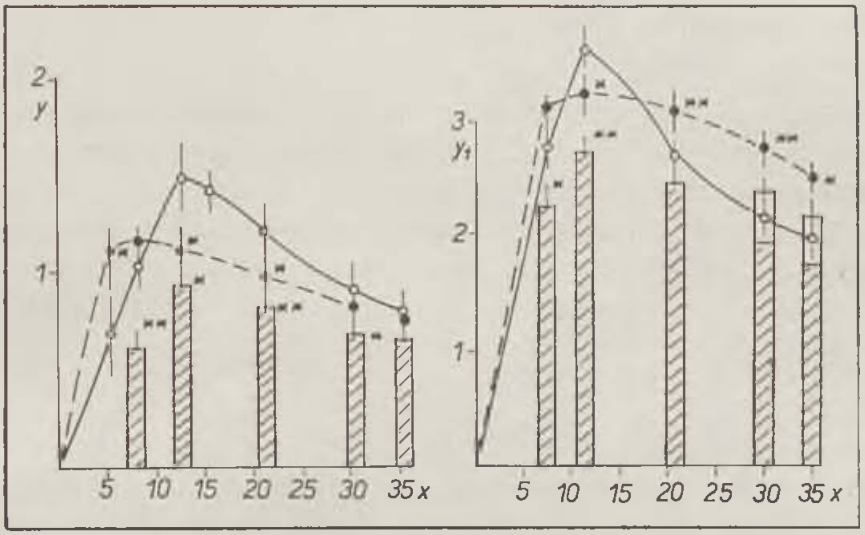

Fig. 3

y = acid glycosaminoglycans in 10^2 μg/piece, y_1 = glycoproteins in 10^2 μg/piece, x = days, ○ control, ● US continual treatment, ≡ US accumulated treatment, *P = = against control, **P = 0.02

pressure waves may be responsible for slight damage to or even destruction of cells, particularly those of a size large enough to take in a maximum of pressure changes. Stationary tissue cells are likely to be affected more than mobile cells as the latter have a chance of escaping from an intensive ultrasound field once the environment begins to vibrate.

The results of the experiments show that continual uses of low doses of ultrasound tends to make use of the positive action of radiation pressure thus making for an improvement in supplying the tissue with nutrients and oxygen. A cumulated dose of ultrasound may produce either vascular paralysis or damage the tissue structure as a result of amplitude pressure. In this particular case, the time interval between each two acts of sonication is not long enough to make good for the resulting microdamage and so a cumulation of the damage occurs.

To provide a comprehensive idea, the results of the experiments are summed up in Tab. The continual method of ultrasound treatment will stimulate the active process of healing. Mitotic and synthetic cell activity is increased (DNA, NSC), but there are no changes in the end products of the synthesis — collagenous and non-collagenous proteins — as regards their contents in the tissue. Acid glycosaminoglycan content is

even lower. This may be due to increased metabolic turnover of these structural constituents, particularly noticeable in glycosaminoglycans. Glycoproteins are not specifically local substances. Given a better blood supply, their increase may be induced by a flow from other sources. Accumulated ultrasound treatment in the acute phase of healing (day 5—15) tends to reduce the concentration of cells and newly developed collagen (NSC) just as of GAG and glycoproteins. There is, however, an increase in the amount of structural proteins in the tissue, a piece of evidence of their metabolic turnover being slowed down.

In contrast, collagen synthesis is found increased in the chronic phase of the inflammation (day 14—25). It may well be that in this phase the cells are less sensitive to damage and that what can be seen going on is a synthetic activation of some of the already resting cell population in response to an accumulated dose of ultrasound. The subsequent drop in the amount of structural proteins (day 25—35) may be due to a stimulation of proteo- and collagenolytic action in the tissue. J. H.

CONCLUSION

The results obtained by two methods of treatment using ultrasound of the same frequency, intensity and sonication time in the course of model healing give an idea of its possible clinical uses. An appropriate exposure to ultrasound can help speed up the process of healing. An alternative method (more frequent exposures in a shorter period of time) can, in contrast, help break down structural proteins in the chronic phase. The dosage as well as the method of ultrasound treatment must be indicated precisely in line with the therapeutic objective with due respect to the condition and dynamics of the process to be affected.

SUMMARY

Observations were made of different methods of ultrasound treatment in experimental model healing in rats. Prime attention was devoted to collagen metabolism. Sonication at longer intervals of time can help speed up the process of healing. Ultrasound treatment at short intervals helps break down structural proteins in the chronic phase of healing.

RÉSUMÉ

Influence de l'ultrason sur la synthèse et l'accumulation du collagène dans le tissu du granulome expérimental. La possibilité d'une utilisation clinique de l'ultrason dans les troubles de la guérison

J. Pospíšilová

On a suivi l'influance des différents modes d'application de l'ultrason sur une guérison expérimentale de modèle chez les rats. On a prêté attention surtout au metabolisme du collagène. Si la sonorisation se fait à intervalles éloignés, le processus

de la guérison peut être accéleré. L'application de l'ultrason dans de courts récuss de temps fait avancer la dégradation des albumines structurales dans la phase chronique de la guérison.

ZUSAMMENFASSUNG

Der Einfluss des Ultraschalls auf die Synthese und Ablagerung des Kollagens in das Gewebe des Versuchgranuloms. Die Möglichkeit der klinischen Anwendung des Ultraschalls bei Heilungsstörungen

J. Pospíšilová

Es wurde der Einfluss verchiedener Applikationsmethoden des Ultraschalls auf die Versuchsmodellheilung bei Ratten untersucht. Die Aufmerksamkeit konzentrierte sich vor allem auf den Stoffwechsel des Kollagens. Bei der Beschallung mit längeren Zeitabständen kann der Heilungsprozess beschleunigt werden. Die Applikation von Ultraschall in kurzen Zeitabständen unterstützt den Abbau strukturaler Eiweisse in der chronischen Phase der Heilung.

RESUMEN

Influencia del ultrasonido a la síntesis y acumulación del colágeno al tejido de un granuloma experimental. La posibilidad de utilizar en clínicas el ultrasonido durante curación difícil

J. Pospíšilová

Fue observada influencia de la varia manera de la aplicación del ultrasonido a la curación experimental modelo en las ratas. Atención fue prestada especialmente al metabolismo del colágeno. El proceso de la curación puede ser acelerado por aplicación del ultrasonido con intérvalos mayores. Aplicación del ultrasonido con intérvalos cortos ayuda a la degradación de las albúminas estructurales en la fase crónica de la curación.

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LONG-TERM RESULTS OF THE FREE CORIUM-FAT PLASTY BY VARIOUS FACIAL DEFECTS AND DEFORMITIES

L. A. SOKOLOVA

Many diseases of a mandibulo-facial region lead to underdevelopment and atrophy of facial tissues. Subsequently, the changed facial contour, disturbed symmetry of both sides and disfiguration of the face adversely affect the somatic and psychic condition of a patient.

Various kinds of autografts, homografts, heterografts and alloplastic materials can be used for a contour plasty of a disfigured face.

Recently, a contour autoplasty by a free deepithelized corium-fat graft is used more and more widely in plastic surgery of the face all over the world. A purposefulness of this method of facial contour plasty was admitted by many surgeons (Burian 1967; Rauer and Mikhelson 1943; Pešková 1971; Mukhin 1974 and others).

The positive features of the free corium-fat facial autoplasty are: availability and simplicity of the method, possibility to repeat it more than once, physiological features of the applied tissue, short duration of treatment and early appearance of a desired effect.

Tab. 1. The free corium-fat plasty by facial defects and deformities of various etiology

Diagnosis	Number of patients	Number of corium-fat plasties	Number of subsequent correcting operations
1. Progressive lipodystrophy (Barraker-Simon's disease)	10	15	2
2. Progressive facial hemiatrophy	4	4	—
3. Defects and scar atrophy of soft tissue due to injuries and inflammatory processes	3	10	—
4. Inborn facial hypoplasia	5	6	1
5. Paralysis of facial mimic muscles	3	4	—
6. Microgeny	8	9	2
Total	33	48	5

1a 1b

1c 1d

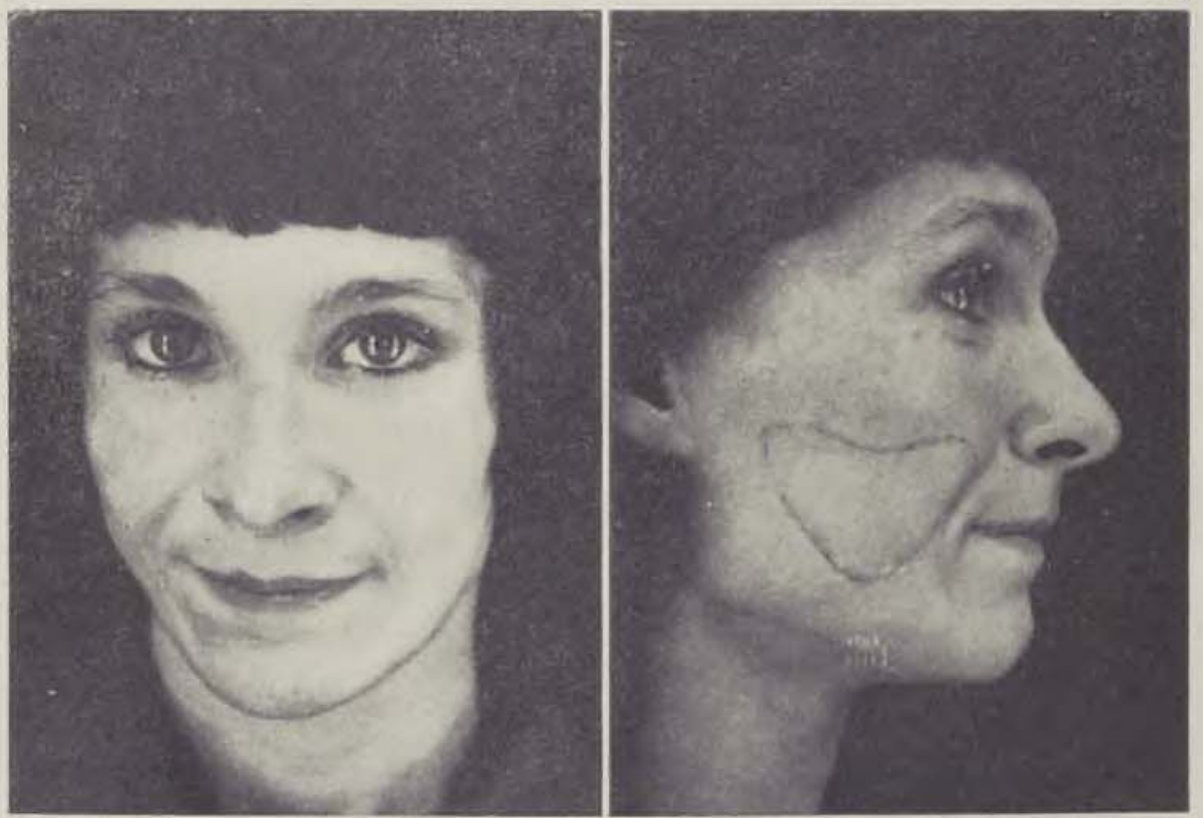


Figure 1.: Patient P. Progressive lipodystrophy. — a — before treatment (17 years old), b — 4 years after corium-fat plasty, c — 6 years after the plasty, d — contours of the corium-fat graft 6 years after the operation

The final opinion on rationality of the free corium-fat facial autoplasty should be based on study of long-term results of the treatment. But this problem was only minimally answered in literature. Therefore, we analyzed the long-term results of the free corium-fat contour autoplasties by 33 patients with various deformities of the face (28 women and 5 men). Totally, 48 plastic operations were performed, starting in 1967.

A technique of the operation was described elsewhere (Sokolova 1972).

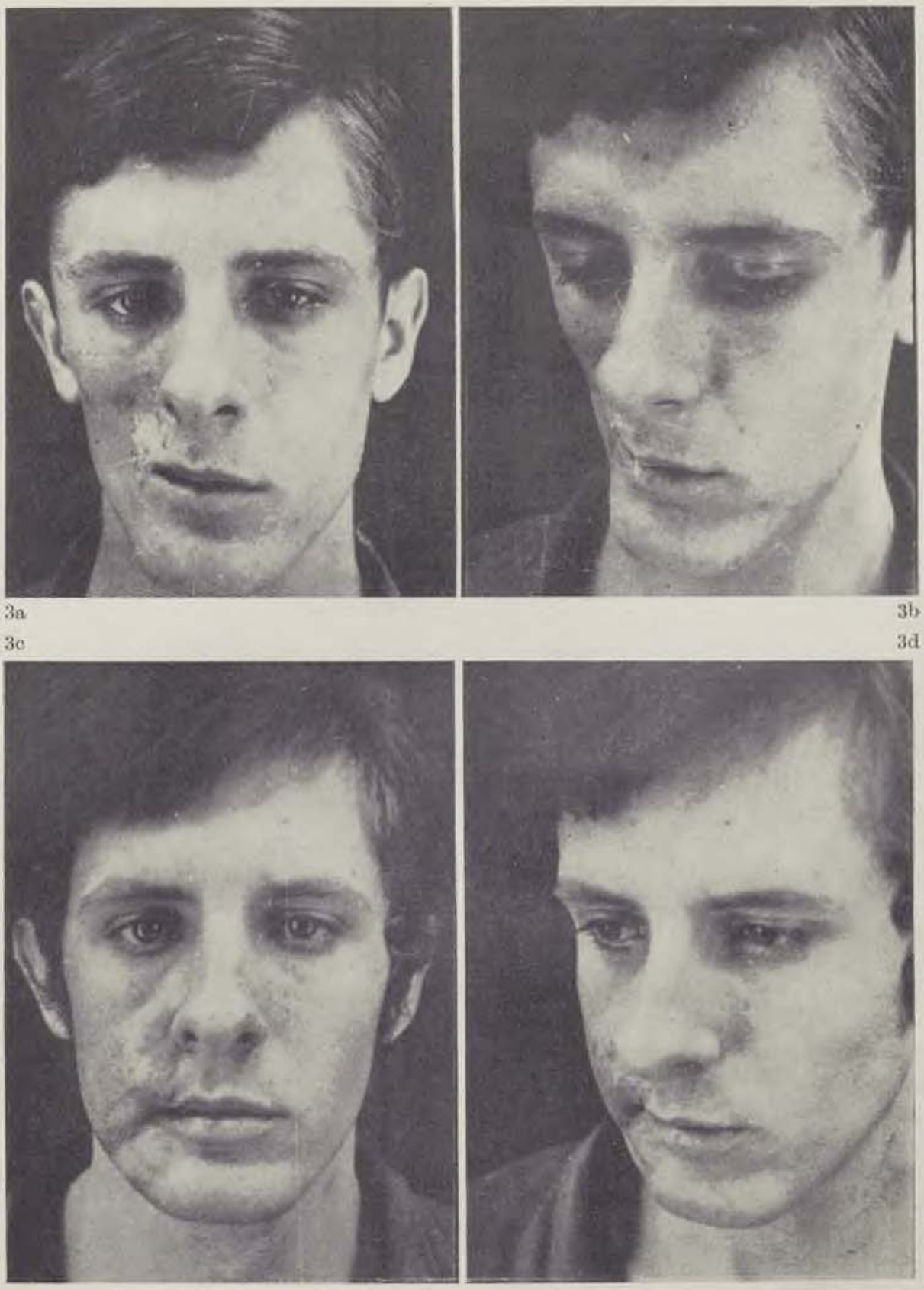
The Table 1. shows numbers of free corium-fat contour autoplasties performed by patients with various facial defects and deformities.

All the operations proceeded successfully without sequestration of the corium-fat autograft and without purulent inflammation. The patients left the Clinic 3 to 4 weeks after the operation and could continue in their work. A supplementary corium-fat facial contour autoplasty was performed 1—6 years later by 8 patients and excision of surplus corium-fat layer was necessary in 3 cases. Such an intervention is highly undesirable, as it may be followed by extensive resolution of the fat graft. This was observed in one patient with progressive lipodystrophy. It was necessary to repeat the facial plasty 5 years later.

An estimation of the long-term results of facial plasties by free corium-fat grafts was based on clinical data, photographic documentation and examination of the patient.

2a 2b

Figure 2.: Patient Sh. Progressive facial hemiatrophy on the right side. — a — before treatment (14 years old), b — 6 years after free corium-fat plasty



3a 3b

3c 3d

Figure 3.: Patient G. Scar atrophy of soft tissues on right cheek caused by x-ray therapy of hemangioma. — a, b — before treatment; c, d — 3 years after free corium-fat plasty

A total of 10 patients suffered from progressive facial lipodystrophy (9 women and 1 man) and were operated on in the age of 16 to 41 years. The long-term results were checked 6 to 7 years after the operation by five of them and 2 to 4 years after the operation by another five patients. In the first two patients with a progressive lipodystrophy the plasty of cheeks by the free corium-fat graft was several times repeated, so that the symmetrical contours of both sides of the face were not achieved and further plasties and corrections were required. In other 8 patients the plasty of both sides of the face was made simultaneously during one operation and the symmetry of both free corium-fat grafts and corresponding subcutaneous pockets on cheeks, was precisely controlled. Good results were obtained in these patients and further corrections were unnecessary. The deepithelized corium-fat grafts were taken from gluteal regions. Their size was 8×7 cm. During years a partial resolution and fibrosis took place (the fibrosis in 2 cases was histologically confirmed). By a patient P. with a progressive lipodystrophy (Fig. 1), who was described in a previous paper (Sokolova 1972), the cheek gradually became thinner during 6 years after the operation, but it did not proceed to relapse of a cheek depression, nor to formation of wrinkles. The size of healed corium-fat grafts measured by palpation was diminished by 2—3 cm and recently it is 6×4 cm. The patient was satisfied with the cosmetic effect of the operation and got married.

Four girls with progressive facial hemiatrophy, 14—17 years old, were operated on. They were followed for 6 to 8 years after the operation. During this time, the size of healed corium-fat grafts decreased by 2—3 cm. By a girl suffering from Romberg's disease and followed for 11 years, a contour facial plasty by deepithelized tubed flap was several times repeated and a free corium-fat plasty served only as a supplementary correcting operation.

Another patient Sh., 14 years old, with a facial hemiatrophy on the right side was operated on June 24, 1969. A contour plasty was made by free corium-fat layer of 10.5×4 cm size, inserted through an incision in the right temporal region. Earlier, the girl was already treated in different hospitals. In the age of 6 she was irradiated by x-rays. A bleeding into an anterior eye chamber led to loss of vision of the right eye. A sympathectomy of right stellate ganglion was made in 1962. On January 22, 1970, a plasty of partially atrophied upper lip was performed according to Abbe. In 1971, the right eye was enucleated in the Clinic of eye diseases and a prosthesis was applied. The size of the healed corium-fat graft in the right cheek decreased to 7.5×2.5 cm 6 years after the operation, but its rounded shape was preserved. The patient is satisfied with the cosmetic effect of the operation and studies in the third class of the Institute of Economy.

A scar atrophy of the soft tissues in the right cheek occurred after x-ray therapy, indicated in childhood as treatment of hemangioma, in a patient G. (born in 1952). The free corium-fat plasty led to good long-term result (Fig. 3). A depression on a contour of the right cheek was repaired by means of five-times repeated insertion of the free corium-fat grafts into wide sub-

cutaneous pockets, simultaneously with excision of the scar. The same result of a similar operation was obtained by patient S. (born in 1945) with scar atrophy of the soft tissues on the left cheek caused by noma, and by patient Sh. (born in 1953) with a defect of facial tissues due to bullet injury. The size of healed corium-fat grafts in these patients diminished by 1—2 cm during 3 years. The achieved cosmetic effects are preserved.

4a 4b

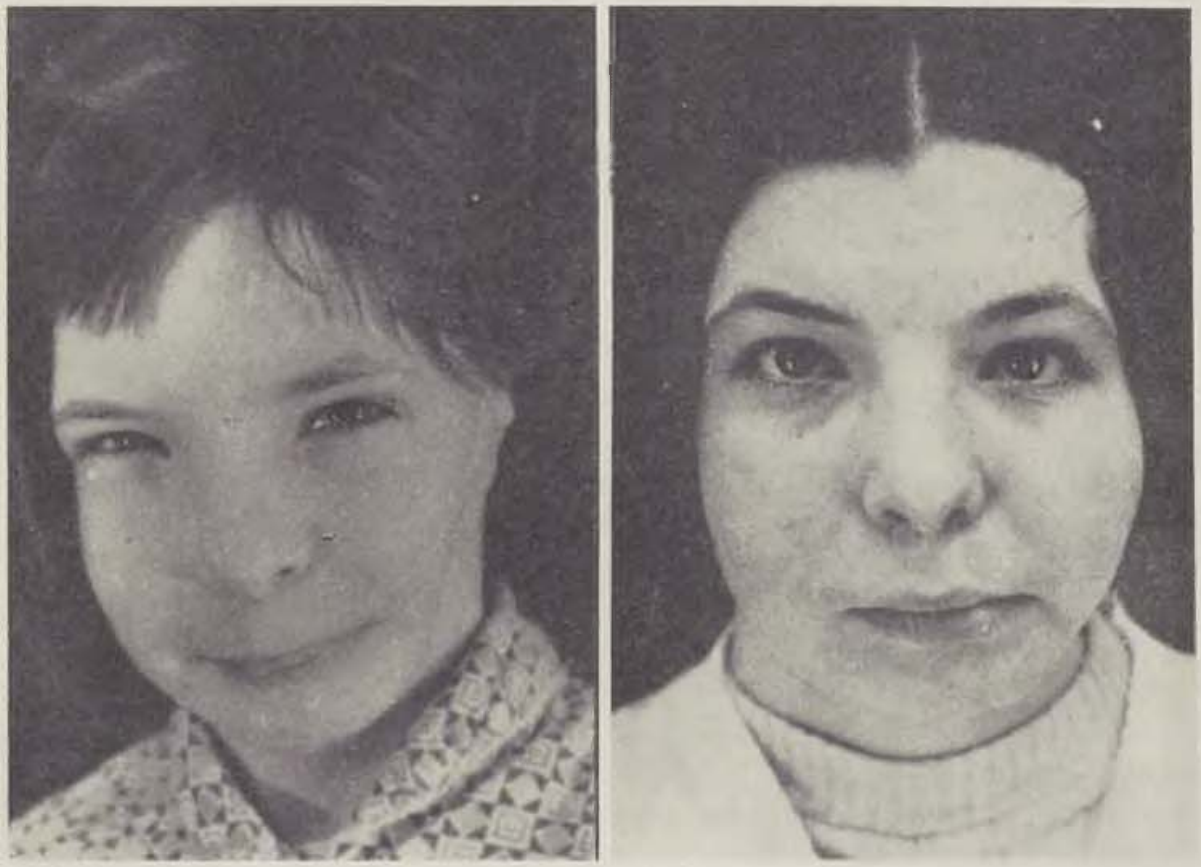


Figure 4.: Patient Tch. Inborn facial hypoplasia on the left side. — a — before treatment, b — 2 years after free corium-fat plasty

The satisfactory results of the free corium-fat contour cheek plasty in two adult patients with inborn facial hypoplasia were followed for 6 to 8 years. Supplementary corrections were not required, the healed corium-fat grafts were only moderately resolved. By patient Tch., 14 years old, with inborn hypoplasia of the left part of the face and aplasia of the left auricle (Fig. 4), an auriculoplasty by Filatov's flap and two-times repeated plasty of the left cheek by the free corium-fat graft, were performed. Two years later the result was quite good. In another 2 patients with inborn facial hypoplasia (14 and 25 years old) the good results of the free corium-fat plasty were also observed 2 years after the operation.

A facial asymmetry was partially corected by the free contour corium-fat plasty in 3 adult patients affected with a paralysis of facial mimic muscles on one side. Preliminarily, the basic operations were performed: myoplasty, or static suspension of the mouth angle, scleroblepharorhaphy etc. The corium-

fat grafts were inserted subcutaneously, above the layer of atrophic facial muscles. The size of healed grafts descreased slowly. The result obtained 6 years after operation was preserved.

The free corium-fat plasty of cheek and mandibular region by 3 adult patients with microgeny appeared to be less effective. It is explained by sharp asymmetry and deformation of the face. The fat contour plasty by 5 other patients, which was preceded by radical operation of mandible, gave good long-term results.

CONCLUSIONS

1. The free corium-fat contour autoplasty leads to good long-term results by progressive lipodystrophy (Barraker-Simon's disease), progressive hemiatrophy of the face, inborn hypoplasia, some defects of the soft tissues and by scar atrophies of the face due to injuries and inflammatory processes. In the case of symmetrical progressive lipodystrophy, the plasty made simultaneously on both sides gives better long-term results.

2. The free corium-fat contour autoplasty may serve as a supplementary correcting operation in addition to radical operation on the bone.

3. The free corium-fat contour autoplasty is also a supplementary correcting operation, which may be indicated by paralysis of facial mimic muscles as a supplement to basic operations, i.e. myoplasty, static suspension, sclero-blepharorhaphy etc. M. T.

SUMMARY

The positive long-term results of the free corium-fat contour autoplasty of the face were described by 33 patients with various facial defects and deformities, during time periods ranging from 2 to 8 years.

RÉSUMÉ

Résultats de longue durée d'une plastie libre du tissu cutané et graisseux dans différents défauts et déformations de la face

L. A. Sokolova

On a décrit les bons résultats de longue durée d'une autoplastie libre cutaneo-graisseuse destinée à faire les contours de la face dans les périodes de 2 à 8 ans obtenus chez 33 malades ayant différents défauts et déformations faciaux.

ZUSAMMENFASSUNG

Langzeitergebnisse der freien Haut- und Fettgewebeplastik bei verschiedenen Defekten und Deformationen des Gesichtes

L. A. Sokolowa

Es wurden beschrieben gute Langzeitergebnisse der freien Haut- und Fettgewebekonturautoplastik des Gesichtes in Zeiträumen von 2 bis 8 Jahren bei 33 Kranken mit verschiedenen Defekten und Deformationen des Gesichtes.

RESUMEN

Resultados de larga duración del injerto cutáneo libre y del tejido adiposo en varios defectos y deformaciones de la cara

L. A. Sokolova

Fueron descritos resultados buenos de larga duración en la autoplastia cutáneo-adiposa libre por contornos de la cara en los períodos de 2 a 8 años de edad en 33 pacientes con varios defectos y deformaciones faciales.

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G. Jost and F. Legent: **Atlas de chirurgie esthétique plastique**. 296 pages, 920 illustrations, hardback — price 260 francs. French-English edition. Masson, 120 Boulevard Saint Germain, Paris — 1975.

The atlas falls into two parts, the first, 200 pages, devoted to operations on the face, by both authors, the second, concerning operations on the breasts, abdomen and thighs, by G. Jost. The book is laid out so that each left page carries the French and English texts arranged in horizontal columns with the drawings and photographs situated on the right-hand page.

The authors first outline in basic principles the preoperation analysis of the cosmetic defect of the face, an assessment of the patient's motivation for surgery, a preliminary estimation of the possible outcome and the inevitable general investigation. Then they go on to refer to preparatory work prior to the operation, choice of anaesthesia, asepsis, the patient's position and instruments to be used.

The chapter on the basic features of operation technique discusses how incisions are to be made warning of the need to follow physiological cleavage lines which are not identical with Langer's lines. A recommendation is made to use minor Z plastic operations in wounds and scars running across physiological cleavage lines. The following four procedures are recommended for the correction of unsatisfactory scars: excision and suture, dermabrasion, abrasion using

Cont. p. 202

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RESULTS OF EYELID, CONJUNCTIVAL AND ORBITAL PLASTIES IN CHILDREN

M. V. ZAIKOVA, V. I. SHCHIPATCHEVA, N. A. SHEVTSOVA

The defects and deformities of eyelids and orbit are relatively common in children. The may be inborn or acquired (injuries, diseases). But the problems connected with their repairment are quite insufficiently answered in literature. In most papers only individual original methods of eyelid and orbital plasties are described without indications of their specific features, when applied in children (Bursuk 1938; Filatov 1943; Kurlov 1955 etc.).

In the Sverdlovsk scientific institute of traumatology and orthopaedics and in the Clinic of eye diseases of the Vladivostok medical institute, 90 children were surgically treated during the time period from 1949 to 1973. The total of 298 operations was performed on different stages of the plasties. The patients were 38 boys and 52 girls.

A classification in respect to age of the treated children was done: 6 to 12 months — 19 patients, 1 to 3 years — 10, 3 to 5 years — 7, 5 to 8 years — 21, 10 to 12 years — 7, 12 to 14 years — 26 patients.

Tab. 1. Distribution of children in respect to the long-term results of plasties

Method of plasty	Result		
	good	satisfactory	bad
1. Local tissue plasty	20	2	—
2. Skin flap on a pedicle	7	2	—
3. Mucosal free graft	1	—	—
Skin free graft	25	—	1
4. Acute flap	8	—	—
5. Microflap	5	1	—
6. Tubed flap	14	—	—
7. Chondroplasty	3	—	1
Total	83	5	2

The groups of treated children were formed according to our classification of defects and deformities, thus enabling further study of the specific features of the plastic operations.

Classification based on etiology

1. Consequences of trauma:
   a) bullet wound — 12
   b) burns (thermal, chemical) — 15
2. Consequences of diseases (inflammations, tumors and others) — 34
3. Inborn developmental anomalies — 17

Classification based on anatomical features

1. Isolated deformities and defects:
   a) partial ectropium of the eyelid — 2
   b) total ectropium of the eyelid — 29
   c) partial defect of the eyelid — 36
   d) total defect of the eyelid — 6
   e) irregular position of the eyelids (deformation caused by scar, displacement of the eye opening, ptosis of the upper eyelid) — 5
   f) partial defect of eyelids and eyebrows — 2
   g) total defect of eyelids and eyebrows — 4
2. Combined defects of the eyelids:
   a) together with a defect of an orbital wall — 5
   b) together with a defect of orbit and of periorbital region — 1.

It is seen that the defects of eyelids, conjunctiva and orbit were different in respect to their etiology and results of a clinical examination.

The children were operated on in any age, if there was no contraindication representing a danger for the whole organism. The method of plasty was chosen individually: the clinical features of the defect, its localization and size, state of the eyeball and of surrounding tissues were taken into account.

The most simple method of plasty was preferred. Planning of the operation further consisted of estimation of the total size of the defect on external and internal laminae of the eyelids, choice of the place, from which the plastic material would be taken and of the way, how to shift it towards the defect.

The older children were operated on in local anaesthesia by infiltration with 0.5—2 % Novocain solution, the younger children were operated on in general anaesthesia using ether or fluothane with oxygen.

The applied methods of plasty were: plasty utilizing local tissues — in 21 cases, plasty by skin flap on a pedicle — in 9, free skin graft — in 26, free mucosal graft — in 2, plasty by a flap — in 8, plasty by an acute microflap — in 6, plasty by a tubed flap — in 14, chondroplasty — in 4, chondroplasty together with other types of operations — in 16 cases. A superficial blepharoplasty was performed in 80 patients and a deep blepharoplasty in 10 patients.

The long-term results were examined in 90 patients after periods of time ranging from 6 months to 20 years: from 6 to 12 months — by 20 children, from 1 to 2 years — by 23, from 2 to 4 years — by 14, from 4 to 6 years — by 6, from 6 to 10 years — 10, from 10 to 12 years — by 4, from 12 to 15 years — by 11, from 15 to 20 years — by 2 children.

An examination of the long-term results led us to a conclusion that the result of an operation was often dependent on the correctness of the chosen

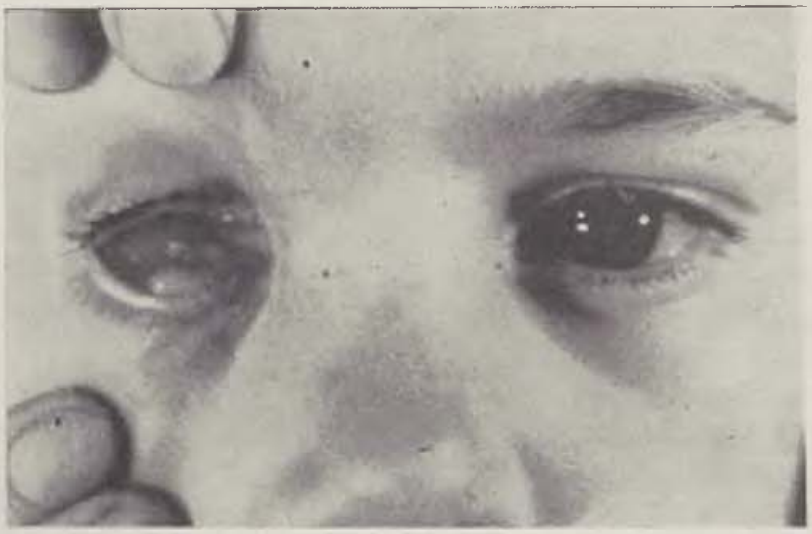


Fig. 1a

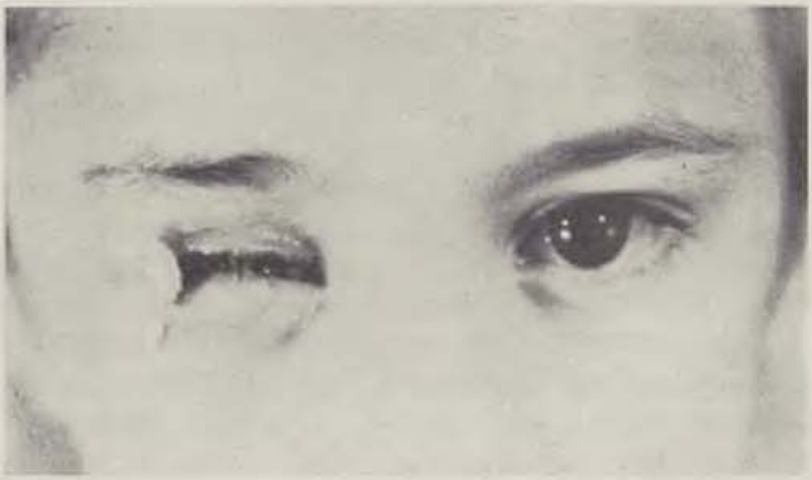


Fig. 1b

plastic method. The purposefulness of an individual approach to selection of the method of plasty by children was proved by retrospective statistical analysis of the surgical tactics.

The Table 1 shows results of different methods of plasty by children. Good results were obtained in 82, satisfactory in 6 and bad results were obtained in 2 patients. Thus, good results of blepharoplasty by children were observed in 91.1 %, satisfactory in 6.7 % and bad in 2.2 % of patients.

The plasty of eyelids utilizing local tissues was used in such cases, when the defect or deformity of the eyelid was isolated and sufficient reserves of

surrounding unchanged skin were available. The skin and subcutaneous tissue of shrinking or stretching scars was removed as far as possible and edges of the wound were widely mobilized. As a result, the real size of the eyelid defect or deformity was revealed. If the eyelid was deformed by scars, then the Limberg's method of triangular flaps situated in opposite directions, Imre's method, or other local plasties were performed. The plasty by skin flap on

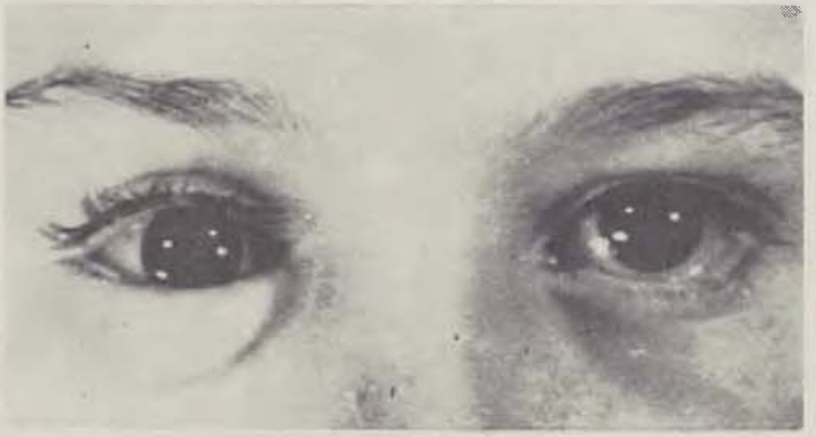


Fig. 1c

Fig. 1d

Figure 1.: An eyelid plasty by a patient G. — a — before operation, b — on stage of an acute microflap plasty, c — after the operation, d — 12 years later

a pedicle was used in the case of penetrating defects of eyelids. The inner lamina of the eyelid was substituted by skin or mucosal autograft.

The ectropium of one or both eyelids, produced by scars, was repaired by a free skin graft, which was cut out from the posterior surface of the auricle, or from the inner surface of the shoulder, and sutured to margins of the defect. The consequent scar formation in the skin autograft led to a bad result.

If large scars of eyelids and defects of the osseous margin or of the wall of orbit had to be repaired, then the plasty by flap on a pedicle, taken usually in the temporal region near to border of hairs, was successful.

The combined defects of eyelids, eyebrows and periorbital region, formed as consequence of burns, were repaired by Filatov's tubed flap plasty resulting in good long-term results. On different stages of this plasty usually 4 to 8 operations were performed.

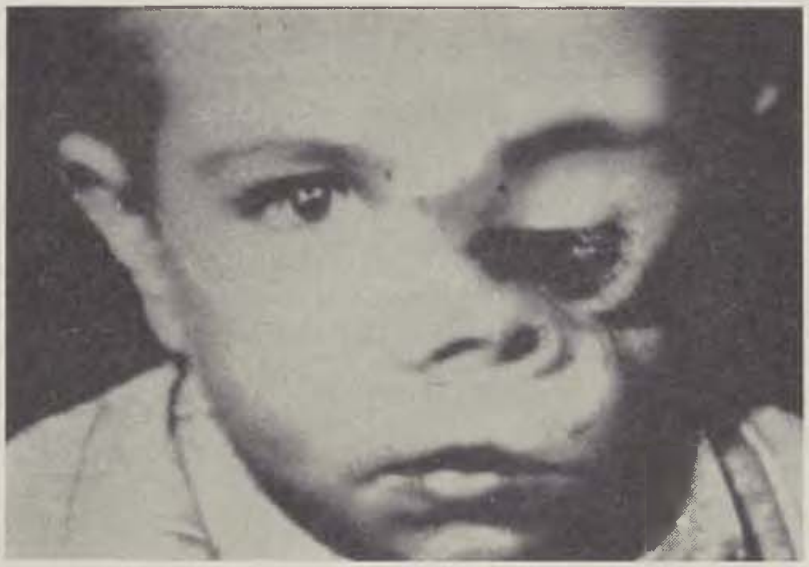


Fig. 2a

Fig. 2b

Figure 2.: An eyelid plasty by a patient L. — a — before operation, b — 22 years after the tubed flap plasty

The deformities and defects of eyelids and orbit, caused by injuries, appeared to be greatly variable in form and size, and very often were combined with defects of orbital margins or walls. The scar deformation or partial ectropium of eyelids was repaired by local plasty, the defects of orbit were substituted by homologous or heterologous cartilage. The total defect of eyelid, in absence of damaged orbital margin, was substituted by means of a deep combined plastic method, i.e. an autograft of lip mucosa was sutured

to margins of the conjunctival defect and a skin flap on a pedicle or a free part of an acute microflap, cut out in the region of the upper eyelid according to Zaikova (1969), was sutured to margins of the skin defect of the eyelid.

As an example, a concise history of a disease will be described.

A patient B., 6 years old, came to Sverdlovsk institute of traumatology and orthopaedics on September 9, 1959, with a diagnosis: Ectropium of the lower eyelid caused by scar, anophthalmy and obliteration of the lower conjunctival arch, as a consequence of injury on the right side.

The first examination revealed: The right eyeball was missing, the lower eyelid was reversed and shortened near its inner angle, the archs were not present, the cavity was represented by a fissure oriented in an anterior-posterior direction (Fig. 1 a). On September 15, 1959, the first stage of a combined method of a deep blepharoplasty was performed: the mucosal autograft was sutured to margins of the conjunctival defect in the lower arch, and the acute microflap according to Zaikova (1969), which was taken in the upper eyelid region with its pedicle running towards the temporal side (Fig. 1 b), was sutured to margins of the skin defect on the lower eyelid. The second step of the deep blepharoplasty, i.e. the resection of the microflap's pedicle by a combined method, was performed on December 22, 1959. The reconstruction of the conjunctival cavity was achieved and the scar-induced ectropium of the lower eyelid was repaired (Fig. 1 c). Twelve years later a prosthesis and eyelids remained still in the right position (Fig. 1 d).

It was especially difficult to recover combined defects of eyelids, conjunctival cavity and orbit, caused by injuries in children. The eyelid defect was covered by a flap on a pedicle or by an acute flap, that were taken in the temporal region according to Zaikova. A healing of large deep defects required a great quantity of viable plastic material. In such cases, a tubed flap plasty, consisting of many steps, led to the best results. In the first stage, a tubed flap was formed on breast of boys or on the inner surface of shoulder by girls. In the second stage, a transplantation of the flap to the place of the defect was made, or a spreaded flap's pedicle was directly sutured to the margins of the eyelid defect. By anophthalmy and deep total defects of eyelids, all layers of the eyelid were reconstructed by means of the tubed flap. A defective margin of the orbital wall was simultaneously substituted by homologous or heterologous cartilage. As an example, a concise history of a disease will be described.

A patient L., 6 years old, came to Sverdlovsk institute of traumatology and orthopaedics on December 21, 1949. The diagnosis was: A combined facial defect caused by accidental bullet injury, defect of nasal dorsum, teared off and displaced lower eyelid, defect of the inner bottom wall of orbit and anophthalmy on the left side. The first examination revealed: Deformation of the left half of the face and nose. In the place of original defect a large contracted scar was observed, which passed from mandibular angle to nasal dorsum. The left eyeball was missing. The lower eyelid was shifted down by scars (Fig. 2 a). A sequestrectomy was made and foreign bodies were removed

on January 5, 1950; a tubed flap was formed on the left side and anterior abdominal surface on April 26, 1950; the flap's pedicle was transferred to a hand on September 2, 1950; on March 20, 1951, a plasty of the conjunctival cavity and of the left cheek was made, utilizing local tissues and Filatov's flap; a chondroplasty of the bottom wall of the left orbit and correction of the lower eyelid was performed on September 25, 1952; on October 29, 1956, a plasty of the lower eyelid was made.

Fig. 3

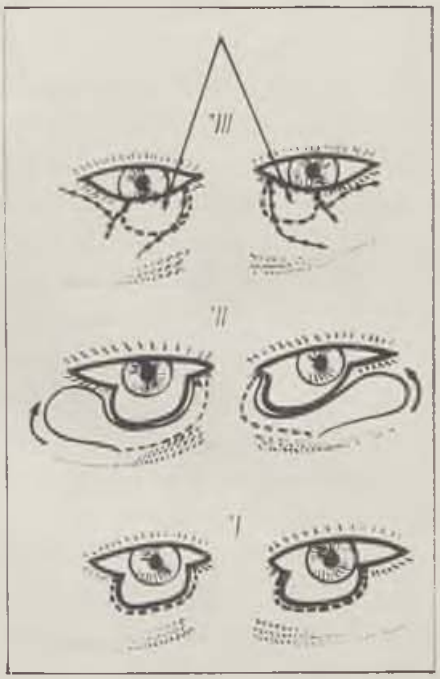


Fig. 4

Figure 3.: A patient P. before operation

Figure 4.: A diagramm showing the partial deep plasty of upper eyelids made during one operation

The patient was followed for 22 years. The defect of eyelid, nasal dorsum and orbital region on the left side was permanently reconstructed (Fig. 2 b).

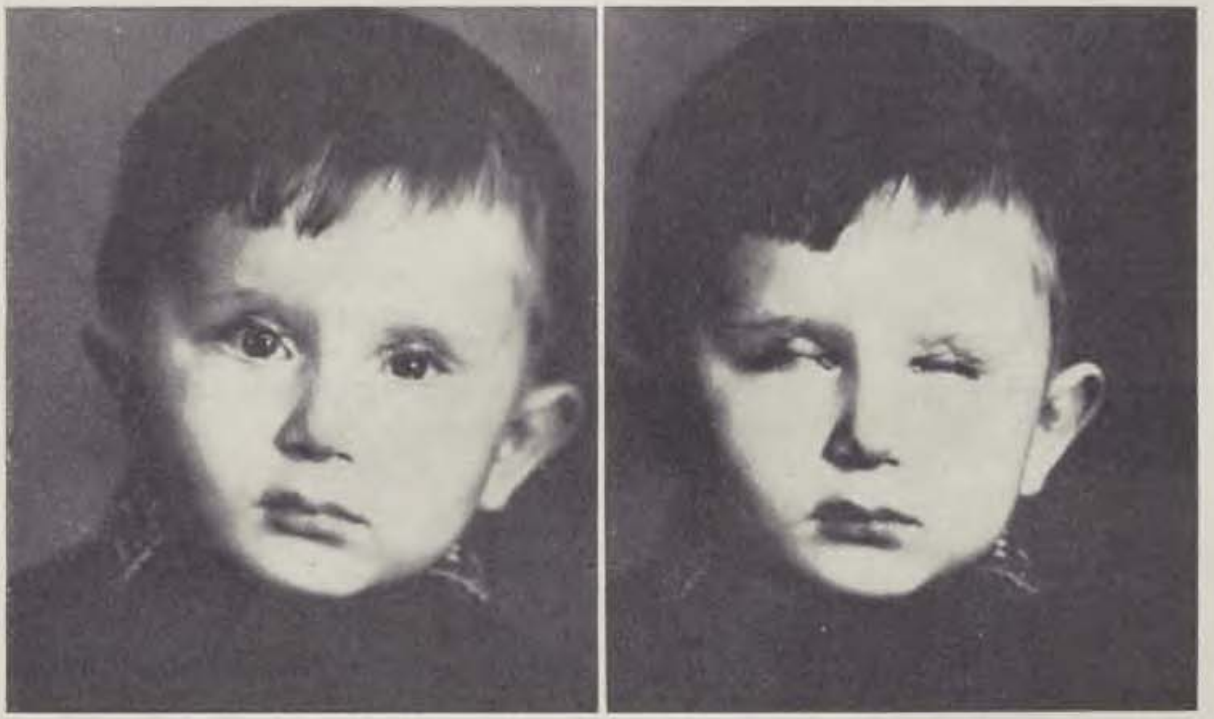
Various methods of plasty can be used for repairment of inborn defects. The isolated deep eyelid defects were successfully healed by combined method of deep blepharoplasty, i.e. the skin defect was covered by local tissues and the conjunctival defect was substituted by mucosal autograft. The larger inborn defects required plasty by a flap on a pedicle, plasty by an acute or tubed flap. The example follows.

A patient P., 3 years old, came to Clinic of eye diseases of Vladivostok medical institute with diagnosis of partial defect of upper eyelids. The first examination showed: The inner two thirds of the left and right upper eyelids were missing, the size of the defect was 1.5×2.5 cm. A 0.3 mm long islet-like rest of the eyelid was seen in the inner angle on both sides (Fig. 3).

On March 4, 1974, a bilateral partial deep plasty of upper eyelids was performed under fluothane — oxygen anaesthesia. The local tissues and mucosal autograft were utilized: an incision was led along the margin of the turned

out conjunctiva and its edges were widely mobilized. In the region of the lateral half of the upper eyelid, a skin flap on a pedicle of 2.5—1.5 cm size was cut out, turned around by 90^0 and sutured to margins of the skin defect of the eyelids (Fig. 4, I—II). The mucosal autograft of 2.0×1.0 cm size was taken in the region of the lower lip and sutured to the margins of the conjunctival defect. Both flaps were sutured together on sides of the newly formed part of the eyelid (Fig. 4, III).

Thus, the defect of the upper eyelids was fully reconstructed by the bilateral plasty made during one operation (Fig. 5).



5a Figure 5.: A patient P. after operation 5b

The inborn defects of the conjunctival cavity in children were mostly related to underdevelopment and shortening of eyelids and to atrophy of retrobulbar connective tissue. The depressed archs and deformed cavity were repaired by a homologous or heterologous cartilaginous graft of 2.0×1.5 cm size, which was fixed in ethanol. The prosthesis should have been inserted in right position. If the eyeball was missing, then the margins of the sectioned conjunctiva were sutured to the skin or mucosal autograft.

When the conjunctival cavity was fully obliterated, a free grafting of skin or mucosa, or plasty by an acute microflap together with chondroplasty was performed. A resolution of a free skin graft and a relapse of the arch shortening had to be treated by secondary skin or mucosal autoplasty or by acute microflap, taken from the region of the upper eyelid.

The defects of the conjunctival cavity caused by injuries or diseases were reconstructed by means of skin or mucosal autografts or by acute microflap plasty together with chondroplasty of the orbit.

The operation had to be repeated after 3—6 months, if the result was unsatisfactory.

An analysis of the long-term results has shown that the free skin grafts are not resolved during the growth of a child. They stand out slightly, due to their paleness on the background of the surrounding facial skin. The tissues transferred by means of a local plasty or an acute flap in children are thoroughly indistinguishable by their colour and the scars turn to be only slightly notable. The healed up tubed looses surplus subcutaneous fat tissue during several years, does not fail to keep pace with growth of the surrounding parts of the face and firmly substitutes the large combined defects of eyelids, conjunctival cavity and orbit.

CONCLUSION

The defects of eyelids and orbit by children are variable in respect to both etiology and clinical manifestations. Isolated and combined deformities and defects of eyelids, conjunctival cavity and orbit are to be repaired in early age of children. The individual choice of a plastic method in respect to state of the eye and surrounding tissues is a basic condition of successful results in all the cases. The study of long-term results showed no secondary deformations of eyelids and of orbital region during the growth of the child's organism. The use of cartilaginous autografts leads to better results of eyelid and orbital plasty by children of any age.

M. T.

SUMMARY

The total of 90 children was treated for defects of eyelids, conjunctival cavity and orbit and followed thereafter. A number of 298 operations was performed on different stages of the plasties. The method of plasty was chosen individually, based on features of a defect. The plasty was made in any age of a child. The indications of all basic plastic methods were worked out. Good results were obtained in 91.1 %, satisfactory results in 6.7 % and bad results in 2.2 % of children.

The long-term results were checked after periods up to 20 years. It was concluded that the defects of eyelids and orbital region should be repaired in the early age of children. No secondary deformation of eyelids during further growth of children was observed. The results of plastic operations by children can be improved by chondroplasty.

RÉSUMÉ

Résultats de la plastie des paupières, du sac de conjonctive et de l'orbite chez les enfants

M. V. Zaykova, V. I. Chtchipatcheva, N. A. Chevcova

On a suivi 90 enfants chez lesquels on a fait 298 opérations dans différentes étapes pendant la correction plastique des défauts des paupières, du sac de con-

jonctive et de l'orbite. Le choix de la méthode était individuel selon la particularité du type de défaut. La plastie était faite chez les enfants qui différaient de l'âge. Nous avons fait des indications de toutes les méthodes fondamentales de plastie. Un bon résultat de l'opération a été obtenu dans 91,1 %, un résultat satisfaisant dans 6,7 %, un mauvais résultat dans 2,2 % d'enfants.

Nous avons vérifié les résultats de longue durée dans les périodes jusqu'à 20 ans. On a constaté que les défauts des paupières dans la région de l'orbite pouvaient être réparés le mieux à l'âge l'enfance. Au cours de croissance de l'organisme de l'enfant, on n'a trouvé aucune déformation sécondaire des paupières. Les résultats des opérations plastiques des enfants peuvent être améliorés par la chondroplastie.

ZUSAMMENFASSUNG

Ergebnisse der Augenlid-, Bindenhautsack- und Augenhöhlenplastik bei Kindern

M. V. Zaikowa, V. I. Schtschipatschewa, N. A. Schewcowa

Wir verfolgten 90 Kinder, bei denen 298 Operationen in verschiedenen Etappen bei der plastischen Korrektur von Defekten der Augenlider, des Bindehautsackes und der Augenhöhle vorgenommen wurden. An die Wahl der Methode traten wir individuell heran, unter Berücksichtigung der Besonderheiten des Defektes. Die Plastik wurde im verschiedenen Alter der Kinder vorgenommen. Wir schlugen Indikationen aller grundlegender plastischer Methoden vor. Gute Operationsergebnisse sind in 91,1 %, befriedigende in 6,7 % und schlechte in 2,2 % aller Fälle erzielt worden.

Die Langzeitergebnisse überprüften wir in Zeitabständen bis von 20 Jahren. Wir haben festgestellt, dass die Defekte der Augenlider und im Bereich der Augenhöhle am besten im Kindesalter zu korrigieren sind. Bei dem wachsenden Kinderorganismus sahen wir keine sekundäre Augenliddeformation. Die Ergebnisse der plastischen Operationen bei Kindern können durch Chondroplastik verbessert werden.

RESUMEN

Los resultados en la plastia de los párpados, del saco de conjuntiva y de la órbita en los niños

M. V. Zaikova, V. I. Shchipacheva, N. A. Shevzova

Fueron observados 90 niños en los cuales fueron hechas 298 operaciones en varias etapas durante el corrigimiento plástico de los defectos de los párpados, del saco de conjuntiva y de la órbita. Fue escogido un método individual según las particularidades del tipo del defecto. La plastia fue realizada en varia edad de los niños. Propusimos las indicaciones de todos los métodos fundamentales de la plastia. Un resultado bueno de las operaciones fue conseguido en 91,1 %, un satisfactorio en 6,7 % y un resultado malo en 2,2 % de los niños.

Los resultados tardíos fueron confirmados en períodos hasta los 20 años. Fue hallado que los defectos de los párpados y en la región de la órbita podían ser corregidos a lo mejor en la infancia. Una deformación segundaria de los párpados no fue observada en el organismo de los miños durante su crecimiento. Los resultados de las operaciones plásticas en los niños pueden ser mejoradas por condroplastia.

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a dermatome or scalpel, and corticoid injections. The authors go on to give a list of flaps shifted or rotated from around the facial defect, free skin transplantation, combined grafts, transfer of corium, cartilage, and bone, and allogeneic grafts.

An extensive chapter is devoted to plastic operations on the nose. It contains the anatomy, changes and downward displacement of the nose due to age, a morphological study listing some of the nose (Greek, Egyptian, Gothic) and nasal ventilation. Another part contains a description and demonstration of the principles of reducing the size of the nose — either the whole of it in all tissues or as regards deformations of parts of it — tip, wings, nasal septum, nasolabial angle as well as deviations of the whole bony structure of the nose. The authors give a list of the possibilities of shifting fragments of cartilage and bone as well as an instruction concerning saddle nose correction. There are references to bandage, postoperative nursing, complications and possible adverse results of rhinoplasty. There are also drawings illustrating the principle of nose replacement from the forehead devised by Converse and supplementing the ridge tissues using an island flap from the forehead.

25 pages of the atlas are devoted to plastic operations on the pinna complete with its anatomy and a description of the procedure used by the authors to correct protruding ears. An account is also given of how to correct some of the minor deformities of certain parts of the pinna, lobule reduction or shortening, Musgrave's correction of lop ear, reducing the size of a large pinna supplemented by an analysis of possible complications and causes of unfavourable results.

A further part deals with operations on the eyelids, removal of skin folds, wrinkles and fat prolapses. There is also an account of how to correct minor ectropion of the lower eyelid using a pedicled skin flap from the upper eyelid, and one procedure, apparently most favoured by the authors, in upper eyelid ptosis involving a shortening of the exposed levator.

The subject of the next chapter is face-lifting, a frequently performed operation of tightening the skin to smooth out wrinkles. The authors warn of the existence of difficult preparation zones and the risk of damaging important tissues as well as the fact that tightening the skin sometimes fails to remove skin folds below the chin, the so called turkey gobbler neck. There are pictures showing the lines of incisions, the extent of the skin removed, surplus resection after tightening, and a list of possible complications. There are also details of the procedure involved in tightening the skin in only certain areas of the face, in lifting the skin of the forehead using excision made above the hairline, as well as in plastic operations of the submental region.

The next chapter contains a discussion of operations on the jaws. Following an interesting introductory word on facial

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IMPROVED RESULTS OF A FACIAL CONTOUR PLASTY BY AN ALLOGENIC DICED CARTILAGE

ALLA A. LIMBERG, A. I. FUKS, V. I. PETCHERSKII

The results of a contour plasty by an allogenic (cadaverous) hyaline cartilage, as described in literature, have been rather contradictory. Recently, this kind of plastic material has been fully avoided in many european and american clinics and the own cartilage of the patient or synthetic materials have been utilized, when necessary. However, many years of observations performed by number of authors indicate groundlessness of an opinion that the allogenic cartilage would be practically useless (Mikhelson, 1962, Limberg et al. 1969, Krüger 1964).

As early as in 1967 a careful study of literature led us to suggestion that the results of the allogenic cartilage plasty depend on the character of factors influencing it before or during transplantation, i.e. on methods of conservation, storage and mechanical treatment (Limberg 1967). It was suggested to ascertain always a plasticity of the allogenic cartilage and to select suitable methods of its conservation and storage.

MATERIAL AND METHODS

The observations of 1253 contour plasties by diced hyaline cartilage have been collected in our department. The long-term results were followed for periods up to 20 years. In 1110 cases a transplantation of an allogenic cartilage utilization of the allogenic cartilage and followed during long periods of time in one clinic enabled us to estimate the results of this type of contour plasty and to ascertain their dependence on various factors, e.g. immuno-biological state of recipient and donor, and influences on cartilage before transplantation. A statistical analysis supplied the objective information on results of contour was performed.[1]) Great number of homologous observations concerned with plasty, their dependence on various factors and a character of this dependence (Limberg and Fuks 1975). In the statistical study, 791 observations of contour

[1]) The method of contour plasty, which was used, was described in papers of Limberg (1961) and Limberg et al. (1969).

plasty performed on 579 patients were included. Usual methods of clinical investigation were used for estimation of the results. The results were considered as stable, if no change of the repaired field occurred, in comparison with its appearance immediately after cartilage transplantation. The changed form of the repaired part of face or of the supporting function was explained by resolution of the cartilage.[2])

RESULTS

A stable preservation of the cosmetic effects of the plasty or of the supporting function was observed after 634 diced cartilage transplantations by 425 patients (80 ± 3 % observations) — see Tab. 1. Disturbances of the cosmetic effect or of the supportive function, due to resolution of the cartilage, were accounted after 157 transplantations by 154 patients (20 ± 3 % observations). In majority of patients, by whom resolution of the cartilage occurred (after 97 from 157 transplantation), it happened during the first two years after the contour plasty. The probability of the cartilage resolution decreased with increasing time period after transplantation from $33 \pm {}^{6}_{5}$ % to 12 ± 3 %). When the features of recipients were studied, the higher frequency of the cartilage resolution in men (25 ± 2 %) than in women (17 ± 2 %) was found. It corresponds to natural biological phenomena, i.e.

Tab. 1. Results of

Region of contour plasty	Number of patients	Total				
		Total number of plasties	Cartilage preserved		Cartilage resolved	
			number	probability (%)*)	number	probability (%)*)
Nasal dorsum after rhinoplasty	29	44	33	75^{+12}_{15}	11	$25^{\pm 15}_{12}$
Nasal dorsum by saddle nose	207	240	177	$74^{\pm 5}_{6}$	63	$26^{\pm 6}_{5}$
Margin of a pyriform aperture	110	118	96	$81^{\pm 6}_{8}$	22	19^{+8}_{-6}
Forehead, zygomatic region, mandible	233	389	328	$84^{\pm 4}$	61	$16^{\pm 4}$
Total	579	791	634	$80^{\pm 3}$	157	$20^{\pm 3}$

*) The limits of deviations correspond to a 95% confidence interval.

[2]) The morphologic changes of cartilage in grafts and of tissues constituting a bed for a graft, which are characteristic for this method of contour plasty, were described by Yartchuk et al. (1973).

considerable irregularity of life parameters in male population and higher ability to develop immune tolerance in female recipients (Vyazov and Verbitskii 1968, Volkova 1970, Boyd 1966).

A dependence of results of the plasty on ABO system of blood groups of recipients was also studied. A similar distribution of survival (80 %) and resolution (20 %) of the transplanted cartilage was found by patients with $A\beta$ (II), $B\alpha$ (III) and $0\alpha,\beta$ (I) blood groups, while significantly lower frequency of the cartilage resolution (12 %) was estimated by patients with AB00 (IV) group. But the significance of this relationship was lower than 95 %, as low number of observations was available. Therefore, further studies will be required. According to Kosyakov (1974) and Boyd (1966), a tendency to less frequent resolution of the cartilage in recipients with AB00 (IV) blood group may be explained by special genetic determination of the ABO system, which is manifested by absence of α and β isohemagglutinins in recipients with this group of blood.

A study of recipient's age revealed higher frequency of the cartilage resolution in patients younger than 16 years (27 %). It is in correspondence with well-known high immune reactivity of young organisms (Efimov 1966, Kosyakov 1974). But significance of this relationship is lower than 95 % and further study will be necessary. The frequency of the cartilage resolution in

cartilage transplantations

Application of "unpurposeful" types of allogenic cartilage				Retrospective analysis of distribution of the results, if "unpurposeful" types of the allogenic cartilage were excluded				
Total	Cartilage preserved	Cartilage resolved		Total	Cartilage preserved		Cartilage resolved	
	number	number	probability (%)*		number	probability (%)*	number	probability (%)*
5	2	3		39	31	80^{+11}_{-16}	8	20^{+16}_{-11}
83	36	47		157	141	90^{+4}_{-6}	16	10^{+6}_{-4}
23	7	16		95	89	94^{+4}_{-7}	6	6^{+7}_{-4}
88	47	41		301	281	93^{+2}_{-3}	20	7^{+3}_{-2}
199	92	107	54^{+4}_{-4}	592	542	92^{+2}_{-3}	50	8^{+3}_{-2}

other age groups is relatively similar and corresponds to the mean level (20 %).

An analysis of results of the plasty in dependence on etiology of the disturbed form of face showed relatively more frequent cartilage resolution

(29 %) in recipients, who suffered from lupus erythematosus, syphillis, scleroderma and hemiatrophy of the face. The probability of the cartilage resolution was near to the mean value (18—19 %) in patients with inborn defects (syndrome of the 1st and 2nd branchial arch, inborn cleft lip and palate) and in patients with deformities caused by mechanical trauma or non-specific inflammation. These results are in agreement with the fact that lupus erythematosus belongs to diseases with deep reorganization of an immune system of an organism. The operation and the transplantation of cartilage by patients with this disease lead to development of demarcation reaction and resolution of the graft. Apparently, for the same reason a frequency of cartilage resolution is higher also in patients with syphillis, sclerodermia and facial hemiatrophy.

The results of the plasty were analysed also in respect to previous, operations, e.g. transplantation of an autogenic bone and skin, allogenic cartilage, plastic operations of bones and operations of the soft tissues. No significant relationship influencing result of the operation could be determined. It may be explained by relatively long intervals (more than a year) between different operations in majority of patients. Good results of the plasty by some recipients with several times repeated transplantation of diced cartilage in intervals shorter than 6 months (4 % of the total number of

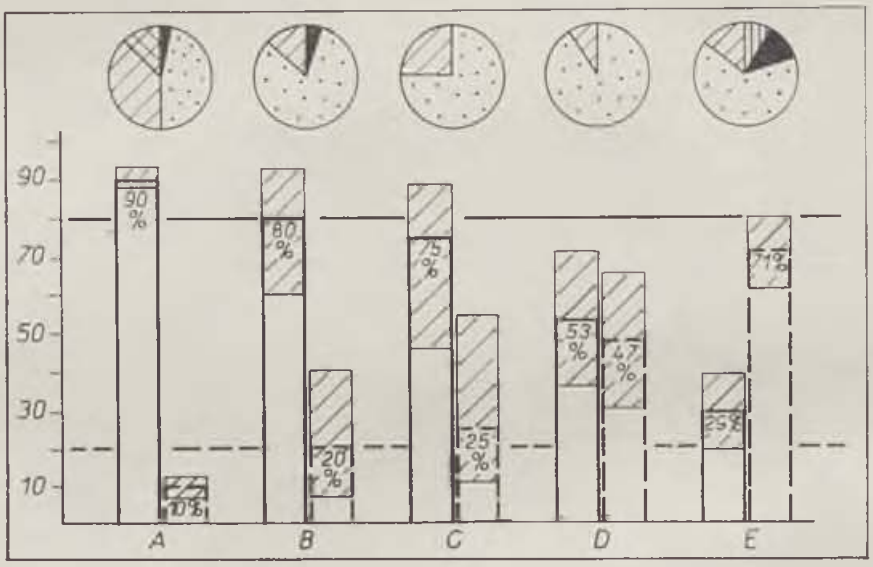

Fig. 1. Distribution of results of the contour plasty by diced cartilage in dependence on causes of donor's death. Causes of donor's death: A (n = 575) — heart and circulatory insufficiency; B (n = 25) — mechanical trauma; C (n = 28) — poisoning; D (n = 32) — electric trauma; E (n = 107) — mechanical asphyxia. Ordinate — probability of cartilage preservation and resolution (in %). Columns demarcated by a continuous line — preservation of cartilage; columns demarcated by a broken line — resolution of cartilage; hatched parts of columns — 95 % confidence interval of probability. The horizontal lines represent medium levels of cartilage preservation and resolution for all observations. — A distribution of donors according to age in each group is shown by sectors in circles: horizontal hatching — less than 16 years; black sectors — 16 to 20 years; points — 21 to 40 years; oblique hatching — 41 to 60 years; crossed hatching — more than 60 years

recipients with positive results of the plasty) could be explained, according to our opinion, not so much by antigenic peculiarities of the cartilage, as especially by development of an immunologic tolerance of recipients under steady influence of chondromucoid substances contained in the cartilaginous grafts. It is known that polysaccharide antigens are potent inducers of tolerance (Khundanov et al. 1972).

It was noticed that results of the plasty are dependent on topographic-anatomical specificities of a bed destined for the graft (see Tab. 1.) The best results of the plasty were obtained after transplantation of the cartilage to regions of forehead, zygomatic bone, orbital margins, mandible and frontal surface of maxilla (16 ± 4 % of bad results). The highest frequency of resolution was observed after the cartilage transplantation to nasal dorsum ($26 \pm^{6}_{5}$ %) and after reconstructive rhinoplasty (25 %). The last figure is apparently related to presence of recipients suffering from lupus, sclerodermia and syphilis in this group (approximately 50 %).

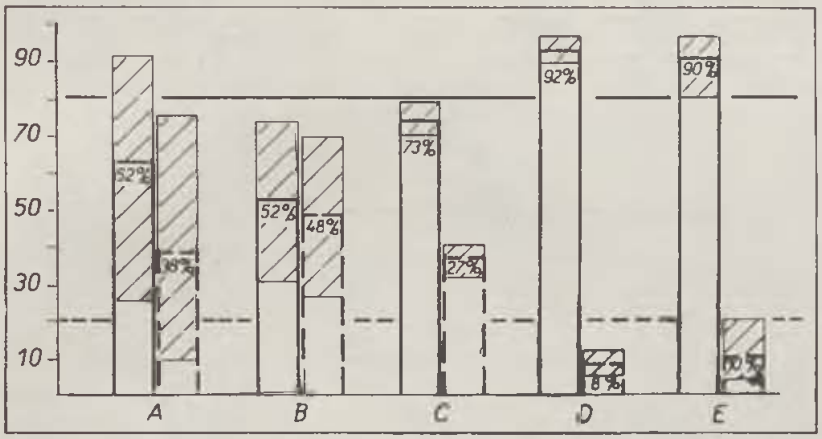

Fig. 2. Distribution of results of the contour plasty by diced cartilage in dependence on age of donor. A (n = 8) — less than 16 years; B (n = 21) — 16 to 20 years; C (n = 417) — 21 to 40 years; D (n = 259) — 41 to 60 years; E (n = 62) — more than 60 years. Other descriptions are the same as Fig. 1

The factors characteristic for d o n o r s were also studied. A significant dependence of results of the plasty on mechanism of donor's death was shown (Fig. 1). Utilization of cartilage removed from donors, who died in chronic hypoxia caused by heart and circulatory insufficiency, gave stable results of the plasty in majority of cases ($90 \pm \frac{3}{2}$ %). Utilization of the cartilage obtained from donors, who died in "acute agony" caused by electric trauma or asphyxia (drowning, hanging) led to stable results of the plasty only in 53 % and 29 % of observations, respectively. If the cartilage of donors, who died as consequence of poisoning or mechanical trauma, was transplanted, then the medium frequency of the stable results was obtained. It is evident, that "acute agony", which is followed by "superfast autolysis" according to Lushnikov and Shapiro (1974), triggers changes of the cartilage, which are unfavourable for its utilization as a free graft.

A specific relationship between results of the plasty and age of donors was shown (Fig. 2). The maximal probability of resolution of the cartilage grafts was observed when the cartilage of donors younger than 20 years was used. This finding is in agreement with observations of Klen et al. (1962) and others. However, it cannot be definitely concluded that a free transplantation of the cartilage obtained from young persons leads to unfavourable results. A comparison of age of donors and of cause of their death revealed the fact that majority of persons in age lower than 20 years died from asphyxia, while by older donors causes of death were variable. Further investigations, which would permit reliable conclusions in respect to influence of donor's age on results of the plasty, are necessary.

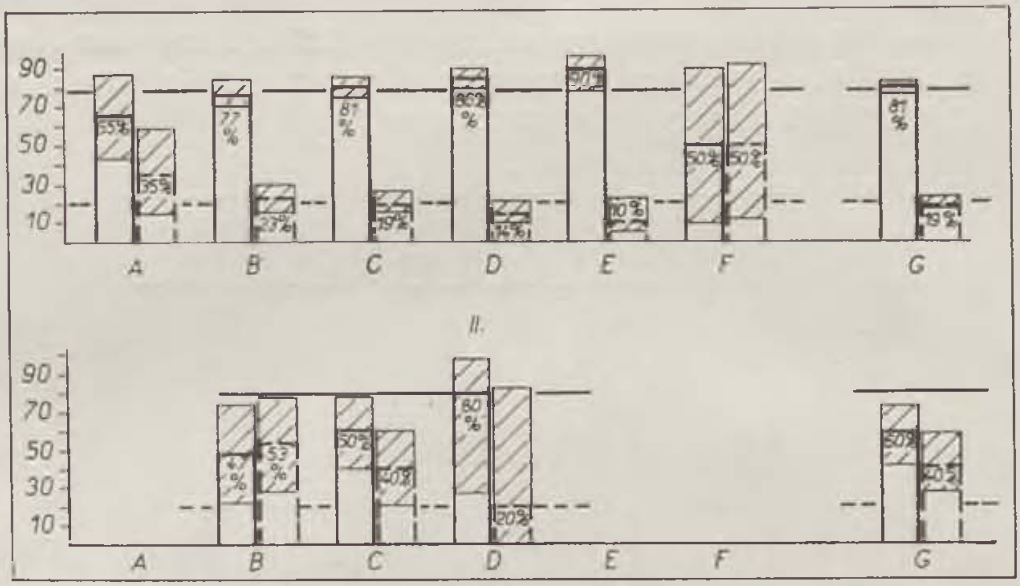

Fig. 3. Distribution of results of the contour plasty by diced cartilage in dependence on method and duration of the cartilage preservation. I — freezed cartilage, II — cartilage preserved in paraffin. — A (n_I = 20, n_{II} = 1) — time of preservation upto 10 days; B (n_I = 145, n_{II} = 15) — 11 days to 1 month; C (n_I = 261, n_{II} = 25) — 1 to 3 months; D (n_I = 217, n_{II} = 5) — 3 to 6 months; E (n_I = 56) — 6 months to 1 year; F (n_I = 4) — more than 1 year; G (n_I = 703, n_{II} = 46) — the totals corresponding to the methods of preservation

In further study of features of donors, it was found that results of the plasty depend on blood group type of donor's blood in the ABO system. The best results of the plasty (90 ± 2 % of stable results) were obtained, when the cartilage from donors with $B\alpha$ (III) blood group was used. The transplantation of cartilage from universal blood donor was not so advantageous.

No definite influence of the recipient's and donor's blood compatibility in the ABO system on distribution of the results of plasty could be shown. However, a tendency to some relative decrease of resolution by presence of compatibility of the main erythrocyte isoantigens (18 % compared to 23 % in absence of compatibility) indicates an expediency of further investigation of the relationship between this factor and the results of transplantations of the diced allogenic cartilage.

No influence of conformity in sex of donors and recipients on results of the plasty was found.

A marked dependence of results of the allogenic cartilage plasty on the mode of conservation was established.

The best results were obtained when the allogenic cartilage was stored before transplantation in solutions of crystalloids according to Mikhelson's method (100–7 %).

Transplantation of the cartilage, which was preserved by freezing in —70 °C gave stable results of the plasty in 81 ± 3 % cases (Fig. 3). The best results were obtained, if the cartilage was stored for 10 days to 1 year before use. With increasing time period of storage up to one year, the probability of stable results increased as well. The short (less than 10 days) and rather long (more than one year) time periods of storage of cartilage lead to decreased probability (in average 65—50 %) of stable results after transplantation of the cartilage, which was preserved by freezing.

The results of plasty of the allogenic cartilage, which was preserved in paraffin, indicated an unfavourable effect of this method. If such cartilage was used, the probability of stable results of the plasty decreased to $60 \pm^{11}$ %.

The analysis of data on distribution of results of the plasty in dependence on method of dicing of the cartilage showed relatively higher incidence (88 ± 3 %) of stable results after cutting cartilage with a scalpel, than after use of a chondrotome (78 ± 2 %).

Thus, the statistical analysis confirmed dependence of results of the contour plasty by allogenic diced cartilage on several factors, related to genetic features and a state of general responsiveness of recipients and donors, and to methods of treatment of the cartilage before transplantation.

It was found that transplantation of the allogenic diced cartilage leads apparently to manifestation of its antigenic properties. Therefore, such transplantations increase probability of recipient's immune reaction on cartilaginous grafts.

The results of contour plasty by allogenic diced cartilage can be improved, if immunological selection of a donor in respect to recipient is made and if the cartilage from donors who died in "acute agony", the cartilage preserved in paraffin and the cartilage preserved by freezing for less than 10 days or more than one year (see a Table) is not used. A retrospective analysis has shown that under described conditions the probability of stable results of the plasty increased from 80 ± 3 % to 92 ± $\frac{2}{3}$ % (see a Table).

It is also necessary to apply methods of dicing of cartilage, which are causing the least damage to the cartilage tissue of the grafts.

CONCLUSIONS

1. The results of the contour plasty by diced allogenic cartilage depend on numerous and varied factors, which reflect the specific features of general reactivity and immunological state of recipient and donor, and also the character of treatment of the cartilage before transplantation.

2. The transplantation of the allogenic diced cartilage leads to manifestation of its antigenic properties and to recipicient's immune reaction on cartilaginous grafts.

3. If an allogenic cartilage stored in solutions of crystalloids is applied, then the stable results of the plasty can be awaited almost in all transplantations (100_7 %). The use of the allogenic cartilage preserved by freezing gives probability of stable results equal to 81 ± 3 %. The application of the cartilage preserved in paraffin decreases probability of stable results of the plasty to 60 ± $\frac{11}{19}$ %.

4. It is possible to increase considerably a probability of good results of the contour plasty by means of purposeful selection of the allogenic cartilage.

The best results of the contour plasty by diced allogenic cartilage are obtained, if the principles of immunogenetic selection of a donor in respect to recipient are applied, if the cartilage from the donor who died in "acute agony", the cartilage stored in paraffin or the cartilage preserved by freezing less than 10 days or longer than a year, is not used, and if the least damaging methods of dicing are applied to the cartilaginous tissue of the grafts.

M. T.

SUMMARY

A retrospective statistical analysis of results of the facial contour plasty by allogenic diced hyaline cartilage in 579 patients, was performed. An examination of the results of 791 transplantations followed for periods up to 20 years enabled us to estimate a preservation of the cartilaginous grafts and a stable cosmetic effect of the plasty in 80 ± 3 %, and a disturbed cosmetic effect due to resolution of the cartilage in 20 ± 3 % of observations.

It was shown that a probability of good results of the contour plasty can be increased to 92 ± $\frac{2}{3}$ % by means of purposeful selection of the allogenic cartilage.

RÉSUMÉ

Amélioration des effets de la plastie de contour de la face à l'aide d'un cartilage allogène pulvérisé

Alla A. Limberg, A. I. Fuks, V. I. Petscherskiy

On a fait une analyse statistique rétrospective des résultats de la plastie de contour de la face faite par le cartilage allogène pulvérisé chez 579 patients. En suivant les résultats de 791 transplantations dans les périodes de l'âge à 20 ans nous avons constaté que la greffe cartilagineuse était restée conservée et l'effet cosmétique avait été durable chez 80 ± 3 % malades. Le cartilage a été absorbé et c'est pourquoi l'effet cosmétique était altéré dans 20 ± 3 % cas observés.

On a démontré que c'était le choix convenable du tissu cartilagineux allogène qui peut augmenter la probabilité des bons résultats de la plastie de contour dans 92 ± $\frac{2}{3}$ %.

ZUSAMMENFASSUNG

Verbesserung der Ergebnisse der Konturplastik des Gesichtes durch allogenen zerkleinerten Knorpel

Alla A. Limberg, A. I. Fuks, V. I. Petscherskij

Wir unternahmen retrospektive statistische Analyse der Ergebnisse der Konturplastik des Gesichtes mit allogenem zerkleinerten Knorpel bei 579 Patienten. Bei der Untersuchung der Ergebnisse von 791 Transplantationen in Zeitabständen bis von 20 Jahren haben wir festgestellt, dass das Knorpeltransplantat erhalten geblieben und der kosmetische Effekt der Operation bei 80 ± 3 % von Patienten dauernd ist. Zur Störung des kosmetischen Effektes kam es infolge der Knorpelresorption in 20 ± 3 % aller Beobachtungen.

Wir haben gezeigt, dass durch entsprechende Wahl des allogenen Knorpelgewebes die Wahrscheinlichkeit der guten Ergebnisse der Konturplastik bis auf 92 ± $\frac{2}{3}$ % erhöht werden kann.

RESUMEN

Perfeccionamiento de los resultados de la plastia por contornos en la cara mediante un cartílago alogéneo pulverizado

Alla A. Limberg, A. I. Fuks, V. I. Pecherskii

Hemos hecho un análisis estadístico retrospectivo de los resultados de la plastia por contornos de la cara mediante un cartílago alogéneo pulverizado en 579 pacientes. Al observar los resultados de las 791 transplantaciones en los períodos hasta la edad de 20 años ha sido hallado que el transplante se conservía y el efecto cosmético de la operación era durable en 80 ± 3 % de los pacientes. El efecto cosmético fue alterado a consecuencia de haberse absorbido el cartílago en 20 ± 3 % de las observaciones.

Ha sido demostrado que por elección conveniente del tejido cartilaginoso alogéneo es posible aumentar la probabilidad de resultados buenos en la plastia por contornos a 92 ± $\frac{2}{3}$ %.

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Cont. From p. 202

expression, the authors go on to describe the principles of clinical soft tissue investigation, dental imprints, cephalometric investigation using teleradiography and roentgenography. Page 204 carries a list of operations on the bones, particularly the mandible, as well as on soft tissues. The authors deliberately refrain from giving pictorial or other details of complicated osteoplasty so brilliantly performed by Tessler in congenital malformations.

The second part of the book opens with plastic surgery of the female breast. Descriptive and morphological anatomy is followed by a chapter on how to correct hypertrophy and ptosis of the breasts. Plain description, drawings and operation photographs are used to illustrate the authors' own version of the surgical technique devised in principle by Skoog, as well as free transplantation of the areola in gigantomastia. There is again a list of possible early or late complications.

The next chapter is about the implantation of gel-filled silicone prostheses, both as regards the technique of simple deposition of the prosthesis and as regards the possibility of the simultaneous correction of ptosis using vertical skin excision downward from the areola.

Complications are listed as including prostheses rejected due to allogeneic material intolerance, infection, badly deposited prostheses, abnormal rigidity of the breast, with inverted nipple correction closing the chapter. The authors obviously do not perform and therefore refrain from publishing operations according to Longacre.

Plastic corrections of the abdominal wall are mostly done using horizontal incisions drawn sideways above the groins up to the flanks. The authors loosen broad segments of abdominal wall tissues, drawing them downwards, shifting the location of the navel, resecting in 3—4 parts whatever surplus tissue there is, adding — where necessary — a suture of dehiscence-separated abdominal muscles, sometimes even using a vertical incision along the median line of the suprapubic region.

The book closes with a chapter dealing with operations in cases of excessive accumulation of fat in the gluteal region, on the thighs and hips with excisions made as necessary so as to allow them being covered up by clothes.

As for surgery of the eyelids, ptosis, and also the breasts and the abdomen, the authors prepared leaflets with comprehensive information on the operations which they recommend to give to the patients prior to surgery.

The authors present only such procedures which they themselves employ and have experience with; there are no references to other methods described in literature.

The drawings and photographs are clear and instructive. The Atlas is bound to be appreciated by those who perform surgical operations of cosmetic defects.

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USE OF A VACUUM SPLINT IN THE MANAGEMENT OF CROSS-LEG FLAPS

G. M. WARD

For the proper management of the cross-leg flap it is essential that the limbs are fixed rigidly in a position to allow maximum perfusion of the flap and greatest comfort to the patient. Plaster of Paris casts are the most commonly used form of fixation which can be moulded pre-operatively to the mutual satisfaction of both surgeon and patient. Devices can then be incorporated into the casts at the end of surgery for efficient immobilisation (Stark 1959). Such a splint is heavy and leads to difficulties in nursing care (Oliveira and Madeira 1967). In such rigid fixation for a period up to three weeks the patient may experience discomfort or pain with later complications of pressure necrosis and compression of peripheral nerves. If there is an incomplete acceptance of the skin graft on the donor limb the cast becomes locally putrid and malodorous (Adams et al. 1969). In an attempt to overcome these complications rods fitted to adjustable pivots can be incorporated into the casts (Salamanca 1967). Even this precaution does not allow for easier nursing of the patient as the apparatus remains heavy and bulky. Therefore skeletal fixation alone was introduced using Steinmann pins connected by steel rods that are held by universal clamps (Alms 1963). This technique leads to rigid immobilisation while allowing the position of the legs to be altered. The legs can also be suspended to reduce the possibility of pressure sores and to allow access and ventilation to the posterior aspect of the limb. At the same time the major joints can be exercised actively or passively. Other surgeons have found that skeletal fixation by Steinmann pins without clamps (Constant and Grab 1968; Adams et al. 1969) or just by Kirschner wires (Oliveira and Madeira 1967) provides yet more efficient management. However these authors confess to the occasional complication of osteitis and inflammation around the pin-track which subsides after removal of the pins.

Several additional factors emerge that must be considered in the proper management of the cross-leg flap. The apparatus, although providing efficient rigidity, must be able to be adjusted in order to counter problems of pressure areas, compression of nerves and discomfort to the patient. It must permit physiotherapy of the hip, knee and ankle joints especially in the more elderly patients, to reduce the chances of joint stiffness. Finally it should avoid additional problems of infection such as osteitis.

It is the purpose of this paper to describe the use of a vacuum splint that appears to meet all these requirements. The splint is basically a polythene bag fitted with an exhaust valve and filled with expanded polystyrene balls 3 mm in diameter. In its unevacuated state the bag is soft and flaccid like a pillow, but on evacuation the polystyrene balls are compacted thereby solidifying the splint in its resting shape. Splints based on this vacuum principle have been used for at least ten years, either for positioning the patient on the operating table or for various orthopaedic supports (Povey 1970). They have the disadvantage of being heavy as the casing is thick and insulated and contains unexpanded polystyrene granules. This particular splint, called a "polyvac" splint, is much lighter by virtue of the use of expanded polystyrene balls and a thinner polythene casing (Schetrumpf 1973).

Fig. 1. At operation the legs lie in the vacuum splint being separated from it by a sterile towel and mackintosh sheet

Technique

Before surgery the splint is moulded by the surgeon so that the legs of the patient lie in the exact position required for performing the cross-leg flap. They should not be encased but should be comfortably within it so that they can be lifted free. The splint is then evacuated to make it rigid. At the time of operation the limbs can lie in the ideal position in the splint, being separated from it by a sterile mackintosh sheet and towel (Fig. 1). The splint can be connected to a suction apparatus so that it can be re-moulded, as necessary, by the surgeon at any stage of the operation. In this way the splint acts like a second surgical assistant.

At the end of the operation the intervening towel is pulled away so that the legs adopt the pre-determined position in the splint (Fig. 2). At this stage it is advisable to bind the legs into the splint at the level of the ankles and knees so that any involuntary movements in the recovery room will not jeopardise the circulation in the flap. Alternatively the splint can be partially

evacuated to a doughy consistency so that the edges can be moulded to overlap or encase the limbs. It is then re-evacuated to a similar rigidity as plaster-of-paris. At the casing is made of plastic sheeting it is lined with a linen towel to reduce the possibility of maceration of the weight-bearing areas (Fig. 3).

Fig. 2. After inset of the cross-leg flap the surgical towels are withdrawn so that the legs lie in the predetermined position

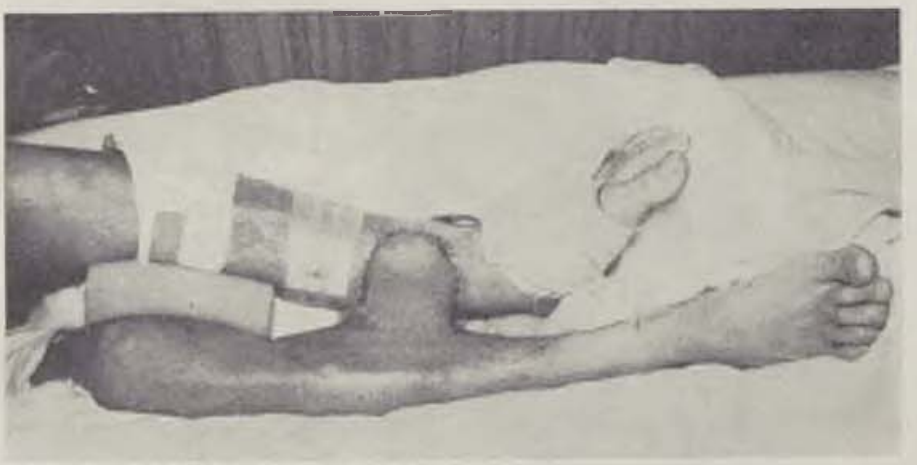

Fig. 3. The splint is lined with a linen sheet to reduce the chances of maceration of the weight bearing areas

Post-operatively the patient can lift both legs from the splint with or without the help of the attending nurse or physiotherapist (Fig. 4). Thus it is possible to inspect the dependent surface of the limbs and supervise joint movements. As the splint only weighs one kilogram the tone and power of the quadriceps can be further maintained by elevating the splint moulded around the limbs (Fig. 5). At any stage in the post-operative course it is a simple matter to remould the splint for the comfort of the patient or the integrity of the flap. The patient is returned to theatre for division of the flap with the

legs lying in the splint. Both limbs and splint are draped as previously described and the flap divided. Minimal assistance is required.

To date, seven cross-leg flaps have been created using the "poly-vac" splint. Six have proceeded to the entire satisfaction of the patient, nurses and

Fig. 4. If necessary the patient can lift both legs from the splint with or without aid from an attendant

Fig. 5. Assisted physiotherapy of the quadriceps is achieved by moulding the light vacuum splint around the legs

surgeons. The management of one patient was complicated by the collapse of the splint during the night leading to separation of the flap. A small leak was eventually located in the wall of the splint which it was possible to seal with waterproof tape, but in the meantime the legs were immobilised with traditional plaster-of-paris casts. The subsequent progress of this flap was

satisfactory. However, this complication does serve as a warning to carefully test the splint for leaks at all times and to avoid any circumstances that might lead to perforation of its wall.

1. The "poly-vac" splint can be obtained from Plastic Sheet Developments Ltd, Stafford Street, Bristol BS3 4DA, England.

SUMMARY

Methods of immobilisation of cross-leg flaps using plaster of Paris casts or various forms of skeletal fixation are discussed together with other requirements for the efficient management of a cross-leg flap. The use of a vacuum splint is described which is lighter than other similar splints employed for different purposes by virtue of its thinner casing and filling of expanded polystyrene balls ("poly-vac" splint). In the management of six patients with cross-leg flaps this splint proved to be ideal. However, reversible problems occurred with the seventh patient when the wall of the splint was accidentally perforated. Simple precautions must therefore be made.

RÉSUMÉ

Immobilisation à l'aide des attelles vacuum dans les greffes des lambeaux cutanés d'une jambe à l'autre

C. M. Ward

On apprecie les méthodes d'immobilisation réalisées par un pansement plâtré dans les greffes des lambeaux cutanés d'une jambe à l'autre et différentes formes de la fixation squelletique en ce qui concerne le caractère effectif de la transplantation. On décrit l'utilisation des attelles vacuum qui sont plus légères que les autres moyens d'immobilisation utilisés dans différents buts grâce à leur enveloppe plus fine et leur remplissage par des boulettes étendues de polystyrène (attelles polyavacuum). Ces attelles-ci se montraient idéales pendant le traitement de 6 malades avec une greffe des lambeaux cutanés d'une jambe à l'autre. Des problèmes contraires se sont traduits chez le septième malade quand l'enveloppe de l'attelle s'est perforée par hasard. C'est pourquoi il faut faire des précautions simples.

ZUSAMMENFASSUNG

Immobilisation mittels Vakuumschienen bei der Transplantation von Hautlappen von einem Bein zum anderen

C. M. Ward

Es werden die Methoden der Immobilisierung mit Gipsverband bei der Transplantation von Hautlappen von einem Bein zum anderen und verschiedene Formen der Knochenfixation vom Standpunkt der Forderungen auf die Effektivität der Transplantation bewertet. Man beschreibt die Anwendung von Vakuumschienen, die leichter sind als alle übrigen für verschiedene Zwecke benutzten Immobilisierungsmittel, und zwar dank der dünneren Hülle und der Füllung mit expandierten Polystyrenkugeln („Poly-Vakuumschienen"). Diese Schienen bewährten sich ideal bei der Behandlung von sechs Kranken durch Transplantation von Hautlappen von einem Bein zum

anderen. Reversible Probleme entstanden aber im Fall des siebenten Patienten bei zufälliger Perforation der Schienenhülle. Deshalb sind einfache Vorsichtsmassnahmen erforderlich.

RESUMEN

Inmovilización mediante tablillas vacuum en transplantaciones de lóbulos cutáneos de una pierna a otra

C. M. Ward

Los métodos de inmovilización por enyesando en las transplantaciones de lóbulos cutáneos de una pierna a otra y varias formas de fijación esqueletal están apreciados desde el punto de vista de las exigencias de la efectividad de la transplantación. Fue descrito el empleo de tablillas vacuum que son más ligeras que todos los demás medios de inmovilización usados para varios fines gracias al envase más fino y a ser rellenados de bolas extendidas de polistiren ("tablillas poli-vacuum"). Estas tablillas se mostraron ideales en el tratamiento de 6 enfermos con transplantación de lóbulos cutáneos de pierna a pierna. Problemas reversibles ocurrieron, sin embargo, en el séptimo enfermo al ser el envase de la tablilla perforado por casualidad. Por eso medidas de precaución simples son necesarias.

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EXPERIENCE OF TREATING INFECTIOUS COMPLICATIONS OF SEVERE BURNS USING A COMBINATION OF TRIMETHOPRIM AND SULFAMETHOXYZOL (SEPTRIN^{R})

R. KÖNIGOVÁ, V. VACEK, J. SKŘIVÁNEK

The Trimethoprim — Sulfamethoxazol combination was first used at our unit in May 1971, then as a preparation under the trade mark of BACTRIM^{R}. The success of the treatment drew our attention to some of the attractive properties the combination offered for the treatment of severe burns:

1. relatively broad antibacterial spectrum,
2. good tissue penetration,
3. tolerance permitting even prolonged therapy in cases of multiple damage to organs during the burn disease (the so called burn syndrome, acute period).

METHODS

Over the past four years, a combination of Trimethoprim and Sulfamethoxyzol going under the trade mark of SEPTRIN^{R} has been used at our unit to treat patients with severe, second- to third-degree burns affecting more than 20 % of the body surface. The aim of the present study is to assess the therapy using either Septrin alone or in combination with other antibacterial drugs in 80 patients aged 4—72 years. 46 cases were indicated for chemotherapy because of infection in the residual granulation areas preventing both spontaneous epithelization and transplantation. The infection was due to mixed flora with Staphylococcus pyogenes aureus being present each time in conbination with different gram-negative conditioned pathogens.

The other indication group consisted of 34 patients suffering from sepsis from the burned areas, or from infectious complications in the lower respiratory tract. Infection in the latter group was substantially more acute than in the former. The criterion of success in the former group was seen in an

improvement of the burned area condition making transplantation possible. The latter group was marked by an abatement of septic signs or by a pronounced improvement of the organ finding.

Septrin was administered to 30 patients in the basic dosage (2 tablets, 12-hourly), and to 50 patients in an increased dosage (2 tablets, 8-hourly). One tablet of Septrin for adults contains 80 mg Trimethoprim and 400 mg Sulfamethoxazol; one tablet for children — 20 mg Trimethoprim and 100 mg Sulfamethoxazol. Given this ratio, the two constituents tend to develop a serum level ratio of 1 : 20 (an optimum for most pathogens). Both constituents are almost completely absorbed from the intestine and are, for the most part, excreted in the urine. Concentrations in the tissues and in the urine are in excess of that in the serum.

In case gentamycin was indicated simultaeously, its dosage ranged between 5 and 10 mg/1 kg b.w. daily. Polymyxin B or colmycin were given in doses of about 3 mil. units a day.

Microbiological investigation was performed using the semiquantitative imprint method, with the therapy aimed particularly against those microbes that grew at a rate of over 300 colonies on a plate. Sensitivity to antibiotics was estimated using the routine disk method. The first group (infection of granulation areas) was treated so as to preserve sensitivity to Septrin in all the species present except Pseudomonas and Achromobacter which cause no damage to grafts. In the second group (general infection, infection of respiratory or urinary tracts) the point was to cover each time the whole microbian spectrum involved with a number of gram-positive as well as gram-negative microbes. A higher degree of resistance was noticeable in enterococci, Proteus mirabilis and Pseudomonas aeruginosa. Mycobacteria, Mycoplasma pneumoniae and pathogenic fungi were entirely resistant.

RESULTS

The best results were achieved in the first group (Tab. 1), i.e. in the treatment of mixed infections of granulation areas marked by a predominance of Staphylococcus pyogenes aureus. Septrin therapy was successful in 75 % of the cases involved. Such conditions are also seen as the main indication for Septrin in burns. The conditions, naturally, must include the microbes' well-preserved sensitivity to Septrin which is to be checked every other day by means of a microbiological examination of the burned areas. The therapeutic results are in good agreement with those of in vitro tests.

In the group of sepses and pulmonary and urinary complications (Tab. 2) Septrin was always used in combination with other drugs. True, the effect of Septrin alone did not, as a rule, suffice to cope with as serious conditions as that, though, on the other hand, Septrin might act as a significant supplement to the antibacterial effects of gentamycin. Of particular significance was the intensive therapeutical action of the Septrin-gentamycin combination on infection caused by Pseudomonas

Tab. 1. Typical cases of group 1

Patient	Indication for treatment	Microbiological finding	Septrin therapy dose/duration	Result
P. Ž. 4 years 20 kg 35% 3rd degree	preparation of granulation areas prior to transplantation	burned area: Staphylococcus pyog. aureus Pseudomonas	1 ped. tablet 8-hourly/10 days	Autotrans-plantation Healed in 8 weeks
J. M. 61 years 75 kg 30% 3rd degree	granulation area preparation on the chest Temperatures over 39 °C (prevention of lung complications)	burned area: Staphylococcus pyog. aureus Proteus upper respir. tract: Staphylococcus pyog. aureus	2 tablets 8-hourly/8 days	Autotrans-plantation Healed in 11 weeks

aeruginosa in spite of the fact that the microbe does not normally fall within the spectrum of Septrin action. All in all, the therapy in this group proved to be a success in 60 % of the cases involved. Considering the fact that the average extent of the burns was 40 % with extremes going up to 85 %, and also that this group involved some of the most serious cases of sepsis for the period under observation, the results are favourable. There was less success with combination of Septrin and some of the polymixin antibiotics. Only 30 % patients were successfully cured, a figure linked with the fact that a number of other methods of treatment had already failed in this group of severely burned patients and that the patients were found to carry microbian strains resistant to gentamycin.

SIDE-EFFECTS

The rate of side-effects in our group is substantially higher (20 %) than that usually met in medical or surgical groups. In the course of the burn disease (acute period, burn syndrome), complications arising from parenchymatous organ affection in all sorts of combinations are the rule, not an exception. It is therefore not always possible to tell exactly which of the signs (allergic exanthemata, nausea or even vomiting, diarrhoea or obstipation, increased transaminases) are caused by the underlying disease and which are due to the therapy. All one can say about the side-effects observed is that they were chronologically associated with the Septrin therapy. It is difficult to speak of any cause and effect relationship as Septrin could be administered without fear for periods of up to three weeks even to those patients, in whom parenchymatous organ damage had been diagnosed previously. The rate of nephrotoxic signs in the

Tab. 2. Typical cases of group 2

Patient	Indication for treatment	Microbiological finding	Septrin therapy dose/duration + Gentamycin	Result
J. K. 20 years 70 kg 40% 3rd degree	preparation of burned area for necrectomy temperatures over 40 °C tremor proteinuria haematuria BUN/CR: 24/1.3	burned area: Staphylococcus pyog. aureus E. coli urine: Pseudomonas Achromobacter	2 tablets 8-hourly/6 days + 160 mg i. m. 8-hourly	abatement of septic signs heterotransplantation after necrectomy
M. L. 21 years 3 courses of Septrin treatment	I. Proteus sepsis temperatures over 40 °C proteinuria haematuria BUN/CR: 27/1.1	nose, throat cannula urine Proteus Rettgeri	2 tablets 8-hourly/7 days + 80 mg i. m. 8-hourly	meningismus subicterus of area: Pseudomonas GM resist. (Polymyxin + tetracyclin)
	II. preparation of granulation areas before transplantation	area: Staphylococcus pyog. aureus Proteus, Pseudomonas gram-*posit.!*	2 tablets 8-hourly/7 days + 80 mg i. m. 8-hourly	Autotransplantation healed in 16 weeks
	III. readmission: after 8 weeks graft area disintegration	area: Staphylococcus pyog. aureus Proteus	2 tablets 8-hourly/12 days + 80 mg i. m. 8-hourly	epithelization hepatosplenomegaly (CMV?)

therapy involving the Septrin-gentamycin combination was the same as that when gentamycin alone was used.

The following circumstantial evidence suggests that Septrin is relatively safe for the treatment of severe burns:

1. all changes found were temporary,

2. the changes had no adverse effect on the course of treatment thus making any interruption of the therapy unnecessary.

*

Our thanks for continually performed investigations are due to the Institutes of Microbiology, Biochemistry, and Haematology of the Medical Faculty of Hygiene, Prague.

J. H.

SUMMARY

Septrin is a valuable contribution to the treatment of infections complicating severe burns. It was found effective in mixed infections on granulation areas where it enabled transplantation, and also in combination with gentamycin in sepses of mixed aetiology as well as in infections of the lower respiratory and urinary tracts. It can, of course, be used only where it can be taken orally. A dosage of two tablets every 12 hours is adequate in common infections in adults but in severely burned patients the interval should be cut down to 8 hours in between doses. (The same interval of 8 hours is used in children kept on paediatric tablets or sirup.) The therapy must always be preceded by an in vitro establishment of sensitivity, and its duration determined by regular bacteriological check-up of the sources of infection performed every other day. A certain rate of side-effect development must be taken into account though these are reversible according to literary data as well as to our own experience.

RÉSUMÉ

Expérience en traitement des infections compliquant des brûlures graves par le combination de Trimethoprim avec Sulfamethoxyzol (SEPTRIN^R)

R. Königová, V. Vacek, J. Skřivánek

Septrin présente une contribution de grande valeur pour le traitement des infections compliquant les brûlures graves. Ce médicament-ci a affirmé sa réputation dans les infections mixtes sur la surfaces de granulation, où il a rendu possible la transplantation tantôt en combination avec Gentamycine dans les septicémies d'une étiologie mixte, tantôt dans les infections des voies aériennes inférieures et urinaires. Naturellement, il ne peut être utilisé que là où une application orale est possible. Une dose de deux cachets au bout de douze heures suffit dans les infections courantes des adultes, mais chez les grièvement brûlés on réduit l'intervalle entre deux doses à 8 heures. (Chez les enfants on applique les cachets pédiatriques ou le sirop même chaques 8 heures.) Cette thérapie doit être toujours fondée sur une constatation de la sensibilité in vitro et sa durée obéit à un examen bactériologique régulier des origines de l'infection étant fait tous les deux jours. Il faut tenir compte de l'existence des symptômes secondaires qui sont selon les rapports des publications et nos expériences réversibles.

ZUSAMMENFASSUNG

Erfahrungen mit der Kombination von Trimethoprim und Sulfamethoxyzol (SEPTRIN^R) bei der Behandlung von Infektionen als Komplikationen schwerer Verbrennungen

R. Königová, V. Vacek, J. Skřivánek

Septrin ist ein wertvoller Beitrag für die Behandlung von Infektionen, die als Komplikationen bei schweren Verbrennungen auftreten. Es bewährte sich sowohl bei Mischinfektionen auf Granulationsflächen wo es Transplantation ermöglicht hat, als auch in Kombination mit Gentamycin bei Sepsis kombinierter Ätiologie, und ferner bei Infektionen der unteren Atmungs- und Harnwege. Begreiflicherweise kann es nur dort angewandt werden, wo perorale Applikation möglich ist. Die Gabe von zwei

Tabletten in 12-Studen-Intervallen ist ausreichend für übliche Infektionen bei Erwachsenen, bei schweren Verbrennungen verkürzen wir die Zeit der Verabreichungen auf 8 Studen. (Bei Kindern geben wir pädiatrische Tabletten oder Sirup ebenfalls alle 8 Stunden.) Diese Therapie muss stets auf Grund einer Ermittlung der in vitro Empfindlichkeit erfolgen und ihre Dauer richtet sich nach den Ergebnissen der regelmässig jeden zweiten Tag durchgeführten bakteriologischen Infektionsherdermittlungen. Es muss mit gewissen Nebenerscheinungen gerechnet werden, die nach Literaturangaben sowie unseren Erfahrungen reversibel sind.

RESUMEN

Experiencias con el tratamiento de infecciones que complican, quemaduras graves, el mismo siendo una combinación de Trimethoprim y Sulfamethoxyzol (SEPTRIN^R)

R. Königová, V. Vacek, J. Skřivánek

Septrin es una contribución valiosa al tratamiento de las infecciones que complican quemaduras graves. Se probó su eficacia en infecciones mixtas en las superficies con granulación donde hizo posible una transplantación tanto en combinación con Gentamycin en las septicemias de etiología mixta y también en las infecciones de las vías respiratorias inferiores y de las vías urinarias. Puede ser usado naturalmente sólo en los casos donde aplicación oral es posible. Una dosis de 2 pastillas cada 12 horas es suficiente para infecciones corrientes en los adultos, pero en los gravemente quemados el intérvalo entre las dosis se abrevia a las 8 horas. (En los niños aplicamos pastillas pediátricas o almíbar también cada 8 horas.) Este tratamiento debe siempre ser basado en determinación de sensibilidad in vitro y su duración se dirige según examinación bacteriológica regular de las fuentes de la infección cada dos días. Hay que contar con cierta presencia de síntomas secundarios que según noticias de la literatura y según nuestra experiencia son reversibles.

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A COMPARISON OF DERMO-EPIDERMAL AND CHORION-AMNIOTIC GRAFTS IN THE TREATMENT OF BURNS

R. KLEN, H. SKALSKÁ

Like in transplantation of all types of tissue, fresh autologous grafts is the best choice from the biological viewpoint also for transplantation of skin grafts. However, autologous skin grafts may prove to be too high-priced — sit venia verbo — for the burned patient. Their "expresiveness" rises first of all with the increasing extent of the area damaged by burn, and, secondly, when those sites are involved in the damage from which autologous skin is normally withdrawn for the purpose of autotransplantation. It is thus unavoidable to make use of heterologous grafts in the treatment of burns.

The number of reports or cases where extraembryonic membranes were employed in local treatment of burns is low (1—9). Besides that, one can find publications describing the use of extraembryonic membranes for purposes other than grafting to burned patients (10—16). Since all the results reported are very encouraging, we decided to test in particular the feasibility of using freezedried human extraembryonic membranes as a temporary biological bandage in the treatment of burns. The clinical results were compared with those obtained with classical human dermo-epidermal grafts.

METHODS

In due course we worked out the indications of procurement of the tissue, as well as the technique of withdrawal and further processing including sterilization and preservation; we further determined the maximum time period of safe storing of preserved tissue, and, last but not least, measured its permeability. Preserved grafts were mailed to the Center for the Treatment of Burns in Praha and in Šaca, and to the Surgical Dept. at Michalovce, where they were applied as temporary biological dressing of burns. All grafts were changed repeatedly within four days until the transplantation of autologous skin graft was performed. Special questionnaire compiled by clinicists was attached to each graft, in order to keep record of clinical particulars of the case in point. Data on separate grafts were then summarized in order to gather information on the results of transplantations in individual recipients.*)

*) The authors wish to thank Dr. J. Sabol from the Surgical Dept. at Michalovce, Dr. Št. Šimek, CSc., from the Center for the Treatment of Burns at Šaca, and Dr. H. Topinka from the Center for the Treatment of Burns at Praha, who provided the clinical data.

In an effort to base the conclusions on particular types of graft used under different circumstances upon evaluations made with the maximum of objectivity, we classified the results into 5 classes according to the degree of clinical success. The first category included all cases which ended with the death of the treated patient, regardless of the trend of the other main criteria (local finding, pain intensity, general state). Besides the lethal outcome, other cases were classified as failures, if at least one main indicator showed a deterioration. Thirty combinations are theoretically possible. The next category was formed by unconvincing results. It consisted of cases characterized by any of the following combinations: local finding unchanged, pain intensity the same or inestimable, general state unaffected or inestimable. Four combinations are possible. The third category comprised transplantation cases showing improvement in one indicator and none which got worse. This category was called "difficult to assess" and contained eight combinations. The next category was classified as partial success and was characterized by improvement in two indicators and no deterioration. Five combinations are possible. The last category of full success was distinguished by improvement in all three indicators and consisted therefore of one single combination.

Theoretically there exist 48 possible combinations in the evaluation of the outcome of the treatment. Each of the possibility was assigned the same incidence probability of 1/48. Taking the number of possible combinations into account, we estimated the theoretical probability p_i of the incidence of a particular result in each of the described five classes, i = 1, 2, ... 5 (Tab. 1). For quantification of the given qualitative random quantity Y (outcome of the treatment) we made the assumption of normal distribution of this random quantity (despite the theoretical highest incidence probability of one of the extreme classes, namely failure) with the mean equal to 0 and variance equal to 1. By accepting this assumption it was possible to evaluate quantitatively each class of data and thus to broaden the possibility of an objective appraisal of the results.

The calculation starts from the inverse function of the standard normal distribution $y_i = \Phi^{-1}(P_i)$, where P_i stands for cumulative probability of class i of results. For each point y_i the density of normal distribution $\varphi(y_i)$ is searched out in the table. By calculating the value

$$y^{*i} = \frac{1}{P_i}[\varphi(y_i - 1) - \varphi(y_i)]$$

one can obtain the first assessment of the desired quantities. Let us assume that the value y^{*i} corresponds to the random quantity Y*. Its mean value is EY* = 0, variance DY* = 0.7144. In order to obtain the standard random quantity, a correction is needed: $y^i = y^{*i}\{DY^{*i}\}^{-1/2} = y^{*i}.1.1832$. Values of y^i correspond to the random quantity Y with EY equal to 0 and DY equal to 0.972. It is therefore an approximately standardized random quantity which we wanted to arrive at. The value y^i is thus assigned to each result in class i. The protocol of numerical evaluation is shown in table 1.

Tab. 1. Design of statistical evaluation used

Class	Cumulative probability P_i	Values $y_i = \Phi^{-1}(P_i)$	$\varphi(y_i)$	y^{*1}	y^i
I.	0.6250	0.32	0.38	−0.6	−0.7
II.	0.7083	0.55	0.34	0.5	0.6
III.	0.8750	1.15	0.21	0.8	0.9
IV.	0.9792	2.04	0.05	1.5	1.8
V.	1.0000	4	0	2.4	2.8

For further statistical analysis each relevant result was assessed by points. (As an example: local finding unchanged, pain intensity unchanged, general state improved — is placed in the 3rd class of results and assessed with 0.9.) The index of succeeding was determined as the average point score of a given group.

RESULTS

The material was first assessed in respect to the extent of the area covered and graft type employed in 7 subgroups. The results are given in table 2; statistical evaluation by means of Wilcoxon rank test in 9 pairs is shown in table 3. In none of the compared pairs is the difference significant.

Further we evaluated only both extreme classes of results, i.e. failures including deaths and full successes (Tab. 4). The percentual ratio of results of the two classes were compared by means of Fisher test of equality of two parameters of binomic distribution.

Tab. 2. Results of transplantation of different types of grafts on burns of various extent and on surgical wounds caused by removal of skin for ectopic autologous grafting

Extent of burn in %	Mean extent	Type of graft	No. of		Percentage of		Index of succeeding
			trans-plants	recipients	failure	full success	
3	2	d—e	4	4	25	75	1,92
25—58	43	d—e	12	10	41.6	25	0.76
2—10	5	ch—a	10	9	0	60	2.07
14—28	21	ch—a	17	15	0	47	1.95
30—70	38	ch—a	16	13	31.2	25	0.97
5—35	19	a	9	9	22.2	44.5	1.42
*)op		ch—a	30	23	17	80	

d—e = dermo-epidermal grafts
ch—a = chorion-amniotic grafts
a = amniotic grafts
op = skin removal

*) Evaluation of this group had to be modified and is based solely on local symptoms. The intensity of pain cannot be taken into account, as the covering grafts are always applied immediately after the removal of autologous skin grafts and no comparison is possible. Neither could be the general state of the patient evaluated, since undoubtedly the burn injury itself, and eventual complications, alter the general state in a decisive way. Only three categories can therefore be classified: failure, inestimable transfer, and success.

Tab. 3. Comparison of transplantation of d—e, ch—a and a grafts with respect to the extent of burns

Extent	Type of graft	Extent	Type of graft	Test criterion
3	d—e	2—10	ch—a	1
25—58	d—e	30—70	ch—a	9
3	d—e	25—58	d—e	10
2—10	ch—a	14—28	ch—a	5
2—10	ch—a	30—70	ch—a	34
14—28	ch—a	30—70	ch—a	54
5—35	a	all	d—e	8.5
5—35	a	all	ch—a	222
all	d—e	all	ch—a	412

When considering the failures, it was found that

1) chorion amniotic grafts used for covering burns affecting 2—10 percent of body surface gave a percentage of failures significantly lower at the 10 % level of significance than identical grafts used in cases where the extent of the burned area amounted to 30—70 percent ($p = 0.0664$);

2) chorion-amniotic grafts used for covering burns of 14—18 % extent gave a percentage of failures significantly lower at the 5 % level of significance than identical grafts used in cases where the burned area extended over 30—70 percent ($p = 0.0184$);

3) differences in all other pairs were insignificant.

When considering full successes, significant difference was found for one pair only:

4) chorion-amniotic grafts used for covering burns of 2—10 percent extent gave a ratio of full successes significantly higher at the 10 % level of significance than identical grafts used in cases where the damaged area extended over 30—70 % ($p = 0.0856$).

Tab. 4. Results of transplantation of d—e and ch—a grafts with respect to the extent of burns

Extent of burn in %	Type of graft	No. of		Percentage of		Index of succeeding
		transplants	recipients	failure	full success	
25—58	d—e	12	10	42	25	0.76
2—10	ch—a	10	9	0	60	2.07
14—28	ch—a	17	15	0	47	1.95
30—70	ch—a	16	13	31	25	0.97
5—35	a	9	9	22	44	1.42

Thus, the conclusions consistently indicate that the success of chorion-amniotic grafts decreases with the increase in size of the burned area.

In evaluating the results in relation to the degree of burn, it is necessary to take into consideration the large inhomogeneity of our sample. It is due to the fact that the relative ratio of different degrees of burn is unknown in

those cases, where 2 or even 3 degrees are simultaneously present. Besides that, the total number of cases in individual groups varies considerably. The first part of the study, which analyzed the effect of the extent of burn damage, allows us to conclude that the success of transplantation therapy is indirectly proportional to the extent of burn, regardless of the degree of burn.

Tab. 5. Results of transplantation of d—e and ch—a grafts with respect to the degree and extent of burns

Degree	Extent	Type of graft	No. of		Percentage of		Index of succeeding
			trans-plants	recipients	failure	full success	
IIa, III	2—58	d—e	6	6	50	50	1.05
III	1—57	d—e	8	7	37	25	0.85
IIa, III	4—70	ch—a	10	9	20	40	1.4
III	2—55	ch—a	22	17	9	40	1.6

Tab. 5 contains data remaining after excluding those groups that were not numerous enough for statistical evaluation. The differences of five separate pairs were again treated statistically by means of Wilcoxon rank test, and the results are listed in table 6. None of the compared pairs shows a sig-

Tab. 6. Comparison of transplantations of d—e and ch—a grafts with respect to the degree of burns

Degree of burn	Type of graft	Degree of burn	Type of graft	Test criterion
IIa + III	d—e	III	d—e	1.5
IIa + III	ch—a	III	ch—a	157.0
IIa + III	d—e	IIa + III	ch—a	3.0
III	d—e	III	ch—a	96.5
all	d—e	all	ch—a	279.0

nificant difference. The two extreme groups of results (failures including death and full successes) were compared separately and the data on relative ratio (in percent) of results classified in one or the other selected group were tested in all combinations by Fisher test of equality of two parameters

Tab. 7. Results of transplantation of d—e, ch—a, and a grafts with respect to the severity of burns

Classification of burn	Type of graft	No. of		Percentage of		Index of succeeding
		transplants	recipients	failure	full success	
Critical	d—e	12	10	41	25	0.76
Mean	ch—a	12	11	0	58	2.01
Critical	ch—a	40	34	17	37	1.45
Critical	a	7	7	28	43	1.34

of binomical distribution (Tab. 7). Significance was found neither for failure nor for full success.

In order to evaluate the tested grafts in respect to the severity of the damage, we made use of the common classification of burns, but made more rigorous by classifying even less serious damages as critical, if they were accompanied by complications. The available clinical material was divided into 6 subgroups and the relevant data arranged in Tab. 7. The sample was tested statistically in 4 pairs by Wilcoxon rank test and the results of the evaluation are given in Tab. 8. None of the tested pairs showed significant difference.

Tab. 8. Comparison of transplantations of d—e, ch—a, and a grafts with respect to the severity of burns

Classification of burn	Type of graft	Classification of burn	Type of graft	Test criterion
Critical	d—e	critical	ch—a	252.50
Critical	a	critical	d—e	8.50
Critical	a	critical	ch—a	163.00
Mean	ch—a	critical	ch—a	367.50

In a further test, only the two extreme groups of results were evaluated. We compared the relative ratio (in percent) of results in separate groups and tested all combinations by Fisher test. In the group of critical burns covered with dermo-epidermal grafts, the ratio of failures was significantly higher at the 10 % level of significance when compared with cases transplanted with chorion-amniotic grafts ($p = 0.0915$). The differences between other comparable pairs were insignificant. Likewise, no significant difference was found in evaluating full successes.

SUMMARIZING ASSESSMENT

When one compares the ratio of failures in all transplantations using dermo-epidermal grafts with those using chorion-amniotic grafts (irrespective of the extent, degree, and severity of burn), a significantly lower percentage of failures was found in cases treated with chorion-amniotic grafts ($p = 0.0332$).

No other comparison (i.e. chorion-amniotic against amniotic grafts, and amniotic against dermo-epidermal grafts) shows any statistically significant difference.

When evaluating the criterion of full success, none of the differences was found significant.

CONCLUSION

In general one can state that chorion-amniotic grafts and amniotic grafts do not differ significantly in their therapeutic efficiency from dermo-epidermal grafts. However, chorion-amniotic grafts have a significantly lower ratio of failures compared to dermo-epidermal grafts. Taking only the ratios of full

success or failure into consideration, the best therapeutic effect was found with chorion-amniotic grafts, followed by amniotic grafts; the least effective were transplantations of dermo-epidermal grafts. In view of the fact that percentual differences among some groups are quite large, it can be expected that by increasing in number the statistical samples, some of the differences would become significant. Yet, for the moment we make a rather conservative conclusion that chorion-amniotic grafts are at least equal to, if not better than, dermo-epidermal grafts.

All grafts used in the study were provided by one laboratory and the method of graft processing did not change during the whole period of the test. This assures a high degree of standardization in the preparation of preserved grafts within the frame of biological variability of the tissue employed. Transplantations were performed by three different medical institutions, differing not only in their size and thus in the number of cases treated, but also in the degree of specialization. This was done so on purpose, our aim being to arrive at conclusions with maximum general validity, and not just conclusions applicable to specific conditions. The general validity of the results is further strenghtened by the very rigorous statistical evaluated used.

The results of the study lead to a conclusion that chorion-amniotic grafts provide as yet insufficiently exploited, very suitable and relatively easily available biological material which extends the possibilities of transplantation therapy of burned patients.

SUMMARY

A statistical comparison was made of the results of transplantations using freeze-dried dermo-epidermal grafts with those using freeze-dried chorion-amniotic grafts in the treatment of burned patients hospitalized in three different medical centers. The results convincingly indicate that chorion-amniotic grafts are at least equal in therapeutic efficiency to common dermo-epidermal grafts.

RÉSUMÉ

Comparaison des greffes dermoépidermales et celles de chorion et d'amnios chez les brûlés

R. Klen, H. Skalská

On a réalisé statistiquement une comparaison des greffes des transplantations faites par les greffes dermoépidermales et celles de chorion et d'amnios lyophilisées chez les brûlés qui étaient traités aux trois différents services. Les effets démontrent persuasivement que les greffes de chorion et d'amnios égalent au moins les greffes dermoépidermales.

ZUSAMMENFASSUNG

Vergleich der Dermo-epiderm- und Chorioamniontransplantate bei Verbrannten

R. Klen, H. Skalská

Die Ergebnisse der Übertragung lyophilisierter Dermo-epiderm- und Chorioamniontransplantate bei Verbrannten, die an drei verschiedenen Krankenabteilungen

behandelt wurden, sind statistische verglichen worden. Die Ergebnisse zeigen überzeugend, dass die Chorioamniontransplantate den Dermo-epiderm-transplantaten zumindest gleichwertig sind.

RESUMEN

Comparación de los injertos dermo-epidermales con los de corión y amnion en los pacientes con quemaduras

R. Klen, H. Skalská

La comparación de los resultados en los injertos dermo-epidermales liofilizados con los de corión y amnion en los quemados los cuales fueron tratados en 3 departamentos diferentes, fue hecho por métodos estadísticos. Los resultados muestran presuasivamente que los injertos de corión y amnion igualan por lo menos a los dermo-epidermales.

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IN MEMORIAM

The day of September 17th 1976 when recalling the 95th birthday of the 11 years ago deceased unforgettable teacher, founder of his branch in Czechoslovakia and one of the pioneers of plastic surgery in the world Prof. F. Burian M.D., has become for all of us a day of great sorrow.

The beloved daughter of Prof. Burian, Olga Klásková-Buriánová M.D., died on September 17th after a brief illness, at the age of 60 years.

For many years indeed, doctor Klásková has belonged to our community of plastic surgeons, not only because she had cooperated for many years with her father, but also due to her activity as a scientific worker at the Research Laboratory of the Czechoslovak Academy of Sciences established by him. She devoted her interest to congenital defects, chiefly clefts, which had also been the center of interest to her father during all his life.

Great credit must be given to Dr. Olga Klásková-Buriánová of having summarized and elaborated the life long work of her father, but her persistent care, devotion and love greatly aided his admirable activity till great age. Having sacrificingly accompanied her father to meetings and congresses, many plastic surgeons all over the world will remember her as a merry sensitive, straight and highly educated woman, fully devoted to her family.

To all of us she always been a friend, never to be forgotten. We shall keep her in kind remembrance!

Prof. Helena Pešková M.D., Prague

BOOK REVIEWS

Moulton K. Johnson, M. D., Myles J. Cohen, M. D.: **The Hand Atlas**. Charles V. Thomas, Springfield, Illinois, 1975; hard cover, pp. 89, price not quoted.

This perfectly illustrated topographical anatomical atlas is intended for those who operate on the hand and particularly to those who treat the injured hand. In the accompanying text the authors use terminology published in 1970 by the International Federation of the Hand Surgery Association.

The atlas informs the reader about the topography layer by layer — as the surgeon proceeds during operation — from the skin down. Attached are X-ray pictures of the bones. Perfectly made black and white photographs obtained during the autopsy of the tissues of the hand, unpreserved in any way before, are supplemented by 8 colour pictures of the most complex part of the hand — the palm of the hand — with the vessels injected with red latex and part of the course of tendon sheaths with black silastic. The possible extent of the space in the palm of the hand and the lower part of the forearm is made apparent in X-ray pictures with contrast medium injection.

The size of most of the pictures is very nearly that of the normal hand, or enlarged where it was deemed necessary.

The text and pictorial documentation fall into 10 chapters.

The first chapter gives a description and topographic location of the organs of the volar distal part of the forearm in three layers with particular attention devoted to the carpal tunnel and the retinacula.

The second chapter, devoted to the palm of the hand, is introduced by photographs of the skin lines complete with a projection of their course on the bones, and by pictures of the nerve supply of the skin of the hand. The individual layers give an idea of the location and mutual relationships of the nerves, tendons, muscles and ligaments.

The third chapter deals with the thumb giving information on the specific composition of the skin and subcutis as well as on the functions — grip and grasp — enabled by the arrangement of the bones, joints and muscles. There are also X-ray pictures of the thumb in different functional positions and in the relative positions of the thumb bones and carpals.

The fourth chapter on the fingers presents a description of skin ligaments and pulpous space followed by pictures of the vascular supply, tendons and their sheaths, vincula, joints etc.

The fifth chapter, an independent one, is devoted to the radial area of the hand along with the anatomy of the Fossa tabatière (snuffbox) region.

A description of the anatomical relationships on the dorsum of the hand together with pictures of the vessels, tendons, retinacula, ligaments, dorsal fasciae and carpal bones can be found in chapter 6.

Chapter 7 gives a description of the dorsal area of the thumb and the mechanism of extensor and thenar muscles.

The eigth chapter on the dorsal areas of the fingers opens with a description of the fingernail and an arteriogram of the finger. There is a perfect pictorial documentation of the complicated extension

apparatus as well as the interosseous and lumbrical muscles.

In the ninth chapter the authors classify spaces on the hand as potential and true. The first group includes subcutaneous spaces in between the fingers and on the dorsum of the hand. The latter group in the authors' conception includes dorsal subtendon spaces on the fingers, on the back of the hand, synovial spaces of extensor and flexor sheaths, ulnar and radial bursae, the mediopalmar, thenar, and Paron's spaces. There are extremely instructive pictures of parts of tendon sheaths injected with black silastic and the already mentioned X-ray pictures.

The closing part of the book is a chapter on the motor mechanism of the wrist with X-ray pictures showing the normal position as well as maximum radial and ulnar deviations, flexion and extension, pronation and supination with clearly marked angles, within the range of which the bones move in function.

This beautifully documented atlas with its comprehensive and clearly formulated text ought to be available at every surgical department and consulted even in the operating theatre. The authors certainly deserve thanks for it.

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Höhler, H.: **Plastische und Wiederstellungs-Chirurgie.** Stuttgart-New York, Schattauer 1975. XX + 372 p., 33 figs, 11 tabs, size 165×240 mm, paperback. Price DM 69.

The book, edited by H. Höhler, is a collection of 45 papers presented on September 5th—8th, 1973, at the Frankfurt am M. 4th Conference of German Plastic Surgeons' Association. It is introduced by two of the opening addresses with the papers divided into four groups.

The first group contains 10 papers devoted to surgical operation on ageing and old faces, operations on eyelid wrinkles and wrinkles on the face ad throat. Two of the papers are concerned with plastic surgery and psychiatry. The authors draw attention to some of the physical and mental as well as pathological changes brought about by old age, as well as to the need for psychiatric consultation in necessary cases prior to surgery. More papers are devoted the tactical approach to surgical procedures in wrinkles. Except for some minor surgical subtleties, there is little new to throw light on the problem. Two papers contain reports on errors and possible complications. An analysis of the results of 2,168 cases operated on by different surgeons and compiled by Cholnocky in the USA shows a surprisingly high proportion of complications, some of them rather serious (skin necroses, major haemorrhage, damage done to motor nerve branches, ectropion or even blindness following eyelid surgery, persistent postoperative pain etc.), phenomena we hardly ever meet at our surgeries observing all the rules of physiological operation. Part of the explanation certainly is that in this country such cosmetic defect operations can only be performed by surgeons well-versed in the whole of plastic surgery.

The second group of 9 papers is concerned with the problems of surgical treatment in facial nerve paralysis. It is introduced by a report by W. D. Mühlbauer et al. of Munich. The authors present a description as well as a critical assessment of presently employed surgical procedures in partial and general paralysis, describing operations directly on the nerve such as have become substantially widespread thanks to advances in diagnostics and operative features of modern neurosurgery. The authors go on to discuss procedures involved in the transposition of adjacent unparalysed muscle, free transplantation of muscle from a different part of the body, as well as static methods using biological as well as man-made materials. One report by P. Wilflingseder on 10 years of ex-

perience with allomaterial which made the authors confine its uses only to cases where no other approach was possible (physical and mental state of health, age etc.) can be seen as proof of the end of the era of enthusiasm for artificial materials which lasted for several years and which we in this country never succumbed to. Modern microscopic surgical techniques have extended the scope for successful operations on the nerve itself permitting, as sugested in H. Enderle's paper, even a free transfer of nerve-muscle graft as proposed by Noel Thomson on the basis of new knowledge provided by basic research on the cell and muscle fibril. Three teams of authors present reports on their good experience with this method. W. Mühlbauer et al. provide information on their new method of implating minute platelet magnets in eyelid paralysis.

The third section of the book is entitled burn scars and contains 15 papers. One, by D. Walther, is devoted to the histopathology of wound healing following burn, while the significance of changes in the collagen fibre arrangement in the development of scars is discussed by J. J. Longacre who has been engaged in the problem for 15 years now. There is also a study on the uses of aminoacetonenitrite in the prevention of contractures and on the drug's toxicity, on the effects of vitamin B administration with graphic representation of microangiographic findings in the revascularization of burned areas and transplantations etc. There is an interesting paper by D. L. Larson of Texas on the prevention of development and non-surgical correction of hypertrophic scars and contractures using proper positioning and Jobst's elastic pressure devices. The author of the paper refers to a group of 800 children. Good experience is also reported by Berger. As far as we are concerned, we can only recommend the method from our own experience although, having no such original appliances, we have only been improvizing with them. It appears to be an improvement on what we have been recommending our patients all along — gentle pressure massage using fingers.

Initial experience with prim. y excision and early transplantation — as suggested by Janžeković of Maribor and as increasingly used — is reported on by N. Olivari. In agreement with our own experience the authors concludes by stressing that the method offers best advantage if used in burns affecting 20 % of the surface area with the operation being performed in stages if more than 20 % of the area is affected. Other authors report on contractures on the throat, the therapeutical difficulties of which are recognized by all involved in the treatment of burns, as well as on contractions in the elbow area.

The final portion of the book includes 11 papers on adverse results and complications in plastic surgery illustrated by concrete cases. For those of us who have always rejected the idea of injections of silicone and other materials into tissues there is some justification of our rejection in H. Jenny's report on the disastrous consequences of small breast silicone augmentation and in some others dealing with the development of granuloma as a result of Teflonpaste injection.

The book printed on good glossy paper with clear documentation, though containing much of what has already been published elsewhere in plastic surgery literature, deserves to be recommended for reading to both plastic and general surgeons.

Prof. H. Pešková, M.D., DrSc.

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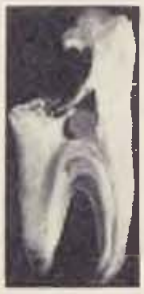

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