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CONTENTS

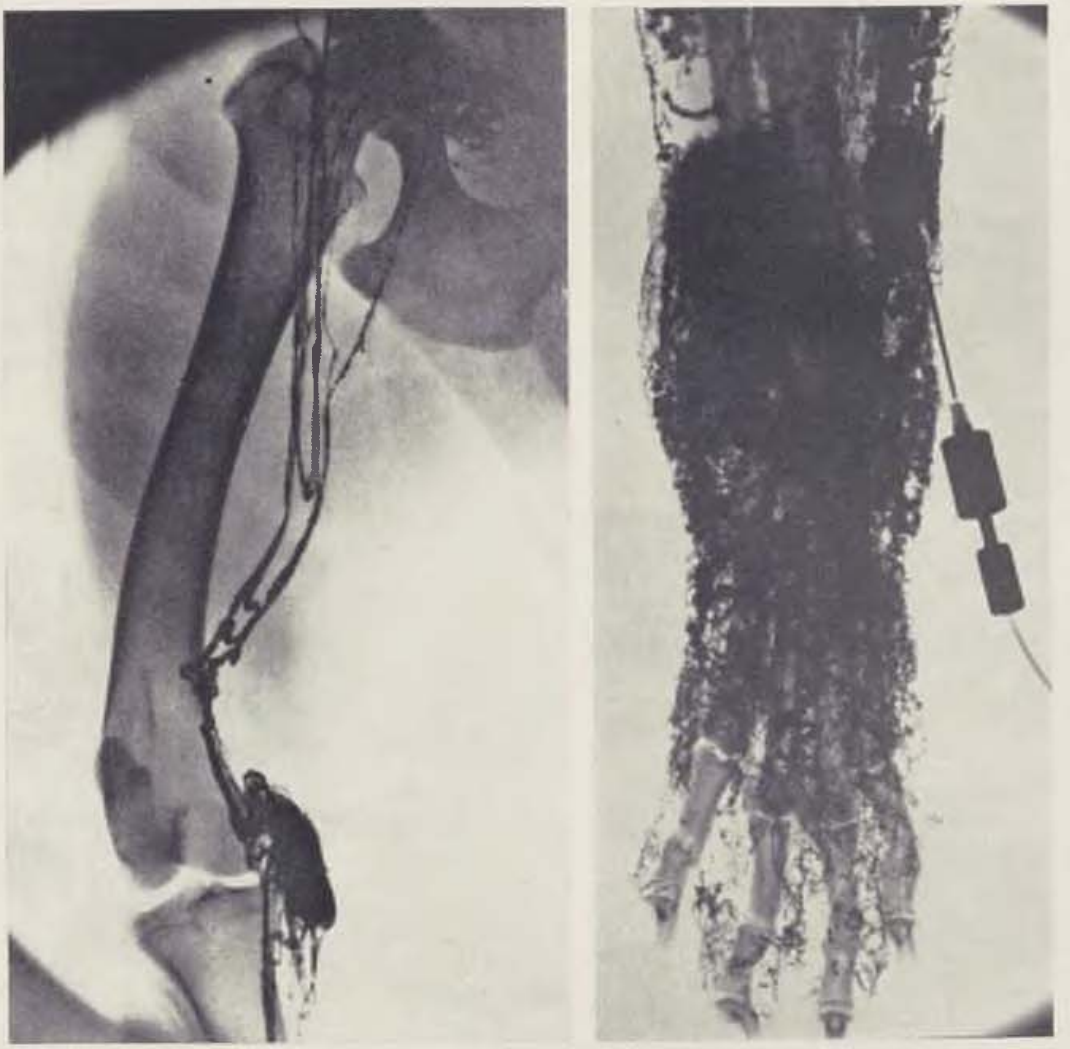

Fig. 1a. Lymphogram of the hind leg of a normal dog. — Fig. 1b. Lymphogram of a dog with chronic experimental secondary lymphedema

J. Moserová, E. Běhounková, Z. Koníčková

EXPERIMENTAL ENZYMATIC NECROLYSIS AND NECRECTOMY IN BURNS

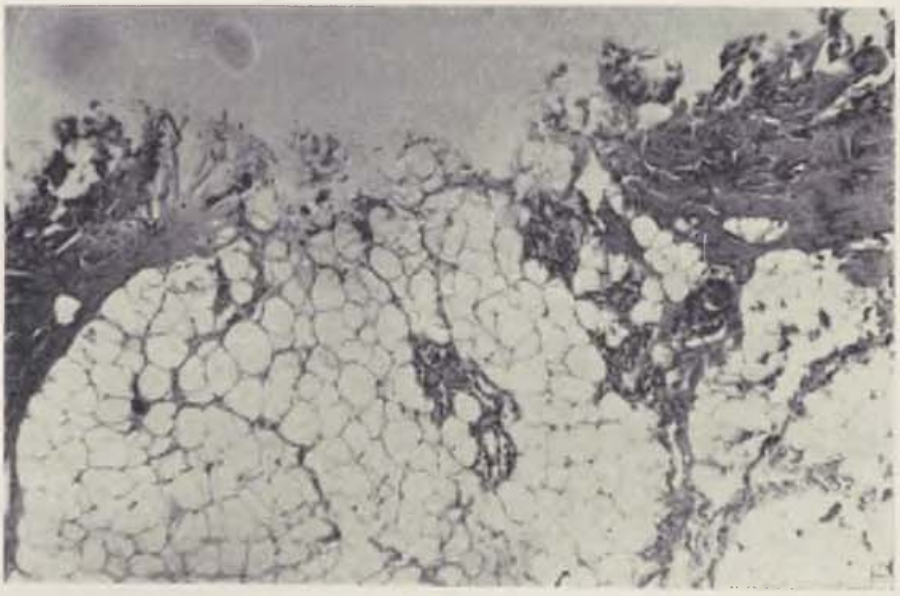

Fig. 1. First day after enzymatic debridement of burn necroses. Subcutaneous fatty tissue with thermally changed remnants of connective tissue bundles. HES, 50× enlarged

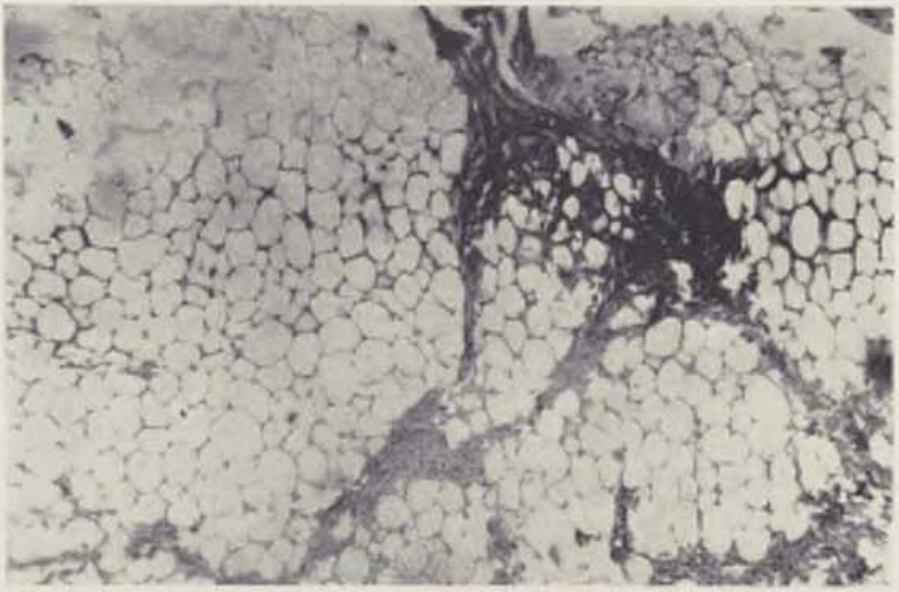

Fig. 2. Seven days after enzymatic debridement of burn necroses. Subcutaneous tissue with residual sequesters of necrotic corium. Massive infiltration in the superficial layers of subcutaneous fat. HES, 50× enlarged

Fig. 3. Seven days after enzymatic debridement of burn necroses. Enzymatic debridement of necrosis was not complete. Epithelization from the viable hair follicles and ducts under the remaining thermally damaged corium may be observed. HES, 50× enlarged

Fig. 4. The first day after total excision of the burn necroses. Subcutaneous fatty tissue with massive cellular infiltration in superficial layers of necrotic connective tissue bundles. HES, 50× enlarged

Fig. 5. 28 days after total excision of burn necroses. Uneven surface of scar tissue. HES, 50× enlarged

Kanton Hospital Zürich (Switzerland) — Department of Plastic Surgery

EXPERIMENTAL LYMPHEDEMA AND THERAPEUTIC CONCEPTS

L. CLODIUS

Most frequently we are confronted with secondary lymphedema of extremities, subsequent to removal or blockage of lymphatics at the root of the extremity.

For therapeutic considerations we should know the answer to the following questions:

— what is the mechanism of this secondary lymphedema;
— why, so many patients, after lymphadenectomies at the base of the extremity, do not get secondary lymphedema — or why do they get it only after months or years?

The reason for secondary lymphedema, according to current concepts, is the resection of lymphatic vessels and blockage of lymphflow by scar tissue. The lymphatic block, at the root of the extremity, leads to a secondary edema within the epifascial compartment, as first described by Lanz and Kondoleon. Capillary filtration exceeds venous resorption and lymphatic return, thus edema fluid, rich in high-molecular proteins, accumulates epifascially. Lymphedema then, primary or secondary, is lymphostatic disease of the epifascial compartment of a limb. Since the times of Lanz and Kondoleon, various forms of therapy have been advocated to minimize the effects of the resulting pathophysiological changes.

Experimentally, the consistant production of chronic secondary lymphedema in animals is very difficult. It has been known since the time of Halsted, Reichert, Drinker and many others, that this is a consequence of the tremendous regenerative capacity of the lymphatics.

The different behaviour of the epi-and of the subfascial compartment in lymphedema (which is especially important for the plastic surgeons) has been known since it was first demonstrated by Lanz and Kondoleon. Anatomically, swelling is only observed within the epifascial compartment, while the subfascial, deep portion of the extremity remains unaffected by disease. From this anatomical finding, the pathophysiological conclusion was drawn, that the mechanism of disorder is restricted to the epifascial compartment of the extremity. Therefore, since Kondoleon up to the present, therapy was considered

necessary only for the skin and subcutaneous tissue compartment. In addition, it was believed, that the epifascial compartment could be drained into the subfascial compartment as a physiological operation (Lanz, Kondoleon, Thomson). The excisional mesaures since Charles, were considered to eradicate the epifascial disease.

We have produced three types of experimental chronic lymphedema in the dog (fore- and hindleg):

Type 1. Total block of both deep and superficial compartment.

Type 2. Total block mainly of deep compartment, preserving an intact skin bridge.

Type 3. Total block of the superficial compartment.

For blocking the deep compartment we have used Etheron, which totally prevents all regeneration of lymphatics (Clodius). Of each type, the clinical picture, lymphographic findings, experimental value and therapeutic considerations are discussed briefly.

Lymphedema Type 1. Clinical picture: There is massive and progressive swelling of the extremity. Cutaneous lymphfistulas result. All animals died within three weeks due to massive loss of proteins. Therefore we call this type malignant lymphedema. Lymphographic findings: There is total lymphflow obstruction in front of the surgically produced block. There the contrast medium flows from the deep to the superficial lymphatics. There is no dilatation of lymphatics. Experimental value: the findings of a total lymphblock suggest, that in the man such a total block is incompatible with life. Compensatory mechanisms (lympho-lymphatic anastomosis, lympho-venous shunts) do not occur in time to save the animal. Therapeutic considerations: We have used this malignant lymphedema for testing free omental transplants (Clodius et al.). Although this did prevent death of the dogs, some developed clinical edema following a latent phase.

Lymphedema Type 2. Clinical picture: this model corresponds with the clinical procedure in men, in whom at the root of an extremity, lymphangiectomy and subsequent irradiation, both leading to fibrotic lymph obstruction, is carried out. In the animal, there is initial swelling, which subsides. Following a latent phase up to five months, without swelling, definitive chronic lymphedema sets in. The concept of the latent phase (Olszewski) is important to remember for every result of lymphedema therapy: While clinically there is no swelling, the process of gradual lymphatic decompensation proceeds for months or years, until finally clinical decompensation: clinical swelling, becomes apparent. Lymphografic findings: There is gradual enlargement of the epifascial lymphatics up to enormous proportions (Fib. 1b), while deep lymphatics dilate only minimally, due to the adjacent unyeilding deep fascia. In contrast to lymphographic findings of a normal limb (Fig. 1a), there is marked dermal backflow as seen in Fig. 1b. Deep lymphnodes as well as their associated deep lymphatics cannot be demonstrated. Occasionally spontaneous lymphovenous shunts are demonstrated by cinelymphography. Experimental value: As an experimental model, its appearance, occurrence, lymphographic

and pathophysiologic pictures closely parallel those of secondary lymphedema in the extremities of man. Therapeutic considerations: We have observed that nature has a number of means at her disposal to overcome a lymph block. By using this model of lymphedema we have been able to test the effectiveness of surgically created lymphonodo-venous (Olszewski and Nielubowicz) and lymphaticovenous shunts (Sedláček, Cordeiro, Degni) as a means for future lymphedema therapy. Especially, we are evaluating the problems with artificial lymphovenous shunts, which are: Differences of pressure and differences of flow and the quantitative problem: Can we find and anastomose a sufficient number of collectors for adequate drainage.

Lymphedema Type 3. Clinical picture: As in Type 2 chronic edema develops after a latent phase. Lymphographic findings: There is extreme cutaneous backflow in front of the block, as in Type 2. Experimental value: This model demonstrates, that chronic lymphedema occurs after an epifascial blockage only. It also shows, that the subfascial lymphatics, following a latent phase, undergo decompensation with resultant failure to remove the lymphatic load from the extremity. Clinically, we have encountered lymphedema of this type in cases of congenital constricting bands of the extremities. Therapeutic considerations: We are using large cutaneous flaps (rotation flaps and tube pedicles) as well as epithelial tubes, constructed according to the method of Denis Brown (application of the buried intact epithelium technic) for investigating the quantitative problem of such drainig operations (Šmahel and Clodius).

Acknowledgment: The author wishes to express his gratitude to the Swiss National Funds, The Swiss and Zürich Cancer Ligue and to Hoffman-LaRoche for making it possible to carry out the experimental part of the paper.

SUMMARY

The findings of the three models of experimental lymphedema which we have presented, suggest a revision of the classical pathophysiological concept of chronic lymphedema of the extremities and of mechanisms for relief, nature and surgery can provide. Various measures of surgical therapy can be investigated in the experimental animal and long term control of therapeutic mechanisms is possible.

RÉSUMÉ

Lymphoedema expérimental et les conceptions thérapeutiques

L. Clodius

Les constatations faites sur la base de trois modèles du lymphoedema expérimental étant décrits dans ce travail-ci prouvent qu'il est nécessaire de faire une révision de la conception pathophysiologiqe classique du lymphoedema chronique des extrémités et des méchanismes de l'aide laquelle peut être offerte par la nature et la chirurgie. On peut examiner de différentes mésures dans les expériences faites sur les animaux. Celles-ci rendent possible même de faire un contrôle de longue durée des interventions médicales.

ZUSAMMENFASSUNG

Experimentelles Lymphödem und therapeutische Konzeption

L. Clodius

Die Befunde auf Grund von drei in der Arbeit beschriebenen Modellen des experimentellen Lymphödems bezeugen die Notwendigkeit der Revidierung der klassischen pathophysiologischen Konzeption des chronischen Lymphödems der Gliedmassen und der Mechanismen der Hilfe, die von der Natur und Chirurgie geleistet werden können. In Tierversuchen können verschiedene Massnahmen untersucht werden; sie ermöglichen gleichfalls eine langzeitige Kontrolle der therapeutischen Eingriffe.

RESUMEN

Linfedema experimental y concepciones terapéuticas

L. Clodius

Los hallazgos adquiridos en la base de tres modelos del linfedemo experimental en esta obra demuestran la necesidad de revisar la concepción patofisiólogica clásica del linfedema crónico de las extremidades y los mecánismos de ayuda la cuál puede ser ofrecida por la naturaleza y la cirugía. Varias medidas pueden ser comprobadas durante los experimentos en los animales; los experimentos facilitan al mismo tiempo un control de larga duración de las intervenciones terapéuticas.

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MACROSTOMIA. A MODIFIED TECHNIQUE OF SURGICAL REPAIR

S. JAWORSKI

Macrostomia is a rare anomaly, occuring about 1 in 80.000 live births. It may be unilateral or bilateral, isolated or associated with facial syndromes (mandibulofacial dysostosis, Goldenhar) as their more or less regular component (6).

A note on embriology and pathogenesis.

The normal lateral extent of the opening of the mouth is at the point of bifuraction of the maxillary and mandibular processes. Later, this broad mouth slit is reduced by progressive fusion of the lips and by the development of the muscles of mastication and of facial expression.

Macrostomia results from faulty development of the first branchial arch in consequence of deficient amount of mesoderm and of its abnormal migration. The cleft extends from the commissure of the mouth out into cheeks but usually

Fig. 1. Disjunction of orbicularis oris and buccinator visible when the lips are pursed as in whistling

no further than the anterior border of the masseter muscle. The skin, orbicularis oris, buccinator and buccal mucosa are involved. Functional deficiency of the muscles can be demonstrated when the lips are pursed as in whistling. Articulation and taking of the foods, especially fluids, may be disturbed in some cases.

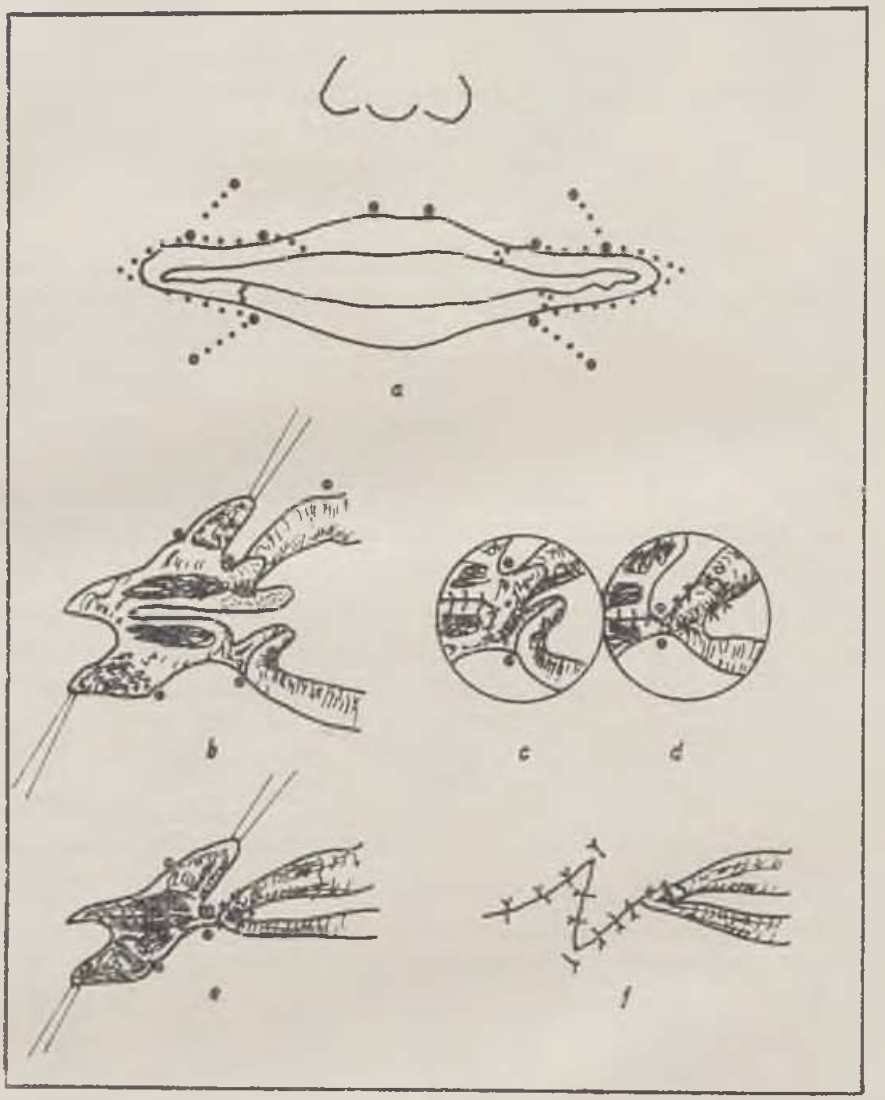

Fig. 2. Diagrams illustrating successive steps of operation (details in text)

TREATMENT

Approaches to the problem of treatment have been outlined by several workers but very little information is available on the details of surgical technique (1, 2, 3, 5). It therefore seems justified to give an account of the surgical measures undertaken in our five patients affected with macrostomia.

Commonly performed operation consists of a simple 3-layered closure of the fissure. Function is rather well restored if the split muscles are properly sutured. Cosmetic effect, however, may be unsatisfactory as the straight cutaneous scar running over the muscle suture usually shows the tendency to sink below the level of the surrounding skin thus producing the so-called stigma of the cleft.

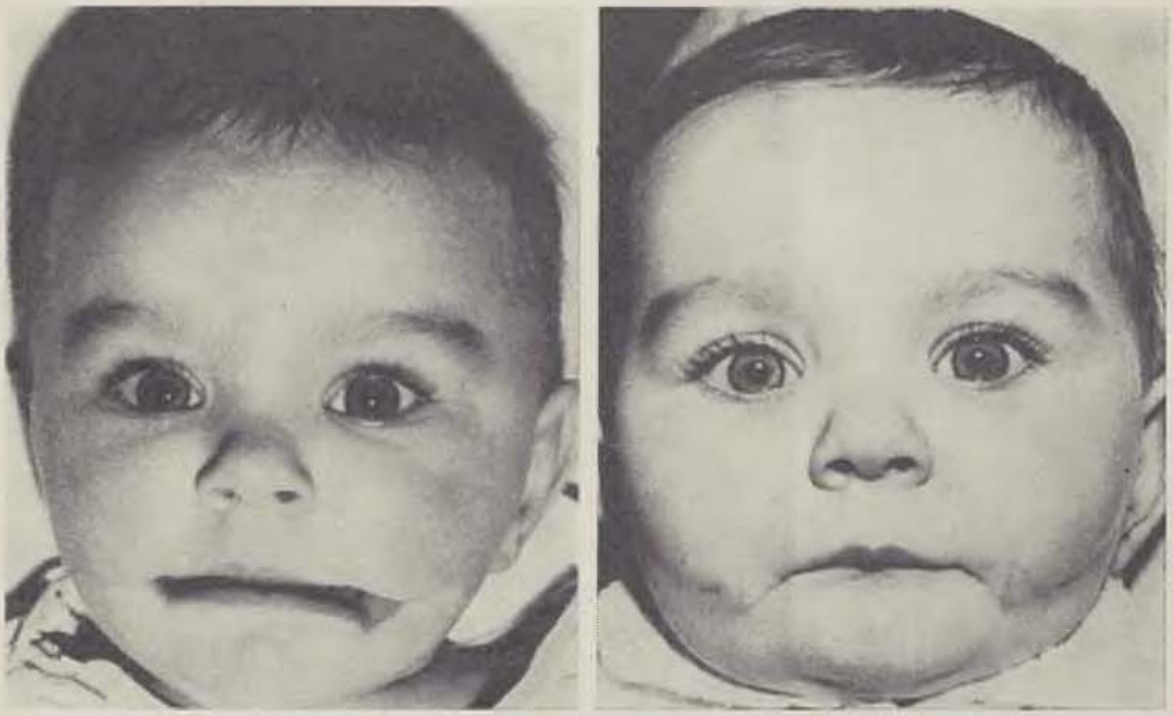

Fig. 3a. Two-year old girl with bilateral isolated macrostomia. — Fig. 3b. The same child after one year since surgery

On the other hand, the suture of the vermilion situated directly in the angle of the mouth may contribute to the poor healing and to the development of painfull erosions. Facial asymmetry may appear later, due to the contracture of the straight cutaneous scar and to excessive scarring of the oral angle.

In order to avoid all those undesirable complications I have introduced the modification to the surgical technique described by Longacre et al. in 1963 (4).

Operation is performed in general anaesthesia with endotracheal intubation. Owing the intranasal insertion of the tube, the operative field si well exposed and there is no additional tension which would be produced by the tube attached to the lip.

From the points marked on each of the peaks of Cupid's bow the normal sites of oral angles are established. It can be performed with precision as the vermilion is well distinguishable from the everted buccal mucosa of the macrostomic fissure. Identical points are marked on the lower lip. They represent starting points for the line of incision marked on the border of the skin and buccal mucosa around the fissure.

As a successive step, two Z-plasty triangular flaps are produced at the angle of 60 degrees. The upper flap has paramedial, and the lower one lateral base. In the vermilion of the lower lip, lines of incision are made laterally to the point marking the angle. A corresponding line of incision on the upper lip is situated paramedially from the same point. Incisions were performed along the designed lines. Both skin flaps with subcutaneous fat and mucosa along the whole length of the fissure are dissected as well as both mucosal flaps for reconstruction of the oral angle. Split muscles are then exposed on both borders.

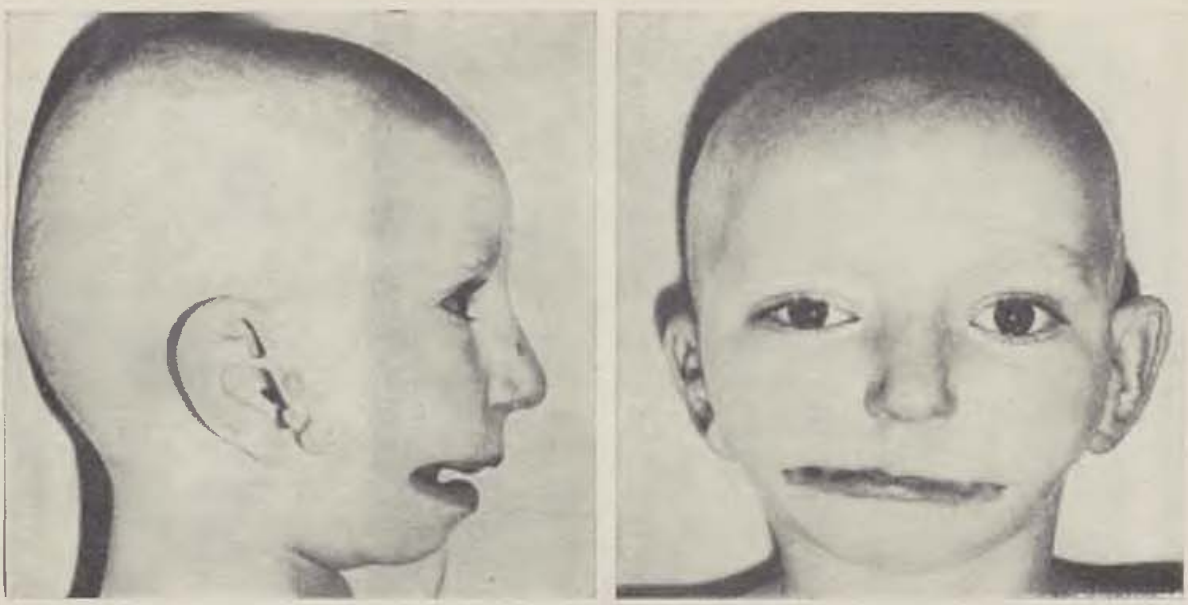

Fig. 4a, b. Five-year old girl with bilateral macrostomia associated with maldevelopment of the mandible and preauricular chondromas

The buccal mucosa is the first to be sutured after excision of its excessive amount and precise approximation of the borders. Interpolated suturing of mucosal folds in the area of the oral angle is an essential moment of the operation. The flap from the upper lip is sutured into the site of the base of the flap on the lower lip, from the oral side. The latter flap, after its precise fitting, is sutured into the defect of vermilion on the upper lip. No suture is running within the oral angle. In the next step, the muscles and transposed triangular skin flaps are sutured. The middle portion of Z-plasty must correspond to the course of the labio-buccal fold.

Fig. 4c, d. The same child after surgery

The above operative technique was applied in the treatment or our patients with succesful functional and cosmetic effect.

SUMMARY

Detailed account of surgical treatment of macrostomia is presented. The children were operated on with the use of technique designed by Longacre with author's modification in respect to the repair of the oral angle.

RÉSUMÉ

Macrostomie. Technique modifiée de le correction chirurgicale

S. Jaworski

On a décrit en détail le traitement chirurgical de la macrostomie. Dans les opération des enfants on emploie la technique indiquée par Longacre qui se porte — dans la modification de l'auter — vers la correction des commissures labiales.

ZUSAMMENFASSUNG

Makrostomie. Modifizierte Technik der chirurgischen Korrektur

S. Jaworski

Der Autor beschreibt eine Methode der chirurgischen Behandlung der Makrostomie. Bei Operationen von Kindern wird eine Technik benutzt, die von Longacre angedeutet wurde und die in der Modifikation des Autors auf die Korrektur der Mundwinkel gerichtet ist.

RESUMEN

Macrostomia. Técnica modificada de la corrección quirúrgica

S. Jaworski

Fue descrito detalladamente el método de curación quirúrgica de la macrostomia. En las operaciones de niños fue empleada la técnica indicada por Longacre, en la modificación del autor dirigida al reajuste de las comisuras labiales.

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A NEW METHOD OF LIP SUTURE IN UNILATERAL CLEFT

L. BAŘINKA

The modified Veau's operation has been applied in principle at the Department of Plastic Surgery in Brno from 1949 till 1971 in 3.800 patients with cleft lip, possibly with cleft palate.

It ought to be stressed that 25 years of controlling all these patients, have convincingly proved that the method has brought satisfactory results from the functional aspect. From the view of anatomic formation of the lip, however, V-excision has not fulfilled all expectations. Such a complicated, and dominat-

Fig. 1. Suture of the lip according to Veau's method in our modification

ing sector of the upper lip, as the filtrum and its typical prominence (tuberculum labii maxillaris Cupid's bow) is, could not be reconstructed by this method, without remaining more or less conspicuous. The height of the lip in the place of the suture was lower in comparison with the healthy half and the resulting linear scar formed an unfavourable line of the prolabium. This garland

Fig. 2, 3. Condition after suture according to Veau. The typical bow form of the lip with the scar is apparent

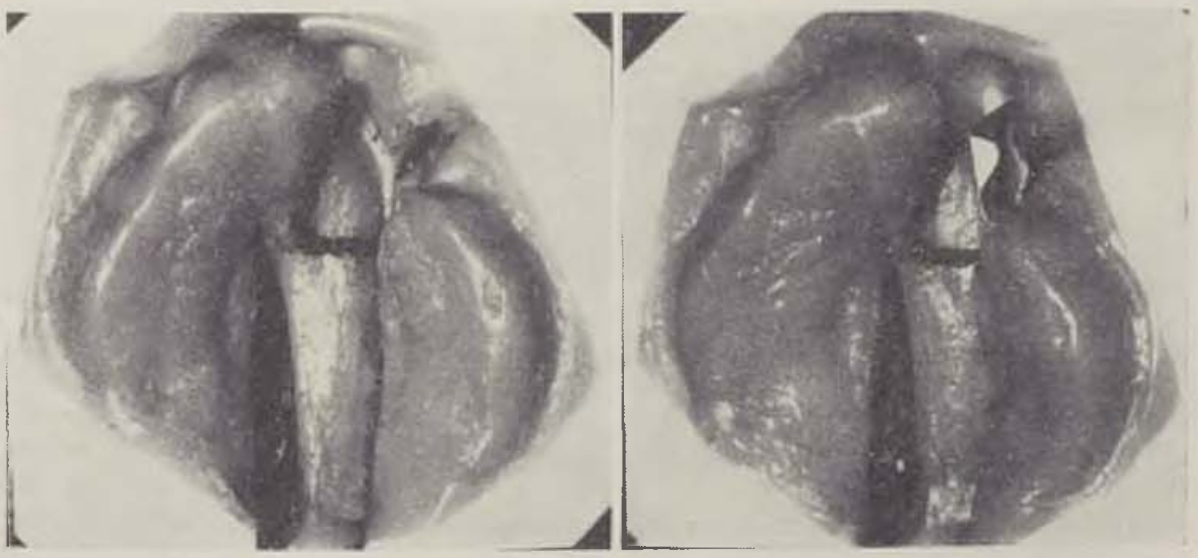

Fig. 4, 5. Vomeral flap, its extent and method of lifting and twisting into the discision of the freed wing (marked by arrow)

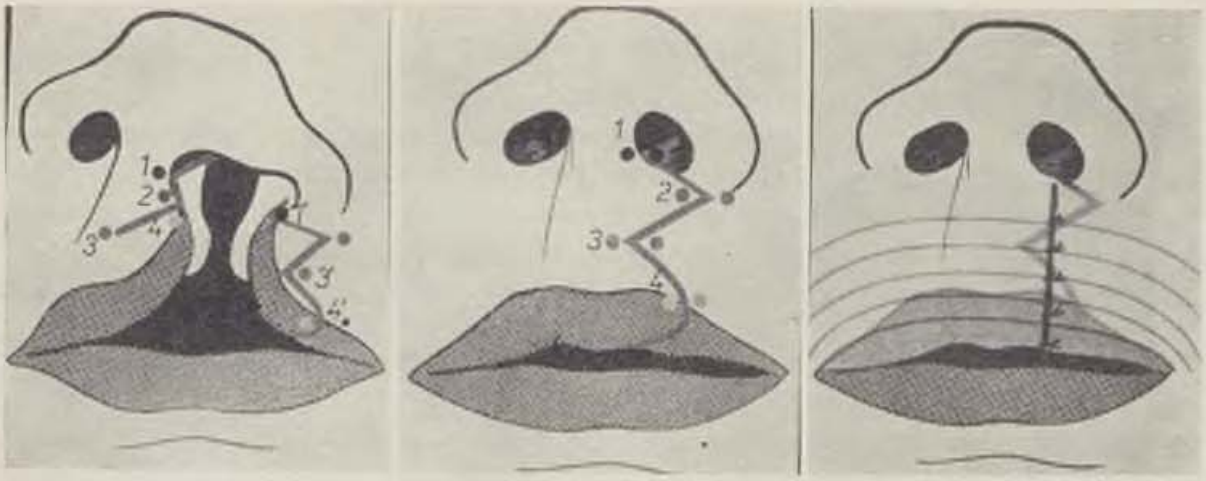

Fig. 6, 7. Demonstration of the skin incisions and method of shifting the flaps marked by numbers 1—4. The cross hatching, marks the tissue which will be removed. — Fig. 8. Diagram demonstrating the resulting suture of the lip orbicular musculature

"curtain" of red, influenced the general esthetic impression unfavourably and this could not be even improved by the fine scar with accurate adaptation of the labium red and a well formed nasal wing (Fig. 1, 2, 3).

Although we were aware of these disadvantages and knew that quite a number of plastic surgeons has endeavoured in the past fiften years to

Fig. 9

elaborate better surgical procedures, we yet remained conservative for many reasons.

It is not the intention of this report to analyze the individual methods and their disadvantages which are generally known. We should like to remark that we have been in a position to study for a long period at home and abroad the operational results according to Le Mesurier, Hagendorn-Le Mesurier, Brown-

Mc Duwel, Millard and Tennison. We were also able to establish from the individual surgical procedures some sort of synthesis of the favorable findings of these methods and to influence by it, the elaboration of our submitted method. It was chiefly our intention to continue in the Czechoslovakian tradition in the treatment of clefts which we believe to be rich and of long standing.

Fig. 9, 10. Demonstration of the incision in skin and mucosa and the vomeral incision for freeing the flap (marked by arrow)

Fig. 11. Method of suture of the musculature of the orbicular muscle

We started out chiefly from the principle of functional revival of the lip, which should not be limited only to the esthetic aspects, which might be sometimes short-lived and might disappear due to the development of the patient.

With these aspects we approached the elaboration of our new method which requires a fine handling of the operated on tissues (physiologic operational technique) and their correct functional integration (Fig. 6—12).

Since 1971, 320 children with unilateral cleft were operated on by our new method, they were systematically controlled and the first findings evaluated, appear to be very favourable.

Fig. 12. Wedging of the lateral skin wedge into the discision of the medial part of the lip, prior to the skin suture

We respected the following three time-proved principles from the former surgical procedure:

1. We never disturb the circular course of the musculature during its suture. This means that we are opposed to skin incisions en bloc the musculature included, as some methods demand. We always suture musculature broadly in order to establish a physiologic barrier around the oral aperture (Fig. 8 and 11).

2. We endeavour primary reconstruction of the deep vestibulum in order to achieve later a good fixation of the orthodontic apparture. The fixated lip with shallow vestibulum or the mucosal folds, require a further surgical step, sometimes soon after the first operation.

3. We observe perfect reconstruction of the nasal entry, nasal floor and correct formation of the wing. Kobáček's vomeral flap has been most satisfactory in this procedure (Fig. 4, 5, 7).

Application of the vomeral flap removes some disadvantages caused by the former procedure. Firstly, the entire vomer area is not exposed — it used to leave a widely opened defect of the mucosa, open to infection from the nasal cavity and later shrinkage. Lifting and twisting of the wedge of the vomeral mucosa by Kubáček's method when closing the nasal floor solves furthermore

the lack of reconstruction material and affords the final zig-zag mattress suture which prevents later stenoses of the vestibulum nasi and passage of the nose to be formed. It also affords good conditions for primary closure of the front pole in suture of the palate. Finally, incision in the course of the vestibular fold into which the vestibular flap is turned, solves well the good formation of the retracted wing and thus secures simultaneously also the shifting of the musculature in medial direction and affords suture of the musculature without tension.

a

Fig. 13a, b, c. The complete left-sided cleft and the result after operation by the new method after 6 days and after 7 months

b

c

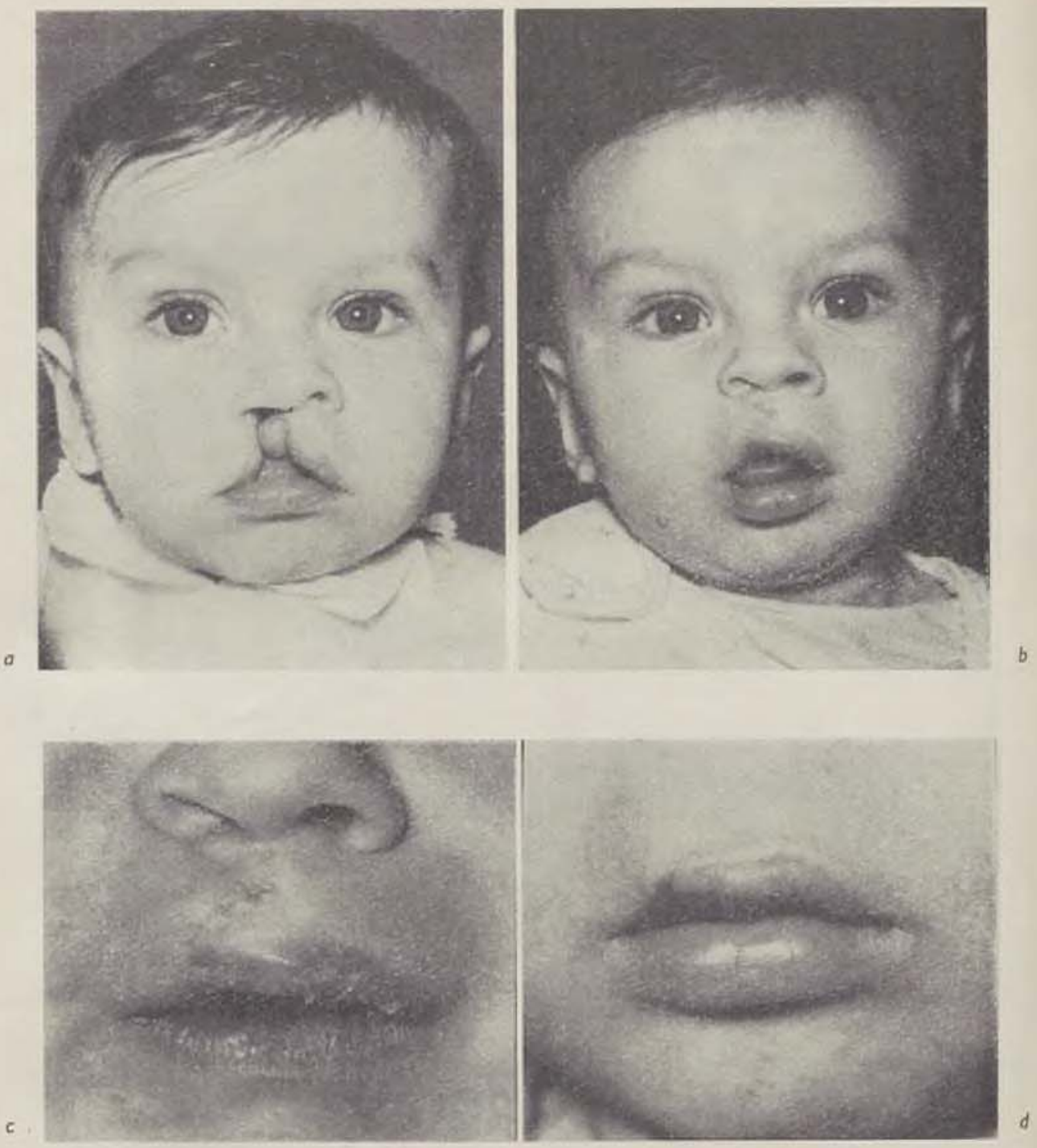

Fig. 14a, b, c. The resulting condition 10 days after suture of the lip and the complete right-sided cleft. — Fig. 14d. Result after 8 months

Our new procedure is a continutation of these 3 principles, where only the incision of skin and mucosa in the vestibulum is adapted, whereby a primary deep vestibulum on the principle of Z-plasty is achieved.

The present findings disclose that any contraction in the skin and mucosa part of the suture is excluded.

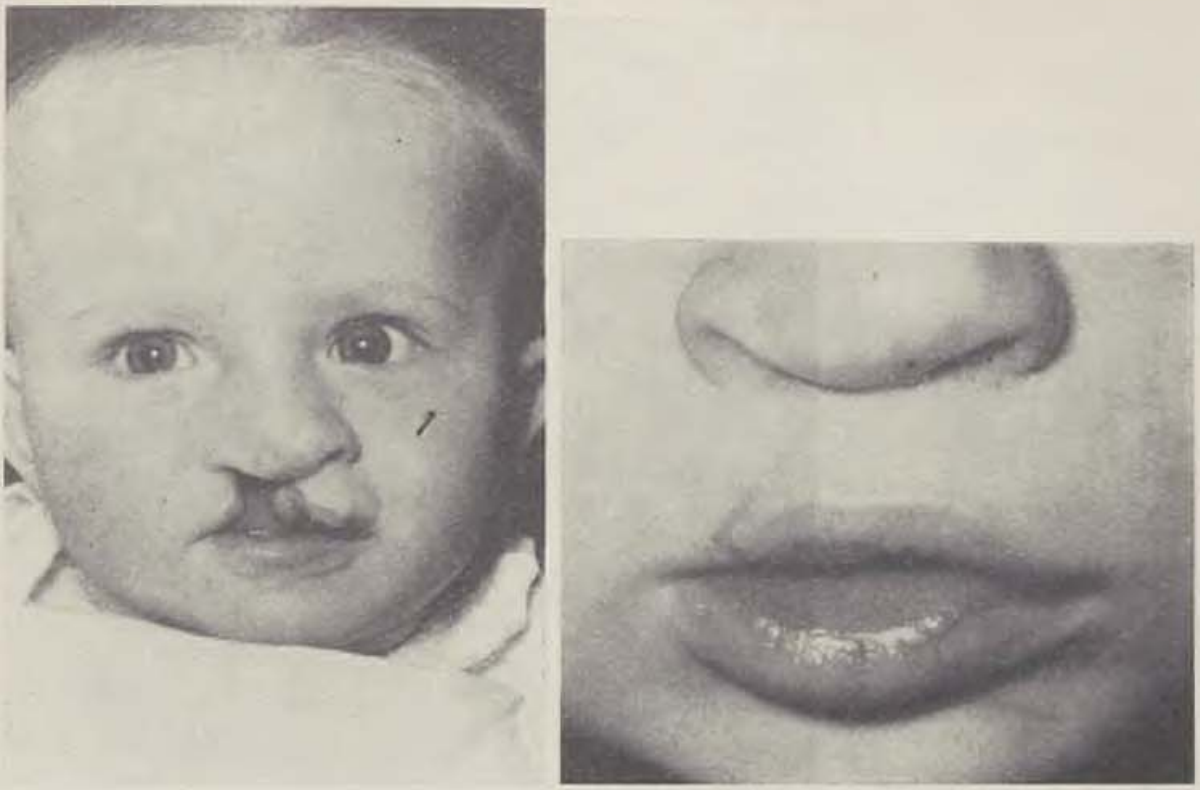

Fig. 15a, b. The resulting condition after 6 months since operation of the cleft lip and the complete right-sided cleft

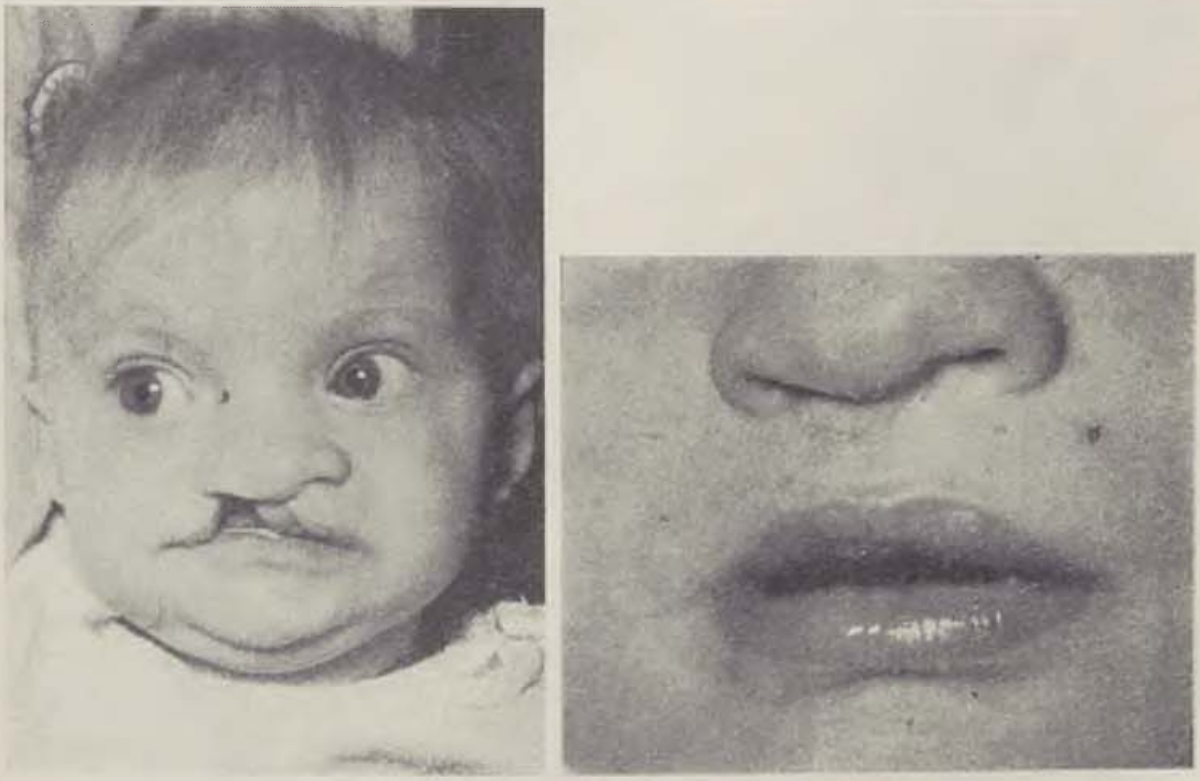

Fig. 16 a, b. Result after 6 months since operation of the complete right-sided cleft

Fig. 17a. Condition prior to the operation of the lip in complete left-sided cleft with skin bridge

Fig. 17b, c. Resulting condition after 2 years with detail of the lip scar

A further great advantage of our method in comparison with the former one, is a perfect formation of the lip without the undesirable future of secondary corrections which previously were very frequent. The efective primary result in unilateral cleft defects of different extent appears thus in the foreground (Figs. 13 to 20).

CONCLUSION

It was our intention to demonstrate the operational procedure of our new method applied in unilateral cleft defects of the lip of different extent in

a

b

c

Fig. 18, b, c. Incomplete cleft lip and result after 6 days and after 6 weeks

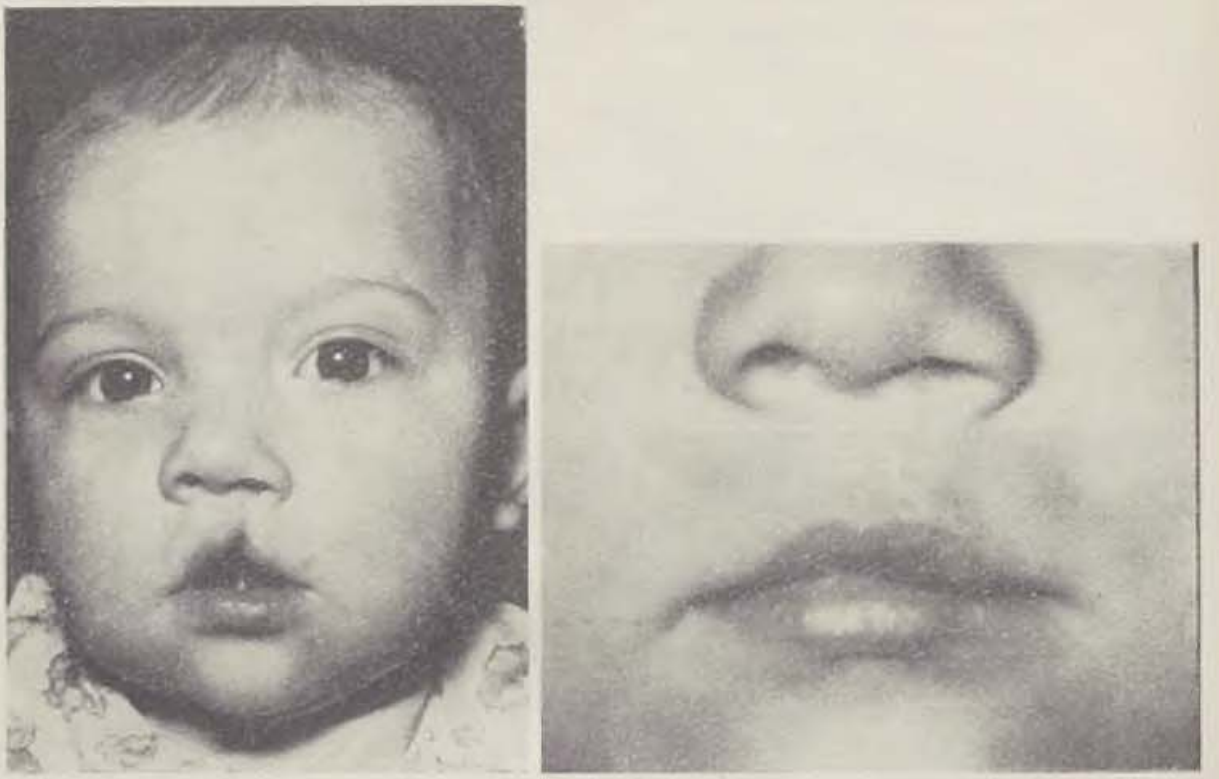

Fig. 19a, b. Incomplete left-sided cleft of the lip and result after 6 months

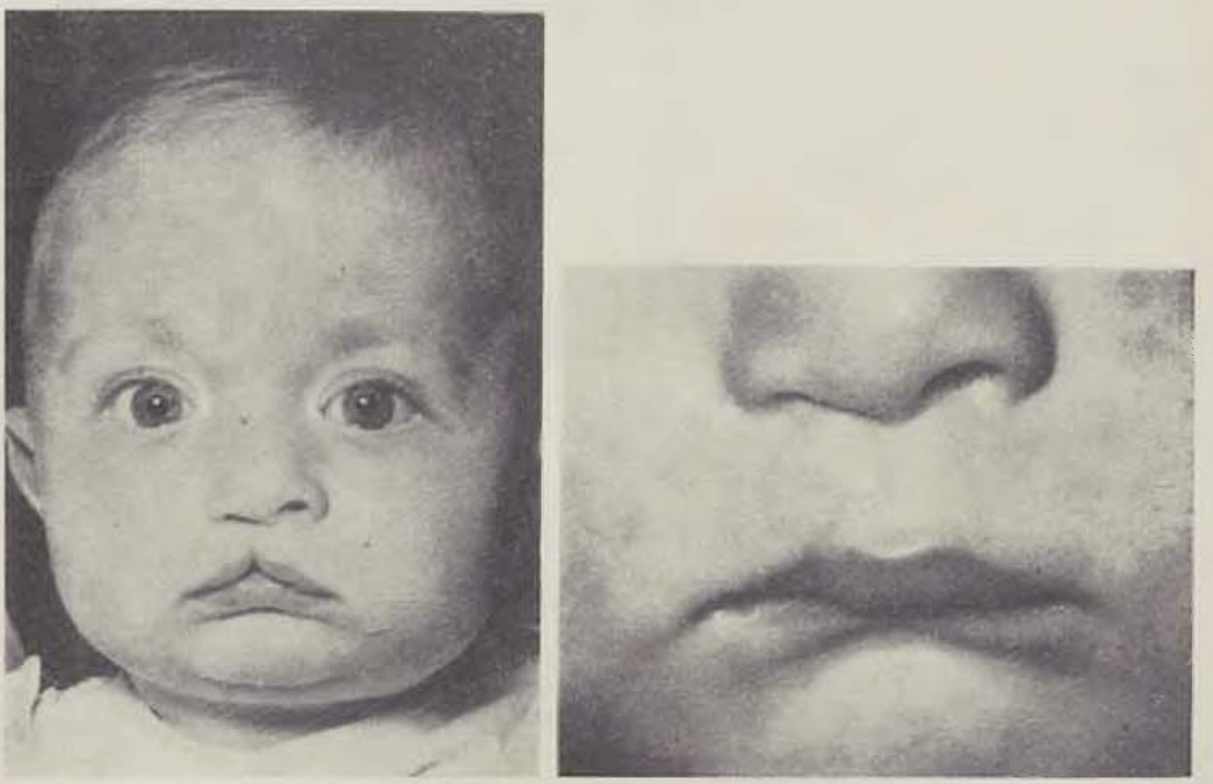

Fig. 20a, b. Incomplete cleft of the lip on the right and a heavier deformation of the nasal wing and result after 6 months

comparison with the previous V-excision. The first experience and results were evaluted in 320 operated on patients since 1971 at the Department of Plastic Surgery in Brno. We are justified after four years of experience, to point out already to-day the numerous advantages of the new method, which due to its simplicity makes no great demands upon any plastic surgeon with basic knowledge. H. S.

SUMMARY

At the Department of Plastic Surgery in Brno, 3.800 patients with cleft lip were operated on since 1949 till 1971. Till that time, a modified method on the principle of Veau's operation was applied. The results not being satisfactory, a new method was elaborated which is demonstrated on diagrams and figures. Since 1971 till 1975, 320 patients with unilateral cleft of the lip of different extent, were operated on by the new method. The results appear to be much more favourable when compared with the former V-excision. The method is simple and applicable in all unilateral clefts of the lip.

RÉSUMÉ

Nouvelle méthode de la suture de la lèvre en cas d'une fissure unilatérale

L. Bařinka

Dès 1949 jusqu'à 1971 3800 patients ont été opérés pour la fissure de la lèvre à la clinique de chirurgie plastique à Brno. Jusqu'à ce temps-là on a employé une méthode modifiée sur la base de l'opération de Veau. Nétant pas contant des résultats on a élaboré une nouvelle méthode illustrée sur les schèmes et les images. A l'aide de cette méthode on a opéré de l'année 1971 jusqu'à 1975 320 malades souffrant d'une fissure de la lèvre des différentes dimensions. Les résultats apparaissent beaucoup plus favorables en comparaison avec la V-excision antérieure. Il s'agit d'une méthode simple qui entre en jeu dans toutes les fissures unilatérales de la lèvre.

ZUSAMMENFASSUNG

Neue Methode der Lippensutur bei einseitiger Spalte

L. Bařinka

An der Klinik der plastischen Chirurgie in Brno wurden in den Jahren 1949—1971 insgesamt 3800 Patienten mit Lippenspalte operiert. Bis zu diesem Zeitpunkt wurde die modifizierte Methode auf dem Prinzip der Veau-Operation gebraucht. Mit den Ergebnissen waren wir nicht zufrieden und aus diesem Grunde ist eine neu Methode erarbeitet worden, wie sie in Schemen und Abbildungen dargestellt ist. Mittels der neuen Methode wurden in der Zeitspanne 1971—1975 320 Kranke mit einseitiger Lippenspalte verschieden Umfanges operiert. Die Ergebnisse erweisen sich als wesentlich günstiger im Vergleich zu der früheren V-Exzision. Es handelt sich um eine einfache Methode, die bei allen einseitigen Lippenspalten mit Erfolg eingesetzt werden kann.

RESUMEN

Un método nuevo de la sutura del labio en la fisura unilateral

L. Bařinka

En los años 1949-1971 fueron operados 3800 pacientes con fisuras del labio en la clínica de la cirugía plástica de Brno. Hasta a quel tiempo fue empleado un método modificado en la base de la operación de Veau. Los autores no estuvieron contentos con los resultados y por eso un método nuevo fue desarrollado, como está demonstrado en los esquemas y en los cuadros. Desde el año 1971—1975 fueron operados 320 pacientes con una fisura del labio unilateral de varia extensión con ayuda de este método. Los resultados parecem mucho más favorables en comparación con la V-excisión anterior. Se trata de un método simple con aplicación en todas las fisuras del labio unilaterales.

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EXPERIMENTAL ENZYMATIC NECROLYSIS AND NECRECTOMY IN BURNS

J. MOSEROVÁ, E. BĚHOUNKOVÁ, Z. KONÍČKOVÁ

The aim of the following experiments was to study the effectiveness of the preparation Debridin in the debriding of burn necroses and to study the course of healing of burned areas after enzymatic debridement.

The authors verified the effectiveness of collagenase of the microbe Clostridium histolyticum in prior experiments in vitro, incubating samples of burned and unburned skin in an enzyme solution (Moserová et al., 1971), and in experiments in vivo in laboratory pigs, testing the effectiveness of the enzyme at different concentrations and in different ointments (Moserová et al., 1974).

Debridin contains collagenase and an admixture of unspecific proteases in an anhydrous ointment base; the preparation can be stored in this form without loss of effectiveness.

METHODS

In the experiments the authors used adult laboratory pigs, weight 25—30 kg. Altogether 120 animals were used. Circular burns of 24 cm^2 size were induced on the sides of the animal; the burn in the centre penetrated the entire thickness of the skin, on the periphery the burn only affected the more superficial layers of corium. The burn was induced by a non-contact source of standard output. On each animal 3—6 burned areas were placed.

The control zones were left uncovered and untreated. On a further group of burns, a layer of about 2 mm of Debridin ointment was applied immediately after the burn, covered by dry gauze, the dressings were fixed by adhesive tape. The dressings were removed after 24 hours and the burned areas were macroscopically and microscopically evaluated.

In a further group of burns, necroses were radically excised on day 0. and the resulting defects were allowed to heal spontaneously.

The studied areas were evaluated macroscopically and samples for histologic examination were taken on day 0., 1., 7., 14., 21. and 28.

Tab. 1. The mean values of scar areas during the course of healing (in absolute values)

	Control	Collagenase	Excision of necroses
	cm^2	cm^2	cm^2
Day 0.	n = 27 x = 21,70±2,02	n = 22 21,27±1,91	n = 15 x = 23,27±3,10
Day 7.	n = 28 x = 26,80±2,78	n = 22 25,5±3,95	n = 15 x = 21,61±8,66
Day 14.	n = 28 x = 22,90±6,76	n = 22 21,15±6,02	n = 15 x = 12,33±5,45
Day 21.	n = 28 x = 18,30±4,75	n = 22 15,83±4,51	n = 15 x = 10,01±3,75
Day 28.	n = 28 x = 14,60±4,38	n = 22 12,25±4,30	n = 15 x = 8,23±2,70

The outline of the healing area was traced in the respective time periods and the areas were evaluated planimetrically (the external circumference of the epithelialized dermis without hair was traced).

RESULTS

Enzymatic necrolysis by Debridin:

It was macroscopically and microscopically ascertained that after 24 hours complete necrolysis occurs in the homogenized part of the corium. In animals with a thicker dermis a thin corium layer remained at the base and manifested thermal changes of a lesser degree.

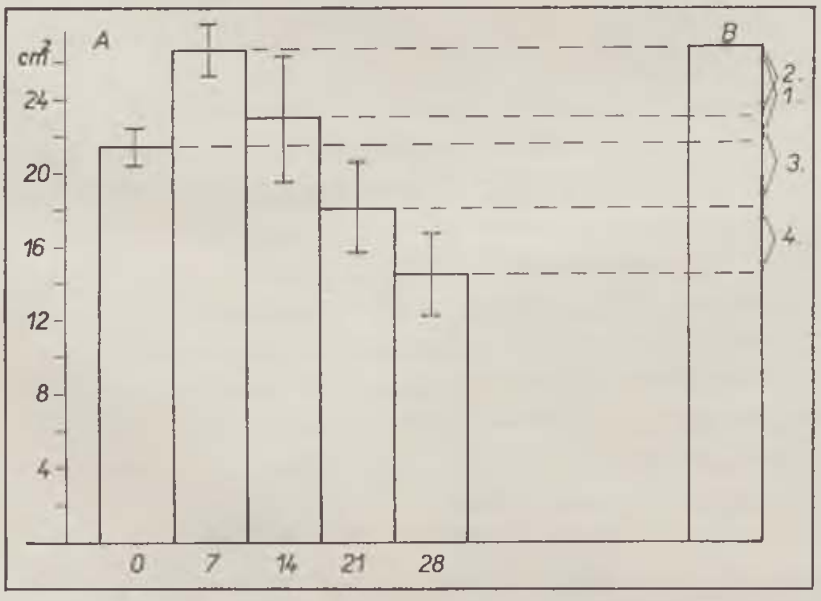

Diagram 1. A = Area of control burns, 0—28 days, B = Extent of scar contraction in week 1.—4.

Course of healing

Macroscopic observations showed rapid spontaneous epithelization of the burns treated with Debridin proceeding from the edges and from undamaged skin adnexae in the base of the defect. In the first weeks purulent secretion was observed only rarely on defects with granulation tissue in the centre of the area, similarly as in the control zones. In a number of defects a thin

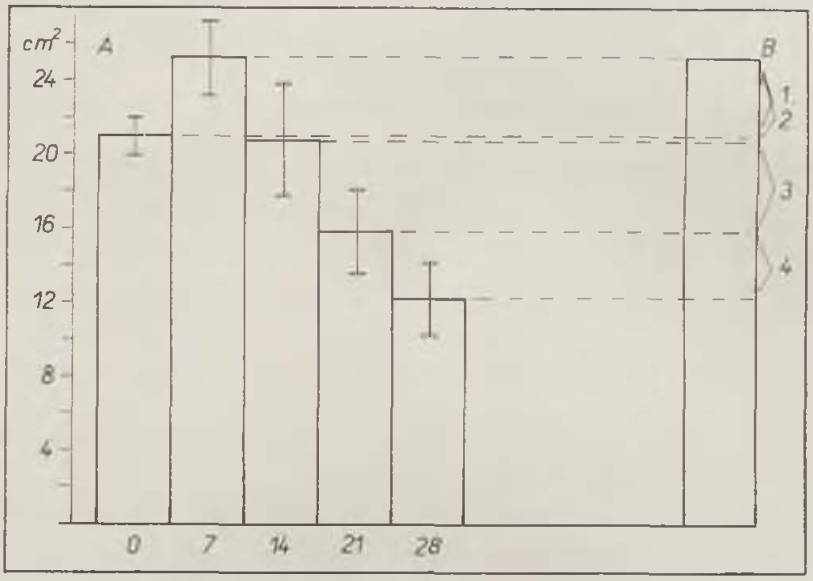

Diagram 2. A = Area of scars after enzymatic debridement of necroses day 0.—28., B = Extent of scar contraction in week 1.—4.

parchment eschar formed on the surface after debridement, but complete epithelization of the defect occured in the majority of cases. The eschar was observed in cases, where a dermis layer persisted on the base of the area 24 hours after Debridin application.

According to microscopic findings it has been ascertained that in the burns treated by Debridin a significantly lesser inflammatory infiltration occurs on the border of thermal changes in comparison with the controls, even in cases

Tab. 2. The mean values of scar areas during the course of healing (in %)

	Control	Collagenase	Excision of necroses
Day 0.	100,00 ± 9,31	100,00 ± 8,98	100,00 ± 33,00
Day 7.	123,00 ± 12,81	119,00 ± 18,57	92,97 ± 37,24
Day 14.	105,53 ± 31,15	99,41 ± 28,29	53,02 ± 23,44
Day 21.	84,36 ± 21,90	74,40 ± 21,20	43,04 ± 16,04
Day 28.	67,31 ± 18,22	57,58 ± 20,21	35,39 ± 11,61

Tab. 3. Contraction of healing areas in individual weeks during the course of healing

	Control	Collagenase	Excision of necroses
	cm^2	cm^2	cm^2
Week 1.	+23,50	+19,89	— 7,13
Week 2.	—14,55	—17,06	—42,94
Week 3.	—20,09	—25,15	—18,82
Week 4.	—20,22	—21,62	—17,78

where part of the injured dermis remained on the base. Gratulation tissue formed in the second week, i.e. with a one-week delay as compared with the excised areas. The spontaneous epithelization proceeded to the centre without marked scar contraction and formation of epidermal ridges (Tab. 1—3, diagram 1—4).

DISCUSSION

As it appears from the results, Debridin does have a selective necrolytic effect upon burned skin and after a single 24 hrs. application, complete lysis of the homogenized corium layer occurs in the experimental animals. In the course of healing, the epithelization is more rapid than in the controls, but the reparative process proceeds with a certain delay when compared with the defects after excision of necroses. The planimetrical measurements disclose that in the controls and also in the burns treated with Debridin, the area increases in 1st week. The authors believe that it is caused partly by deeper penetration of the changes by dehydration and partly by the formation of oedema and

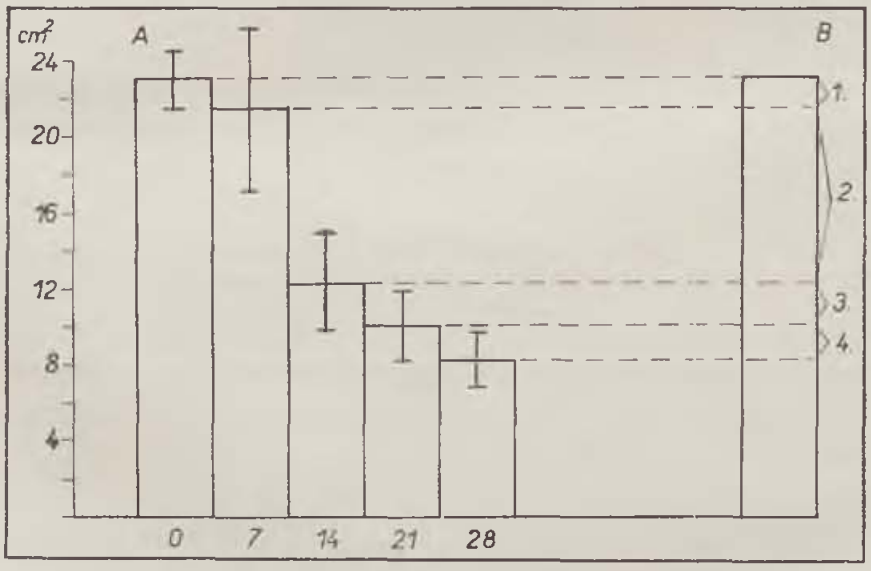

Diagram 3. A = Area of scars after excision of necroses day 0.—28., B = Extent of scar contraction in week 1.—4.

secondary distension of the tissues which contracted immediately after the burning due to rapid dehydration (Moserová and Běhounková, 1975). This phenomenon was not observed in excised zones where, on the contrary, the defect becomes gradually smaller as granulation tissue forms and matures.

Tab. 1—3 and diagrams 1—3, demonstrate the course of retraction and the values in the individual groups of burns at the respective time intervals. As can be seen on Tab. 1 and 2, marked individual differences can be observed during the course of healing in individual animals (this fact is reflected in the values of standard deviation).

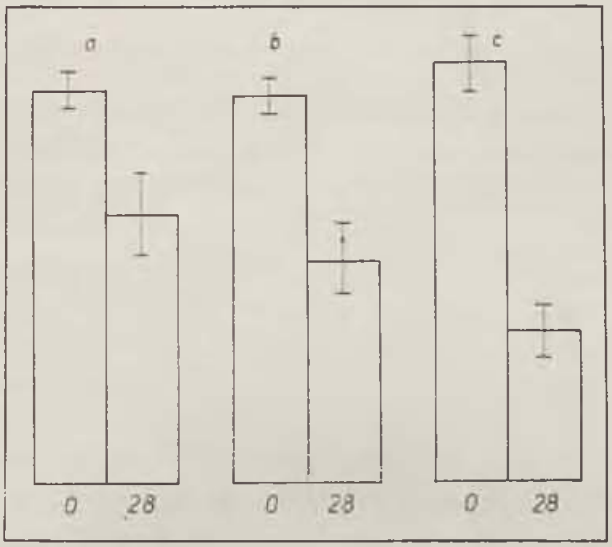

Diagram 4. Area of scars on day 0. and 28. — a) Controls, b) Collagenase, c) Excision of necroses

Diagram 4 demonstrates the difference in the size of the burns on day 0 and 28. It appears from the diagram that there occurs a considerably more marked scar contraction in the excised burns than in the burns treated with Debridin and the controls healing spontaneously.

According to the experimental results, Debridin can be recommended for clinical application because it removes necrotic tissue effectively without affecting live tissue and the course of the reparative process after enzymatic necrolysis is favourable.

SUMMARY

The authors studied in the submitted report the effectiveness of the preparation Debridin containing the enzyme collagenase and an admixture of unspecific proteases, in the debridement of burn necroses in laboratory pigs. The course of healing of the burns was furthermore studied after enzymatic necrolysis, after necrectomy and in control burns left to spontaneous healing. The results disclosed that Debridin possesses a selective lytical effect upon burn necrosis without affecting healthy tissue. It was ascertained that the course of

the reparative process in burns treated with Debridin is more favourable than in the controls, there being, however, a certain delay in comparison with excised defects. It was ascertained on the other hand by planimetrical measurements of the scar areas and by histologic examination that the most distinct scar retraction occurs after excision. In control burns the retraction amounted to 32,69 %, in burns treated with Debridin 42,42 % and in burns after excision of necroses 64,61 %.

RÉSUMÉ

Nécrolyse enzymatique expérimentale et la nécrotomie dans les brûlures

J. Moserová, E. Běhounková, Z. Koníčková

Dans le travail présenté les auteurs ont suivi l'efficacité de la préparation Debridin contenant l'enzyme — la collagénase avec l'addition des protéases non spécifiques pendant la séparation des nécroses de brûlures chez les cochons de laboratoire. Puis, on a suivi le cours de la guérison des surfaces après la nécrolyse enzymatique, après la nécrotomie et même sur les surfaces de contrôle étant laissées guérir spontanément. Les résultats ont démontré que Debridin avait un effect sélectif dissolvant dans la nécrose de brûlure et qu'il n'affectait pas le tissu intact. On a constaté que le processus réparatif se déroulait plus favorablement sur les surfaces où on avait appliqué Debridin que chez les contrôles, mais avec un certain rétard en comparaison des défauts existant après les cisions des nécroses. Au contraire, on a constaté en mésurant le tissu cicatrisé et faisant des examination histologiques que c'était après l'excision où apparaissait la rétraction cicatrisée la plus expressive. Sur les surfaces de contrôle la rétraction était de 32,69 %, chez les surfaces où on a appliqué Debridin 42,42 %, sur les surfaces après une excision des nécroses 64,61 %.

ZUSAMMENFASSUNG

Experimentelle enzymatische Nekrolyse und Nekrektomie bei Verbrennungen

J. Moserová, E. Běhounková, Z. Koníčková

In der vorliegenden Arbeit untersuchten die Autoren die Wirkung des Präparates Debridin, das das Enzym Kollagenase in Kombination mit unspezifischen Proteasen enthält, bei der Absonderung von Verbrennungsnekrosen bei Laborschweinen. Ferner untersuchte man den Verlauf der Heilung der Flächen nach enzymatischer Nekrolyse und nach Nekrektomie sowie bei Kontrollflächen, die einer spontanen Heilung überlassen wurden. Die Ergebnisse haben gezeigt, dass Debridin auf die Verbrenungsnekrose eine selektive lytische Wirkung ausübt und das ungeschädigte Gewebe nicht angreift. Es wurde festgestellt, dass der Wiederherstellungsprozess bei den mit Debridin behandelten Flächen günstiger verläuft, als bei den Kontrollen, jedoch mit einer bestimmten Verzögerung gegenüber Defekten nach Nekroseexzision. Andererseits wurde durch planimetrische Messung der Narben und durch histologische Untersuchung festgestellt, dass es nach der Exzision zu der markantesten Narbenretraktion kommt. Bei Kontrollflächen betrug die Retraktion 32,69 %, bei mit Debridin behandelten Flächen 42,42 %, und bei Flächen nach Nekroseexzision 64,61 %.

RESUMEN

Necrolisis enzimatica experimental y necrectomia en quemaduras

J. Moserová, E. Běhounková, Z. Koníčková

En la obra presentada los autores observaban la eficacia del preparado Debridin, que contiene la enzima colagenasa com adición de proteasis no especificadas, en separar las necrosis de las quemaduras en los cerdos de laboratorio. Además fue observado el transcurso de la curación de las superficies después de necrolisis enzimáticas y después de necrectomia y en las superficies de control que fueron dejadas para cicatrizarse espontáneamente. Los resultados mostraron que Debridin temía efecto disolvente selectivo sobre la necrosis y no atacaba el tepido intacto. Fue probado que el proceso reparativo en las superficies tratades con Debridin transcuría más favorablemente que el de control, pero con cierto atraso en comparación con los defectos restantes después de las excisiones de las necrosis. Al contrario fue probado por mediciones planimétricas del tejido con cicatrices y por examinación histológica que después de una excisión se produce retracción de cicatrices lo más expresadamente. La retracción en las superficies de control fue de 32,69 %, en las superficies tratadas con Debridin 42,42 %, y en las superficies después de la excición 64,61 %.

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CYTOMEGALOVIRUS INFECTION IN SEVERELY BURNED PATIENTS

J. SEEMAN, R. KONIGOVÁ

INTRODUCTION

The cytomegalovirus infection (CMV) has a clinical and a latent form. The source of the infection — the cytomegalovirus — belongs into the group of herpetic viruses together with the herpes virus of type 1 and 2, the varicella-zoster virus and the Epstein-Barr virus. The CMV is strictly type specific, so that man can not be infected by the animal types and vice versa. The cytomegalovirus can be only cultivated on tissue cultures of the fibroblast type, obtained from the homologue kind. The mostly used are tissue cultures, prepared from diploid cells of human embryonic lungs.

The clinical forms of the cytomegalic inclusion disease (CID) occur under a varied spectre of symptoms such as hepatosplenomegaly, icterus, atypical subacute hepatitis, pneumonia, encephalitis, CMV mononucleosis, febrile conditions, CNS disorders, congenital developmental defects a.o., as described for ex. by Hanshaw (1), Carlström and Jalling (2), Lasovská and Seeman (3), Mc Allister (5), Krech and Jung (6).

Congenital infections are transmitted from the mother upon the foetus, causing its damage. The gravidity terminates in abortion or premature birth. The infants are often afflicted with microcephaly with chorioretinitis, hepatosplenomegaly, heavy icterus, malformations, damage of the CNS and heavier cases terminate in death — Hanshaw (1), Benyesh-Melnick (4).

A large spreading of the cytomegalovirus infection in the population tends to be proved by the results of the seroepidemiological studies, which point out the antibody response in man, with CMV infection — Stern and Elek (5), Trlifajová and Seeman (6).

In consideration of the CMV tendency to persist in human organism and to form chronic infections, the subclinical and asymptomatic forms of infection are the most frequent in adults.

Clinical manifestation of the infection occurs in adults especially in stress conditions of organism. It occurs in persons with altered immune defence at immunosuppressive therapy, in recipients of renal allografts — Andersen (7) and in patients with repeated transfusions as described by Prince (8). A manifest form of CMV infection occurs also in patients after intrathoracial operations, especially after cardiac operations. In these cases there occurs acute, clinically significant cytomegalovirus infection, often resulting in death — Rifkind (9).

Irrespective whether it is a primary infection which manifests more easily in weakened organism than in the healthy individual, or a reactivation of a latent infection, the patient is always seriously threatened.

Tab. 1. Number of patients treated in the Intensive Care Ward (september 1973—december 1974)

Number of all patients	160
Number of patients with cytomegalovirus antibodies	54
Number of patients with the 4-or greater increase of cytomegalovirus antibodies	15
Isolations of cytomegalovirus from urine: tested	10
positive	3

Severely burned persons can be undoubtedly classified amongst patients with enormously loaded organism. As far as the authors have been able to ascertain in literature, the incidence and importance of the cytomegalovirus infection in burn diseases has not been described so far in the ČSSR nor anywhere in the world. This is the reason why they made a virologic-clinical study in a group or extensively burned persons.

MATERIAL AND METHODS

The studies were carried out in a group of heavily burned persons from the Ward of Intensive Care at the Burns Unit, Department of Plastic Surgery, Medical Faculty of Hygiene in Prague.

Serious cases of burned persons, which corresponded to the following criteria were selected for the group:

1. Type of burn: only affliction of III. degree at an extent exceeding 20 % (These conditions are always connected with heavy burn shock.)

2. The necessity of repeated grafting (homografts, heterografts which precede autograft).

3. The necessity of repeated transfusion of whole blood.

4. The necessity of administering so called high antibiotics in megadoses and in atypical combinations.

5. Occasional administration of corticosteroids in antiinflammatory doses

Each of these criteria would justify classification in the group, but the majority of studied patients corresponded to all the criteria mentioned.

Tab. 2. Complement-fixing reaction with cytomegalovirus antigen in severe burns 1973—1974. Number of patients: 74

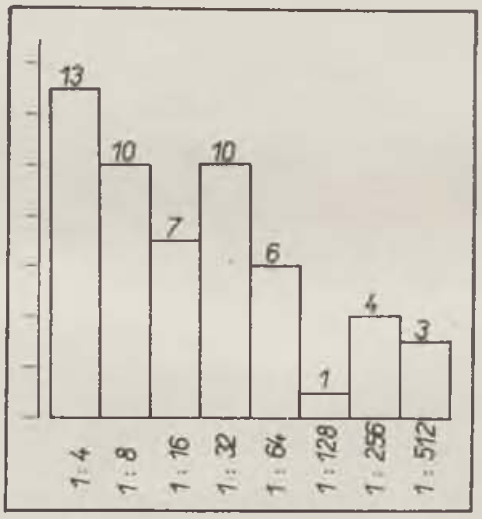
Negative		Anti-body titer	Positive				
number	%		number	%			
20	27	<1 : 4	54	73			
Antibody Titer	1 : 4	1 : 8	1 : 16	1 : 32	1 : 64	1 : 128	1 : 256	1 : 512
Number of patients	13	10	7	10	6	1	4	3

All the patients were studied in detail clinically and at the laboratory. Biochemical, hematologic and bacteriologic examinations were continously carried out in the respective Institutes and Departments.

The virologic examination for detection of the cytomegalovirus infection was carried out serologically and also by cultivation on tissue cultures.

Blood samples were collected from all patients at different intervals and immediately sent for serologic examination.

The method applied was the complement-fixing test (CFT) with the cytomegalovirus antigen, prepared at our laboratory from strain AD 169 by means of the technique described by Seeman (10). The CFT microtechnique was applied. Prior to the experiment, each serum was inactived for 30 min. at 56 °C. All



Tab. 3

dilutions were carried out with veronal buffer pH 7,2, starting with dilution 1 : 4. Two units of complement were used in the experiment and the incubation took place in a refrigerator for 16 hours at 4 °C.

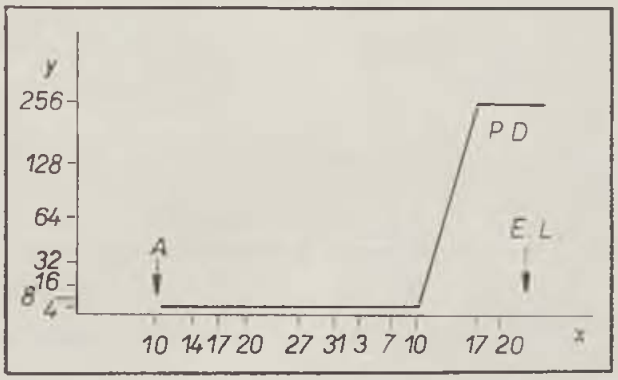
The results were only evaluated in sera which possessed no anticomplementary properties and which did not react positively with control antigen prepared from non-infected tissue cultures.

The CMV isolation attempts were performed from the urine of patients, collected under sterile conditions by catheterization into the transport medium (Eagl's medium with streptomycin 100 γ/ml, aureomycoin 50 γ/ml and fungisone 20 γ/ml). The transport medium proved satisfactory because it decreases the hazards of urine contamination and prolongs the otherwise very short period of CMV viability, during transport.

The material was immediately sent for virologic examination. The urine was only collected from patients without bacteriuria.

The isolation experiments were carried out on tissue cultures prepared from the diploid line of human embryonic lung cells (HEL). Eagle's medium with 5 % calf serum was used.

Tab. 4. Complement-fixing test with cytomegalovirus antigen (AD 169)



J. H., age 47, 50 p. c., III-- degree

Bilirubinemia	0,9	1,5	2	
SGPT	8	41	50	
SGOT	45	52	97	
AU/SH antigen		negative		
N-urea/creatinin	34/1,2	67/4	118/9,7	127/11

A = accident, P. D. = peritoneal dialysis, E. L. = exitus letalis

X: date-months May, June, Y: Antibody titers

The inoculated tissue cultures were regularly examined for possible formation of the cytopathic effect (CPE) characteristic for CMV. The cultures were studied for a period of 4 weeks before they were declared to be negative.

RESULTS (Tab. 1)

Of 160 treated burned persons, 74 persons were selected for the studied group according to the above mentioned criteria and altogether 410 serologic examinations were performed.

The levels of cytomegalovirus antibodies were determined in all patients. In the majority of cases examinations were repeated in order to determine the dynamics of the antibody formation. A significant increase of the antibody titre, i.e. a minimally fourfold increase of the titre (seroconversion) was considered to be positive proof.

Of the group of 74 burned persons, 54 (73 %) had cytomegalovirus antibodies and 20 persons (27 %) reacted negatively. The results are demonstrated on Tab. 1.

Tab. 5. Complement-fixing test with cytomegalovirus antigen (AD 169)

I. M., age 39 years, 60 p. c., III-- degree

Bilirubinemia	0,5	0,9	1,0	0,8	3,8	11,5	1,5	1,1
SGPT	77,2	13,2	20,9	49,0	92,0	79,5	11,0	5.3
SGOT	93,7	18,0	58,0	19,2	58,0	<100	12,0	7,5
Au/SH antigen			+	++	+			

Y: Antibody titers, X: date-months January, February, March, April, May, June, July (urine culture-CMV positive)

The distribution of the CMV levels of antibodies in positively reacting patients is demonstrated on the diagram, Tab. 2 and 3.

Most patients had lower and medium CMV titres of antibodies. In the higher titres of antibodies (1 : 128 and more) all the cases took a serious course and special attention was paid to them.

We have differentiated several types of cytomegalovirus affliction in heavily burned patients:

a) from the aspect of the time of CMV incidence of antibodies

b) from the aspect of the clinical picture and course of the disease.

ad a):

In 50 burned patients the CMV antibodies were ascertained soon after the accident.

4 burned patients were negative in the course of the burns disease.

A sudden, significant — more than fourfold — increase of CMV antibodies appeared in them closely before death.

ad b):

3 patients with high titres of antibodies (1 : 256) died of pneumonia, which often manifest a disseminated form of CMV infection.

In a burned patients the CMV infection only manifested by high titres of of antibodies (1 : 512). The clinical symptoms were difficult to distinguish from the complicated course of the burns disease. In 7 burned patients the CMV infection occured under the picture of hepatitis (titres of antibodies 1 : 512). Although the biochemical changes were significant and the clinical condition serious, the development of this complication was, in contrast to serum hepatitis, mostly benign.

A further paper will contain case reports with a detailed analysis of the clinical symptoms. Two cases of patients are reported here:

From group a):

A man aged 47, 50 percent BSA, deep second and third degree. No serologic response to CMV infection was ascertained during the entire period of treatment. Septic condition occured during hospitalization.

5 days before death there was a sudden increase of antibodies (Titre 1 : 256). The post mortem finding disclosed bilateral pneumonia besides hepatodystrophy and purulent nefritis which by themselves would be already the cause of a bad prognosis. The CMV infection participated in the unfavourable course. (Tab. 4.)

From group b):

A man aged 39, 60 percent BSA, deep second and third degree, cytomegalovirus antibodies were ascertained immediately after the accident (1 : 8). 5 weeks after the accident there was an increase (1 : 16) along with the increase of transaminases. 77 days after the accident there occurred a steep increase of the titre of CMV antibodies (1 : 512) at hyperpyrexia and icterus. The transaminases reached values above 100 mU/ml, bilirubinaemia above 11 mg%, AU/SH antigen was positive. The course of this complication was favourable, however: the CMV antibodies decreased to 1 : 64 at positive viruria which is still persisting. The liver function became quite normal (Tab. 5).

DISCUSSION

Manifestations of cytomegalovirus infection show considerably differing clinical pictures: from lighter manifestations up to forms terminating in death. The intensity and type clinical symptoms depends upon the time when the infection occurred (prenatal, postnatal), upon its intensity and immunologic condition of the afflicted organism and also its general condition.

Starr (1) points out that CMV infection can be proved in 2 % of all infants, although it is inapparent and the number of congenital heavy forms, small.

Importance has been lately attributed to the previously mentioned light perinatal infections, which the child overcomes, but late sequels occur in the years to follow, such as psychomotoric retardation and disorders of the central nervous system, hearing damage, neurologic dysfunctions a. o. Hanshaw (1).

It has come gradually to light that CMV induces various atypical and subclinical forms much more frequently than classical forms. They remain undetected without virologic diagnostics or they occur under another wrong diagnosis. [Štafová, Seeman (12).]

This applies also for the CMV infection in persons with stressed organism, e.g. by immunosuppressive therapy etc. as described in the introduction [Andersen-Spencer (7), Rifkind (9)]. In these cases there occurs more easily a clinical manifestation of an otherwise latent infection. Heavily burned persons in which besides significant hypoxia in the period of shock there also occurs weakening or even exhaustion of organism in the phase of the burns disease, can be also counted in this group. The cytomegalovirus which is latently present in organism, may activate under these conditions and induce a heavy clinical infection, as it is the case with virus Herpes simplex, which manifests in weakened organism.

The authors finding of a significant increase of the level of cytomegalovirus antibodies eventually with CMV isolation accompanied by a change of the clinical picture, tends to prove the activation of the CMV infection in seriously burned persons.

The disease occurred under the clinical picture of an acquired form of CMV infection and manifested in disseminated and also in organic form (e.g. CMV hepatitis). Subacute hepatitis is mentioned as one of the important manifestations of cytomegalovirus infection.

Neiman and Wasserman (14) ascertained a similar activation of CMV infection in patients with organism weakened by bone marrow graft, which — for therapeutic reasons — was carried out in aplastic anemia or in acute leucemia. In 31 % of these patients CMV infection was serologically ascertained. It is remarkable that in the absolute majority of grafted persons CMV could not be proved in the urine, although is was a disseminated infection. Of 50 grafted patients, 20 persons contracted interstitial pneumonia as a complication, which was of CMV origin in nine cases.

It is not possible to ascertain retrospectively in the authors group, whether it has been a reactivation of a latent infection provoced by the stress of organism with an extensive burn or whether it was a primary infection which has in thus weakened organism, suitable conditions for clinical manifestation. The primary infection originates in the contact with objects infected by the secretions of the patient, but it also forms iatrogenically e.g. by repeated transfusions. Analysis of the relation of the primary infection to the reactivation of the latent infection establishes an epidemiologic problem and would exceed the scope of this report.

It remains a fact that in a number of severly burned patients, the cytomegalovirus infection, potentiated by the weakened condition of the patient, manifested in clinical forms of CID. The infection worsened the general condition of the burned patients in which surgery had been already successfull, it prolonged their reconvalescence and partcipated in several critical cases in the lethal termination.

The possibility of cytomegalovirus infection should be remembered in the differential diagnosis of such clinical conditions. The virologic examination will confirm the diagnosis. H. S.

Acknowledgement: The authors should like to thank the Institute of Medical Microbiology, the Institute of Biochemistry and the Institute of Haematology, Medical Faculty of Hygiene in Prague 10 for the cooperation in the performance of laboratory examinations.

SUMMARY

The incidence and importance of cytomegalovirus (CMV) infection in severely burned patients has been described. A group of 74 severely burned patients of the ward for intensive care at the Burns Unit, was studied.

All the patients were clinically studied in detail. 410 serologic examinations by the complement-fixing test with CMV antigen (AD 169) were performed and in positive cases isolation was attempted on tissue cultures.

In 54 burned patients (73 %) CMV antibodies were ascertained. In a number of patients in which the clinical condition worsened critically, a significant rise of the antibody level was proved, demonstrating a clinical manifestation of the cytomegalovirus infection.

The authors point out the importance of CMV infection which worsened the clinical course in a number of seriously burned patients. In some cases it participated in the lethal termination.

They recommend in severely burned patients in which the clinical picture worsened, to remember differential diagnostics for cytomegalovirus infection.

RÉSUMÉ

Infection cytomegalovirale chez les grièvement brûlés

J. Seeman, R. Königová

Le travail décrit l'existence et l'importance de l'infection cytomegalovirale (CMV) chez les grièvement brûlés. On a étudié un ensemble de 74 grièvement brûlés qui ont été soignés au service des soins intensifs du départment des brûlures.

Tous les malades ont été suivis en détail par les voies cliniques. On a fait 410 examens sérologiques à l'aide de réaction complementofixative avec l'antigène CMV. Dans les cas positifs on a commencé une expérience d'isolation sur les cultures de tissus.

Les antigènes CMV ont été constatés chez 54 brûlés (73 %). Chez beaucoup de malades dont l'état clinique s'aggravait d'une manière critique, on a démontré une élévation significative du niveau des antigènes prouvant une manifestation clinique de l'infection CMV.

Nos constatations montrent que l'importance de l'infection qui a aggravé le cours clinique chez beaucoup de grièvement brûlés est evidente. Il y avait quelques cas où elle a causé la fin fatale.

Chez les grièvement brûlés dont l'image clinique s'est aggravée les auteurs recommandent de penser à l'infection par un cytomegalovirus dans le diagnostic différencial.

ZUSAMMENFASSUNG

Cytomegalovirusinfektion bei Schwerverbrannten

J. Seeman, R. Königová

Der Autor berichtet über das Vorkommen und die Bedeutung der Cytomegalovirusinfektion bei Schwerverbrannten. Es wurde eine Aufstellung von 74 Schwerverbrannten aus der Einheit der Intensivpflege der Abteilung für Verbrennungen studiert.

Alle Kranke wurden klinisch auf das genaueste überwacht. Es wurden 410 serologische Untersuchungen durch die Komplementbindungsreaktion mit dem CMV-Antigen durchgeführt und in positiven Fällen wurde ein Isolationsversuch an Gewebkulturen angelegt.

Bei 54 Verbannten (73 %) wurden CMV-Antikörper gefunden. Bei einer Reihe von Kranken, bei denen eine kritische Verschlimmerung des klinischen Zustandes eingetreten ist, wurde ein signifikanter Anstieg des Antikörperspiegels festgestellt, der auf die klinische Manifestation der Cytomegalovirusinfektion hinweist.

Aus unseren Befunden ersieht man deutlich die Bedeutung der Cytomegalovirusinfektion, die bei einer Reihe von Kranken den klinischen Verlauf verschlimmert hat. In einigen Fällen beteiligte sie sich an dem lethalen Ausgang.

Die Autoren empfehlen bei Kranken, bei denen eine Verschlimmerung des klinischen Bildes eingetreten ist, differential-diagnostisch an eine Cytomegalovirusinfektion zu denken.

RESUMEN

Infección citomegaloviral en personas gravemente quemadas

J. Seeman, R. Königová

Fue descrita presencia e importancia de la infección citomegaloviral (CMV) en personas gravemente quemadas. Fue estudiado un conjunto de 74 personas gravamente quemadas al servicio de curación intensiva del departamenta de quemaduras.

En todos los pacientes fueron observados síntomas clínicos en todos detalles. Fueron hechos 410 reconocimientos serológicos con ayuda de reacción complementofijativa con el antígeno CMV y en casos positivos fue comenzado un experimento aislativo en culturas de tejidos.

En 54 quemados (73 %) fueron comprobados los antígenos CMV. En muchos de los enfermos, en los cuales apareció empeoramiento crítico del estado clínico, fue hallada elevación significante del nivel de los antígenos que demuestra manifestación clínica de una infección citomegaloviral.

Nuestros hallazgos demuestran que la importancia de la infección CMV que empeoró el transcurso clínico en muchos de los gravemente quemados es evidente. En algunos casos tenía parte en el fin fatal.

Los autores recomiendan pensar en la infección citomegaloviral en los gravemente quemados en los cuales apareció empeoramiento del cuardo clínico.

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THE STANDARD NON-CONTACT BURN
Immediate contraction of burned skin

J. MOSEROVÁ, E. BĚHOUNKOVÁ

The authors induced a standard non-contact burn in male rats and laboratory pigs. In elaborating the method of an experimental burn the authors aimed to exclude or limit possible inaccuracies which often distort results in experimental trauma. Therefore a macroscopical and microscopical study of the burns was carried out as well as a study of the dynamics of subcutaneous temperatures during the burning and immediately on termination of the exposure to the source (Prouza et al., 1972; Moserová, Prouza 1973). Furthermore the authors aimed to ascertain in both types of experimental animals the immediate contraction of burned skin, which occurs during the exposure to the thermal source and might be of considerable importance in some studies.

METHODS

The source of thermal energy

The experimental burn was produced by an apparatus which enables non-contact transfer of heat from the source to the object. The thermal source is a water plasmatron, in which electric energy is transformed into thermal energy and low-temperature plasma originates. The plasma beam is projected on the front of a graphite electrode (Ø 50 mm), which becomes the actual source of thermal radiation. The temperature of the central part of the plasma beam amounts to (29,000 ± 1,000) ^{0}C. The temperature of the front of the graphite electrode after a 30 second exposure to the thermal radiation is (2,850 ± 300) ^{0}C. The mean output of the apparatus at the current input of (300—340)A and at the voltage of (200—22)V amounts to (70 ± 10)kW. The thermal energy can be transferred from the source to the object by two methods:

— by means of an optical system, using two parabolic mirrors (Ø 2000 m) at the focal distance of (848 ± 2 mm)

— by direct transfer of thermal energy

The time exposure was regulated by a circular shutter placed 100 mm before the front of the graphite electrode. The shutter was operated by an exposure chronometer (with an error of ± 0,3 sec.).

Using the indirect transfer of thermal energy, the graphite electrode was placed into focal distance of one mirror, the experimental object was placed at the focal distance of the other mirror. It was possible to expose an area of up to 20 cm^2, the density of the thermal flux being (22,5 ± 0,85) $cal.cm^{-2}sec^{-1}$. With the use of direct transfer of thermal energy a larger area may be exposed; at a distance of 120 mm from the graphite electrode, the mean density of the thermal flux is (9,80 ± 1,15) $cal.cm^{-2}.sec^{-1}$ in a circular area of 10 cm diameter.

The burn infliction and the determination of the immediate skin contraction in rats:

Male rats, Wistar (Mezno) strain, weight 200—250 g, were used. Prior to exposure to the source, the animals were fastened under light ether anaesthesia

Fig. 1. The rat. Excision taken immediately after the burn infliction. The transition between the central and paracentral zone. Homogenization of superficial layers of corium, in deeper layers "pseudoelastic" degeneration of the connective tissue. Hair follicles completely destroyed. Skin muscle staining more intense. HES, 50× enlarged

to special frames and shaved. The back area of the animals was exposed to the thermal flux at 1″ exposure, using indirect transfer of thermal energy.

In a group of 15 experimental rats, each animal was marked, prior to the burn, by auxiliary dots of dye. In the longitudinal axis of the back of the anaesthetized rats two marks were placed; one dot was placed 2 cm below the nape of the neck and the other dot in the pelvical region. The horizontal axis of the back was marked by two dots, bilaterally from the expected burn. The distance of the dots in the vertical and horizontal axis was measured. After the burn, the animals were sacrified using ether and the distance of the dots in each axis was measured again.

When comparing the results from the planimetrically measured areas in this first group of animals, it was found that the areas differed in size but did not, however, differ in shape. In order to verify the hypothesis that the shape is reproducible, the relation of the area in cm^2 to the length and width (to the

Fig. 2. The pig. Excision taken immediately after burn infliction. Thermally damaged skin, excision from the central area. Foamy structure of the corium papillary layer, homogenization of the corium reticular layer. HES, 50× enlarged

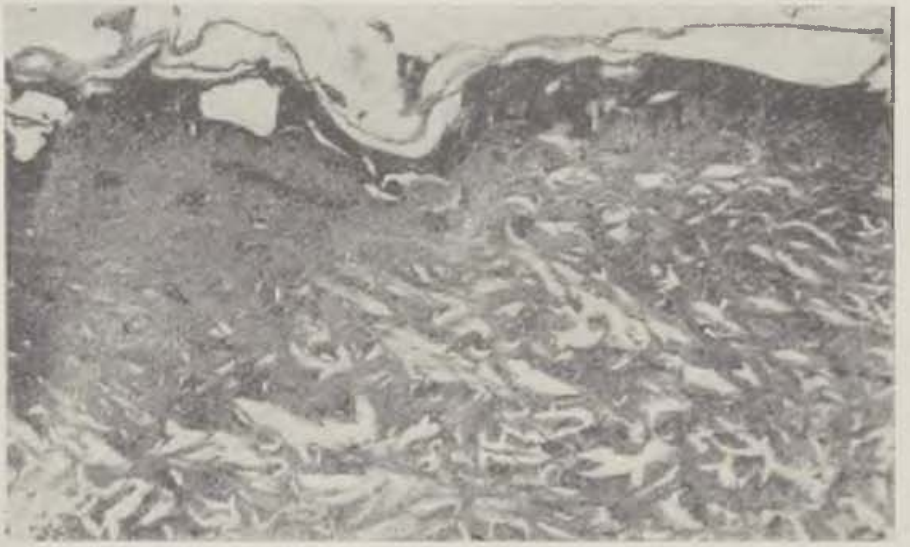

Fig. 2a. The pig. Excision taken immediately after burn infliction. Transition between central and paracentral zone. On the right the homogenization of the corium is less marked. Thermally damaged epidermis discernible. HES, 50× enlarged

product of length and width) was calculated in the 15 animals; the relation was found to be reproducible. It was assumed therefore that the actual area of skin upon which the thermal flux was directed, would be of similar shape and would therefore have a corresponding relation to the product of length and width (Tab. 1).

The contraction in the length and width of the area (the difference of the distance of the auxiliary spots prior to the burning and after the burning in each axis) was ascertained by measuring the distance of the auxiliary dots in each axis. Thus knowing the contraction of length and of width, the geometrical shape of the actual area could be presumed.

The actual area of the skin affected by the thermal flux, could be therefore calculated by means of the following formula:

$$s = \frac{(l' + cl)\ (w + cw).\ S'}{l'.\ w'}$$

The actual length of the burned area (1) equals the measured length of the contracted area (l') plus the contraction in the longitudinal axis (cl). The width of the burned zone (w) equals the measured width (w') plus the contraction of the width (cw). S' = the measured zone.

The burn infliction and the determination of the immediate skin contraction in laboratory pigs.

Laboratory pigs of both sexes, weight 25—30 kg, sexually mature, were used. Prior to exposure to the source the animals were brought into general thiopental anaesthesia and fastened to a suspended frame; 2—3 zones on each side of the animal were exposed to the thermal source for 10", using the direct transfer of thermal energy. The thermal radiation was screened by an asbestos shutter with an opening of 6 cm^2 in diametr.

Prior to the burn, circles of 54,33 ± 4,73 cm^2 were drawn by gentian violet in the respective location on both sides of the animals, the area of the circles being larger than the expected burn. The burn was then located into the centre of the drawn circle. The circumference of the circle was traced on transparent foil prior to the burn and a second tracing was made within five minutes after the burn; both areas were then determined planimetrically. The difference found in the size of the areas corresponds to the extent of instant contraction of the thermally damaged skin. The results were statistically evaluted.

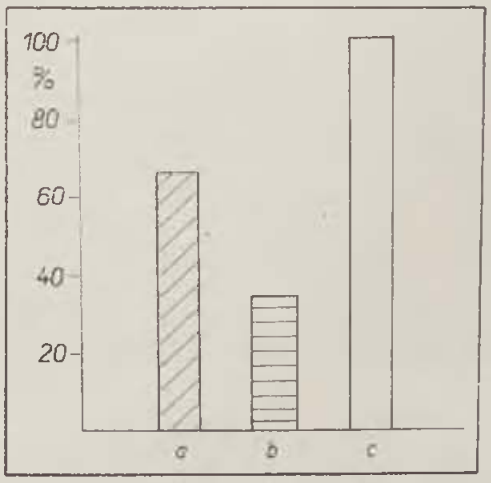

Diagram 1. Immediate skin contraction in rats in percent. a — Planimetrically determined area of burn, b — Immediate contraction, c — Actual extent of thermally injured skin

RESULTS

Determination of the size of the burned area.

Determination of the immediate contraction of the thermally damaged skin:

Results obtained in rats:

Tab. I. The relation of the area of the burn (S') to the product of length and width of the burn

Measured area S'	Product l.w	S' l.W
17,7	6,0.4,0	0,737
16,2	5,4.4,0	0,750
14,3	4,5.3,2	0,993
16,3	6,0.3,9	0,696
19,9	6,4.4,0	0,777
18,1	6,4.4,0	0,707
14,8	5,4.3,8	0,721
14,9	5,8.3,6	0,713
15,0	4,8.4,2	0,744
15,1	6,0.3,5	0,719
15,1	3.8.5,3	0,749
13,8	5,1.4,0	0,676
14,8	5,6.3,9	0,677
14,4	5,1.3,9	0,724
15,7	5,9.3,8	0,700
15,74 ± 1,66	5,58 ± 1,8.3,9 ± 0,3	0,738 ± 0,07

In 15 animals the relation of the product of length and width to the area of the burn is reproducible and may be expressed by the constant 0,738.

The size of the burned area could be therefore calculated using the following formula:

$$S = (l.w).k$$

Tab. 2. Extent of the actual loss of skin

	1'' exposure
contracted area (S)	15,8 ± 1,74 cm²
length of contracted area (')	5,58 ± 0,18 cm²
width of contracted area (w')	3,9 ± 0,31 cm
contraction of length (kl')	1,3 cm
contraction of width (kw')	0,9 cm
length of the resulting burn(l)	6,8 cm
width of the resulting burn(w)	4,8 cm
extent of the actual loss of skin	23,97 ± 3,63 cm²
immediate contraction of skin	8,17 cm²

The burned area represents 73,8 ± 0,7 % of a rectangle the area of which is the product of the length and width of the burn.

Contraction in % of values, calculated for the actual extent of thermal damage of skin

retraction of length	19,57 ± 11,15 %
retraction of width	20,80 ± 6,81 %
immediate contraction	34,08 %

The contraction at 1″ exposure amounts to 15,85 ± 1,74 cm^2.

Thus the area of the skin affected by the thermal flux, amounts to 23,97 ± 3,63 cm^2.

The results obtained in laboratory pigs:

The mean size of the burned areas determined planimetrically in 21 animals amounts to: 21,7 ± 2,02 cm^2

The area of the auxiliary circular drawing prior to the burn: 54,33 = 4,73 cm^2 (n = 57)

The area of the auxiliary circular drawing after the burn: 42,9 ± 6,05 cm^2 (n = 57)

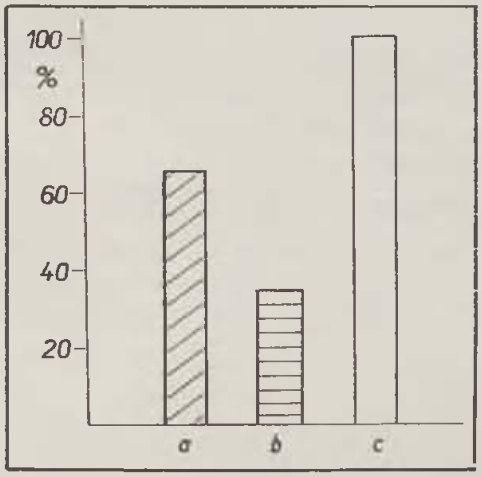

Diagram 2. Immediate skin contraction in pigs in percent. a — Planimetrically determined area of burn, b — Immediate contraction, c — Actual extent of thermally injured skin

Immediate contraction: 11,43 ± 3,41 cm^2

The area of the auxiliary circle before and after the burn differs highly at 1 % of statistic significance level.

The actual extent of the thermally damaged skin equals the sum of the planimetrically ascertained extent of burn and of the extent of immediate contraction: 21,7 ± 11,43 = 33,13 cm^2.

The thermally damaged skin retracts therefore during the exposure to the thermal flux by 34,5 %.

According to histologic findings in both types of animals the central area of thermally damaged skin represents a full thickness burn penetrating into the skin muscle. In the paracentral area and on the periphery, changes penetrate gradually into more superficially located tissues (Fig. 1, 2, 2a).

DISCUSSION

The method of immediate retraction determination of burned skin in the laboratory pig is more exact than the method applied in rats. In view of the relatively slight convexity of the animal's sides, it has been possible to draw auxiliary circles in the immediate vicinity of the expected burn and there was practically no danger that distension of the healthy skin in the vicinity of the burn might enlarge or decrease the contraction in any direction, thus causing distortion of the results.

It may be assumed that the values of immediate contraction ascertained in pig skin, will maximally approach the values in human skin, which especially on the back, the thorax and thighs in younger persons, is similarly mobile and elastic. In elder persons or after extensive loss of weight, human skin becomes of course looser and more pliant.

The values of immediate contraction, i.e. retraction of the dermis which occurs through dehydration and coagulation of proteins during the exposure to the thermal source equals practically the values ascertained in rats. Whereas the immediate contraction in rats occuring during the burning amounts to 34,08 %, in laboratory pigs it ammounts to 34,5 %. The percentage of immediate retraction found in both types of animals used in the above experiment, would be of importance chiefly in cases where more extensive burns would be studied and which would require calculation of the percentage of skin loss in relation to body surface. The determination of immediate burned skin retraction would also be of importance in studies concerned with scar contraction. H. S.

SUMMARY

A standard non-contact burn was induced in male rats and laboratory pigs. The immediate contraction of burned skin, which occurs chiefly due to dehydration and denaturation of collagen during the exposure to the thermal source was determined in both types of animals. The authors based the calculations of the contraction of the thermally damaged skin in rats on the assumption that the relation of the shape of the burned area to the length and width of the area is reproducible (the authors verified this assumption by calculations). By ascertaining the contraction in the longitudinal and horizontal axis it was then possible to determine the immediate contraction, which in a burn of 23,97 cm^2 size amounts to 8,17 cm^2, i. e. 34,08 %. In laboratory pigs circular burns were located into an auxiliary drawn circle which was measured before and after the burn. The decrease of the area of the circle corresponds to the retraction, which amounts to 11,43 cm^2, i.e. 34,5 % in pigs with burned areas of 33,13 cm^2. When

determining the percentage of body surface loss or when studying scar contraction in burns, it is necessary to calculate with immediate contraction, which occurs during a thermal trauma.

RÉSUMÉ

Brûlure standarde n'étant pas causéee de contact. Contraction instantanée de la peau brûlée

J. Moserová, E. Běhounková

On a développé une brûlure standarde n'étant pas causée de contact sur les mâles des rats et les cochons de laboratoire. Chez les deux espèces des animaux on a observé une retraction instantanée de la peau brûlée laquelle est causée surtout par la déhydratation et dénaturation du collagène au cours de l'action de la source de chaleur. Examinant la contraction de la peau modifiée par l'action thermique chez les rats les auteurs ont supposé que le rapport entre la forme de la surface brûlée et sa longueur et largeur était constant (cette prémisse a été vérifiée par des calculs). Après avoir constaté la contraction dans l'axe longitudinal et transversal on a pu observé la rétraction de superficie qui fait, dans une surface de 23,97 cm^2, 8,17 cm^2 ce qui présente 34,08 %. Chez les cochons de laboratoire, les brûlures circulaires ont été situées dans un dessin auxiliaire qui était mesuré avant et après avoir été brûlé. La surface réduite du cercle répond à la rétraction qui, chez les cochons ayant les surfaces brûlées de 33,13 cm^2, fait 11,43 cm^2, c'est-à-dire 34,5 %. En déterminant le pourcentage de l'atteinte de la surface totale où en constatant la rétraction cicatrisée dans les brûlures il faut tenir compte de la rétraction instantanée qui se traduit au cours du trauma thermique.

ZUSAMMENFASSUNG

Kontaktlose Standardverbrennung. Unmittelbare Kontraktion der verbrannten Haut

J. Moserová, E. Běhounková

Es wurde eine kontaktlose Standardverbrennung bei Rattenmännchen und Laborschweinen erarbeitet. Bei beiden Tiergattungen wurde die unmittelbare Retraktion der verbrannten Haut ermittelt, zu der es hauptsächlich durch Dehydrierung und Denaturation des Kollagens während der Wirkung der Wärmequelle kommt. Bei der Messung der Kontraktion der thermisch veränderten Haut bei Ratten gingen die Autoren aus der Voraussetzung aus, dass die Beziehung zwischen der Form der verbrannten Fläche und der Länge und Breite der Fläche konstant ist (diese Voraussetzung überprüften die Autoren durch Berechnungen). Durch die Ermittlung der Kontraktion in der Längs- und Querachse wurde es dann möglich, die Flächenretraktion festzustellen, die bei einer 23,97 cm^2 grossen Fläche 8,17 cm^2 beträgt, d. h. 34,05 %. Bei Laborschweinen wurden die ringformigen Verbrennungen in eine Hilfszeichnung lokalisiert, die vor und nach der Abbrennung gemessen wurde. Die Verringerung der Ringfläche entspricht der Retraktion, die bei den Schweinen bei einer 33,13 cm^2 grossen Verbrennungsfläche 11,43 cm^2 beträgt, also 34,5 %. Bei der Ermittlung des Prozentsatzes der Schädigung der Gesamtoberfläche oder bei der Ermittlung der Narbenretraktion muss mit der unmittelbaren Retraktion gerechnet werden, die während des thermischen Trauma eintritt.

RESUMEN

Quemaduras standard no causadas por contacto. Contracción inmediata de la piel quemada

J. Moserová, E. Běhounková

Fue desarrollada quemadura standar no causada por contacto en machos de rata y en cerdos de laboratorio. En las dos especies fue observada retracción inmediata de la piel quemada que se produce sobre todo por dehidratación y denaturación del colágeno durante la acción de calor. Al examinar la contracción de la piel cambiada por acción térmica en las ratas los autores partieron de la hipótesis que la relación de la forma de la superficie quemada hacia la longitud y el ancho de la superficie era constante (esta hipótesis fue probada por calculación). Después de hallar la contracción en el eje longitudinal y transversal fue posible hallar la retracción de la superfice la que hace 8,17 cm^2 en la superficie de 23,97 cm^2, lo que es 34,03 %. En los cerdos de laboratorio las quemaduras circulares fueron localizadas en un diesño auxiliar que fue medido ante area of burn, b — Immediate contraction, c — Actual extent of thermally injured skin y después de abrasar los animales. La deminución de la superficie del círculo corresponde a la retracción que hace 11,43 cm^2 en los cerdos abrasados en las superficies de las quemaduras de 33,13 cm^2, lo que es 34,3 %. Al determinar el por ciento del perjuicio de la superficie entera o al hacer constar la retracción de las cicatrices en las quemaduras es necesario contar con retracción inmediata que se produce durante el trauma térmico.

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HYPOSPADIAS FROM THE GENETIC POINT OF VIEW

Annotation of experimental results

M. TOLAROVÁ

In large world statistical surveys, the inborn malformations of urogential tract are the second most frequent malformations, the inborn malformations, of extremities being on the first place. If the population incidence of the malformations is considered, the hypospadias are always found among the highest values (2, 3). The most frequent inborn defect of penis is phimosis and on the second place are hypospadias.

The incidence of hypospadias varies by different authors. In majority of reports the occurence 1 : 250—350 was described. In Czechoslovakia the incidence one affected with hypospadia to 300—350 live born boys was found (4). About one third of them should be repaired surgically. The hypospadia of another two thirds of them is rather light (glandular and some penile forms) and often are not registered, especially in clinical studies.

In the monograph "Hypospadia " in 1967, the sample of 500 individuals with hypospadia, operated in the Department of Plastic Surgery in Prague, was thoroughly examined (1). The sample of 325 pedigrees of probands mostly identical with patients in the clinical study, was analyzed in the Genetic laboratory of the Institute of Experimental Medicine (Czechoslovak Academy of Sciences) in Prague. The most common was penile hypospadia (213 probands affected, i.e. 65,5 %). The glandular of hypospadia occured in 25 (7,7 %) probands and penoscrotal and scrotal types occured in about 10 %.

Higher incidence of hypospadia in pedigrees with proband affected with the same malformation in comparison to normal population implies genetic mechanism in its etiology. Positive family history was found in 5,2 % pedigrees. Several types of transfer of the malformation were distinguished (see table). The transfer from father to son was most common (almost half of all cases, 48,5 %). In one

third (33,3 %) of all cases the mother was carrier (another man suffering from hypospadia was found in the mother's part of the pedigree). The frequency of affected sibs and relatives from the father's part of the pedigree were 9,1 % each. The interesting observation that hypospadias in some pedigrees with familiar occurence are transmitted by women was noticed already by Kučera (4).

In 338 suitable sibsibs 2,01 % of brothers of probands were also affected. This value is rather low. It is suggested that some individuals with light forms (or microforms) of hypospadias were not registered, as the data were obtained anamnestically. The sons of patients with hypospadia were affected in 13,3 %. These figures may serve as a basis for prediction of a genetic prognosis. The risk figure for the further brother equals 2,01 % and its value for proband's son is 13,3 %.

Tab. 1. The types of transfer of hypospadia in pedigrees with familiar occurrence

Type of transfer	N°	% of total number	Remarks
Father — son	16	48,5	once transfer grandfather — — father — son
Affected individual in mother's part of a pedigree	11	33,3	once twins as probands (taken as one into account)
Affected individual in father's part of a pedigree	3	9,2	once brother of the mother's father was affected
Sibs	3	9,1	once twins (taken as one into account)
	33	100,0	

Together with hypospadias the inborn malformations of extremities and facial clefts were observed.

In another part of our study 134 gravidities from which boys with hypospadia were born, were followed. It was striking that only one fourth of all pregnancies proceeded quite physiologically (21.6 %). The drugs were taken by 49,3 % mothers, artifically supported pregnancies occured in 9 % of cases. This means that the factors of the external environment are very important and our suggestion of the multifactorial background of the malformation corresponds to this fact.

The determination of the type of inheritance is practically significant. By inborn malformations which are determined multifactorally, it is possible to some (although limited) extent to apply methods of preconceptional and prenatal care before and during the risk pregnancies (6), together with genetic counselling. The aim is to prevent summation of external unfavourable factors with the genetic background.

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NEWS

Section of Plastic and Reconstructive Surgery of Society Polish Surgeons

List of the officers elected for the next two years during the Conference of Section in May 6—7, 1976 in Polanica Zdrój.

Assoc. Prof. Michael Krauss — president

Prof. Jan Golstein — vice-president

Prof. Tadeusz Orłowski — executive board member

Antoni Trybus MD — executive board member

Jerzy L. Potocki MD — secretary

The address of Secretary of Section Plastic and Reconstructive Surgery of Society Polish Surgeons is:

Clinic of General and Plastic Surgery Medical Academy 02-097 Warszawa, Banacha 1a.

The next Conference of Section will be held in 1978 in Warsaw.

Announcing the Fourteenth Congress of the Pan-Pacific Surgical Association April 1—7, 1978, Place Hilton Hawaiian Village Hotel Honolulu, Hawaii.

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For Details, Write: Cesar B. deJesus, M.D., Pan-Pacific Surgical Association, 236 Alexander Young Building, Honolulu, Hawaii 96813.

12th Course of Plastic Surgery for Postgraduates under the director. Dr. Lorenzo Mir y Mir which will take place in the Institute of the Policlinic of Barcelona from 24th to 29th of next January 1977.

The following topic will be discussed: "Angiology and Plastic Surgery" and "Plastics of the Profile" counting besides other important collaborations with that of prof. Fernando Martorell.

BOOK REVIEWS

P. P. Kovalenko: **Clinical Transplantology.** Rostovskoye knizhnoye izdatelstvo 1975. 367 pp., 140 figures, 9 tables, 1273 references to Russian, Soviet and other literature.

The book is a follow-up on the author's previous work "Basic Transplantology" and deals with the principal problems of the whole complex of clinical transplantology. The scope is evidence of the author's broad view of the field. Though a practising surgeon, the author displays an admirable command of all the problems which he explains in a clear and succint manner. This is a ripe fruit of 25 years of systematic experimental and clinical work summing up also the experience gathered by the author' numerous disciples, some of whom already successfully develop transplantology in their own right.

The book consits of three parts. The first includes general problems, i.e. chapters on the sources of grafts, tissue banks, transplant centres, transplantation immunology and immunosuppressive therapy. The second part carries descriptions of tissue transplantation: bones, cartilages, articulations, fasciae and tendons, transplant operations of the aorta, arteries and veins, pericardium, dura mater, bone marrow, skin, cornea with a number of demonstrations of the author's results. The final part contains chapters on the transplant operations of endocrine glands, organs of the lymphatic system and, eventually transplantation of vital organs.

The last two appendices are lists of subjects and names for easy orientation.

R. Klen

INSTRUCTIONS TO AUTHORS

Acta Chirurgiae Plasticae, the international journal of plastic surgery, is issued in two versions four times a year. One version is in English (or, as requested by the author, in French or German) and the other in Russian. The aim of the Journal is to make specialists acquainted with the work of authors of the socialist countries, but studies from other countries are also published and welcomed.

Articles are accepted for publication which deal with the problems of plastic surgery and allied branches (clinical, laboratory, experimental studies); they must be original and not yet been published elsewhere. Articles written by authors of the countries which are represented in the editorial board of the Journal, must be given their imprimatur by the respective members.

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The manuscript must be typewritten in two copies (1 original plus 1 carbon-copy), one page per sheet, with doublespacing between the lines, 60 types per line and no more than 30 lines per page. There must not be more than five corrections by handwriting per manuscript. The manuscript should not exceed eight pages and contain no more than 10—12 illustrations. The institute the author works at, its director, the title of the article and the full name of the author (or authors), must be stated on the first page. All other pages should be numbered consecutively. Every paper must have a summary which is then translated into French, German and Spanish. The summary, the references and the captions to the figures are to be written each on a separate page and added to both copies of the manuscript. The address of the main author should be given at the bottom of the references. The place where the tables are to be inserted, must be marked in ink on the margin of the text. Figures are to be separate and not affixed in the text. On the back of each figure, the author is requested to write his name, the short title of the paper and the consecutive number of the illustration which must tally with the number marked on the margin of the text. An arrow indicates the way the figure should be set. Photographs must be clear, with good contrast and of the same size (best 6×9 cm.). The tables and graphs should be lined with Indian ink on white paper so as to make them well readable.

References should be limited, quoted from internationally accessible sources and not older than five years. If the number of references exceed ten, the editors are entitled to pick their choice.

Quotations should be adjusted according to Czechoslovak norm as follows: Articles in journals — author's surname and initials, title of the article (may be left out), international abbreviation of the journal, volume, number, page and year of issue. For instance: Frazer F. C., Warburton D.: Plast. reconstr. Surg., 33, 4 : 395, 1964.
Books and monographs — name of author, title of publication, place of issue, publisher, year of issue and — maybe — also page from which quotations has been taken. For instance: Burian F.: Surgery of Cleft, Praha, SZdN 1954.

Manuscripts which do not comply with these requirements, cannot be published.

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